FLORIDA MEDICAL STUDENT RESEARCH JOURNAL

Volume 5, Issue 1
April 2020

ISSN: 2471-2930

For more information and to view our archives, please visit
FMSRJ.fiu.edu

This publication is made possible through the support and funding of

FIU Herbert Wertheim College of Medicine
Florida International University

Cover Art

"Rēnēs" by Helen Rynor
M.D. Candidate, Class of 2021
Florida International University

TABLE OF CONTENTS

Letter from the Editors **3**

Editorial Board **4**

Letter from the Dean **5**

Image Quiz **6**

A 72-year-old Woman with Abdominal Pain 6

A Young Girl with a Depigmented Annular Plaque 8

Original Research **10**

Level of Parental Education and Physical Activity in the Pediatric Epileptic Population 10

Case Reports **17**

Niraparib Therapy for Recurrent Ovarian Cancer Resulting in Lethal Hemorrhagic Mucositis, Black Esophagus, and Gelatinous Bone Marrow Transformation: A Case Report 17

Persistent Left Superior Vena Cava Draining into the Left Atrial Appendage with Associated Bicuspid Aortic Valve: A Case Report 23

Median Arcuate Ligament Syndrome - an Anomaly on the Differential for Chronic Abdominal Pain 27

Cavitary Pulmonary Nodules in Metastatic Cancer 30

Acute Onset of Psychosis and Personality Changes in a Woman with Newly-Identified Lung Malignancy and Urinary Tract Infection: A Case Report 35

A Case Report of Zoster Sine Herpete Presenting with Acute Onset Chest Pain 39

Vaping-Associated Lung Injury: A Confounded Diagnosis 42

Acute Flaccid Myelitis in a Colombian Boy with One Affected Relative: A Case Report 46

Nasal Reconstruction with the Rieger Flap in a Patient with Merkel Cell Carcinoma: A Case Report 50

Editorials **53**

Prenuptial Agreements: Just What the Doctor Ordered 53

Appendicitis in the Older Adult: A Diagnostic Conundrum and Serious Issue 55

Letters to the Editor **59**

Blan 59

Female Genital Mutilation: The Physician's Need for a Standardized Approach 61

Proceedings of the 2020 FIU HWCOM Research Symposium **63**

Thank You to Judges 64

Oral Abstracts 65

Poster Abstracts 73

LETTER FROM THE EDITORS

Dear Readers,

Thank you for choosing to read the *Florida Medical Student Research Journal* (FMSRJ)! We are honored to have had the privilege to work on the fifth volume with our amazing editorial staff. We received many submissions this year from researchers who are making a difference in their field. We are happy to be able to share their work with you.

Founded in 2015, the Florida Medical Student Research Journal is a student-run, peer-reviewed research journal. FMSRJ publishes work from healthcare and biomedical researchers, aimed at providing opportunities for medical students to learn and participate in the peer review process. We are one of eighteen international medical student journals publishing original research, case studies, reviews, and editorials with the help of dedicated faculty advisors.

This year, we have expanded our editorial board to include medical students from Florida International University and University of Miami. We were also pleased to launch formal author guidelines and an online submission platform this year. Of course, we continuously strive to improve the rigor of our peer review process, raise the standards of our published manuscripts, and position the journal for indexing in order to promote the dissemination of the research herein.

We are extremely grateful to our editorial board, faculty peer reviewers, Executive Advisory Board, and to Helen Rynor for the beautiful cover art "Rēnēs."

This experience has been one we will both cherish forever and we thank you for taking interest in the journal we have been privileged to lead this year. We are confident that next year's editors will provide you with an even better research journal, and we look forward to reading it.

Sincerely,

Thomas Vazquez
Editor in Chief

Nicole Wilson, Ph.D.
Editor in Chief

Thomas Vazquez
Editor in Chief

Nicole Wilson, Ph.D.
Editor in Chief

Dear Readers,

I am writing this message during a period of significant global public health challenges that have arisen by the emergence of a "new" virus, COVID-19. There can be no greater example of the importance of scientific research in the practice of medicine than what we have witnessed within the past three months. The first case reports describing the clinical impact of this virus were startling, especially since this Coronavirus had never been seen before: there was no prior information on its genetic composition nor its antigenic components; commensurately, there were no molecular methods at its onset to specifically test for infection. Because of the concerted efforts of many biomedical researchers, the viral genetic sequence was quickly deduced, and there are now PCR-based methods to formally identify this agent. The dissemination of this key information was rapid, and more information is constantly being gathered and shared. Soon, we hope, further biomedical research will drive forward the creation of vaccines, and possibly, the needed therapeutic agents to specifically combat this illness. This cycle represents the practice of "translational medicine": clinical medicine and medical science equally converging from bedside-to-bench-to-bedside.

I hold deeply to the notion that the practice of translational medicine is community service. Indeed, it is arguably the highest form of community service. Clearly, in the response to COVID-19, the clinicians, biomedical scientists, and epidemiologists that sprung into action did not perceive any distinction between their fields. To the contrary, they readily appreciated the interconnectedness of their efforts, collectively laboring to understand the social determinants and the biologic basis of this disease. They immediately perceived the threat to their local communities, but, also, quickly responded to the needs of the global community, i.e., *all of humanity.*

I am extremely proud of the fact that the *Florida Medical Student Research Journal (FMSRJ)* contains contributions by medical students, is peer-reviewed by medical students, and is edited/published by medical students. As clearly evidenced by the COVID-19 pandemic, the welfare of humanity critically hinges on discovery science and the dissemination of new medical knowledge/information. Accordingly, I am confident that the future of humankind is secure precisely because of the level of commitment to the advancement of medical knowledge exemplified within the pages of the FMSRJ.

It is my immense privilege to gratefully acknowledge, and to support, the efforts of the student leadership and student contributors in making possible this issue of the *FMSRJ.* More so, it is my great honor to foster the medical education necessary to prepare the next generation of healers that will enable better outcomes for all diseases.

Sincerely,

Robert Sackstein, M.D., Ph.D.

Senior Vice President for Health Affairs
Dean, Herbert Wertheim College of Medicine

A 72-year-old Woman with Abdominal Pain

Juan Carlos Alvarez, M.D.[1], Christopher Febres-Aldana, M.D.[1], Robert Poppiti, M.D.[1,2]

[1]A.M. Rywlin, M.D. Department of Pathology, Mount Sinai Medical Center, Miami Beach, FL

[2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Corresponding author: Juan Carlos Alvarez Moreno, M.D., juan.alvarez@msmc.com

Case presentation

A 72 year old woman with no significant medical history, presented with 5 days of abdominal pain. On physical exam a left upper quadrant mass is palpated. An abdominal MRI showed a 13.8x11.6x9.1cm lobular, solid and cystic, mass in the body/tail of the pancreas (**Figure 1**).

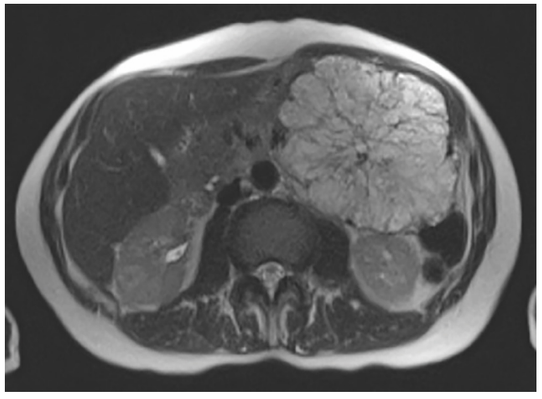

Figure 1. *MRI: showing lobulated, solid and cystic mass.*

The patient had surgery for excision of the mass. Gross examination revealed a lobulated predominantly solid mass with small cystic foci (**Figure 2**).

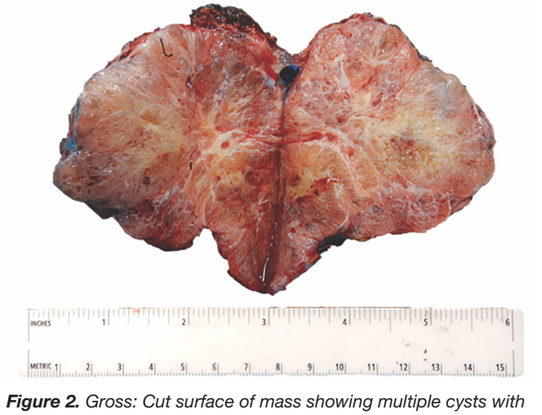

Figure 2. *Gross: Cut surface of mass showing multiple cysts with clear-straw colored fluid.*

The cysts are filled with a clear to straw-colored fluid. A central stellate fibrous scar is present. Microscopic examination revealed multiple cysts lined by single-layered cuboidal/flat epithelium. The cytoplasm is clear and the nuclei are round to oval with a homogenous chromatin (**Figure 3**).

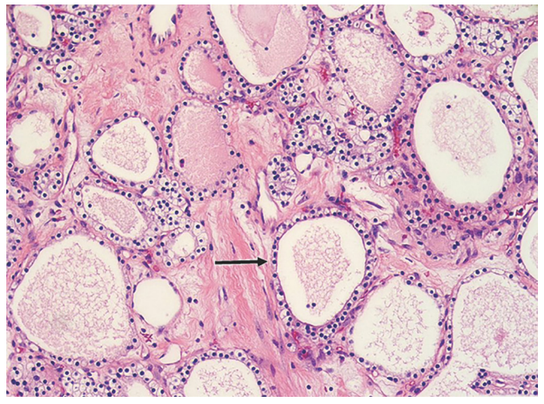

Figure 3. *H&E: 20x. Cysts lined by cuboidal epithelium.*

What is the diagnosis?

A. Ductal Adenocarcinoma
B. Mucinous Cystic Neoplasm
C. Neuroendocrine Tumor
D. Serous Cystadenoma
E. Pseudocyst

Answer

D, serous cystadenoma. It can arise in the body or tail. Grossly they are lobulated masses composed of numerous cysts, containing clear to straw-colored fluid. A central stellate fibrous scar is usually present. The epithelium is cuboidal to flat cells within dense fibrous trabeculae. The cytoplasm is clear due to the glycogen. The nuclei are round to oval with a homogenous chromatin. A Periodic Acid-Schiff reaction will induce a reaction with the glycogen in the cytoplasm showing granular purple-magenta color.

Discussion

Pancreatic neoplasms

Ductal adenocarcinoma is the most frequent neoplasm in the head of the pancreas. They present with symptoms such as abdominal pain, weight loss and jaundice. Grossly they are poorly defined, pale, firm masses. Mucinous neoplasms can present in the body or tail. Grossly they are multilocular, with irregular cyst walls, thick mucoid content and papillary excrescences. The epithelium is columnar and have ovarian-type stroma. Serous neoplasms, as in our case, can arise in the body or tail. If they arise in the head they can obstruct the biliary tract. Grossly they are lobulated masses composed of numerous cysts, containing straw-colored fluid. The epithelium is cuboidal to flat cells within dense fibrous trabeculae. Neuroendocrine neoplasms are discrete, circumscribed masses, with a pale-gray to tan color. Commonly located in the body or tail. Microscopically the cells can form a ribbon-like or trabecular pattern, they are round or elongated shaped, with a round nucleus with a dense heterochromatin. Pseudocysts are more common in the tail. There are unilocular cavities with watery to thick content without an epithelial lining.[1]

References

1. Thompson L, Basturk O, Volkan Adsay N. Pancreas. In: Mills S, Greenson J, Hornick J, Longacre T, Reuter V, eds. *Sternberg`s Diagnostic Surgical Pathology.* 6th ed. Philadelphia, PA: Wolters Kluwer. 2015:1577-1662.

A Young Girl with a Depigmented Annular Plaque

Sydney R. Resnik, M.S.[1], Ashley Goldberg Sanderson, MMS, PA-C, M.S.[2], Barry I. Resnik, M.D.[3,4]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Riverchase Dermatology, Venice, FL

[3]Resnik Skin Institute, Miami, FL

[4]Dr. Phillip Frost Department of Dermatology & Cutaneous Surgery, Miller School of Medicine, University of Miami, Miami, FL

Corresponding Author: Sydney R. Resnik, M.S., sresn005@med.fiu.edu

Case Presentation

A 10 year-old girl presented with a depigmented, pruritic, raised plaque with surrounding hyperpigmentation and distinct borders on her left mid-cheek (**Figure 1**).

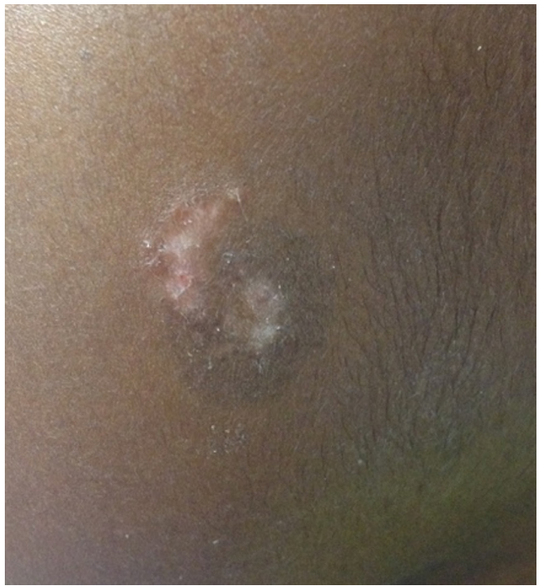

Figure 1. *Lesion at presentation with the appearance of scarring and depigmentation.*

The area first appeared as a red patch approximately two months earlier. She was initially seen by her pediatrician, who prescribed mometasone cream (topical corticosteroid). She applied the cream two times per day for about two weeks, and noted only mild improvement of the lesion. The patch of skin began to thicken and lighten in color after use of mometasone, and she returned to her pediatrician for re-evaluation. The mometasone was discontinued, and she was prescribed a course of oral griseofulvin for 30 days for a presumptive diagnosis of tinea faciei. Minimal change was noted after the oral antifungal treatment. The area became larger, thicker, and lighter in color. The patient then sought dermatologic evaluation.

1. Which of the following is the appropriate next step in diagnosing this patient?

A. Perform KOH scraping of the area
B. Biopsy the lesion
C. Order blood work including ANA
D. Perform bacterial culture

Answer

B, Biopsy the lesion. A 3mm punch biopsy was performed at the center of the lesion. Pathology results showed parakeratosis, acanthosis, focal spongiosis, and a lymphohistiocytic infiltrate in the dermis. Periodic acid-Schiff (PAS) stain was performed which showed hyphae within the hair follicles. KOH scraping was not appropriate because this patient previously underwent treatment with topical corticosteroid and oral antifungal agent. Both of these therapies would make the probability of a positive KOH unlikely, resulting in a false negative. No abnormalities in blood work would be expected due to a superficial lesion. As there was no break in the skin or open wound, bacterial infection was not part of the differential and culture would not be applicable.

2. What is the definitive diagnosis?

A. Discoid Lupus
B. Atopic Dermatitis
C. Majocchi's Granuloma
D. Pityriasis alba

Answer

C, Majocchi's Granuloma. Majocchi's Granuloma (MG) is a dermatophytic folliculitis with granuloma formation. Dermatophytes are a group of filamentous fungi that are recognized by their ability to grow in the presence of keratin.[1] The most common cause of MG is *Tinea rubrum* (*T. rubrum*), though *T. mentagrophytes*, *T. violaceum*, and *T. tonsurans* are also potential etiologies.[2] Infection may result from physical trauma to the skin or local immunosuppression, such as application of topical corticosteroids. Among immunocompetent patients, *T. rubrum* infection generally presents as follicular papules. On the other hand, in patients with areas of immunosuppression, clinical presentation typically takes the form of subcutaneous nodules.[2,3] These nodules form in response to keratin within the dermis, and immune reaction to the dermatophyte.[2,3] Solitary to multiple lesions can develop depending on the extent of involvement and the extent of immunosuppression. Diagnosis generally requires biopsy of a lesion with histopathologic evaluation.[2,4] General histopathology usually shows infiltration with lymphoid cells, macrophages, multinucleated giant cells, and neutrophils.[2] In cases of fungal infection, PAS stain is preferred, which may demonstrate perifollicular spores and hyphae. For definitive diagnosis, findings of dermatophytes as well as perifollicular granulomas is necessary.[1,2,4] Discoid lupus is less likely because this condition is generally erythematous when active, displaying scaling and follicular hyperkeratosis.[5] Atopic dermatitis typically exhibits multiple areas of involvement with a distribution in the flexural areas and is usually bilaterally symmetric.[6] Finally, pityriasis alba was also unlikely as this condition has a tendency to relapse and recur without treatment and is often preceded by erythematous changes followed by multiple, rather than a singular, hypopigmented patches.[7]

3. Which of the following is the appropriate treatment regimen for the patient at this time?

A. Oral Prednisone
B. Intralesional triamcinolone
C. Ketoconazole 2% cream
D. Oral itraconazole for one month

Answer

D, Oral itraconazole. The patient was prescribed itraconazole oral solution 10mg/ml; 10ml by mouth daily for one month. After one month, the patient returned for follow-up, which showed post-inflammatory pigment alteration and resolution of fungal infection (**Figure 2**).

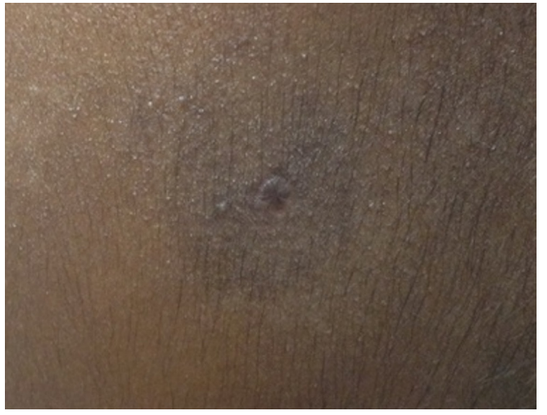

Figure 2. *Lesion following itraconazole treatment.*

Systemic antifungal treatment is often required due to the deep involvement of dermal dermatophytosis. Azoles, including itraconazole, are favored and should be continued until complete resolution is achieved.[2] Topical and systemic corticosteroids are only able to decrease inflammation. The actual result of those options will be an overwhelming proliferation of the fungal organism.

References

1. Rouzaud C, Hay R, Chosidow O, et al. Severe Dermatophytosis and Acquired or Innate Immunodeficiency: A Review. *J Fungi (Basel).* 2015; 2(1):4.
2. Boral H, Durdu M, Ilkit M. Majocchi's granuloma: current perspectives. *Infect Drug Resist.* 2018;11:751–760.
3. Bonifaz A, Tirado-Sánchez A, Ponce RM. Majocchi's granuloma. *Gac Med Mex.* 2008;144(5):427-33.
4. Kanaan IC, Santos TB, Kac BK, Souza AM, Cerqueira AM. Majocchi's granuloma - case report. *An Bras Dermatol.* 2015;90(2):251– 253.
5. Jarrett P, Werth VP. A review of cutaneous lupus erythematosus: improving outcomes with a multidisciplinary approach. *J Multidiscip Healthcare.* 2019;12:419-428.
6. Maliyar K, Sibbald C, Pope E, Sibbald R. Diagnosis and management of atopic dermatitis. *Adv Skin Wound Care.* 2018;12:538- 550.
7. Miazek N, Michalek I, Pawlowska-Kisei M, Olszewska M, Rudnicka L. Pityriasis alba— Common disease, enigmatic entity: Up-to- Date review of literature. *Pediatr Dermatol.* 205;32(6):786-91.

ORIGINAL RESEARCH

Level of Parental Education and Physical Activity in the Pediatric Epileptic Population

Andrew Payomo*, Helen Rynor*, Kelly Nguyen*, Grettel Castro, M.P.H., Juan Ruiz, M.D., M.Med.Sci., Marcia Varella, M.D., Ph.D., M.H.S.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Corresponding Author: Andrew Payomo, apayo001@med.fiu.edu

*These authors contributed equally to this work

Abstract

Background: Epilepsy in the pediatric population has a noticeable impact on quality of life. Epileptic children are less likely to participate in physical activity than non-epileptic children.

Objective: To assess the association between level of parental educational and physical activity in American epileptic children.

Methods: We performed a secondary analysis of the National Survey of Children's Health 2016, involving epileptic children aged 6-17. Independent variable was the highest level of parental education. Dependent variable was adequate physical activity of child. Associations were assessed using logistic regression models.

Results: Overall, only 43% of epileptic children exercised adequately. We didn't find an association between parental educational levels and adequate physical activity in epileptic children [adjusted OR=1.4, 95% CI=0.5-3.6].

Conclusion: Physical activity in epileptic children seems suboptimal. Although an association between parental educational levels and physical activity adequacy was not documented, due to limited study power, it cannot be ruled out.

Key Words: pediatric epilepsy; physical activity; organized sports; exercise, parental education

Introduction

Epilepsy is a common brain disorder in the pediatric population of the United States, with approximately 471,900 active cases in the year 2015.[1] Epilepsy drastically affects many aspects of the quality of life of children, including, but not limited to an increased sense of vulnerability, disempowerment, discrimination,[2] poorer score of mood and emotions on quality of life (QOL) questionnaire,[3] increased bullying as compared to those with cerebral palsy,[3] higher levels of repeated grades, difficulty with communication, and lower rates of attending class.[4] However, physical activity and participation in sports are associated with better quality of life. Results of a cross-sectional study showed that inactive epileptic adults had increasing levels of mood disturbances and depression.[5] These findings were corroborated by a cross-sectional study that showed that sedentary/irregularly active patients with epilepsy had worse scores on the Quality of Life Epilepsy Inventory.[6]

Despite the evidence that suggests physical activity improves the quality of life for epileptic children, these children are shown to perform less physical activity than their healthy counterparts. A cross-sectional survey involving 13-17 years old epileptic children reported that 64% of parents claimed their epileptic children were less physically active than they should be, as compared to only 36% of non-epileptic children.[7] In a Canadian population-based study, those with epilepsy were 1.4 times more likely to be physically inactive than the general population.[8]

Several factors impacting the physical activity level in epileptic children have been identified.[6] It has been reported that parents are reluctant to allow their epileptic children to partake in physical activity because they believe it may lead to head injuries or excessive fatigue, precipitating seizures.[9] Additionally, parents are hesitant to reveal their child's diagnosis due to fear of stigmatization and/or an inability to explain the condition to others.[10]

Among the multiple factors associated with physical activity of epileptic children, parental educational status has been mostly unexplored in the literature. Yet, parental educational status has been identified as an important factor associated with physical activity in children with selected chronic and acute medical conditions, such as childhood cancer, type I diabetes, and asthma.[11–13] Childhood cancer survivor studies reported low levels of physical activity in adolescents with parental education less than college level compared to those with parents with higher educational levels.[12] Parental educational level has also been associated with communication practices with their children,[14] wherein higher levels of parental education are associated with a greater willingness to engage in conversation with their epileptic children regarding their condition. By opening the discussion, children learn more about their condition and physical limitations. This, in turn, leads to de-stigmatization of epilepsy in the home environment, which may improve growth, development, and physical activity. Only one cross-sectional study in Iran analyzed the association between level of parental education and physical activity in epileptic children.[15] Results suggested that mothers with higher education had epileptic children who reported higher levels of physical activity.

Given the lack of studies in literature, we aimed to assess the association between the level of parental education and the participation in physical activity in children diagnosed with epilepsy in the US using data from the National Survey of Children's Health year 2016, with the objective of help identifying at-risk groups that may benefit from interventions aimed at improving physical activity and, thereby, quality of life in epileptic children.

Methods

Design

We performed a secondary analysis of a cross-sectional study, the National Survey of Children's Health (NSCH) year 2016. The NSCH collected data to examine the physical and emotional health of children ages 0-17 years of age nationwide. We included children 6-17 years old diagnosed with epilepsy.

Variables

Information collected were based on reports from the interviewed parents. The exposure variable was level of education of the parents of children with epilepsy, classified into two categories: high school/GED or less and greater than high school status. We combined "less than high school" and "high school/GED" into the category of "less than high school" and "some college/technical school" and "college degree or higher" into the category of "greater than high school". The outcome was the level of physical activity split into two categories: lower versus higher levels of exercise. Parents reported the number of days in which their children participated in exercise, played sports, or engaged in physical activity for 60 minutes and categorized into "0 days," "1-3 days," "4-6 days," and "Everyday". For the purposes of our study, we combined the "0 day" and "1-3 day" options into one category (0-3 days of exercise) and "4-6 day" and "every day" into another (4+ days of exercise). The categories of exercise were adapted from the Physical Activity Guidelines for Children by the CDC, which recommended vigorous-intensity aerobic activity, muscle strengthening activities, and bone strengthening activities for 60 minutes at least three days a week.[16] Based on the CDC guidelines, three days of high intensity physical activity is set as the "minimum necessary exercise." The categories used in the NSCH survey do not allow proper classification of the participants who exercised for exactly 3 days. Thus, we decided to include 0-3 days of exercise as the low levels of exercise category. Potential confounding variables that we assessed included severity of epilepsy, mental health of parents, physical activity of parents, number of parents in family structure, race of parents, ethnicity of parents, number of siblings, health insurance, sidewalks/walking paths, parks/playgrounds, recreation centers, family income and age.

Analytical Plan

A descriptive analysis was performed to describe the characteristics of the sample. Bivariate analyses were used to identify potential confounders of the association between the level of parental education (exposure) and physical activity of children with epilepsy (outcome). Variables that presented a 10% or higher difference in their distribution according to both exposure and outcome, were considered potential confounders and considered in adjusted models. A p value ≤ 0.3 was considered significant for the bivariate analysis. Other factors consistently identified in literature were also assessed. Finally, logistic regression models were fitted to adjust for potential confounders. A two-sided hypothesis test with a p-value ≤ 0.05 was the statistical significance threshold used. Stata v15 software was used for all analyses.

Results

Study Population Characteristics

Of the total NSCH participants, 444 were epileptic children aged 6-17 years old. We excluded 123 children with disabilities, including deafness, blindness, arthritis, cystic fibrosis, heart conditions, and cerebral palsy, leaving 321 eligible participants for the study. Eleven participants had missing information on the parental education level or physical activity, which resulted in a final analytical sample of 310 children.

Sixty-three parents (20%) had high school/GED/ vocational or less than high school, and 175 parents (56%) reported that their child engaged in less three or less days of physical activity for 60 minutes or more. Most children were males (51%) and the mean age of children was 12.29 (SD=3.47). Most children were also white (79%) and not Hispanic or Latino (88%). Most families were two parent households (74%), included more than one child (78%), and were at 200-400% of the Federal Poverty Level (60%).

Parents with lower educational level have a higher proportion of families with a one parent or other family structure, families with more than one child, families with 0-99% of the Federal Poverty Level, parent in the family reporting "very good" or "excellent" for physical activity, both parents self-rating suboptimal mental health, and children with a moderate or severe form of epilepsy (**Table 1**).

There was no significant difference between physical activity and level of parental education, wherein 61.4% of parents with high school/GED or less had epileptic children that exercised 0-3 days per week, and the remaining 55.6% exercised 4-7 days per week (p=0.6187). The frequency of children having adequate levels of physical activity also varied according to selected characteristics (**Table 2**). The percentage of children who performed inadequate levels of physical activity was higher among those with moderate or severe forms of epilepsy, for families in which no parent was adequately physically active, for those without health insurance

coverage, and for children living in neighborhoods without recreation centers. Mean age of those with inadequate physical activity was higher than age in those with adequate levels (**Table 2**).

Prior to adjustment, there was no association between levels of parental education and levels of physical activity among children with epilepsy [odds ratio (OR)=0.79, 95% Confidence Interval (CI)=0.31-2.01] (**Table 3**). After adjusting for severity of epilepsy, parental physical activity levels, parental mental health status, child's race, sex, and age, the point estimate of the OR actually became higher that one, but the confidence interval continued to include 1: [adjusted OR (aOR)=1.37, 95% CI 0.52-3.61].

Discussion

Our study found that only 43.5% of epileptic children reported ≥ 4 days of more than 60 minutes of physical activity in a week, and we found no evidence for an association between the level of parental education and physical activity in epileptic children ages 6 to 17.

Our study contrasts with a cross-sectional study including 106 children with epilepsy between 5 to 17 years old at a pediatric neurology clinic in Tehran, Iran, which showed that children who had mothers with educational level higher than high school had higher overall scoring on the physical activity (as measured by the corresponding subdomain of the Quality of Life in Childhood Epilepsy questionnaire, mean difference 3.83 in scores, CI: 1.4, 6.26.15) Differences in these results may be due to differences in cultural background of participants. In particular, the study identified that the mothers are the primary caretakers of children in Tehran. Given the close relationship between mother and child in Iran as compared to the United States, changes in the quality of education of the mothers may have a more significant impact on the children, especially in the domain of physical activity.[17]

The positive impact of higher parental education on higher levels of physical activity in the context of other chronic medical conditions has also been reported. One such study showed that parents who self-reported not having a college degree were associated with higher rates of poor adolescent physical activity compared to those with a college degree (OR 1.91, 95% CI 1.11-3.32).[12] Though other chronic medical conditions may present different challenges than epilepsy, the mechanism by which the level of parental education might impact physical activity is likely similar. Thus, higher parental education may result in greater critical thinking capacity leading to an appropriate assessment of their child's physical endeavors. For instance, a Brazilian study explored the association between the perception of epilepsy and physical activity. They found that 22.9% of people with epilepsy stopped practicing physical activity for fear of seizures and that higher levels of epilepsy-driven stigma were associated with higher rates of abstaining from physical activity due to a fear of seizures.[6] Lastly, compared to people with epilepsy with no psychiatric comorbidities, those with epilepsy and psychiatric comorbidities were associated with more than twice the odds of stopping physical activity for fear of seizures.

We found that only 43.5% of epileptic children reported at least the minimum recommended physical activity.[16] This proportion most likely underestimates the real frequency of adequate physical activity since children who exercised for 3 days were included in the inadequate physical activity category of 0-3 days of physical activity. Other studies similarly demonstrated a lack of participation in group sports and total sports by epileptic teenagers (13-17 years old) when compared to their non-epileptic siblings.[7] Additionally, 64% of parents reported their epileptic teenagers to be less physically active, as compared to only 36% of parents with non-epileptic teenagers.[7] These results may differ due to a change in the main outcome, where our study assessed physical activity and the other study assessed sports participation.

Our study had some limitations. First, we identified 310 epileptic children in the year studied, which limited the study power. We expected a power of 80% for this study, assuming a frequency of exposure to be about 50% and an OR of 2 when comparing the two educational levels. Our limited power was likely due to a smaller than anticipated sample size, after application of exclusion criteria, for the high school/GED or less group, as well as a smaller difference between groups than was assumed in the power calculation performed during the study planning phase. Yet, exploratory analysis of data from the NSCH for the year 2012, for which data of approximately 1,000 children with epilepsy was available, also failed to show an association between level of parental education and physical activity (data not shown). We were also restricted in the availability of data on potential confounders. For instance, we lacked information on anti-epileptic drugs (AEDs) used, which might ultimately affect physical activity status. A Canadian study of epileptic children found that children with higher numbers of AEDs ever taken had lower levels of individual sports activity and total sports activity (p-value <0.004).[7] Also, the NSCH database lacked information regarding the severity of epilepsy for over 50% of the participants. Nonetheless, a sensitivity analysis was performed for the severity of epilepsy, in which it assumed two scenarios: all "not reported" severity status was considered to be mild or all "not reported" severity status was considered to be moderate or severe. Neither scenario changed the results significantly.

Our study may also be subject to measurement error, as parents completed the surveys, rather than the children in question. Parents may have either over- or under-estimate their child's level of physical activity, which decreases the accuracy of the assessment of the outcome. Of note, it has been reported suboptimal concordance between parent-reported and child-reported sports activities, over the past 7 days or sports participation per year. The study did not report the directionality of this trend.[7] Thus, these inaccuracies increase the risk of biases towards no difference, as seen in our results. The study may have also been impacted by its design as a cross-sectional study (NSCH database). In particular, our study could not track levels of physical activity over time or detect "habitual" levels of activity but "recent" levels of activity. Analyzing physical activity over time

Table 1. *Characteristics of the sample according to the level of parental education*

Characteristics		Level of Parental Education				P-value
		≤ High School		> High School		
		N*	%*	N*	%*	
Sex	Male	29	41	129	51.9	0.3398
	Female	34	59	118	48.1	
Age - mean (SD)		10.7 (0.66)		11.8 (0.38)		0.1498
Hispanic/Latino	Yes	14	30.7	22	19.2	0.2834
	No	49	69.3	225	80.8	
Race	White	52	60.8	193	71.4	0.3645
	Non-White	11	39.2	54	28.6	
Family Structure	2 Parent Household	37	52.2	193	73	0.0972
	1 Parent Household	13	28.4	41	19.8	
	Other	12	19.3	13	7.13	
Child with siblings	No	21	25.6	118	39.4	0.1464
	Yes	34	74.4	129	60.6	
Income (% of FPL)	0-99	25	54.4	17	14.1	<0.0001
	100-199	18	30.5	43	17.6	
	200-400	20	15.1	187	68.2	
Health Insured	Yes	59	87	237	93.5	0.4033
	No	4	13	10	6.52	
Recreation Centers	Yes	24	37.9	114	46	0.5051
	No	38	62.1	132	54	
Sidewalks/Walking Paths	Yes	42	79.2	182	79.9	0.9306
	No	19	20.8	65	20.1	
Parks/Playgrounds	Yes	42	82.9	184	76	0.3975
	No	17	17.1	63	24	
Parental with adequate physical activity	At Least One Parent	30	40.5	200	83.1	<0.0001
	No Parents	27	59.5	45	16.9	
Parental with suboptimal mental health	At Least One Parent	32	68.1	94	37.6	0.0064
	No Parents	27	31.9	151	62.4	
Severity of Epilepsy	Mild	20	33.2	91	67.2	0.0196
	Moderate or Severe	19	66.8	41	32.8	
	Not Reported	24	36.9	115	52.1	

N = Total Number; SD (standard deviation)
*Unless otherwise specified

ORIGINAL RESEARCH

Table 2. *Characteristics of the sample according to the child's physical activity status*

Characteristics		Physical Activity				P-value
		0-3 Days		4+ Days		
		N*	%	N	%	
Level of Parental Education	High School	38	61.4	25	38.6	0.6187
	Above High School	137	55.6	110	44.4	
Sex	Male	85	61.9	73	38.1	0.401
	Female	90	53.7	62	46.3	
Age, mean (SD)		11.96 (0.51)		10.70 (0.44)		0.06
Hispanic/Latino	Yes	23	61.5	13	38.5	0.7327
	No	152	56.5	122	43.5	
Race	White	141	58	104	42	0.9339
	Non-White	34	57	31	43	
Family Structure	2 Parent Household	127	56.8	103	43.2	0.7605
	1 Parent Household	30	54.8	24	45.2	
	Other	17	67.5	8	32.5	
Child with siblings	No	88	58.6	59	41.4	0.8777
	Yes	87	57.1	76	42.9	
Health Insured	Yes	166	55.1	130	44.9	0.0452
	No	9	83.8	5	16.2	
Recreation Centers	Yes	75	66.2	63	33.3	0.1133
	No	98	50.8	72	49.2	
Parental report of adequate physical activity*	At Least One Parent	122	52.6	108	47.4	0.1613
	No Parents	48	69.7	24	30.3	
Parental report of suboptimal mental health**	At Least One Parent	77	63.9	49	36.1	0.2528
	No Parents	94	52.3	84	47.7	
Sidewalks/Walking Paths	Yes	119	55.9	105	44.1	0.4369
	No	55	64.1	29	35.9	
Parks/Playgrounds	Yes	120	56.7	106	43.3	0.899
	No	51	58	29	42	
Income (% FPL)	0-99	27	58.9	15	41.1	0.9557
	100-199	33	59.5	28	40.5	
	200-400	115	56.1	92	43.9	
Severity of Epilepsy	Mild	59	43.6	52	56.4	0.0495
	Moderate or Severe	35	49.9	25	50.1	
	Not reported	81	70.2	58	29.8	

N = Total Number; SD (standard deviation)

*Parental Report of Adequate Physical Activity considered "very good" or "excellent" by parent

** Parental Report of Suboptimal Mental considered "good," "poor," or "very poor" by parent

Table 3. *Association between parental level of education and having more than 4 or more days of physical activity: crude and adjusted analysis*

	Unadjusted		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Level of Parental Education				
High School	0.79 (0.31-2.01)	0.619	1.37 (0.52-3.61)	0.518
Above High School	Ref	Ref	Ref	Ref
Female	1.40 (0.63-3.10)	0.402	1.71 (0.80-3.66)	0.164
Child's age (1 year increments	0.89 (0.80-1.01)	0.08	0.91 (0.81-1.02)	0.12
Hispanic/Latino family	0.81 (0.25-2.66)	0.733	-	-
Race				
White	Ref	Ref	Ref	Ref
Non-White	1.04 (0.41-2.63)	0.934	0.79 (0.29-2.15)	0.646
Family Structure				
2 Parent Household	Ref	Ref	-	-
1 Parent Household	1.08 (0.40-2.95)	0.876	-	-
Other	0.63 (0.18-2.28)	0.484	-	-
Only Child	0.94 (0.42-2.09)	0.878	-	-
Income (% FPL)				
0-99	0.89 (0.32-2.45)	0.821	-	-
100-199	0.87 (0.31-2.45)	0.792	-	-
200-400	Ref	Ref	-	-
No Health Insurance	0.24 (0.05-1.07)	0.062	-	-
No Sidewalks/ Walking Paths	0.71 (0.29-1.70)	0.438	-	-
No Parks/ Playgrounds	0.94 (0.39-2.27)	0.899	-	-
No Recreation Centers	1.90 (0.85-4.20)	0.115	-	-
No Parents Report Adequate Physical Activity*	0.48 (0.17-1.35)	0.165	0.65 (0.25-1.69)	0.373
At Least One Parent Reports Suboptimal Mental Health**	0.62 (0.27-1.41)	0.254	0.57 (0.26-1.26)	0.163
Severity of Epilepsy				
Mild	Ref	Ref	Ref	Ref
Moderate or Severe	0.78 (0.26-2.35)	0.654	0.85(0.28-2.61)	0.774
Not Reported	0.33 (0.14-0.75)	0.008	0.35 (0.15-0.84)	0.019

OR = Odds Ratio; CI = Confidence Interval

*Parental Report of Adequate Physical Activity considered "very good" or "excellent" by parent

** Parental Report of Suboptimal Mental considered "good," "poor," or "very poor" by parent

*** Reference categories were considered for the presence of each corresponding characteristic in the neighborhoods

would allow us to better characterize physical activity levels of epileptic children.

Thus far, an association between parental education and suboptimal physical activity has not been identified. However, due to the power limitations of our study, it cannot be ruled out, and future studies with a larger sample sizes are needed.

In conclusion, in this national sample of epileptic children, we found no evidence for the association between the level of parental education and physical activity. Yet, our results indicate that physical activity in epileptic children is suboptimal. Lack of physical activity is particularly detrimental in epileptic children, leading to decreased quality of life. Further research into the factors that influence the physical activity of the pediatric epileptic population, as well as public health interventions targeting these factors are indicated for improving physical activity levels and reducing the risk of chronic illness in this vulnerable population.

References

1. Zack MM, Kobau R. National and State Estimates of the Numbers of Adults and Children with Active Epilepsy — United States, 2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(31):821-825.
2. Chong L, Jamieson NJ, Gill D, et al. Childrens Experiences of Epilepsy: A Systematic Review of Qualitative Studies. *Pediatrics*. 2016;138(3):e20160658-e20160658.
3. Mezgebe M, Akhtar-Danesh G-G, Streiner DL, Fayed N, Rosenbaum PL, Ronen GM. Quality of life in children with epilepsy: How does it compare with the quality of life in typical children and children with cerebral palsy? *Epilepsy Behav*. 2015;52(Pt A):239-243.
4. Pastor PN, Reuben CA, Kobau R, Helmers SL, Lukacs S. Functional difficulties and school limitations of children with epilepsy: Findings from the 2009–2010 National Survey of Children with Special Health Care Needs. *Disabil Health J*. 2015;8(2):231-239.
5. Roth DL, Goode KT, Williams VL, Faught E. Physical exercise, stressful life experience, and depression in adults with epilepsy. *Epilepsia*. 35(6):1248-1255.
6. Tedrus GMAS, Sterca GS, Pereira RB. Physical activity, stigma, and quality of life in patients with epilepsy. *Epilepsy Behav*. 2017;77:96-98.
7. Wong J, Wirrell E. Physical activity in children/teens with epilepsy compared with that in their siblings without epilepsy. *Epilepsia*. 2006;47(3):631-639.
8. Hinnell C, Williams J, Metcalfe A, et al. Health status and health-related behaviors in epilepsy compared to other chronic conditions--a national population-based study. *Epilepsia*. 2010;51(5):853-861.
9. Livingston S, Berman W. Participation of Epileptic Patients in Sports. *JAMA*. 1973;224(2):236.
10. 1Benson A, O'Toole S, Lambert V, Gallagher P, Shahwan A, Austin JK. To tell or not to tell: A systematic review of the disclosure practices of children living with epilepsy and their parents. *Epilepsy Behav*. 2015;51:73-95.
11. Gong T, Lundholm C, Rejnö G, Mood C, Långström N, Almqvist C. Parental Socioeconomic Status, Childhood Asthma and Medication Use – A Population-Based Study. Chen Y-C, ed. *PLoS One*. 2014;9(9):e106579.
12. Devine KA, Mertens AC, Whitton JA, et al. Factors associated with physical activity among adolescent and young adult survivors of early childhood cancer: A report from the childhood cancer survivor study (CCSS). *Psychooncology*. 2018;27(2):613-619.
13. Nabors L, Bartz J. Type I Diabetes in Children: Facilitating Adherence to Medical Regimens. 2013.
14. Kampra M, Tzerakis N, Lund Holm Thomsen L, et al. The challenges that parents of children with epilepsy face: A qualitative study. *Epilepsy Behav*. 2017;71(Pt A):94-103.
15. Iqbal M, Amirsalari S, Radfar S, Haidari MR. Effects of parental gender and level of education on the quality of life and general health of pediatric patients with epilepsy: An outpatient cross-sectional survey. *Epilepsy Behav*. 2016;60:118-123.
16. Physical Activity Basics | Physical Activity | CDC. https://www.cdc.gov/physicalactivity/basics/index.htm?CDC_AA_refVal=https%3A%2F%2Fwww.calactivity%2Fbasics%2Fchildren%2Findex.htm. Accessed January 7, 2019.
17. Rahkar Farshi M, Valizadeh L, Zamanzadeh V, Rssouli M, Lopez V, Cleary M. Perceptions of Iranian parents towards the paternal role in raising adolescent children. *Nurs Health Sci*. 2018;20(4):479-485.

Niraparib Therapy for Recurrent Ovarian Cancer Resulting in Lethal Hemorrhagic Mucositis, Black Esophagus, and Gelatinous Bone Marrow Transformation: A Case Report

Anthony Tuzzolo[1], Christopher Febres-Aldana, M.D.[2], Robert Poppiti, M.D.[1,2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]A.M.Rywlin M.D. Department of Pathology and Laboratory Medicine, Mount Sinai Medical Center, Miami Beach, FL

Corresponding Author: Christopher Febres-Aldana, M.D., christopher.febres@msmc.com

Abstract

The chemotherapeutic agent niraparib targets poly (ADP-ribose) polymerase (PARP) to promote the formation of double-stranded DNA breakage during replication. It has proven to prolong the survival of patients with recurrent gynecologic tumors; however, PARP inhibitors can cause adverse cytotoxic effects. This case is that of a severely cachectic 65-year-old woman that received niraparib as part of the maintenance treatment for relapsed high-grade serous carcinoma. She presented three weeks after starting treatment with lethal complications, including mucositis, pancytopenia, and Klebsiella pneumonia. Autopsy revealed black esophagus, hemorrhagic necrosis of the large intestine, and gelatinous transformation of the bone marrow. Bacterial translocation and immunosuppression contributed to the development of a septic process that culminated with pulmonary thromboembolism and brain infarction. These findings would have remained undiagnosed without the help of the autopsy. We discuss how niraparib toxicity may have contributed to the deterioration and eventual death of the patient.

Keywords: niraparib; black esophagus; pancytopenia ovarian cancer; bone marrow; mucositis; autopsy

Introduction

Niraparib is an oral poly(ADP-ribose) polymerase inhibitor approved by the FDA for maintenance treatment of patients with recurrent ovarian tumors, fallopian tube tumors, and primary peritoneal tumors in combination with platinum-based therapy. This recommendation is partially based on a double-blind, placebo-controlled trial NOVA (NCT01847274).[1] The agent has also been shown to be especially efficacious in treating BRCA mutation-positive tumors.[1] While niraparib has demonstrated value as maintenance therapy in patients with platinum sensitive recurrent ovarian cancer, it has also associated with severe toxicities. Most notable toxicities: hematologic abnormalities including anemia, leukopenia, or isolated neutropenia, and thrombocytopenia, which typically occur within the first 84 days (3 cycles) of treatment.[1,2] Hematotoxicity can be severe or life-threatening (National Cancer Institute (NCI) Common Terminology Criteria for Adverse Events (CTCAE) grade 3 or 4 events) in 33.8% of cases due to thrombocytopenia, 25.3% due to anemia, and 19.6% due to neutropenia. Pancytopenia has been observed in less than 1% of patients treated with niraparib. Rarely, myelodysplastic syndromes or acute myeloid leukemia may result as well, typically in patients treated for more than 2 months.[3] Additional adverse drug toxicities related to niraparib include mucositis and stomatitis (20%), nausea (74%), vomiting (34%), dry mouth (10%), dyspepsia (18%), myalgia (19%), back pain (18%), arthralgia (13%), and rash (21%).[3] These side effects have been reported in recent clinical trials, but the underlying pathologic changes are unclear. Furthermore, in cases where drug toxicity led to a worsened outcome, it is not clear if niraparib was effective to induce tumor regression. Herein, we present a severely cachectic patient with recurrent widespread ovarian cancer who developed toxicity on full dose niraparib treatment. The autopsy findings revealed that niraparib therapy did not result in significant tumor regression; however, the bone marrow and gastrointestinal toxicity induced by the drug likely accelerated the patient's functional decline. Bacterial translocation and immunosuppression contributed to the development of a septic process that culminated with pulmonary thromboembolism and brain infarction. We conclude that patients with severe malnutrition or cachexia may not be the right candidates for niraparib therapy, and dosage must be carefully adjusted in underweight patients.[4]

Case Report

A 65-year-old woman with a history of hypertensive heart failure and stage-3 chronic kidney disease developed a high-grade serous carcinoma in the left ovary extending into the endocervix with positive peritoneal cytology and lymphovascular invasion. The initial treatment was total hysterectomy with bilateral salpingo-oophorectomy followed by 6 cycles of intravenous carboplatin (dose: 313.2 mg/cycle, calculated using the Calvert formula

CASE REPORT

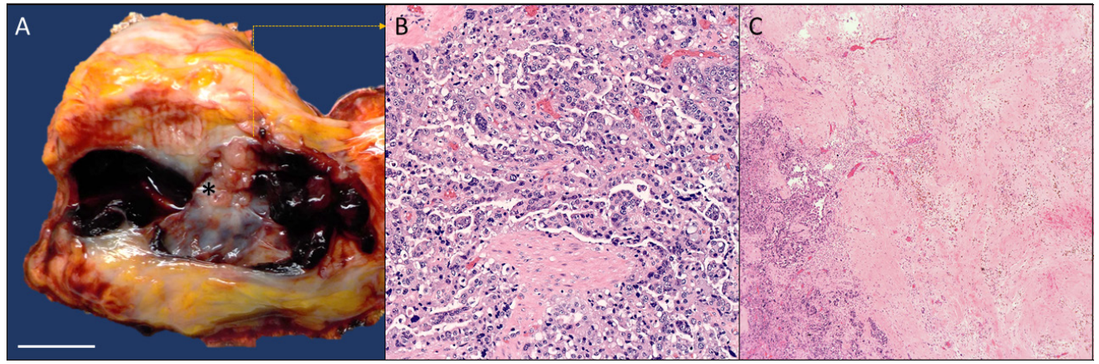

Figure 1. *Photomicrograph of metastatic carcinoma to the abdominal subcutaneous fat with cystic degeneration and hemorrhage. Viable tumor appeared as granular tan-pink soft tissue (**A**, asterisk), which microscopically was composed of papillae lined by highly pleomorphic epithelial cells typical of serous carcinoma (**B**, 200x). A small portion of the tumor showed niraparib-induced tumor regression characterized by fibrosis, hemosiderin deposition, and sparse chronic inflammation (**C**, 100x). B and C: Hematoxylin and eosin (H&E).*

[dose=AUC*(CrCl+25)] targeting an AUC of 6 and with a clearance of creatinine (CrCl) of 27.2 mL/min) and paclitaxel (dose: 283.5 mg/cycle; 175 mg/m2 x 1.62 m2). Following imaging studies that failed to show radiologic evidence of malignancy after 4 cycles of chemotherapy, cycles 5 and 6 were held due to myelosuppression and worsening kidney failure. Approximately 1 year later, the cancer relapsed presenting with weight loss and metastasis to mesentery, liver, bladder, and pleura. A maintenance regimen of intravenous carboplatin (dose: 183.6 mg, targeted AUC: 4) every 3 weeks for 4 months was administered but failed to induce remission. The patient continued losing weight and received 3 cycles of intravenous doxorubicin (dose: 70mg; 50 mg/m2) without response.

Treatments with chemotherapy was stopped and 6 weeks later, niraparib (300 mg/day, oral route) was started. At this time, the patient was planned for hospice care. After being on niraparib for three weeks, the patient was admitted because of severe weakness, accentuation of weight loss (weight before niraparib: 44 kg, weight after niraparib: 35 kg), hemorrhagic mucositis, and pancytopenia. Other patient's medications included oxycodone, metoclopramide, nifedipine, atorvastatin, pantoprazole, furosemide, allopurinol, carvedilol, and aspirin. No drug interaction between niraparib and any of these drugs has been reported. Laboratory tests revealed leukopenia (white blood cell count 0.22 x103 cells/uL, range of normality [RN]: 4.8-10.8, 7.54 x103 before niraparib), normocytic normochromic anemia (hemoglobin 7.9 g/dL, RN: 12-16, 9.1 before niraparib; hematocrit 23.3%, RN: 37-47, 26.9 before niraparib), thrombocytopenia (platelet count less than 2 x103/uL, RN:150-450, 147 x 103 before niraparib), azotemia (creatinine 3.6 mg/dL, RN: 0.55-1.02; BUN 98 mg/dL, RN: 7-18), lactic acidosis (5.8 mmol/L, RN: 0.4-2), hypernatremia (sodium: 153 mmol/L, RN: 136-145), hyperkalemia (potassium: 5.3 mmol/L, RN: 3.5-5.1), and hypoalbuminemia (3.1 g/dL, RN: 3.4-5). Niraparib was discontinued. She required parenteral rehydration, correction of electrolytes, and transfusion of blood products. The patient was septic in severe respiratory distress requiring mechanical ventilation due to Klebsiella pneumoniae pneumonia. Considering the poor prognosis, the case was discussed with the patient's family; the decision was to proceed with comfort care measures. No antibiotics were administered. After two days of hospitalization, the patient expired.

Autopsy Findings

On external examination, there was severe cachexia (body mass index [BMI]: 13.99 kg/m2). The skin was devoid of hair with bands of hyperpigmentation and slippage, superficial sacral erosions, and pitting edema of lower extremities. Upon opening of internal cavities, there was evidence of anasarca including pericardial (10 cc) and bilateral pleural effusions (right: 500 cc, left: 500 cc), and ascites (250 cc). The serous carcinoma had metastasized to retroperitoneal lymph nodes, the visceral and parietal peritoneum, liver, bladder with occlusion of the left ureterovesical junction, vaginal mucosa, paravaginal, paravesical, and pararectal soft tissues. Few foci of carcinoma showed microscopic evidence of tumor regression, but the majority of the tumor showed no treatment effect (**Figure 1**).

The bone marrow exhibited marked hypocellularity, hemosiderin deposition, and serous atrophy of fat, findings typical of gelatinous transformation (**Figure 2**). Mucosal erosion and ulceration with green exudate and black necrotic tissue were present along the oral cavity, pharynx, and larynx, extending to the proximal and mid-segments of the esophagus where the necrosis was transmural (**Figure 3**). There was also diffuse hemorrhagic necrosis of large intestine consistent with infarction. The lungs were congested (right: 600 g, RN: 360-570; left: 660 g, RN: 325-480) with evidence of aspiration pneumonia in the lower lobes including foreign material, abundant bacteria, and parenchymal necrosis (**Figure 4**). There was a serpiginous thrombus in the right pulmonary artery (5.5 cm), and mild atherosclerosis of the main pulmonary artery with early infarction of lung parenchyma (**Figure 5**). Examination of the brain revealed hemorrhagic infarction in the right basal ganglia secondary to septic emboli (**Figure 6**). In addition to changes consistent with severe hypertensive renal disease, the left kidney presented an incidental papillary, clear cell renal cell carcinoma (1.3 cm) (**Figure 7**). The cardiovascular system was abnormal for cardiomegaly (310 g, RN: 200-280) with left ventricular hypertrophy (wall thickness: 2 cm, RN: ≤1.5) with interstitial fibrosis. Other findings were noncontributory.

Discussion

Figure 8 shows a clinicopathologic correlation of the autopsy findings. The patient was a 65-year-old woman who developed chemotherapy-resistant high-grade serous carcinoma. Severe cachexia increased the susceptibility to niraparib cytotoxicity resulting in bone marrow failure causing pancytopenia and damage of mucosal epithelia. In this setting, neutropenia increased the risk of disseminated bacterial infections and the development of sepsis. Potential sources of infection were translocation of bacteria from the gastrointestinal tract due to hemorrhagic mucositis, infarction, and aspiration pneumonia. *Klebsiella pneumoniae* was isolated from premortem tracheal secretions and postmortem lung cultures. The presence of foreign material admixed with bacterial colonies in the lungs supports aspiration as the route of infection. Bronchial aspiration may occur in patients with cachexia due to emaciation of skeletal muscle and weakness of the upper airway muscles with the aspiration of oral secretions. Progression of the septic process along with the metastatic disease generated a prothrombotic state that elicited the formation of thromboemboli causing pulmonary and brain infarcts, and occlusion of the right pulmonary artery, which are fatal events.

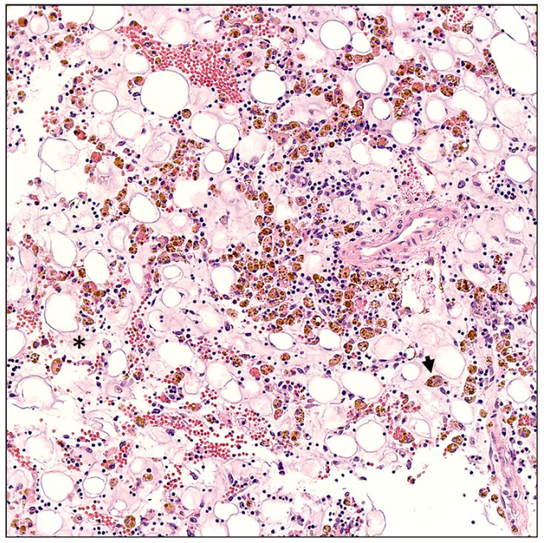

Figure 2. *Photomicrograph of the bone marrow with extensive myxoid changes with variably sized adipocytes (asterisk, typical of gelatinous transformation), markedly decreased cellularity, numerous hemosiderin-laden macrophages (arrow), and few lymphocytes. H&E, 200x.*

Niraparib is an orally administered selective inhibitor of the poly (ADP-ribose) polymerase (PARP) 1 and 2. PARP-1/2's function lies in base excision repair of single-strand DNA breaks.[3] Niraparib binds to PARP-1/2 attached to DNA, preventing this function and increasing the accumulation of DNA breaks during replication leading to cell death. Neoplastic cells with BRCA mutations are prone to errors in homologous recombination repair pathway; therefore, they are more susceptible to niraparib cytotoxicity. Although the mechanism of toxicity in nonneoplastic cells is poorly understood, niraparib's side effect profile may be explained by inhibition of PARPs in rapidly dividing cells such as hematopoietic cells and epithelial cells. Hemorrhagic mucositis occurs after extensive epithelial damage and is frequently seen as a complication of chemotherapy and radiation therapy, including niraparib. However, full-thickness infarction of the gastrointestinal organs has not been reported during treatment with niraparib. In our case, there was a temporal correlation between niraparib treatment and the development of diffuse hemorrhagic necrosis of large intestine as well as transmural infarction of the mid-esophagus. However, infarction of the esophagus, named black esophagus, is associated with numerous conditions including sepsis, vasculopathy, malignancy, diabetic ketoacidosis, alcohol use, thromboembolism, gastric volvulus, and thoracic aorta transection.[5] Exceedingly common findings seen in black esophagus include hypoalbuminemia, anemia, renal insufficiency, and hyperglycemia.[6] Therefore, the mechanism for the development of black esophagus in this patient was likely a result of a combination of ischemic injury (impaired perfusion due to septic shock) and disruption of mucosal barriers (mucositis due to niraparib toxicity).

Gelatinous bone marrow transformation refers to a lesion marked by adipose cell atrophy, hypoplasia of hematopoietic tissue, and deposition of mucopolysaccharides leading to the replacement of bone marrow with a myxoid material.[7] This process can occur in response to several disease states, mainly within the context of nutritional deprivation, including cachexia, malnutrition, anorexia, malabsorption, CHF, infection, and alcoholism. In response to the nutritional deficit, fat cells within the bone marrow undergo atrophy as the body enters an excessively catabolic state to compensate. Mucopolysaccharides replace the areas previously occupied by the now atrophic adipocytes and are thought to prevent interaction between hematopoietic cells within the bone marrow, halting their replication and differentiation.[7] The autopsy findings suggest that gelatinous bone marrow transformation could be part of the spectrum of niraparib-induced hematotoxicity in severely

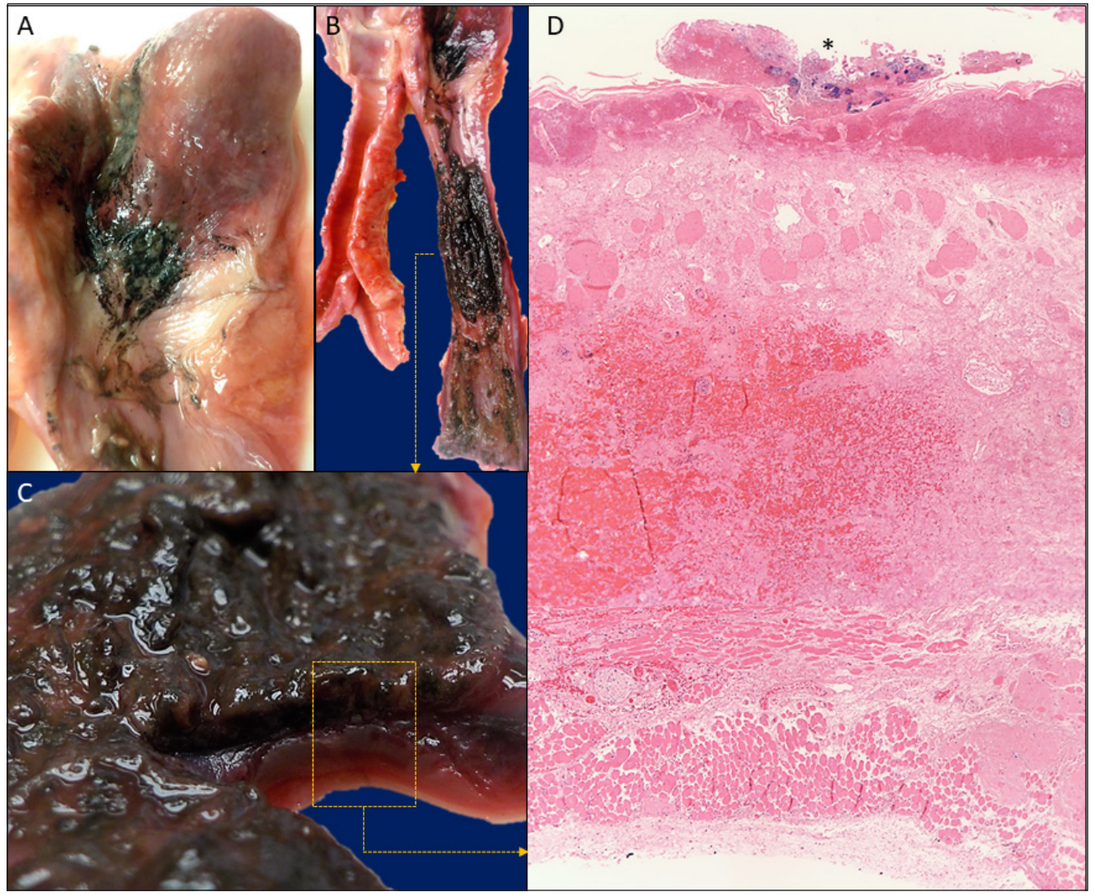

Figure 3. *Gross appearance and photomicrographs of the oropharynx (**A**) and the proximal/mid-segments of esophagus (**B-D**) with hemorrhagic mucosal necrosis. A. Black necrotic mucosa within the epiglottis and anterior oropharynx, **B**. Black esophagus (right) and unremarkable trachea (left). **C**. Full-thickness section of esophagus with diffuse black discoloration. **D**. Coagulative necrosis of all esophageal layers, mucosa (top) through adventitia (bottom), including accumulation of bacterial colonies in the mucosa (asterisk) and extensive hemorrhage in the mucosa and submucosa. H&E, 25x.*

malnourished or cachectic patients. Accumulation of lymphocytes and abundant hemosiderin-laden macrophages in the bone marrow are not typical of gelatinous transformation and may be attributed to a combination of niraparib hematotoxicity and malnourishment.

Of the approved PARP inhibitors, niraparib has the highest incidence of hematologic toxicities.[2] The recommended dose of niraparib is 300 mg/day; however, patients <77 kg or with baseline platelets less than 150,000/mm3 should receive a reduced initial dose of 200 mg/daily. The patient's weight and platelet count before starting niraparib treatment were 44 kg and 147,000/mm^3, respectively. A niraparib dose of 300 mg/day could have been considered too high for the patient's body weight and baseline bone marrow function. The incidence of NCI CTCAE grade 3 or 4 adverse events was greater among patients that weighed less than 58 kg in the NOVA study.[1] However, there are no data or recommendations for dose adjustment in patients with extreme nutritional deficit and cachexia. Niraparib is metabolized mainly via carboxylesterases and excreted through hepatobiliary and renal routes, but there is no need for dose adjustment in cases of moderate renal or hepatic impairment.[1,2] When patients can tolerate the initial dosage for 2-3 months with no hematologic toxicity, they may then be escalated to the 300 mg dose. Current recommendations on dose reduction following the development of toxicity depend upon whether

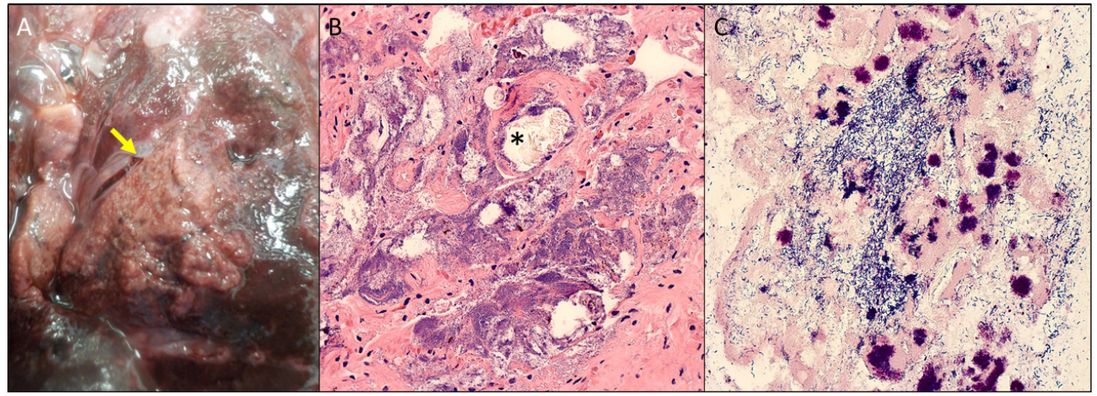

Figure 4. *Aspiration pneumonia in the lower lobe of left lung. **A.** Cut section exposing white-colored parenchymal consolidation (arrow). **B.** Tissue necrosis with accumulation of numerous bacterial colonies and foreign material (asterisk), H&E 400x. **C.** Brown-Brenn staining showing polymicrobial infection by gram positive and gram negative bacteria, 400x. Postmortem cultures revealed Klebsiella pneumoniae, Bacillus sp. and Proteus mirabilis.*

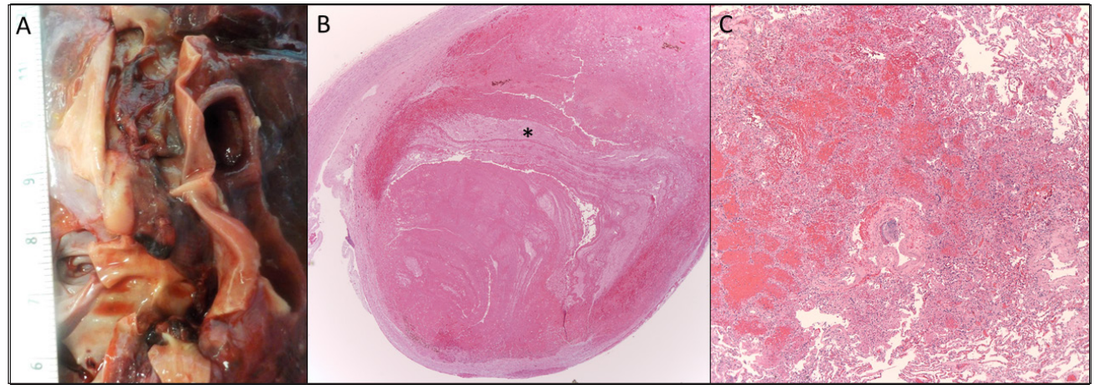

Figure 5. *Thromboembolus in the right pulmonary artery (**A**) with microscopic alternating layers (asterisk, laminations or lines of Zhan) indicating antemortem origin (**B**, H&E, 25x), and intraalveolar hemorrhage consistent with incomplete pulmonary infarction (H&E, 100x).*

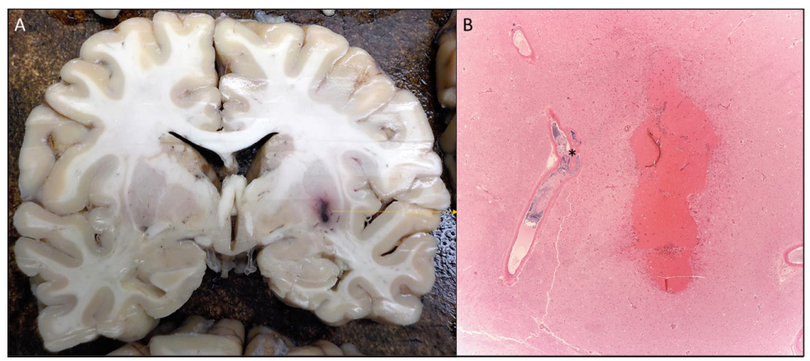

Figure 6. *Coronal section of the brain showing hemorrhagic infarction of the right putamen (**A**, arrow) secondary to a septic embolism of small vessels (**B**, asterisk, infarction of the right, H&E 50x).*

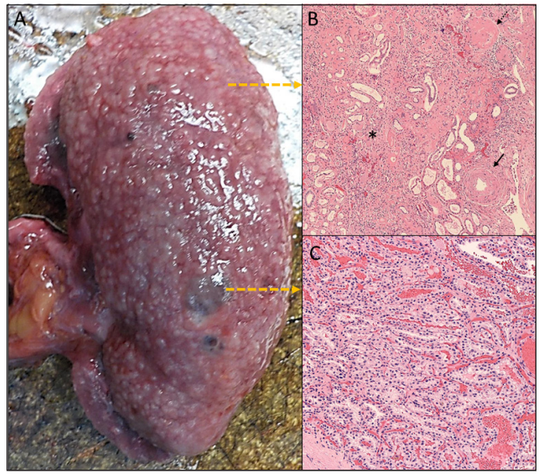

Figure 7. *Left kidney with extensively granular surface (**A**) secondary to changes of long-term hypertensive disease (**B**, H&E, 100x), including arteriosclerosis (arrow), interstitial fibrosis, tubular atrophy and thyroidization of tubules (asterisk) and glomerulosclerosis (dashed arrow). An incidental cyst was identified, composed of tightly packed branched tubules lined by cells with clear cytoplasm consistent with a renal cell carcinoma (**C**, H&E, 200x).*

manifestations are hematologic or non-hematologic and exceed the scope of this report.

In conclusion, the presented case shows how impaired oncologic patients with extreme cachexia are susceptible to develop severe toxic manifestations of niraparib. Dose adjustment is mandatory for patients with underweight and mildly depressed bone marrow function to prevent niraparib-associated adverse events. Niraparib treatment is probably not suitable for severely malnourished or functional impaired patients, for which palliative care may be considered early. The autopsy demonstrated that the toxicity associated with niraparib including hematologic and mucosal ulceration with disruption of mucosal barriers could predispose oncologic patients to the development of serious toxicity including black esophagus, disseminated bacterial infections and death. Furthermore, the effects of niraparib upon hematopoietic progenitor cells of the bone marrow combined with the nutritional deficits commonly seen in cancer-associated hypercatabolic states predispose patients to the development of gelatinous bone marrow transformation causing an immunosuppressive state. Finally, this autopsy also showed that niraparib can damage normal cells and fail to induce tumor regression.

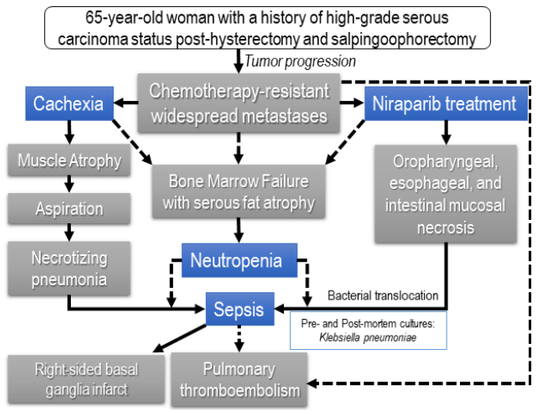

Figure 8. *Clinicopathological correlation of autopsy findings to understand the mechanism of death. (arrow: strong association or causality, dashed arrow: multifactorial, potential contributor).*

References

1. Mirza MR, Monk BJ, Herrstedt J, et al. Niraparib Maintenance Therapy in Platinum-Sensitive, Recurrent Ovarian *Cancer. N Engl J Med.* 2016; 375 (22):2154-2164.
2. Patibandla NS, Monga DK. Niraparib - A promising drug with hematological toxicity. *J Oncol Pharm Pract.* 2018 :1078155218800156. [in press].
3. Jiang X, Li W, Li X, et al. Current status and future prospects of PARP inhibitor clinical trials in ovarian cancer. *Cancer Manag Res.* 2019; 11: 4371-4390.
4. Kumar A, Langstraat CL, DeJong SR, et al. Functional not chronologic age: Frailty index predicts outcomes in advanced ovarian cancer. *Gynecol Oncol.* 2017;147(1):104-109.
5. Gurvits GE. Black esophagus: Acute esophageal necrosis syndrome. *World J Gastroenterol.* 2010;16(26): 3219-3225.
6. Gurvits GE, Cherian K, Shami MN, et al. Black Esophagus: New Insights and Multicenter International Experience in 2014. *Dig Dis Sci.* 2014;60(2):444-453.
7. Barbin FF, Oliveira CC. Gelatinous transformation of bone marrow. *Autops Case Rep.* 2017;7(2):5- 8.

Persistent Left Superior Vena Cava Draining into the Left Atrial Appendage with Associated Bicuspid Aortic Valve: A Case Report

Stephanie A Hernandez[1], Gabriel E Garcia[1], Joseph B Sluhoski, M.D.[2], Jason M Hoyos, D.O.[2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Department of Anesthesiology, Mount Sinai Medical Center, Miami Beach, FL

Corresponding Author: Stephanie Hernandez, shern263@med.fiu.edu

Abstract

A persistent left superior vena cava (PLSVC) is a common congenital anomaly, with the majority of cases having right atrial drainage, and thus no hemodynamic compromise. We present a 38-year-old patient with a bicuspid aortic valve, severe aortic insufficiency, and an ascending aortic aneurysm who presented for aortic valve replacement and repair of ascending aneurysm. Pulmonary artery catheterization and transesophageal echocardiography prior to scheduled aortic valve replacement and aneurysm repair, identified a PLSVC draining into the left atrial appendage. We discuss the embryology and possible clinical and procedural implications of this rare anatomical variant as it pertains to the practice of anesthesiology.

Key Words: persistent left superior vena cava; left atrial appendage; pulmonary artery catheter; transesophageal echocardiography; TEE; right-to-left shunt

Introduction

A persistent left superior vena cava (PLSVC) is a congenital anomaly of the thorax and is present in 0.3-0.5% of the general population.[1] Its incidence is increased to 10% in those with congenital heart malformations.[2] In approximately 80-90% of patients, a PLSVC drains into the right atrium (RA) either directly or via the coronary sinus (CS). In this case, patients are usually asymptomatic, do not have any hemodynamic compromise, and the anomaly is encountered incidentally during cardiovascular imaging or procedures for another indication.[3] In the minority of cases, the PLSVC may drain into the left atrium (LA) via the left superior pulmonary vein, an unroofed CS, or directly into the LA.[3,4] The latter being the rarest finding.

Drainage into the LA, in contrast to the RA, allows for right-to-left shunting and subsequent hemodynamic instability.[3] We report a case of a 38-year-old patient with a bicuspid aortic valve, severe aortic insufficiency, and an ascending aortic aneurysm presenting for aortic valve replacement and repair of ascending aneurysm after following up due to worsening shortness of breath. This patient had baseline oxygen saturation notably in the low 90s and was found preoperatively to have a PLSVC draining into the left atrial appendage (LAA). Available literature as it pertains to PLSVC was reviewed and discussion of the embryology as well as clinical and procedural implications of this anomaly are described. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Case Report

A 38 year-old male ASA III with a past medical history significant for a bicuspid aortic valve, severe aortic insufficiency, and an ascending aortic aneurysm presented for aortic valve replacement and repair of his ascending aneurysm. He was aware of his bicuspid valve many years ago but due to progressively worsening shortness of breath had presented for follow-up. As part of his initial hospital course he had received a transesophageal echocardiography (TEE) which showed markedly reduced left ventricular systolic function with an ejection fraction (EF) of 30% and severe LV dilation with a left ventricular end systolic diameter (LVESD) of 5-5.5 cm and left ventricular end diastolic diameter (LVEDD) of 6.5 cm. His left and non-coronary aortic cusps appeared fused resulting in a lack of coaptation causing severe aortic insufficiency. Additionally, his ascending aorta was measured at 5 cm. He had trivial amounts of mitral regurgitation and all other valves and atria appeared grossly normal. The patient was scheduled for replacement of his aortic valve with a mechanical valve and repair of his aneurysm. As part of the work up for this surgery he received a CT angiogram (CTA) which confirmed the above findings on TEE.

The patient presented to the anesthesia team the morning of surgery in the pre-procedure room where he was to receive a peripheral Iv, an arterial line, and a 9-F introducer with pulmonary artery (PA) catheter and central venous pressure (CVP) monitor. Of note, he was observed to a have baseline saturation in the low 90s on room air. Initial placement of the central line in the right internal jugular vein failed after multiple attempts due to inability to thread the wire. Ultrasound was performed and showed no evidence of thrombus; however, the vein did appear to be small and non-dilated (patient was in Trendelenburg). The left internal jugular vein was then successfully cannulated and the introducer placed with ease- extra care was taken to remove the dilator while the catheter was advanced. To confirm placement, the wire placed was confirmed with ultrasound, column manometry was performed, and

CASE REPORT

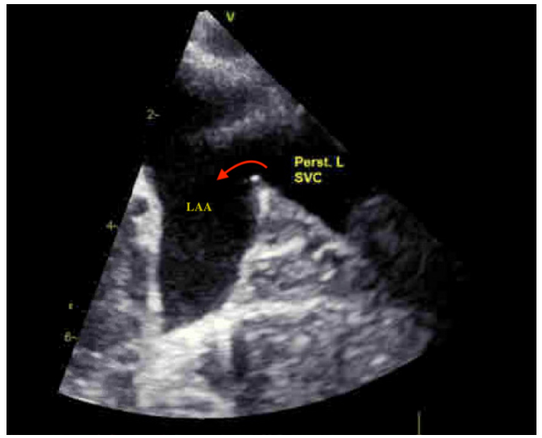

Figure 1. *TEE demonstrating and confirming a PLSVC draining into the left atrial appendage. (pulmonary artery catheter not pictured).*

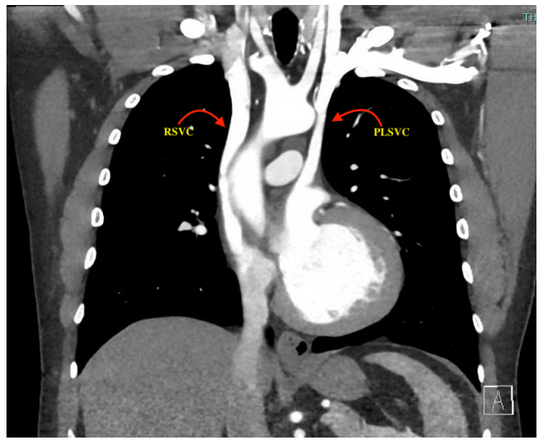

Figure 2. *Coronal CTA with view of left and right superior vena cava.*

non-pulsatile blood flowed freely from the catheter lumens. When the PA catheter was floated there was no resistance; however, the pressures did not appear to be right sided, as they were severely elevated. The patient had a history of elevated mean pulmonary pressures in the 30-40 range. The systolic PA pressures being measured at this time were in the 90-100 range with diastolic in the 10-20 range. The procedure was stopped and the patient moved to the OR for further investigation with TEE and fluoroscopy.

Once in the OR, the patient was placed under general anesthesia and a TEE probe was inserted (**Figure 1**). Repeat placement of the PA catheter confirmed that it was indeed entering the left atrium followed by the left ventricle. Upon further evaluation by cardiology it appeared that the catheter was entering the left atrial appendage (LAA) through a lumen which appeared to be a pulmonary vein or a PLSVC. Upon further review by radiology of the original pre-op CTA it was confirmed to be a PLSVC draining directly into the LAA (**Figures 2-3**). The surgery was cancelled so that the patient could be further worked up. He was then extubated and taken to the post anesthesia care unit (PACU). The additional work up included an MRI, which further confirmed the presence of the PLSVC (**Figure 4**).

The patient returned to the operating room two weeks later for repair of his aortic root, replacement of his aortic valve, and ligation of the PLSVC. In this case, the patient's innominate vein was small but large enough to accommodate drainage from the left upper side of the body. Surgery was successful and the patient had no complications post operatively.

Discussion

The main venous drainage system of the head and the upper half of the body during the fourth week of gestation is via two anterior cardinal veins, while the caudal parts are drained by the posterior cardinal veins. At around the eighth week of gestation, the two anterior cardinal veins are connected by an oblique anastomosis, which later becomes the innominate (or left brachiocephalic) vein. The caudal part of the left anterior cardinal vein regresses to form the remnant Ligament of Marshall directing blood to the proximal right anterior cardinal vein, which is to become the right superior vena cava (RSVC). Failure of the left anterior cardinal vein to regress results in a PLSVC.[5,6] Some of the associated cardiac abnormalities include atrial septal defects, anomalous connection of the pulmonary veins, bicuspid aortic valve, coarctation of the aorta, coronary sinus ostial atresia, heterotaxy syndrome, tetralogy of fallot and double aortic arch.[7]

A PLSVC is most frequently seen with drainage into the right atrium. More rare cases are that of a PLSVC draining directly into the LA via an unroofed CS, and even less frequently is drainage directly into the LA. Also of importance is the presence or absence of the RSVC. Our patient with bicuspid aortic valve was of the rare subset who was found to have a PLSVC draining into the LAA with an atretic RSVC. Reports in the literature describe various ways of diagnosing patients with PLSVC such as TEE/TTE, injecting agitated saline as a contrast in the left and right antecubital veins, contrast upper venous digital subtraction cavography, CT, and MRI.[2] Our patient's presentation serves to show additional factors that should raise clinical suspicion for venous anomalies, such as PLSVC, during the pre-operative assessment. Those factors being the following: low baseline oxygen saturation as evidence of right-to-left shunting, inability to advance a central line via right internal jugular vein, and LA and LV pressure ranges when advancing the PA catheter with a left internal jugular vein approach. Confirmation was made with TEE (**Figure 1**), CTA (**Figures 2-3**), and MRI (**Figure 4**) in this case.

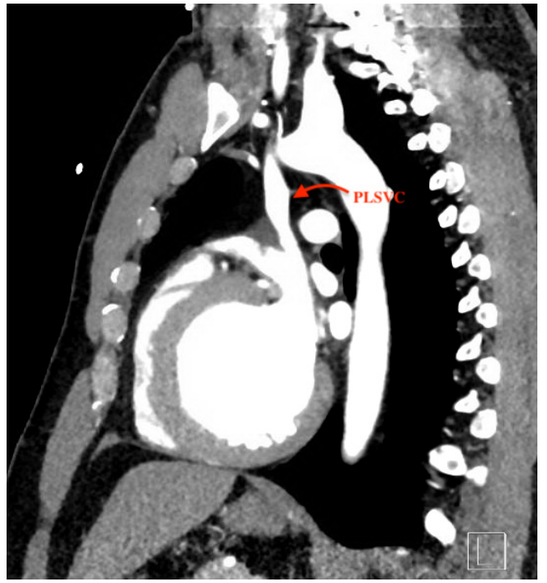

Figure 3. *Sagittal CTA showing persistent left superior vena cava.*

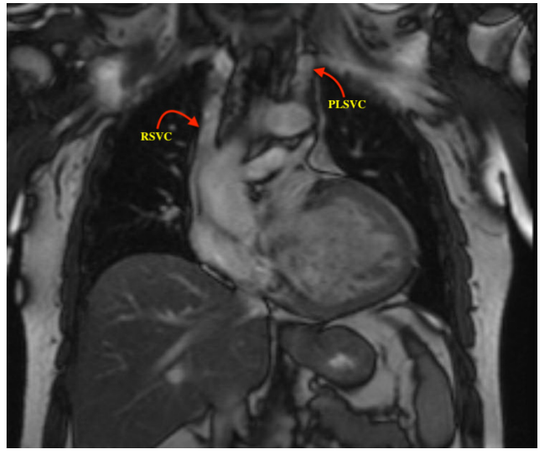

Figure 4. *Coronal MRI with view of left and right SVC.*

A PLSVC with direct LA drainage can bring about challenges during procedures such as central line placement, right heart catheterization, Swan-Ganz catheter, permanent pacemaker, and implantable cardioverter defibrillator. Due to the proximity to the CS, some of the complications that have been reported when a guide wire or catheter is manipulated through a PLSVC include injury to the vessel wall, angina, arrhythmia, cardiogenic shock, tamponade and cardiac arrest.[1,4] In one clinical series, the incidence of supraventricular tachycardia during catheterization was 38% in patients with PLSVC, in comparison to 7.9% in patients with only the right SVC.[8]

The clinical implications of this anomaly if left untreated are mainly due to right-to-left shunting. Such implications include increased risk of cyanosis, heart failure, disseminated infection, intracerebral abscess, and paradoxical embolism.[9] In the literature review, specific cases were found reporting septic emboli leading to intracerebral abscess secondary to a PLSVC after dental procedures.[9,10] Apart from complications due to the right-to-left shunt, it has also been reported that atrial fibrillation and sudden death can occur in patients with a PLSVC owing to repetitive rapid discharges and shorter activation cycle length from the multiple anatomical and electrical communications with the atria. In patients with CS ostial atresia, severe myocardial ischemia can occur if there is interruption of the PLSVC during cardiac surgery.[3] Another important factor to consider is that drugs can directly enter systemic circulation when administered from the left brachiocephalic vein.[9]

This case highlights a rare venous anomaly to be aware of in order to prevent and anticipate complications during procedures such as central lines. Diagnostic imaging modalities should be used prior to invasive procedures if there is any indication of PLSVC based on clinical clues. Patients with known congenital heart defects should increase ones index of suspicion. Anesthesiologists encountering patients with a known PLSVC; particularly with a stenotic RSVC or an absent RSVC while attempting to introduce a PA catheter, should consider an alternative and safer method to obtain central access such as via the femoral vein.

References

1. Bisoyi S, Jagannathan U, Dash AK, et al. (2017). Isolated persistent left superior vena cava: A case report and its clinical implications. *Ann Card Anaesth*, 20(1), 104–107.

2. Uçar O, Paşaoğlu L, Ciçekçioğlu H, et al. (2013). Persistent left superior vena cava with absent right superior vena cava: a case report and review of the literature. *Cardiovasc J Afr*, 21(3), 164–166.

3. Yousaf, M., & Malak, S. F. (2015). Left Atrial Drainage of a Persistent Left Superior Vena Cava. *Radiology Case Reports*, 3(4), 225.

4. Ratliff HL, Yousufuddin M, Lieving WR, et al. (2006). Persistent left superior vena cava: Case reports and clinical implications. *Int J Card*. 2006;113(2):242–246.

5. Mabry VL, Mancino AT, Sullivan SC (2014). Persistent left superior vena cava. *J Assoc Vasc Access*, 19(2), 84–85.

6. Peltier J, Destrieux C, Desme J, et al. (2006). The persistent left superior vena cava: Anatomical study, pathogenesis and clinical considerations. *Surg Radiol Anat*, 28(2), 206–210.

7. Saha S, Paoletti D, Robertson M. (2012). Persistent left superior vena cava - considerations in fetal, pediatric and adult populations. *Australas J Ultrasound Med*, 15(2), 61–66.

8. Fraser RS, Dvorkin J, Rossall RE, Eidem R. (1961). Left superior vena cava: A review of associated congenital heart lesions, catheterization data and roentgenologic findings. *Am J Med*, 31(5), 711–716.

9. Tobbia P, Norris LA, Lane T. (2013). Persistent left superior vena cava draining into the left atrium. *BMJ Case Rep*, 2013;2013:010167.

10. Erol I, Cetin II, Alehan F, et al. (2006). Brain Abscess Associated with Isolated Left Superior Vena Cava Draining into the Left Atrium in the Absence of Coronary Sinus and Atrial Septal Defect. *Cardiovasc Intervent Radiol*, 29(3), 454–456.

Median Arcuate Ligament Syndrome - An Anomaly on the Differential for Chronic Abdominal Pain

Moneba Anes[1], Reema Kola[1], Guillermo Izquierdo Pretel, M.D.[1,2], Muhammad Aziz, M.D.[1,2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Jackson Memorial Hospital, Miami, FL

Corresponding Author: Moneba Anees, manee002@med.fiu.edu

Abstract

Median Arcuate Ligament Syndrome (MALS) is an uncommon cause of abdominal pain. It is a difficult diagnosis to make due to its rarity and nonspecific clinical presentation. MALS causes abdominal pain through compression of the celiac artery by the median arcuate ligament. The syndrome has varied clinical presentations, and diagnosis is further complicated due to the prevalence of incidental findings of celiac artery compression in imaging studies of healthy patients. Thus, MALS has become a diagnosis of exclusion, and patients are put through several tests before being diagnosed. A combination of clues from the patient's history compounded with positive imaging should raise suspicion for MALS. Temporary treatment includes pain medication and nerve blocks; however, long-term relief has successfully been achieved through surgical decompression. Long-term medical management has not extensively been studied in this population. The following is a case report of a 50-year-old female presenting with MALS who was not a candidate for surgical decompression. The severe pain felt by patients suffering from this disorder and the high curative rate of surgical decompression highlight the importance of keeping MALS on the differential for abdominal pain.

Keywords: celiac artery compression; abdominal pain; MALS

Introduction

Although abdominal pain is a common presenting complaint, overall sensitivity and specificity of the history and physical examination for establishing a diagnosis is poor. An infrequent cause of abdominal pain, Median Arcuate Ligament Syndrome (MALS), is a difficult diagnosis to make due to its rarity and nonspecific clinical presentation. The pain associated with MALS is caused by anatomical compression of the celiac artery.[1] The phenomenon was first described in 1917 by Benjamin Lipshutz who noted the anomaly through his work with cadavers. He observed that in some dissections, the celiac artery was overlapped by the diaphragmatic crura.[2] The incidence of MALS remains to be calculated; however, this anatomical variation is present in 10-24% of the population and is rarely associated with clinical findings.[1,2]

When symptoms are present, MALS can be diagnosed. This syndrome presents as chronic, recurrent pain occurring from the compression of the celiac artery by the median arcuate ligament. It is classified by a triad of postprandial abdominal pain, weight loss, and an abdominal bruit heard on physical exam. Nonspecific clinical features of the disease include weight loss, nausea, vomiting, and diarrhea. This syndrome is more prevalent in women between the ages of 40 and 60 years old who have a thin body habitus.[3]

Imaging studies showing compression of the celiac artery help lead to the diagnosis of MALS; however, diagnosing patients with the syndrome is further complicated due to the prevalence of incidental findings of celiac artery compression in patients without abdominal pain.[4] Since the intensity of the compression is affected by ligament movement caused by respiration, inspiratory and expiratory vascular imaging can be performed to test for increased blood flow velocity, suggestive of a stenotic vessel.

Long-term treatment of the syndrome, which consists of celiac artery decompression, is reserved for patients who are symptomatic.[4] Although surgical treatment has a good patient prognosis consisting of an 80% cure rate,[5] treatment of MALS using solely medical management is a rarely sought strategy. In the one retrospective cohort study performed comparing surgical treatment to medical treatment, in which only 3 patients were treated medically, it was found that surgical decompression has a better response than conservative treatment of MALS. [6]

Case Report

A 50-year-old African-American female with a past medical history significant for multiple abdominal surgeries presented to the hospital in 2019 with acute-on-chronic abdominal pain. The pain was localized to the periumbilical region and described as a "constant discomfort" that fluctuated in intensity and occasionally radiated throughout her abdomen. It had been present for several years but progressively worsened over the past three weeks, following removal of a percutaneous gastrojejunostomy tube. This feeding tube had been placed to treat the patient's malnutrition, an indirect result of her significant post-prandial pain. The patient described her pain as a 10/10 in severity at rest, but she said that it significantly increased with movement, bearing down, and eating. At the time of presentation, the patient had been taking Percocet without relief and complained of intermittent episodes of non-bilious, non-bloody emesis. She had lost 15 pounds in two weeks

but denied fever, chills, shortness of breath, sick contacts, recent travel, or changes in urination or bowel movements. She further denied family history of colon cancer and inflammatory bowel disease.

The patient's past medical history included hypothyroidism, hypertension, and depression. Surgical history included three C-sections in 1985, 1992, and 1997, an appendectomy in 1997, a Roux-en-Y gastric bypass in 2000, a laparoscopic cholecystectomy in 2003, and a belt lipectomy and Fleur-de-lis to remove excess abdominal skin in 2006. During this time, the patient's BMI dropped from 47 to 23. Patient described rare alcohol consumption and denied abuse/domestic violence, substance abuse, or tobacco use.

Physical exam revealed a diffusely tender abdomen with no guarding or rigidity. Bowel sounds were normoactive, and no bruit was heard on auscultation. The patient had low levels of protein and albumin. Electrolytes were within normal limits. Labs showed normal liver and renal function. Thyroid function tests showed elevated TSH at 7.07 and low free T4 (0.86). Urinalysis showed no abnormalities.

CT angiography (**Figure 1**) of her abdomen three months prior to admission showed fishhook configuration of the celiac trunk with appearance of a short segment high-grade narrowing in the region of the median arcuate ligament, which corresponded with MALS. Ultrasound duplex at the time showed celiac artery velocities of 389 cm/s at rest, 377.3 cm/s with inspiration, and 350.8 cm/s during expiration. The impression at the time suggested that these findings showed no significant changes in velocity and did not suggest MALS.

A computed tomography (CT) (**Figure 2**) scan performed one month prior to admission demonstrated compression of the celiac trunk, another result concerning for MALS. Repeat duplex ultrasound of the celiac artery at that time showed celiac artery velocities of 200 cm/s at rest, 290 cm/s during inspiration, and 320 cm/s during expiration. These mildly increased velocities could correlate with MALS in the correct clinical setting. A mesenteric angiogram performed during admission showed the presence of an acute angle formed from the celiac artery on both inspiration and expiration. Formation of this angle indicated compression of the artery.

Due to a combination of clues from the history, physical, and multiple suggestive imaging results, diagnosis of MALS was made. The additional factors of depression and post-surgical scarring increased the complication and treatment of the case. One month prior to admission, the patient had a celiac plexus neurolysis (nerve block) performed. However, the patient's pain did not dissipate after this procedure. Although surgical decompression has shown

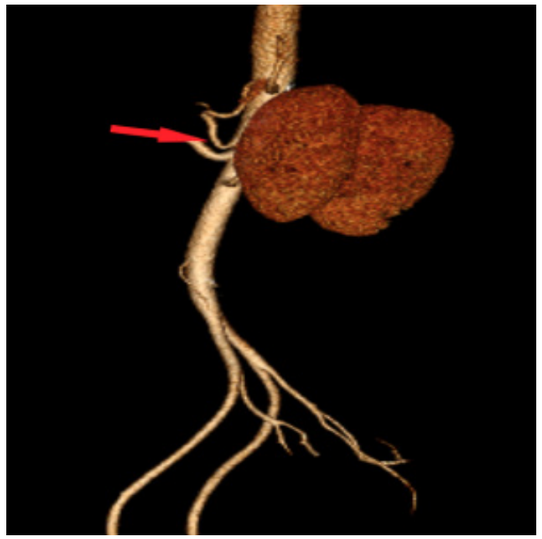

Figure 1. *CT angiography showing fishhook configuration of celiac trunk (red arrow) in the region of the median arcuate ligament, suggestive of median arcuate ligament syndrome.*

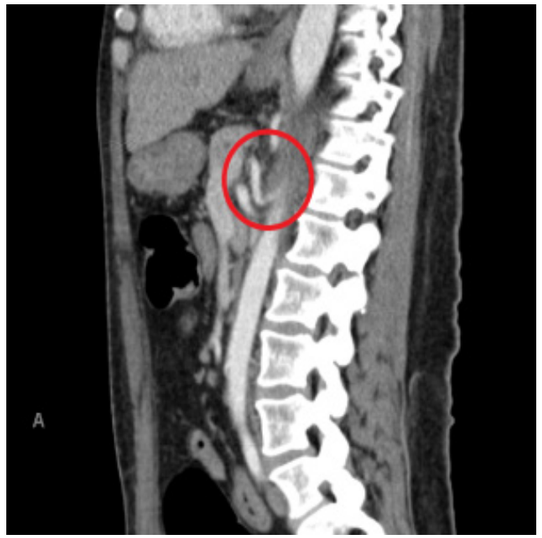

Figure 2. *Sagittal CT abdomen showing compression of the celiac trunk (red circle) near the diaphragm, findings consistent with median arcuate ligament syndrome.*

promising results in patients, surgery was deemed too risky due to extensive scarring from prior surgeries. The patient declined another nerve block after the first unsuccessful attempt, so she was discharged with a pharmacological regimen consisting of 1000 mg Acetaminophen as needed, 5% Lidocaine topical patch as needed, 30 mg Morphine two times a day, 20 mg Oxycodone four times a day, 100 mg Pregabalin three times a day, and 2 mg Tizanidine three times a day. The patient was also prescribed Polyethylene glycol for constipation and vitamins (Vitamin C, D, and B12) for malnutrition. She was also prescribed 0.5 mg Lorazepam and 25 mg Amitriptyline for psychiatric support. Since being discharged, the patient has visited the emergency department twice due to pain exacerbations. At this time, she remains ineligible for surgical decompression.

Discussion

If symptomatic, clinical presentation of MALS is variable; however, patients often present with chronic postprandial abdominal pain and unintentional weight loss resulting from nausea, vomiting, diarrhea, and anorexia.[1] On physical exam, patients can have tenderness to palpation in the epigastric region as well as an abdominal bruit.[7] Due to the rarity of the disease, the normal variant celiac artery compression found in some patients, and varying presentations of the syndrome, MALS is a diagnosis of exclusion. When finally considered, MALS is most often diagnosed in thin middle-aged women who have gone through many examinations for abdominal pain. Our patient presented with the classical history and epidemiology for a patient presenting with the syndrome. She had been battling chronic abdominal pain for several years. The pain increased when she ate and was associated with nausea and emesis. Further, the patient had a significant weight loss. Deviations from the classical presentation included the absence of an abdominal bruit.

Imaging studies can also be useful in diagnosing MALS; however, there are also fallacies in this method. Due to the high prevalence of celiac compression in healthy patients, imaging results must be correlated with clinical symptoms.[3] Findings suggesting MALS can be seen using catheter angiography, Doppler ultrasound, and CT. Although our patient's duplex ultrasound did not originally correlate with findings suggestive of MALS, her repeat ultrasound, angiography, and CT all showed results indicative of MALS.

Since the pain felt in MALS is caused by compression of the celiac artery, curative treatment includes alleviating this compression.[5] Celiac ganglion block can be performed for temporary relief or inoperable cases. Analgesics can also be used to ease pain temporarily. Surgical interventions can be laparoscopic or open, and reconstruction may be needed if artery flow is not adequate. Following surgical intervention, 60-70% of patients reported pain relief.[7] Unfortunately, our patient was unable to safely undergo surgery due to the presence of scarred abdominal tissue, and she decided against a nerve block due to a previous unsuccessful attempt.

This report discusses a case of MALS, a rare syndrome encompassing a variety of presentations, that is being treated by medical management. A combination of clues from the history, physical exam, and imaging studies can help clinicians reach the diagnosis of MALS. Reaching this diagnosis can be advantageous because the syndrome causes patients to suffer excruciating chronic pain. Although medical management for long-term pain relief in the setting of MALS is a phenomenon rarely studied, surgical decompression has shown to have a high cure rate. Due to the rarity of disease, complexity of presentation, and high surgical cure rate, MALS should have a place on every differential for chronic abdominal pain.

References

1. Kim EN, Lamb K, Relles D, Moudgill N, DiMuzio PJ, Eisenberg JA. Median Arcuate Ligament Syndrome-Review of This Rare Disease. *JAMA Surg*. 2016;151(5):471–477.

2. Duckheim M, Geisler T, Zuern CS, Gawaz M. A patient presenting with stress-induced epigastric pain. *BMJ Case Rep*. 2015;2015:bcr2014207799.

3. Horton KM, Talamini MA, Fishman EK. Median arcuate ligament syndrome: evaluation with CT angiography. *Radiographics*. 2005;25(5):1177–1182.

4. Khrucharoen U, Juo YY, Sanaiha Y, Finn JP, Jimenez JC, Dutson EP. Factors Associated with Symptomology of Celiac Artery Compression and Outcomes following Median Arcuate Ligament Release. *Ann Vasc Surg*. 2020;62:248–257

5. Sun Z, Zhang D, Xu G, Zhang N. Laparoscopic treatment of median arcuate ligament syndrome. *Intractable Rare Dis Res*. 2019;8(2):108–112.

6. Ho KKF, Walker P, Smithers BM, et al. Outcome predictors in median arcuate ligament syndrome. *J Vasc Surg*. 2017;65(6):1745–1752.

7. Saleem T, Baril DT. Celiac Artery Compression Syndrome. *StatPearls*. 2019 Jan.

Cavitary Pulmonary Nodules in Metastatic Cancer

Reema Kola[1], Moneba Anes[1], Guillermo Izquierdo Pretel, M.D.[1,2], Muhammad Aziz, M.D.[1,2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Jackson Memorial Hospital, Miami, FL

Corresponding Author: Reema Kola, rkola004@med.fiu.edu

Abstract

Pulmonary nodules with cavitations are a rare finding in cancer that has metastasized to the lungs. We report a case of a 57-year-old female with a past medical history of asthma and major depressive disorder with psychotic features who was admitted for intermittent epigastric pain. Associated symptoms included early satiety, a short course of diarrhea, and a five to ten pound weight loss. Social history was significant for a 22 pack-year smoking history and heavy alcohol intake. Physical examination demonstrated mild epigastric tenderness. CA 19-9 was elevated at 90 U/mL. Computed tomography (CT) of the abdomen showed dilation of the main pancreatic duct, but no solid mass. CT of the chest showed a large noncalcified subpleural nodule with mildly spiculated/irregular borders. Also seen numerous bilateral smaller solid noncalcified nodules many of which had central cavitations. Differential diagnoses included metastatic cancer, tuberculosis, fungal infection, and granulomatosis with polyangiitis. Sputum culture, quantiferon-TB gold, and antineutrophil cytoplasmic antibodies (ANCA) were negative. Biopsy of a pulmonary nodule revealed mucinous adenocarcinoma.

Keywords: mucinous adenocarcinoma; cavitary pulmonary nodules

Introduction

A pulmonary cavity is a gas-filled space within a nodule or area of consolidation. Pulmonary cavitations are features of a variety of disease processes from infections to systemic diseases. Infectious causes include necrotizing pneumonia, septic emboli, mycobacterium tuberculosis, non-tuberculous mycobacterium, nocardia, and fungal infections. Systemic diseases that present with pulmonary cavitations include primary and metastatic malignancies and autoimmune diseases, such as granulomatosis with polyangiitis and rheumatoid arthritis.

Primary lung tumors more commonly present as pulmonary cavitations compared to secondary lung tumors.[1] Among secondary lung tumors, colon cancer and cancers of the head and neck more often cavitate.[1] However, it is rare for pancreatic cancer to do so.[1] Here we present a case of multiple cavitary pulmonary nodules as a manifestation of pancreatic cancer.

Case Report

A 57-year-old female with a past medical history of asthma and major depressive disorder with psychotic features was admitted for intermittent burning and cramping epigastric pain that radiated to the back. The pain started three months ago but worsened in the past two weeks. She reported early satiety and a five to ten pound weight loss that she attributed to not eating. Two to three days prior to admission, she developed non-bloody diarrhea that had resolved before her hospitalization. A previous trial of omeprazole did not alleviate her pain. When enquiring about night sweats, the patient reported hot flashes since undergoing menopause several years ago. Patient reported no fever, chills, cough, nausea, vomiting, constipation, dysuria, urinary frequency, urgency, or history of travel.

Surgical history consisted of four caesarean deliveries. The patient had a 22 pack-year smoking history. She regularly consumed four to five glasses of liquor on the weekends. Her sister died of breast cancer at the age of 49. Her mother and father had type 2 diabetes.

Temperature was 37.1°C, heart rate 55/minute, blood pressure 132/71 mm Hg, respiratory rate 17/minute, and SpO2 100% on room air. On examination patient had an obese body habitus and was in no acute distress. Her lungs were clear to auscultation bilaterally. There was mild epigastric tenderness with no rebound tenderness or guarding. Laboratory results are shown in **Table 1**.

CT of the abdomen showed “dilation of the main pancreatic duct in the body and tail with parenchymal atrophy” concerning for obstructing mass in the pancreatic head. It also showed “nodular opacities in the lung bases and mild right hydronephrosis.” CT of the chest showed a “1.6 X 2.0 cm noncalcifed subpleural nodule with mildly spiculated/irregular borders in the posterior segment of the right lower lobe” in addition to “too numerous to count bilateral smaller solid noncalcified pulmonary nodules many of which demonstrated irregular borders and central cavitation” (**Figure 1**).

Differential diagnosis included tuberculosis (TB), metastatic cancer, fungal infection, granulomatosis with polyangiitis, and other autoimmune disorders. Additional imaging did not reveal a solid pancreatic mass. Endoscopic ultrasound (EUS) was consistent with chronic pancreatitis. Urinalysis was unremarkable, while urine microscopy showed white blood cells 11/hpf, red blood cells 4/hpf, and many hyaline casts. β-D-glucan fungitell, an assay for invasive fungal disease, was positive. However, mycology cultures from the broncheoalveolar lavage as well as the aspergillus assay were negative.putum cultures for TB, Quantiferon-TB Gold, and antineutrophil cytoplasmic antibodies (ANCA) were negative. Biopsy of a lung nodule revealed mucinous adenocarcinoma involving lung parenchyma. The sample was positive for CK7 and CDX2 and negative for TTF-1, napsin-A, CK20, and SATB2 (**Figure 2**).

Table 1. Laboratory values

	Patient values	Normal
Complete Blood Count		
White blood cells (k/mm3)	7.6	4.0-10.5
Neutrophils %	35.3 (L)	36.0-70.0
Lymphocytes %	54.7 (H)	16.0-43.0
Monocytes	8	6.0-12.0
Hemoglobin (g/dL)	14.1	11.1-14.6
Hematocrit (%)	41.6	33.2-43.4
Platelets (x10^3/mcl)	288	140-400
Complete Metabolic Panel		
Sodium (mmol/L)	139	137-145
Potassium (mmol/L)	3.8	3.6-5
Chloride (mmol/L)	101	98-107
Carbon dioxide (mmol/L)	26	22-30
Blood urea nitrogen (mg/dL)	11	7-17
Creatinine (mg/dL)	1.01	0.52-1.04
Glucose (mg/dL)	117 (H)	74-106
Calcium (mg/dL)	9.8	8.4-10.2
Total bilirubin (mg/dL)	0.5	0.2-1.3
Total protein (g/dL)	7.3	6.3-8.2
Albumin (g/dL)	4.6	3.9-5.0
Alkaline phosphatase (U/L)	81	38-126
Aspartate aminotransferase (U/L)	32	15-46
Alanine aminotransferase (U/L)	35	9-52
Lipase (U/L)	346 (H)	23-300
C-reactive protein (mg/L)	0.7	0.0-0.9
Lactate dehydrogenase (IU/L)	530	313-618
CA 19-9 (U/mL)	90.4 (H)	0.0-35.0
Procalcitonin (ng/mL)	0.022	0.000-0.080
Complement C3 (mg/dL)	130	90-130
Complement C4 (mg/dL)	25	10-40

Positron Emission Tomography/Computed Tomography (PET/CT) showed findings concerning for pancreatic malignancy with pulmonary metastasis (**Figure 3**). The GI tumor board came to a consensus that the diagnosis was most likely primary pancreatic cancer. For palliative purposes, the patient was started on chemotherapy with mFOLFIRINOX. She is currently on her sixth cycle.

Discussion

The differential diagnosis for cavitary pulmonary lesions includes infectious, autoimmune, and cancerous etiologies. In addition, several case reports have depicted coexistence of malignancy and infection in cavitary lung lesions.[2-4]

Among the infectious causes, mycobacterium tuberculosis is the most prevalent cause of cavitary pulmonary lesions.[5] The cavities are usually seen in the apical and posterior segments of the upper lobe or superior segment of the lower lobe.[5] Upper lobe disease is usually seen in immunocompetent individuals.[6] In contrast, lower lobe disease is usually seen in immunocompromised individuals.[6] Our patient reported weight loss and hot flashes that could be interpreted as night sweats, however, she did not have a fever, chronic cough, or history of travel. TB was further ruled down when the sputum culture and quantiferon-TB gold assay were found to be negative.

Many fungal infections such as aspergillosis, cryptococcosis, and histoplasmosis cause cavitations.[7] Fever and cough are shared symptoms among these fungal infections.[7] In addition, invasive aspergillosis and cryptococcosis are more common among immunocompromised individuals, while chronic necrotizing aspergillosis and histoplasmosis are more common among those with structural lung disease.[7] Our patient was not immunocompromised and did not have fever, cough, or structural lung disease. Even though the β-D-glucan fungitell assay was positive, the mycology culture from the broncheoalveolar lavage and aspergillus assay were negative.

Cavitary pulmonary lesions frequently occur in granulomatosis with polyangiitis (GPA).[5] Among patients with lung involvement, 35 to 50% have cavitations.[5] Cough and shortness of breath are present in 95% of patients with GPA.[6] other common symptoms include

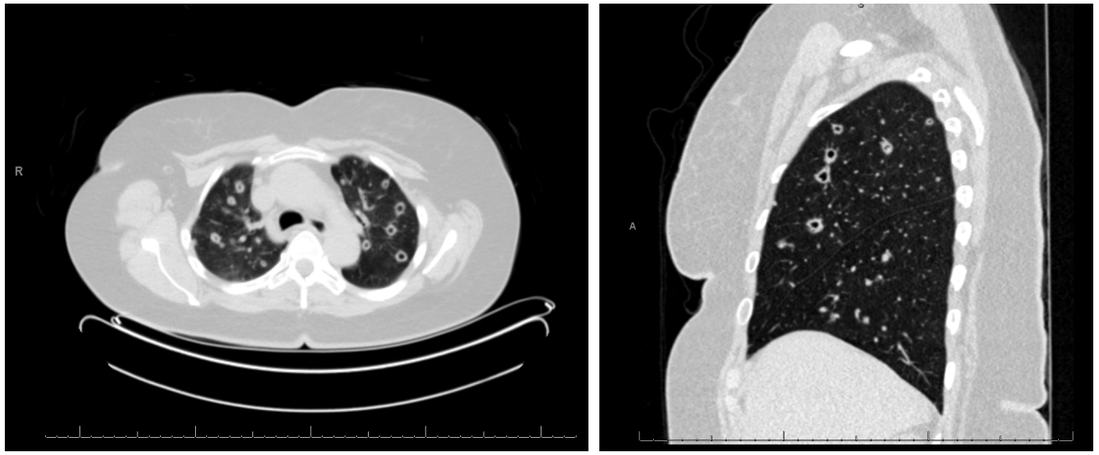

Figure 1: *Horizontal (left) and sagittal (right) plane of CT chest showing numerous cavitating pulmonary nodules.*

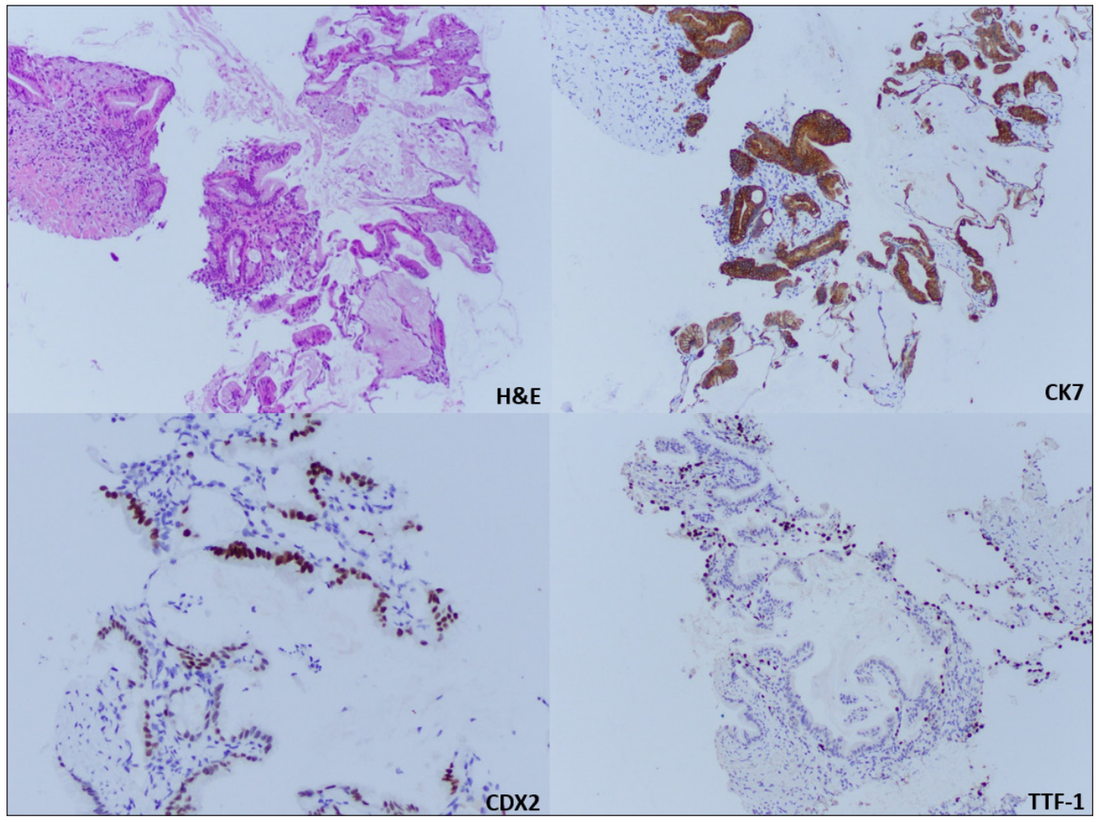

Figure 2: *Immunohistochemistry of lung nodule biopsy (100x).*

epistaxis and hemoptysis. Our patient did not have any of these symptoms. Furthermore, her urinalysis was negative for red blood cell casts and ANCA proteins were negative as well.

Autoimmune diseases such as ankylosing spondylitis, systemic lupus erythematosus and rheumatoid arthritis rarely have pulmonary cavitations.[5] In these cases, clinicians should suspect infectious etiology for these cavitary lesions since these patients are treated with immunosuppressants.[5]

Cavitation in primary lung cancer is more frequent compared to lung metastasis from other primaries.[1] The most common type of primary lung cancer to cavitate is non-small cell lung cancer.[7] Onn et al. reported cavitations from CT images in 22% of non-small cell lung cancer.[8] Mourox et al. studied primary lung cancer and, using both chest radiograph and CT, found that 11% had cavitations.[9] Chui et al. studied 244 lung tumors that were a combination of primary and secondary lung tumors and, using chest radiograph, found that 27 (11%) tumors were cavitated.[10] Out of the 27, only one was due to metastasis from a non-pulmonary primary.[10]

Cavitations occur less often in metastatic lung disease.[1] Chaudhuri studied 25 cases of cavitary pulmonary metastases, of which only two were of pancreatic origin.[1] Both cases had only one cavitation. So far, only nine cases of multiple cavitary pulmonary lesions from pancreatic adenocarcinoma have been published.[11-14] Our patient had countless small pulmonary nodules, many of which were cavitated. Other findings that pointed to the diagnosis of pancreatic cancer included chronic epigastric pain, early satiety, and a 22 pack-year smoking history. Additionally, a core needle biopsy revealed mucinous adenocarcinoma that was positive for CK7 and negative for CK20.. The differential diagnosis for a $CK7^{+}/CK20^{-}$ tumor includes pancreatic and lung adenocarcinoma.[15] TTF-1 and napsin-A, which are markers of lung origin, were negative making primary lung adenocarcinoma less likely.

Pulmonary cavitations are features of various disease processes from infections, such as mycobacterium tuberculosis and aspergillosis, to systemic diseases, such as granulomatosis with polyangiitis and malignancy. Although cavitary pulmonary lesions are a rare feature of pancreatic cancer, this phenomenon can occur, and pancreatic cancer should be included in the differential diagnosis.

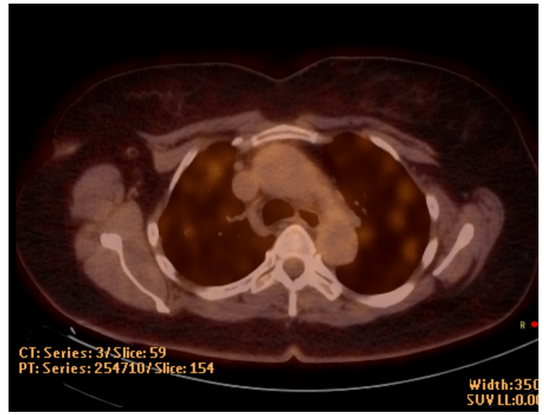

Figure 3: *PET/CT showing numerous pulmonary nodules.*

References

1. Chaudhuri MR. Cavitary pulmonary metastases. *Thorax*. 1970;25(3):375–381.

2. Fujita K, Uchida N, Horimoto K, et al. Two cases of cavitary lung cancer with concomitant chronic infectious disease. *Respir Med Case Rep*. 2018;24:122-124.

3. Byun HG, Yoo JY, Kim SJ, Lee OJ, Yoo MY. Coexistence of lung adenocarcinoma and pulmonary tuberculosis within a single lesion: A rare case report. *Medicine (Baltimore)*. 2019;98(39):e17378.

4. Kobashi Y, Fukuda M, Nakata M, Oka M. Coexistence of metastatic lung cancer and pulmonary tuberculosis diagnosed in the same cavity. *Int J Clin Oncol*. 2005;10(5):366-370.

5. Gadkowski LB, Stout JE. Cavitary pulmonary disease. *Clin Microbiol Rev*. 2008;21(2):305-333.

6. Parkar AP, Kandiah P. Differential diagnosis of cavitary lung lesions. *Journal of the Belgian Society of Radiology*. 2016;100(1):100.

7. Gafoor K, Patel S, Girvin F, et al. Cavitary Lung Diseases: A Clinical-Radiologic Algorithmic Approach. *Chest*. 2018;153(6):1443–1465.

8. Onn A, Choe DH, Herbst RS, et al. Tumor cavitation in stage I non-small cell lung cancer: epidermal growth factor receptor expression and prediction of poor outcome. *Radiology*. 2005;237(1):342–347.

9. Mouroux J, Padovani B, Elkaïm D, Richelme H. Should cavitated bronchopulmonary cancers be considered a separate entity?. *Ann Thorac Surg*. 1996;61(2):530–532.

10. Chiu FT. Caviation in lung cancers. *Aust N Z J Med*. 1975;5(6):523–530.

11. Virgilio E, Iannicelli E, Balducci G. RE: Atypical pulmonary metastases from pancreatic adenocarcinoma. *Korean J Radiol*. 2014;15(3):399–400.

12. Bunker SR, Klein DL. Multiple cavitated pulmonary metastases in pancreatic adenocarcinoma. *Br J Radiol*. 1982;55(654):455–456.

13. Gaeta M, Volta S, Scribano E, Loria G, Vallone A, Pandolfo I. Air-space pattern in lung metastasis from adenocarcinoma of the GI tract. *J Comput Assist Tomogr*. 1996;20(2):300–304.

14. Stern KM, Benn BS. A case of metastatic pancreatic adenocarcinoma confounded by complementary and alternative medicine therapies. *BMJ Case Rep*. 2019;12(10):e231356.

15. Selves J, Long-Mira E, Mathieu MC, Rochaix P, Ilié M. Immunohistochemistry for Diagnosis of Metastatic Carcinomas of Unknown Primary Site. *Cancers (Basel)*. 2018;10(4):108.

Acute Onset of Psychosis and Personality Changes in a Woman with Newly-Identified Lung Malignancy and Urinary Tract Infection: A Case Report

Cristina Fernandez, M.P.H.[1], Eli Levitt, M.S.[1], Noah Smith, M.D.[2-3], Regina M. Carney, M.D.[1-3]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Mental Health and Behavior Sciences Service, Miami Veterans Affairs Medical Center, Miami, FL

[3]Department of Psychiatry and Behavioral Sciences, Miller School of Medicine, University of Miami, Miami, FL

Corresponding Author: Regina M. Carney, M.D., regina.carney@va.gov

Abstract

A 63-year-old female with no past psychiatric history and a history of smoking cigarettes was admitted to the psychiatric unit for management of bizarre behavior, paranoid beliefs, and personality changes that developed over a 2-3 month period. She was found to have a urinary tract infection, which was subsequently treated with cephalexin 500 mg four times per day, as well as a lung opacity found incidentally on chest x-ray performed in the emergency department. Psychiatric symptoms persisted despite proper antibiotic treatment, and a diagnosis of small cell lung carcinoma was made on bronchoscopy. The range of differential diagnoses included prolonged delirium, underlying neurocognitive disorder, and paraneoplastic syndromes presenting with altered mental status. An extensive medical work-up, including various imaging modalities, and lack of clinical improvement in the setting of appropriate treatment provided clues to the patient's diagnosis. Ultimately, electroencephalogram (EEG) revealed normal function with no slowing, the paraneoplastic panel was negative for evaluated antibodies, and the patient regained baseline cognitive function over a period of time including post-discharge, suggesting prolonged delirium as the cause of mental status changes. This case illustrates the complexity in the etiologies of delirium as well as the similarities in clinical presentation of infection-induced delirium and malignancy-induced neurological syndromes.

Keywords: delirium; neoplasm; paraneoplastic syndrome; organic brain syndrome; malignancy; urinary tract infection; small cell lung carcinoma

Introduction

Delirium is a common, life-threatening clinical syndrome. Dementia is the leading risk factor for delirium, and two thirds of cases of delirium occur in patients with dementia.[1] The diagnosis of delirium is primarily clinical and presents unique challenges in management due to the priority of uncovering the underlying cause in a patient who is in a confused state and unlikely to recount an accurate history. The cause of delirium is typically multifactorial.[2] The CARE (CAse REport) guidelines were used in the development of this report.[3] These guidelines exist to improve transparency and completeness in the reporting of case reports by medical journals. This case report presents the clinical course of a veteran with urinary tract infection, substance use, and neoplasm who presented with 2-3 months of abrupt mental status changes.

Case Report

Our patient is a 63-year-old Caucasian female with no past psychiatric history and a past medical history significant for smoking 1-2 packs of cigarettes per day since the age of ten years old, Diabetes Mellitus Type 2 and Chronic Obstructive Pulmonary Disease (COPD), who presented to the emergency department with a chief complaint of, "I need medical attention." The patient was brought in by her husband of 40 years who expressed great concern over her recent changes in personality with new onset delusions, paranoia, and bizarre behavior including suicidal ideation and homicidal ideation against the husband.

Much of the history on initial assessment was provided by the husband as the patient was poorly cooperative and very tangential with frequent loose associations of thoughts and speech. The changes in behavior developed over a period of 2-3 months, and progressively worsened to include insomnia, paranoia, thinking that items dispersed throughout the house were poisoned, social isolation, lack of trust in her spouse, talking to herself, and beliefs that "Google" told her what to do. The patient was sleeping less, averaging approximately four hours of sleep per night. The husband denied a history of mania or psychosis, drug use, and previous suicide attempts or self-harm. Of note, the patient complained of pain during urination, but denied fever, chills, shortness of breath, or cough. She reported a history of multiple falls and last suffered a fall while at home six months ago, with no loss of consciousness or head trauma.

On physical exam, the patient's vital signs revealed a blood pressure of 143/90, pulse of 79, respiration rate of 18, temperature of 97.8 °F, and weight of 108 pounds. On general survey, the patient was thin,

CASE REPORT

disheveled, poorly groomed, and appearing much older than her stated age. Crackles were auscultated bilaterally, with non-pitting lower extremity edema bilaterally. Severe deformities of the hands were seen with Bouchard's nodes and Heberden's nodes noted in both hands. On review of historical weights, the patient had lost 15 pounds from her previous visit eight months prior.

On mental status exam, the patient's eye contact was poor, with grossly intact cognitive function. She was oriented to time, place, person and year, but not month or day. Her concentration and fund of knowledge were both poor. No psychomotor agitation or retardation were noted on motor function. Her affect was constricted and depressed and she described her mood as "bad." No aphasia was noted; however, her speech was quite tangential. Her thought content at the time consisted of suicidal ideation with no plan, paranoid delusions against her husband with homicidal ideation. Insight and judgment were both poor.

A medical workup to identify the underlying cause of her neurocognitive changes began with labs including a complete blood count (CBC), complete metabolic panel (CMP), microscopic urinalysis (UA), urine culture (UCX), and a urine toxicology screen. Initial labs were unremarkable, with the exception of elevated creatine kinase at 223 U/L, a urine toxicology screen positive for previously unidentified use of opioids (oxycodone, specifically), UA remarkable for: >182 WBC/HPF, positive nitrites, moderate leukocytes, 11 RBC/HPF, and 3+ bacteria. UCX revealed *Escherichia coli* >100,000 CFU/ML. When we initially confronted the patient regarding oxycodone present on her urine toxicology screen, the patient stated, "I think it's a contaminated sample." We later learned that the patient had been taking her husband's oxycodone prescription for what she described as "foot pain." As a result, were not able to identify how long the patient had been using the oxycodone.

Our patient's UA and UCX findings were consistent with a urinary tract infection (UTI) on admission and as such, this was the first treatment initiated under our care. We began treatment with cephalexin 500 mg four times per day for 7 days. By day three of treatment, a repeat UA showed a decrease in WBC/HPF to 15, negative nitrites, negative leukocytes, and bacteria was undetectable. She had multiple unremarkable UAs afterward, confirming that the UTI cleared.

Although the UTI had cleared, the patient still had symptoms consistent with a diagnosis of delirium. While treating the UTI, we simultaneously began treatment with quetiapine 75 mg at bedtime for insomnia, as fragmented sleep can be a contributing factor to the development of delirium. Additionally, haloperidol 5 mg was available as needed for severe agitation and psychosis. The patient's psychotic symptoms gradually improved during her stay, as did her disorganized and tangential speech, though delusions of persecution remained; the patient had firm beliefs

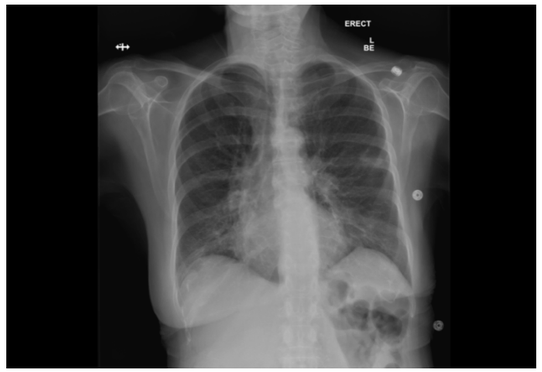

Figure 1. *Chest X-ray performed on admission to the Emergency Department.*

that the medications which she was receiving during her inpatient stay were "poisoned." These medications included amlodipine 5 mg PO daily for blood pressure and atorvastatin 40 mg PO HS for cholesterol. A Montreal Cognitive Assessment (MoCA) was performed with the patient, which revealed a final score of 21 out of 30 approximately one week prior to discharge. A broad approach to identify the etiology and likely delirium, dementia, or other cognitive disorder included laboratory testing for human immunodeficiency virus (HIV), syphilis, thyroid stimulating hormone, autoimmune, endocrinopathies, nutritional/vitamin deficiency states (B12, folate, niacin), unidentified substance use, Lyme disease, and paraneoplastic syndrome.

During the initial workup, a chest x-ray was incidentally performed on intake in the emergency department due to a past psychiatric history significant for severe tobacco use disorder. A 2.5 cm nodular opacity was seen over the left upper lung (**Figure 1**) which was followed by a chest CT for further evaluation. The chest CT confirmed a 2.2 x 1.8 x 1.6 cm spiculated mass along the base of the upper lobe of the left lung as well as adenopathy of the left perihilar space (**Figure 2**). The pulmonology team was subsequently consulted, and a PET scan was coordinated, which revealed a 2 cm hypermetabolic left upper lobe mass and two hypermetabolic left hilar lymph nodes (**Figure 2**). These exams indicated there was a high probability of malignancy, and so bronchoscopy was performed. The bronchoscopy results revealed findings consistent with the diagnosis of small cell lung carcinoma. Given this, we considered the possibility for a paraneoplastic limbic encephalitis (PLE), a rare autoimmune neurological syndrome that is frequently observed in lung cancer patients.[4] Approximately 50% of PLE cases are associated with lung cancer and approximately 80% of these cases are small cell lung cancer (SCLC).[4]

The neurology consult service evaluated this patient and deemed paraneoplastic encephalomyelitis unlikely based on a normal brain MRI (**Figure 3**) and a normal EEG. The patient refused brain MRI

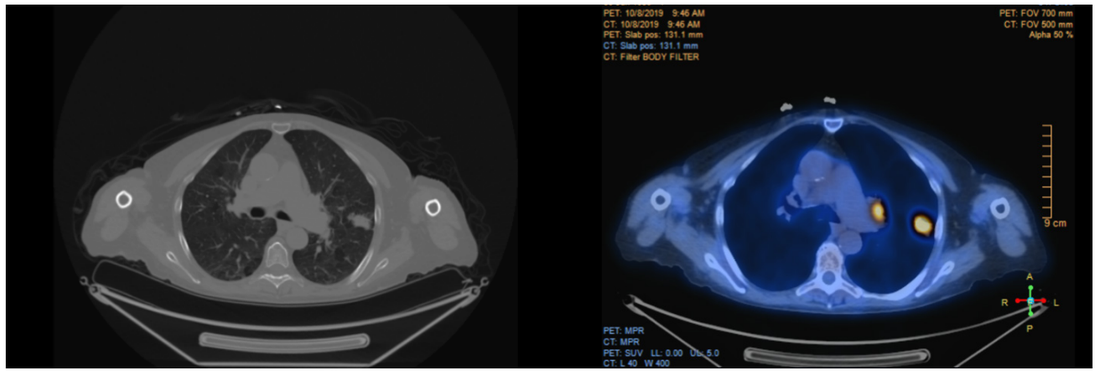

Figure 2. *CT of the thorax without contrast (left), and PET Scan (right) revealing hypermetabolism in a hilar lymph node and left upper lobe lymph node.*

with contrast, which could further help with the diagnosis. In order to completely rule out paraneoplastic syndrome, a paraneoplastic lab panel was collected, which was negative for all tested antibodies (VGCC, VGKC, AChr (Alpha3), VGCC Type N, Ach Rec Bind, Striated Muscle, ANNA1 (Hu), ANNA2 (Ri), ANNA3, PCA1 (Yo), PCA2, PCA-Te (DNER), AGNA/SOX1, Amphiphysin, and CRMP5/CV2). Lyme panel was negative. The HIV test and rapid plasma reagin (RPR) were both negative. The patient became more lucid during the course of the work-up, and no longer voiced psychotic content or displayed disorganized behavior, and was deemed appropriate for discharge. She was able to discuss abstract terms and discharge planning options appropriately, which was an improvement from both baseline presentation. A follow-up MoCA was not performed.

At an outpatient follow-up visit with the Psychiatry service approximately a week after discharge, the patient's sensorium and memory were noted to have returned to her previous baseline with intact cognition and attention. She engaged appropriately with no evidence of psychosis, no confusion, and was fully alert and oriented. She endorsed illness anxiety, which she stated did not distress her greatly or impair her daily function, as well as continued tobacco use. The patient stated that she had discontinued quetiapine due to side effects, and would continue with psychotherapy.

Discussion

In this study, a rare presentation of small cell lung carcinoma has been reported in the case of a woman with no past psychiatric history and a sudden onset of mental status changes including delusions, paranoia, changes in circadian rhythm, and behavior changes. The range of differential diagnoses included prolonged delirium, underlying neurocognitive disorder, and paraneoplastic syndromes presenting with altered mental status, as well as a multifactorial etiology.

Non-psychiatric illness was strongly suspected due to the abrupt onset of symptoms, dramatic presentation, and lack of significant psychiatric history. Extensive medical work-up revealed urinary tract infection, a condition commonly associated with delirium and mental status changes in older individuals, as well as small cell lung cancer, which is associated with multiple psychiatric presentations.

Lung cancer is the leading cause of cancer deaths worldwide in both men and women.[5] The majority of lung cancers are due to non-small cell lung cancer (approximately 85 percent) and the remainder are mostly due to small cell lung cancer, which primarily develops in older adult smokers. The most common clinical manifestations of lung cancer are cough (50 to 75 percent), hemoptysis (25-50 percent), dyspnea (25 percent), and chest pain (20 percent).[6-7] However, for some cancer patients, the first clinical manifestation is a psychiatric symptom. According to a study in the International Journal of Cancer, Danish researchers found that during the first month after a first-time psychiatric contact, not only was the incidence of brain tumors elevated, but lung cancer, especially small cell lung cancer, was elevated.[8]

The pathophysiological mechanisms underlying delirium as the first presentation of small cell lung cancer are complex. In using Inouye's predictive model of delirium, we are able to better understand the reciprocal relationship between a patient's baseline risk and illness severity.[2,9] In accordance, our patient with a less-advanced-stage cancer (without metastases) and an extensive medical history as well as frailty on exam, likely resulted in a more pronounced delirium. Although there are several mechanistic hypotheses for the explanation of delirium, there is no one single mechanism to explain the development of delirium in cancer patients.[10]

We also considered that the delirium could have been associated with a paraneoplastic syndrome. While our patient did present with symptoms of limbic encephalitis (e.g., behavior changes), she lacked the seizures, diffuse sensory impairments, and brainstem

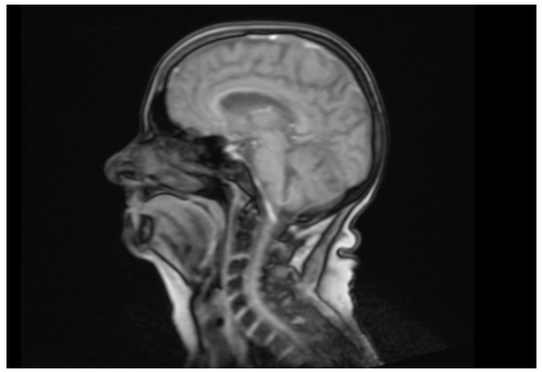

Figure 3. *Brain MRI without contrast revealing unremarkable findings.*

symptoms that are often seen in PLE.[11] Negative findings on the paraneoplastic lab panel provided additional evidence that a paraneoplastic syndrome did not contribute to the patient's symptoms. The patient's final diagnoses were Delirium due to another medical condition (UTI, Lung cancer), persistent, hyperactive; and severe Tobacco Use Disorder.

Areas for further research include whether differences in clinical presentation exist between infection-induced delirium versus malignancy-induced delirium. Additionally, there are limited data on predisposing risk factors for the development of delirium in selected cancers.

Conclusion

This case report highlights the importance of a comprehensive medical evaluation of acute delirium in a patient with no prior psychiatric history. In particular, appropriate use of imaging modalities such as chest x-ray and CT in patients with a history of severe tobacco use is necessary. Clinicians must be made aware that the first-onset psychiatric symptoms could be the first clinical manifestation of undetected lung cancer. Despite the extensive and costly work-up, the patient's underlying UTI was the most likely predisposing and prolonging factor for the delirium, with the newly-identified lung malignancy likely further precipitating and exacerbating the delirium and subsequent recovery.

References

1. Inouye SK, Westendorp RGJ, Saczynski JS. Delirium in elderly people. *Lancet*. 2014;383(9920):911-922.

2. Inouye SK. Delirium in Older Persons. *N Engl J Med.* 2006:9.

3. Gagnier JJ, Kienle G, Altman DG, *et al.* The CARE guidelines: consensus-based clinical case report guideline development. *J Clin Epidemiol.* 2014;67(1):46-51.

4. Shen, K., Xu, Y., Guan, H. *et al.* Paraneoplastic limbic encephalitis associated with lung cancer. *Sci Rep* 8**,** 6792 (2018).

5. Torre LA, Bray F, Siegel RL, *et al.* Global cancer statistics, 2012. *CA Cancer J Clin.* 2015;65(2):87-108.

6. Hirshberg B, Biran I, Glazer M, Kramer MR. Hemoptysis: Etiology, Evaluation, and Outcome in a Tertiary Referral Hospital. *Chest*. 1997;112(2):440-444.

7. Chute CG, Greenberg ER, Baron J, *et al*. Presenting conditions of 1539 population-based lung cancer patients by cell type and stage in new hampshire and vermont. *Cancer*. 1985;56(8):2107- 2111.

8. Benros ME, Laursen TM, Dalton SO, Mortensen PB. Psychiatric disorder as a first manifestation of cancer: a 10-year population-based study. *Int J Cancer*. 2009;124(12):2917-2922.

9. Lawlor PG, Bush SH. Delirium in patients with cancer: assessment, impact, mechanisms and management. *Nat Rev Clin Oncol*. 2014;12(2):77-92.

10. Bush SH, Bruera E. The assessment and management of delirium in cancer patients. *Oncologist*. 2009;14:1039–1049.

11. Kayser MS, Kohler CG, Dalmau J. Psychiatric Manifestations of Paraneoplastic Disorders. *A J Psychiatry.* 2010;167(9):1039-1050.

A Case Report of Zoster Sine Herpete Presenting with Acute Onset Chest Pain

Pooja Gurnani[1], Muhammad Aziz, M.D., M.P.H.[2], Tariq Mahmood, M.D.[1,2], Guido L. Steegers, M.D.[1,2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]West Kendall Baptist Hospital, Miami, FL

Corresponding Author: Pooja Gurnani, pgurn002@med.fiu.edu

Abstract

In this case report, we describe an unusual presentation of herpes zoster with acute onset chest pain and no associated rash. A 58-year-old woman presented to West Kendall Baptist Hospital's emergency department with a chief complaint of severe right-sided chest pain under her breast that radiated to the ipsilateral back for the past two days. After initial workup ruled out a cardiac etiology, the differential diagnosis was expanded to include other possibilities. The characteristic dermatomal distribution of pain made us suspect varicella zoster virus (VZV) reactivation. Typically, when considering VZV reactivation, we look for a vesicular eruption on an erythematous base, along with intense burning pain that follows a dermatome. After an incidence of chickenpox and/or vaccination, VZV can become latent in neurons of dorsal root ganglia (DRG), cranial nerve ganglia (CNG), and enteric (gastrointestinal) ganglia. However, VZV reactivation can mimic a similar dermatomal distribution of pain, but without the classic rash. This is referred to as Zoster Sine Herpete (ZSH). Herpes zoster (HZ) or shingles is a common clinical diagnosis, which makes ZSH an important addition to the differential diagnosis for dermatomal neuralgia. Currently, ZSH can be tested via (1) PCR for VZV DNA, (2) analysis of CSF or blood mononuclear cells (MBCs) for VZV DNA, and (3) anti-VZV IgM and/or IgG antibodies. In the acute setting, however, immunoglobulins are detected only 60% of the time. In our patient, we confirmed ZSH with a positive VZV IgG and IgM serology, symptomatic relief after starting famciclovir and pregabalin, as well as T4-T5 dermatomal neuralgia.

Keywords: zoster sine herpete; virology; DNA; varicella zoster virus; anti-viral agents; chest pain

Introduction

When considering the possibility of varicella zoster virus (VZV) reactivation, a combination of cutaneous manifestations along with pattern neuralgia guides the clinical diagnosis. Typically, the presence of a vesicular eruption on an erythematous base, and intense pain that follows a dermatome pattern points to herpes zoster.[1,2] After an incidence of chickenpox and/or vaccination, VZV can become latent in neurons of dorsal root ganglia (DRG), cranial nerve ganglia (CNG), and enteric (gastrointestinal) ganglia.[3] However, VZV reactivation can mimic a similar dermatomal distribution of pain, but without the classic rash. This is referred to as Zoster Sine Herpete (ZSH).[4] Herpes zoster (HZ) or shingles is a common clinical diagnosis, which makes ZSH an important addition to the differential diagnosis for dermatomal neuralgia.

Currently, ZSH can be tested via PCR for VZV DNA, analysis of CSF or blood mononuclear cells (MBCs) for VZV DNA, as well as, anti-VZV IgM and/or IgG antibodies.[5] In the acute setting, however, immunoglobulins are detected only 60% of the time.[6] This case report highlights an unusual presentation of a 58 year-old female with acute onset right sided chest pain, located under her right breast with radiation to the back. Informed consent was provided by the patient prior to this study.

Case Report

A 58-year-old female presented to the emergency department with central and right-sided chest pain under her breast that started a month ago as a dull ache but rapidly increased in severity over the last two days. She described it as a 9/10 sharp, burning pain radiating to her back, with associated shortness of breath. She recalled that her pain began after lifting her mom who weighs about 95 pounds.

The patient denied any fevers, weight loss, muscle weakness or loss of sensation. A couple days prior to arriving at the West Kendall Baptist Hospital ED, the patient visited her PCP who prescribed her cyclobenzaprine and physical therapy which were unsuccessful. She has a past medical history significant for Type II Diabetes Mellitus, hypertension, morbid obesity and hyperlipidemia. Family history and social history were unremarkable. No history of drug, alcohol or tobacco use.

On physical examination, the patient appeared to be in acute distress. Dermatologic examination revealed no rash or erythema in the affected region (**Figure 1**). Interestingly, the pain appeared to be in a dermatomal pattern around T4-T5. Vital signs were within normal limits. Cardiac and respiratory areas of the physical exam were completed with unremarkable findings.

To rule out the cardiac causes of chest pain, a stat EKG, cardiac enzymes x2 followed by a complete cardiac work-up were done with unremarkable results. Chest CT did not show any acute

CASE REPORT

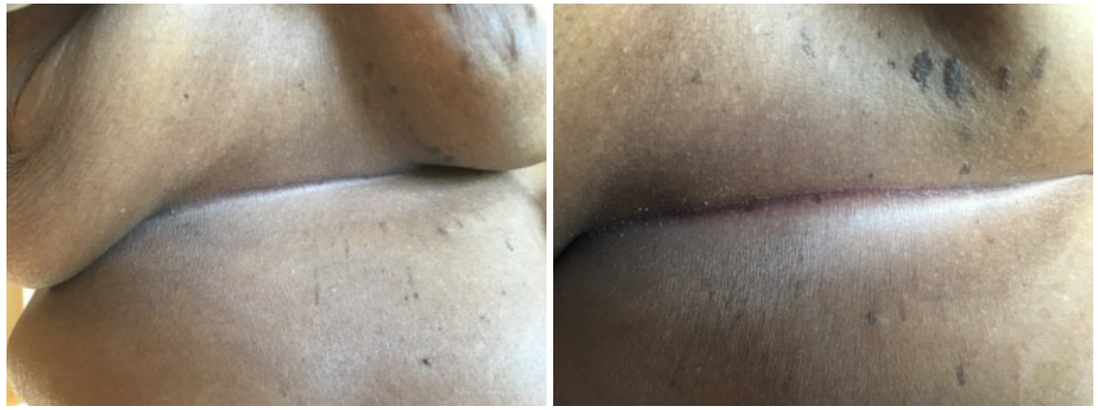

Figure 1. *Photograph showing anterior (left) and lateral (right) view of the right-side of patient's chest without any rash.*

pathology, except mild hypo-ventilatory changes postulated to be linked to her morbid obesity. The patient was admitted and further workup was conducted. A thoracic spine MRI showed mild multilevel degenerative changes which essentially ruled out radicular causes of her chest pain. Urine analysis, urine culture and blood cultures ruled out acute pyelonephritis and the possibility of sepsis.

Once cardiac, pulmonary and musculoskeletal etiologies were ruled down, the possibility of herpes zoster was considered. However, the absence of any cutaneous manifestations was baffling. Concurrently, a viral serology was sent to detect VZV immunoglobulins. In the meantime, the patient was started on famciclovir 500mg taken orally three times a day, and pregabalin 150mg capsule every 12 hours. Over the next 48 hours the patient reported significant improvement of her pain. Viral serology was positive for both IgM and IgG indicating a possible recent infection with VZV. At this point a clinical diagnosis of Zoster Sine Herpete was made based on the T4-T5 neuralgia, atypical absence of rash, and strong response to famciclovir and pregabalin.

Discussion

Zoster Sine Herpete is a medical condition presenting with neuralgia along a dermatomal distribution in the absence of a rash.[7] In this interesting case, the location being the chest instigated an immediate cardiac workup. Since the initial onset of pain happened directly after carrying her mother, costochondritis was on our differential. However, a dermatomal pattern of pain that was burning or shock-like in nature introduces a possible underlying neurological issue such as herpes zoster. A recent study found that the severity of pain and the prevalence of post-herpetic neuralgia were increased in ZSH compared to Herpes Zoster (P=0.0012).[2] This led to more opioid usage by patients with ZSH vs HZ (P = 0.0449; OR, 9.00).[2]

Commonly immunocompromised patients can have reactivation of latent VZV with associated post-herpetic neuralgia similar to this case.[8,9] The past medical history of diabetes, as well as recent life stressors, can categorize our patient as immunocompromised.[10]

A diagnosis was decided based on the following features: 1) positive VZV IgG and IgM serology 2) symptomatic relief after starting famciclovir and pregabalin and 3) overall clinical presentation, including neuralgia along a dermatome.[11] A confirmatory CSF analysis for VZV DNA was not done, as it had been a month since symptom onset. Additionally, treatment had provided adequate symptomatic relief. In this case, VZV antibodies were detected via enzyme-linked immunosorbent assay (ELISA), which has a low sensitivity and specificity yielding false-positives and false-negatives.[12] This is because the test cannot differentiate between an active or past infection. In an ideal setting, serology would be repeated to track the pattern in immunoglobulin levels. However, after incorporating cost-effectiveness and time sensitivity into the patient treatment plan, only one serology sample could be sent. Interestingly, a recent study found that at one month after symptom onset, VZV DNA was detected in 69% of patients with ZSH compared to 12.5% in HZ (P=0.0007). This study was recently published and has the potential to change the way ZSH is diagnosed.[2]

This case highlights the importance of including ZSH as a possible differential diagnosis in relevant clinical scenarios. ZSH is underreported and also mis-diagnosed due to the several neuropathic pains that present more commonly than ZSH. Early diagnosis and treatment of ZSH can significantly improve patient quality of life. The debilitating pain associated with ZSH is of utmost concerns when creating a treatment plan. We hope that this case brings awareness to clinicians and leads to further investigation about Zoster Sine Herpete.

References

1. Ku SH, Kim HS, Kim HS, Park EJ, Kim KH, Kim KJ. A case of zoster sine herpete presenting with thoracic radicular pain diagnosed by polymerase chain reaction in skin exudate. *Dermatologica Sinica.* 2014;32(3):180-182.

2. Drago F, Herzum A, Ciccarese G, Broccolo F, Rebora A, Parodi A. Acute pain and postherpetic neuralgia related to Varicella zoster virus reactivation: Comparison between typical herpes zoster and zoster sine herpete. *Journal of Medical Virology.* 2019;91(2):287-295.

3. Gilden D, Nagel M, Cohrs R, Mahalingam R, Baird N. Varicella Zoster Virus in the Nervous System. *F1000Res.* 2015;4.

4. Lewis GW. Zoster Sine Herpete. *British Medical Journal.* 1958;2(5093):418.

5. Sauerbrei A, Eichhorn U, Schacke M, Wutzler P. Laboratory diagnosis of herpes zoster. *J Clin Virol.* 1999;14(1):31-36.

6. Gilden D, Cohrs RJ, Mahalingam R, Nagel MA. Neurological disease produced by varicella zoster virus reactivation without rash. *Curr Top Microbiol Immunol.* 2010;342:243-253.

7. Blumenthal DT, Shacham-Shmueli E, Bokstein F, et al. Zoster sine herpete: virologic verification by detection of anti-VZV IgG antibody in CSF. *Neurology.* 2011;76(5):484-485.

8. Morita Y, Osaki Y, Doi Y, Forghani B, Gilden DH. Chronic active VZV infection manifesting as zoster sine herpete, zoster paresis and myelopathy. *J Neurol Sci.* 2003;212(1-2):7-9.

9. Forbes HJ, Bhaskaran K, Thomas SL, et al. Quantification of risk factors for postherpetic neuralgia in herpes zoster patients: A cohort study. *Neurology.* 2016;87(1):94-102.

10. Cukic V. The Uncommon Localization of Herpes Zoster. *Med Arch.* 2016;70(1):72-75.

11. Lancaster T, Silagy C, Gray S. Primary care management of acute herpes zoster: systematic review of evidence from randomized controlled trials. *Br J Gen Pract.* 1995;45(390):39-45.

12. Gershon AA, Gershon MD. Pathogenesis and current approaches to control of varicella-zoster virus infections. *Clin Microbiol Rev.* 2013;26(4):728-743.

CASE REPORT

Vaping-Associated Lung Injury: A Confounded Diagnosis

Evan Ales[1]*, Sharan Kapoor[1]*, Annellys Hernandez, M.D., M.S.[1,2]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Jackson Memorial Hospital, Miami, FL

Corresponding Author: Evan Ales, eales004@med.fiu.edu

*These authors contributed equally to this work

Abstract

E-Cigarette or Vaping-Associated Lung Injury (EVALI) is a medical phenomenon under investigation by the CDC with 2290 cases and 47 deaths in 2019 without established etiology or diagnostic criteria. A previously healthy 27-year-old male presented with one week of shortness of breath (SOB) and chest pain (CP). A negative work-up, history revealing significant THC oil vaping, and CT bilateral ground-glass opacities aligned with the CDC's EVALI case definition. After following the published CDC treatment recommendations, the patient rapidly improved. Tetrahydrocannabinol (THC) oil and Vitamin E acetate are likely causative agents. Although a definitive pathogenesis for EVALI is unknown, the CDC considers Vitamin E acetate strongly associated with the outbreak. The CDC case definition includes pulmonary infiltrates and vaping within 90 days of symptoms, and patients commonly present with SOB and CP; treatment requires high-dose corticosteroids and supportive oxygen. Our patient's presentation was highly suggestive of EVALI, but no inquiry was made into his vaping usage until 4 days post-admission. This is partially explained by the overlap in presentation of EVALI with other etiologies (e.g., bilateral pneumonia). Considering this, a low threshold for historical questions regarding e-cigarette use, particularly THC oil, should be prioritized.

Keywords: EVALI; vaping; THC oil

Introduction

E-Cigarette or Vaping Associated Lung Injury (EVALI) is a recent medical phenomenon that has garnered significant mass and scientific media coverage. EVALI currently lacks codified diagnostic criteria; however, on August 30, 2019, the Centers for Disease Control (CDC) released a case definition used for surveillance tracking of cases that is as follows: a confirmed case of EVALI includes (1) use of an e-cigarette (vaping) or dabbing 90 days before symptom onset, (2) pulmonary infiltrates such as ground-glass opacities on chest CT, and (3) absence of pulmonary infection on initial workup.[1] The CDC defines "dabbing" in this context as the use of an electronic device that superheats oil-based substances with various compounds, such as THC, in high concentrations. The CDC has noted that, of those who report their substance use, 86% of EVALI patients reported using THC oil, although 11% reported exclusive use of nicotine products. As of February 6th 2020, 2711 cases of EVALI have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories.[2] Due to increasing cases reported of EVALI, the CDC launched an official investigation on August 1, 2019.

Given the recency of EVALI, the relevant medical literature is sparse. A case series has been published in the New England Journal of Medicine (NEJM), and two further correspondences in the NEJM detail associated findings on imaging and histopathology in those with presumed EVALI. In a review of 17 patients' lung biopsies with clinical suspicion for EVALI, no histopathologic findings were specific, but all 17 had foamy macrophages and pneumocyte vacuolization present.[3] In an imaging review of 34 cases that met the case definition of EVALI, most of the radiologic patterns described included "basilar-predominant consolidation and ground-glass opacity, with areas of lobar or subpleural sparing".[4]

The recent case series revealed that nearly all patients studied presented to the hospital with respiratory symptoms. The most common complaints were shortness of breath, cough, and chest pain, associated with nausea, vomiting, and subjective fever. Patients also commonly exhibited tachycardia, tachypnea, and a resting oxygen saturation of less than 95% on room air and blood count showing a neutrophil-predominant leukocytosis.[1] Here, we report a case of 27-year-old-male who met the case definition of EVALI in the context of significant THC-oil vaping.

Case Report

A 27-year-old man with a past medical history significant for extensive drug use presented to the emergency department with worsening shortness of breath and pleuritic chest pain of one-week duration. Four days prior, the patient went to an urgent care center complaining of shortness of breath. The facility performed an x-ray, electrocardiogram, and urinalysis, and tentatively diagnosed the patient with bilateral walking pneumonia and concomitant urinary tract infection (UTI). He was sent home with oral levofloxacin and instructions to follow up if he did not improve. After four days of failing to improve, he presented to a local emergency department (ED). Pulmonary computed tomography (CT) performed in this ED demonstrated pneumomediastinum with diffuse pneumonia and

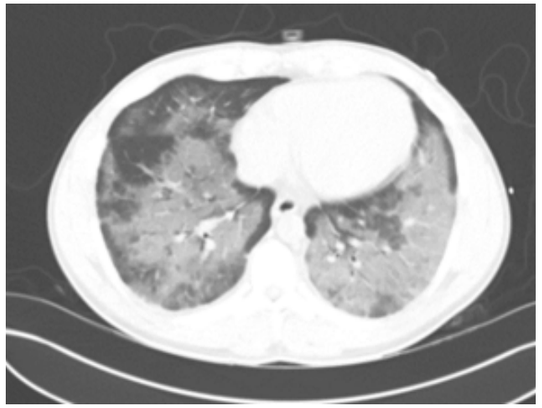

Figure 1. *A section of the patient's CT chest demonstrating diffuse, bilateral ground-glass opacities.*

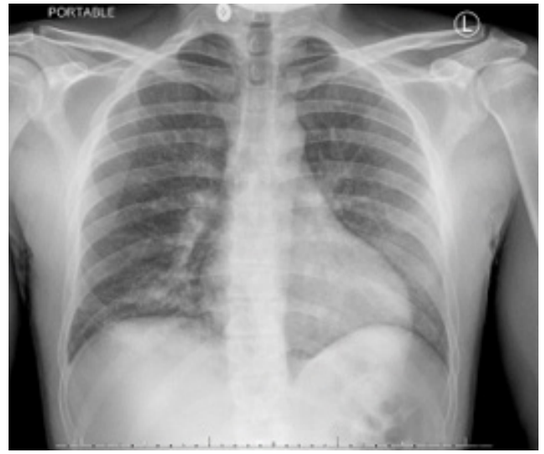

Figure 2. *A chest x-ray of the patient demonstrating diffuse, bilateral ground-glass opacities.*

bilateral ground-glass opacities. The patient was transferred to the major tertiary system in the Miami-Dade community, Jackson Memorial Hospital for concern over esophageal rupture and consideration for a possible emergent procedure.

In the Jackson ED, a repeat CT demonstrated a small, anterior pneumomediastinum but an esophagram was not suggestive of esophageal rupture. X-ray and CT in the ED both demonstrated diffuse ground-glass alveolar opacities (**Figures 1 and 2**). The patient was admitted to the intensive care unit (ICU) due to his clinical condition and complaints of worsening pleuritic chest pain and shortness of breath.

Presenting vital signs were as follows: temperature 38.6º C, heart rate 112, respiratory rate 24, blood pressure 155/95, and resting O2 saturation 94% on 2L nasal cannula. He was febrile the majority of his stay in the ER with a max Temperature of 39.2º C. On pulmonary examination, he was tachypneic and in moderate respiratory distress, but his lung sounds were clear to auscultation bilaterally without rales, crackles, or wheezing. On cardiac exam, he was tachycardic. There were no other remarkable findings on the remainder of his physical examination. His urinalysis was positive for nitrites and bacteria consistent with a partially treated UTI. The admitting physician considered his presentation concerning for bilateral pneumonia, started Zosyn (piperacillin/tazobactam) and azithromycin for the presumed pneumonia, and ordered *Streptococcus pneumonia* and *Legionella* antigens, as well as a full respiratory viral panel. Infectious Disease was consulted upon admission and concurred with the plan.

His first CT scan seemed concerning for possible environmental exposure injury, so the critical care team inquired and learned that the patient had used a vaping device recently but did not consider the possibility of EVALI. After his infectious disease panel was negative, a more thorough social history revealed that the patient had been vaping 1000mg of THC oil per week for the past two years, bought from a friend who sourced it from California. In the context of significant vaping history, a negative respiratory viral panel, and a chest CT demonstrating bilateral ground-glass opacities with no other known cause, the patient met the CDC's case definition for EVALI. The patient was started on the CDC's recommended treatment of intravenous (IV) corticosteroids, in this case methylprednisolone.

Two days after starting IV methylprednisolone, the patient began reporting subjective improvement in shortness of breath, and repeat chest x-ray demonstrated a mild improvement of opacity in the left lung field. Over the next two days, the patient's symptoms further improved and he was moved from the ICU to the telemetry floor. The next day, he completed a six-minute walking test without a nasal cannula and his O2 saturation did not drop below 94%. Given his stability and lack of significant desaturation on exertion, the patient was discharged the following day with an albuterol inhaler as needed and a tapering course of oral prednisone.

Ten days after discharge, he was seen in a Jackson hospital primary care office and started his tapered dose of steroids with daily improvement of his SOB and pleuritic chest pain. He denied continued use of his vaping device.

Discussion

Prevalence of Vaping/EVALI

Electronic cigarettes, also known as e-cigarettes, are devices that aerosolize substances such as nicotine or THC using battery power; their use is commonly referred to as "vaping." These products were

first brought into the global marketplace in 2003 and have made a steady increase in prevalence, especially among young adults. In 2018, more than 3.6 million U.S. middle and high school students reported using e-cigarettes at least once in the past 30 days.[5] Data compiled by the CDC shows that EVALI has been reported in over 1000 patients across all 50 states with a median age of 24 and 70% male predominance. EVALI has been associated with 47 deaths with a median age of 53.[2]

Pathogenesis/Etiology

Many factors may play a role in the pathogenesis of EVALI, including type of vaping devices, frequency, and dosing, though most investigations have focused on the product. Nicotine e-cigarettes are generally recognized as safe, though several chemical contaminants that have not been completely studied which may contribute to toxic effects, including aromatic hydrocarbons, volatile organics, inorganic metals, and endotoxins.[6] Cartridges containing THC oil have been more heavily scrutinized during this outbreak, as they are commonly unregulated and were used by the vast majority (86%) of EVALI patients.[2] Among those tested, Vitamin E acetate was discovered as a common additive and is a possible cause of inflammation; the CDC considers it strongly associated with the EVALI outbreak.[2,7]

The pathophysiology of injury is also being studied. One suggested mode of injury from THC oil products is lipoid pneumonia from inhalation of vaporized oils, corroborated by bronchoalveolar lavage showing lipid-laden macrophages.[8,9] But more recent biopsies of EVALI patients lack evidence of lipoid pneumonia, rather suggesting a chemical pneumonitis with the presence of foamy macrophages and pneumocyte vacuolization.[3]

Diagnosis

As investigations into EVALI are still preliminary, clear diagnostic criteria have not yet been established. The CDC, in collaboration with state health departments, created a case definition for EVALI, which is a diagnosis of exclusion and includes vaping within 90 days of symptom onset and positive pulmonary imaging. Imaging is highly sensitive in the case series on EVALI with 91% of patients having abnormal chest radiographs and 100% of patients with CT scans having bilateral abnormal opacities, commonly ground-glass. While a portion of patients have undergone bronchoalveolar lavage or lung biopsy, neither of these procedures has shown to be effective in diagnosis, as they showed nonspecific inflammation, foamy macrophages, and alveolar damage.[1] On December 20nd, 2019, the CDC released an updated algorithm to appropriately triage and treat patients presenting with EVALI.[11]

Treatment

Patients with continuing symptoms, in respiratory distress, or with an oxygen saturation less than 95% should be admitted for further evaluation and treatment; 47% of CDC-reported cases included ICU admittance.[10] Systemic glucocorticoids are the most widely used therapy in EVALI, given to 92% of patients in the case series with clinical improvement most likely due to reduction of pulmonary inflammation.[2] While EVALI is unlikely to be caused by an infectious etiology, the CDC recommends early initiation of antimicrobials in case symptom overlap occurs with pneumonia.[10] Oxygen therapy through supplemental oxygen, high-flow oxygen, or bi-level positive airway pressure (BiPAP) has been given to most patients, though 22% required intubation and mechanical ventilation.[10]

Follow-Up

After stabilization, oxygen and tapering steroid therapy should be considered in the outpatient treatment of EVALI patients. Patients with persistent oxygen saturation lower than 95% should continue oxygen supplementation and have a close follow-up for worsening symptoms. Complications after discharge include recurrence of EVALI and steroid-induced endocrine disruption. Patients should be counseled on avoidance of vaping, as the effect of restarting usage post-EVALI is unknown. Follow-up care can include repeat lung imaging, pulmonary function testing, and pulmonary physical therapy.

Conclusion

Our patient presented with the classic picture of a Vaping-Associated Lung Injury. What confounds the case is that he similarly presented with signs and symptoms highly suggestive of bilateral infectious pneumonia (including bilateral pulmonary opacities, fever, and lack of other medical history). The proper empiric antibiotic treatment for pneumonia was initiated, and after failing to improve with standard therapy, further imaging, diagnostic tests, and historical questioning led to his ultimate diagnosis with subsequent appropriate treatment. As EVALI is a diagnosis of exclusion, this was the expected progression of a patient with a similar presentation. However, the possibility of EVALI can and should be considered before the exclusion of other possible etiologies to reduce time to diagnosis/proper treatment and avoid improper treatment once confirmed. In this case, the possibility was seriously considered only after all tests returned negative.

Although mass media coverage may be substantial, with increased awareness amongst providers following the CDC's statements on the condition, the possibility of EVALI may not be at the forefront of provider's minds even in the presence of what can be considered the prototypical presentation (age, sex, bilateral ground-glass opacities, lack of significant medical history). Substantiated by the recent dramatic increase in incidence, providers should have a high clinical suspicion for EVALI when seeing patients with chest pain, shortness of breath, and imaging findings such as bilateral ground-glass opacities in association with vaping.

At present, there is no definitive causative agent implicated in the pathogenesis of EVALI, although THC oil (specifically Vitamin E found in many illicit THC oil samples) use is considered highly associated with the development of the condition.

In summary, a low threshold for inquiring about a patient's e-cigarette use should be maintained for the possible inclusion or exclusion of EVALI throughout the current outbreak with particular attention concerning the use of THC oil.

References

1. Layden J, Ghinai I, Pray I et al. Pulmonary Illness Related to E-Cigarette Use in Illinois *Journal of Medicine*. 2019.

2. Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products. Centers for Disease Control and Prevention. https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung- disease.html. Published 2019. Accessed November 21, 2019.

3. Butt Y, Smith M, Tazelaar H et al. Pathology of Vaping-Associated Lung Injury. *New England Journal of Medicine*. 2019;381(18):1780- 1781.

4. Henry T, Kanne J, Kligerman S. Imaging of Vaping-Associated Lung Disease. *New England Journal of Medicine*. 2019;381 (15): 1486-1487.

5. 2018 NYTS Data: A Startling Rise in Youth E- cigarette Use. U.S. Food and Drug Administrationhttps://www.fda.gov/tobacco-products/youth-and-tobacco/2018-nyts-data-startling-rise-youth-e-cigarette-use. Published 2019.

6. Burstyn I. Peering through the mist: systematic review of what the chemistry of contaminants in electronic cigarettes tells us about health risks. *BMC Public Health*. 2014;14(1).

7. New York State Department of Health Announces Update on Investigation into Vaping-Associated Pulmonary Illnesses. Health.ny.gov. https://www.health.ny.gov/press/releases/2019/2019-09-05_vaping.htm. Published 2019.

8. Balmes J. Vaping-Induced Acute Lung Injury: An Epidemic That Could Have Been Prevented. *Am J Respir Crit Care Med*. 2019.

9. Davidson K, Brancato A, Heetderks P et al. Outbreak of Electronic-Cigarette–Associated Acute Lipoid Pneumonia — North Carolina, July - August 2019. Centers for Disease Control and Prevention.

10. Siegel D, Jatlaoui T, Koumans E et al. Update: Interim Guidance for Health Care Providers Evaluating and Caring for Patients with Suspected E-cigarette, or Vaping, Product Use Associated Lung Injury — United States, October 2019. Centers for Disease Control and Prevention.

11. Evans ME, Twentyman E, Click ES, et al. Update: Interim Guidance for Health Care Professionals Evaluating and Caring for Patients with Suspected E-cigarette, or Vaping, Product Use–Associated Lung Injury and for Reducing the Risk for Rehospitalization and Death Following Hospital Discharge - United States, December 2019. MMWR Morb Mortal Wkly Rep. 2020;68:1189–1194.

Acute Flaccid Myelitis in a Colombian Boy with One Affected Relative: A Case Report

Elan Baskir[1], Ronaldo Nuesi[1], Samer Riaz D.O.[2], Julie Kantor M.D.[1,3], Jefry Biehler M.D.[1,3]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Cleveland Clinic Florida, Weston, FL

[3]Nicklaus Children's Hospital, Miami, FL

Corresponding Author: Elan Baskir, ebask003@med.fiu.edu

Abstract

Background: Incidence of acute flaccid myelitis (AFM) has mirrored the biennial pattern of enterovirus D68 infection rates, indicating an association between the virus and the etiology of AFM. However, there is a need to investigate if there are genetic factors that make certain patients more susceptible.

Case: A 3-year-old Colombian male presented with gait difficulties, fever and respiratory symptoms. Family history was significant for a paternal first cousin diagnosed with AFM 15 months prior to this admission, associated with a positive test result for enterovirus D68. Our patient had not had contact with this relative. Physical exam revealed decreased range of motion of the right hip, right lower extremity flaccid paralysis and areflexia. Laboratory tests revealed a slight peripheral leukocytosis and cerebrospinal pleocytosis. Tests for enterovirus D68 were negative. A contrast-enhanced MRI of the brain and spinal cord revealed significant abnormalities in the brainstem and along the cervical region of central spinal cord gray matter, consistent with AFM. Treatment with IVIG, physical therapy and occupational therapy was started. The patient's strength in the right lower extremity mildly improved, enabling him to stand and ambulate a few steps with assistance. The patient was discharged after 13 days of hospitalization, but was subsequently lost to follow-up.

Conclusion: Our patient tested negative for enterovirus D68, but was significant for a family history of AFM in a paternal first cousin, possibly indicating that there may be some genetic susceptibility to AFM.

Keywords: acute flaccid myelitis; genetic susceptibility; case report

Introduction

Acute Flaccid Myelitis (AFM) is a subset of acute flaccid paralysis. It is characterized by weakness in one or more limbs with or without respiratory and bulbar muscle weakness. In one case-series of AFM in five patients aged 2-6, prodromal symptoms (fever, headache, vomiting, cough, reduced appetite, coryza, pyrexia, earache, malaise) lasted 1-7 days before the onset of neurological symptoms.[1] Neurological symptoms include sudden, progressive onset of flaccid paralysis of the upper or lower extremities, often with the proximal muscles affected more than distal muscles, and hyporeflexia of affected limbs. Cranial nerves abnormalities are seen, but encephalopathy and seizures are rare. There is usually no sensory changes, but there may be pain in affected limbs.

The differential diagnosis of sudden asymmetric weakness with bulbar symptoms includes neuroinflammatory disease like transverse myelitis; autoantibody-mediated disease like neuromyelitis optica or anti-myelin oligodendrocyte glycoprotein myelitis; acute inflammatory disseminated polyneuropathy (AIDP or Guillain-Barré); acute disseminated encephalomyelitis; ischemic spinal cord disease or post-traumatic myelopathy; or other infections, including poliovirus or West Nile virus.[2]

Criteria to report to the CDC include acute onset of focal limb weakness and either cerebrospinal fluid with pleocytosis (>5 cells/cc) or MRI evidence of 1+ gray matter spinal cord lesions.[3] In 2018, 233 cases were confirmed by the CDC across 43 states. Most cases are seen in children in the late summer and fall.[3] The number of AFM cases increased in the summer and fall of both 2014 and 2016, mirroring the biennial enterovirus D68 outbreaks in those years, with few cases reported in 2015 and early 2016.[4] There is a need to investigate into genetic factors that may make certain children more susceptible.[5]

There is no established treatment for AFM. Treatment suggested in the literature primarily focuses on supportive therapy, and also includes intravenous immunoglobulin (IVIG), plasma exchange, steroid administration, nerve decompression, neurolysis, and surgical nerve transfer procedures.[6,7]

Case Report

A 3-year-old Colombian male with a history of recurrent acute otitis media presented with gait difficulties.

Four days prior to presentation, the patient arrived in South Florida from Colombia on vacation. On day one of arrival, the patient had bilateral ear pain after removing ear plugs in the pool, which was alleviated by ibuprofen. The following day, he fell while attempting to get out of bed; his parents also reported a subjective fever, decreased activity, and refusal to eat. They treated him with ibuprofen again. He was evaluated by a pediatrician, who diagnosed the patient with pharyngitis, and prescribed amoxicillin. On day three of arrival, he refused to walk; each attempt at ambulation led to falling. Parents reported subjective fever, weakness, fatigue, and decreased activity. On day four of arrival, the parents brought the patient to a pediatrician who referred him to our hospital for evaluation and admission.

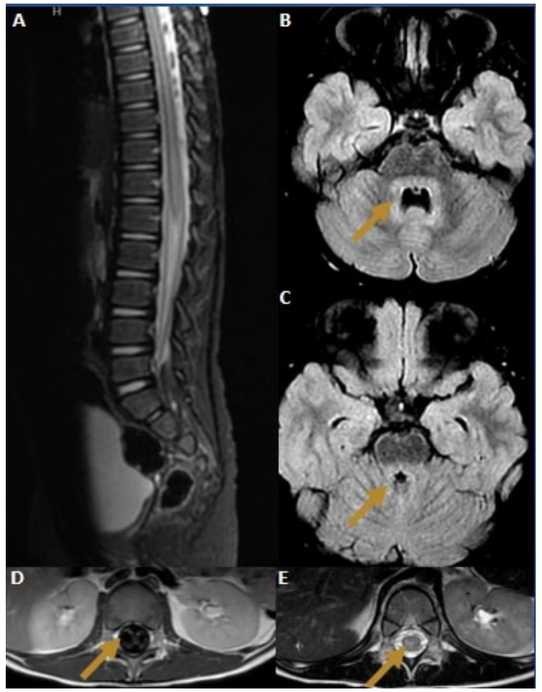

Figure 1: *MRI findings (gold arrows) in the central spinal cord, dorsal tegmentum, and anterior nerve roots. (**A**) MRI T2 weighted image of the thoracic and lumbar spine showing longitudinally extensive lesions in the anterior gray matter. (**B-C**) MRI FLAIR (fluid-attenuated inversion recovery) images of the brain depicting an extensive hyperintense lesion extending from the rostral to caudal pontine tegmentum. (**D-E**) MRI T1 weighted images showing contrast enhancement of the anterior nerve roots at the T12 level, more pronounced on the right.*

Past medical and surgical histories included uncomplicated tympanostomy and adenoidectomy for recurrent otitis media one year prior. His only medication was ibuprofen as needed. Vaccinations were up to date. The patient attended daycare in Colombia, which has a pet farm including ponies, chickens, dogs. His parents denied any recent tick or insect bites.

Family history was significant for a paternal first cousin who had been diagnosed with AFM at age 55, 15 months prior to our patient's presentation. The cousin tested positive for influenza with fever and respiratory symptoms for four days. On the fifth day, he suddenly lost strength in his right lower extremity; the weakness spread to all four extremities over the next day, as well as pain and tingling, diagnosed as AFM. CSF was sent to the CDC and returned positive for enterovirus D68. The cousin refused whole exome sequencing due to the implications it might have on his children. Our patient had not had contact with this relative for years.

Our patient denied weight changes, headache, vision changes, shortness of breath, cough, abdominal pain or distension, nausea, vomiting, diarrhea, constipation, pain or cramping, reported trauma, numbness, tingling, witnessed seizure activity.

In the ED, vital signs showed a heart rate of 120, respiratory rate of 24 and temperature of 38.6°C.

Physical exam revealed complete passive range of motion of right hip without tenderness to palpation. No skin changes. Neurological exam revealed decreased right hip active range of motion, right lower extremity flaccid paralysis, areflexic right patellar and Achilles tendons, 1+ left patellar and Achilles tendons, and decreased generalized muscle tone. Mute right-sided plantar response. Sensation was mildly decreased in his right lower extremity.

Differential diagnosis considered in the Emergency Room was wide-ranging. Due to absent reflexes and weakness in right lower extremity, differential included acute flaccid myelitis, transverse myelitis and Guillain-Barré Syndrome (GBS); thus, neurology was consulted. As findings were asymmetric, GBS was considered less likely. As range of motion was not limited, a septic joint was considered lower on the differential diagnosis. Also considered were viral syndrome, upper respiratory infection, influenza, myositis and rhabdomyolysis.

Serum microbiology was negative for Ebstein-Barr Virus, respiratory syncytial virus, cytomegalovirus, influenza virus, adenovirus, coronavirus, coronavirus, parainfluenza virus, metapneumovirus, enterovirus, mycoplasma PCR, toxoplasma, and bordatella. Serum labs revealed a white blood count of 12,600, erythrocyte sediment rate of 10, C-reactive protein <0.05 and creatine kinase of 56. Cerebrospinal fluid analysis revealed 57 white blood cells, 0 red blood cells, 40 protein and 51 glucose.

Initial imaging with radiographs of bilateral hips and right lower extremity was negative. CT of thoracic and lumbar spines with and without contrast were negative. An MRI without contrast of the right hip bone marrow signal was normal. MRI with and without contrast

CASE REPORT

of the brain and spine showed increased signal on FLAIR (fluid-attenuated inversion recovery) and T2 sequences in the brainstem (dorsal pontine tegmentum), central spinal cord and anterior nerve roots. Figure 1 depicts the longitudinally extensive lesion extending from the rostral to caudal pontine tegmentum and the multi-level root involvement of the anterior nerve roots, which is typical for AFM. MRI with and without contrast of the brain and spine showed gray matter lesions in the central spinal cord, brainstem and anterior nerve roots, consistent with AFM (**Figure 1**).

Treatment with two doses of continuous IVIG 16 g daily was started on admission day six. Physical and occupational therapy were initiated. The patient began to move the toes on his right foot after receiving the second dose of IVIG. The patient's strength in the right lower extremity mildly improved, enabling him to stand and ambulate a few steps with assistance. He was referred for long-term rehabilitation. The patient was discharged after 13 days of hospitalization, but was subsequently lost to follow-up. In the aforementioned case-series of five patients, three patients were able to walk short distance and two regained almost normal mobility within 18 months, with the most significant improvement at 12 months.[1] We suspect our patient would have had a similar prognosis.

Discussion

This case was similar to other cases of AFM in terms of age of presentation, duration of prodromal upper respiratory symptoms before neurological symptoms, pattern of limb weakness, bulbar involvement, cerebrospinal fluid results, and MRI findings.[1]

This case was unique for a few reasons. Serum microbiology was negative for all tested pathogens, including all known pathogens previously associated with AFM (although not all cases have been associated with positive microbiology). Notably, our patient's first cousin did test positive for enterovirus D68. On physical exam, our patient had mildly decreased sensation on the right lower extremity, even though AFM is not known to affect sensation.

Most notable was that the patient had a paternal first cousin diagnosed with AFM 15 months prior. It is interesting to compare and contrast the two cases. Similarly, the cousin's neurological symptoms followed 4 days of URI symptoms, and symptoms began with the right lower extremity. In contrast, the cousin's weakness spread to his other extremities within one day. Furthermore, the cousin tested positive for influenza as well as enterovirus D68. Notably, the cousin was 55 years old at age of diagnosis with AFM; the literature shows a large majority of patients are young children, with a few young adults and immunocompromised adults, too. It is important to note that our patient and his cousin did not have contact for years, decreasing the possibility of an environmental factor. This may suggest an underlying genetic susceptibility.

This case underscores the importance of taking a comprehensive history for all patients. On admission, family history was documented as unremarkable; that is, until day of admission 6, when the neurology consultant discovered the patient's cousin being diagnosed 15 months prior. In this case, or in cases of rare diseases, asking the simple question of "have any family members had something like this before?" can have a big clinical impact. This is an important takeaway for medical students.

Furthermore, despite its rare incidence, AFM was considered at the top of the differential from the beginning, due to the initial physical exam. This underscores the importance of a thorough physical exam to narrow the differential diagnosis, another important lesson for medical students.

There were a few limitations to this case. As the patient returned to his home country of Colombia, we were not able to follow up on his prognosis. Additionally, we were not able to genetically sequence our patient or his paternal first cousin.

Conclusion

AFM is a devastating cause of acute flaccid paralysis predominantly affecting children. Our case is unique in that our patient had a family history significant for an adult paternal first cousin who had been diagnosed with AFM 15 months prior to our patient's presentation. This may suggest an underlying genetic susceptibility to AFM. Future studies are needed to better understand the etiology and pathophysiology of this rare disorder. This case report underscores the importance for medical students to obtain a complete and comprehensive history and thorough physical exam for all patients.

References

1. Kirolos A, Mark K, Shetty J, et al. Outcome of paediatric acute flaccid myelitis associated with enterovirus D68: a case series. *Dev Med Child Neurol*. 2019; 61(3):376-380.

2. Christy A, Messacar K. Acute flaccid myelitis associated with Enterovirus D68: A Review. *J Child Neurol*. 2019;34(9):511-516.

3. Lopez A, Lee A, Guo A, et al. Vital Signs: Surveillance for Acute Flaccid Myelitis—United States, 2018. *MMWR. Morb Mortal Wkly Rep*. 2019;68(27):608-614.

4. Messacar K, Asturias EJ, Hixon AM, et al. Enterovirus D68 and acute flaccid myelitis—evaluating the evidence for causality. *Lancet* Infect Dis. 2018;18(8):e239-e247.

5. Fitzgerald A. Pediatric Acute Flaccid Myelitis Cases Spike Again. *Neurology Today*. 2018;18.23:1-33.

6. Nath RK, Somasundaram C. Functional Improvement of Upper and Lower Extremity After Decompression and Neurolysis and Nerve Transfer in a Pediatric Patient with Acute Flaccid Myelitis. *Am J Case Rep*. 2019;20:668-673.

7. Hopkins SE, Elrick MJ, Messacar K. Acute Flaccid Myelitis—Keys to Diagnosis, Questions About Treatment, and Future Directions. *JAMA Pediatr*. 2019;173(2):117-118.

Nasal Reconstruction with the Rieger Flap in a Patient with Merkel Cell Carcinoma: A Case Report

Leah Cohen[1], Marcus Vinicius da Silva Coimbra Filho, M.B.B.S., M.D., M.Sc.[2], Lara Trindade de Carvalho, M.B.B.S.[3],

Patricia Ferreira Ney, M.B.B.S.[4], Ana Luiza Graneiro, M.D.[5]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Department of Plastic Surgery, Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, Brazil

[3]Department of Dermatology, Universidade Federal Fluminense, Niterói, Brazil

[4]Department of Ophthalmology, Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, Brazil

[5]Nicklaus Children's Hospital, Miami, FL

Corresponding Author: Leah Cohen, lcohe047@med.fiu.edu

Abstract

Merkel cell carcinoma (MCC) is a rare neuroendocrine skin tumor with a characteristically aggressive course and poor prognosis. The diagnosis is made histologically, and the treatment involves surgery, adjuvant therapy, and palliative care, depending on the disease stage. We encountered a 61-year-old Caucasian male with a rapidly growing caudal nasal nodule which was diagnosed as MCC. Skin cancers of the nose require unique surgical considerations and may pose reconstructive challenges. The Rieger flap has been used for the reconstruction of caudal nasal surgical defects in non-MCC skin cancers. We describe the use of the Rieger flap for the repair of a caudal nasal MCC and explain the utility of its use.

Keywords: merkel cell carcinoma; surgical flaps; dermatologic surgical procedures; Rieger flap; wide local excision

Introduction

Merkel cell carcinoma (MCC) is a rare neuroendocrine skin cancer characterized by its aggressive behavior. MCC is caused by either DNA damage from ultraviolet light, or the oncogenic Merkel cell polyomavirus.[1] Patients who are immunosuppressed, such as those with altered lymphocytic function or those on immunosuppressive medications, are at an increased risk of developing MCC.[2] Clinically, MCC most commonly presents as a rapidly growing, solitary cutaneous or subcutaneous nodule in elderly, fair skinned individuals with a history of chronic sun exposure.[2]

The diagnosis of MCC is based on histologic morphology and immunohistochemistry.[3] Histologically, MCC cells have scant pale eosinophilic cytoplasm with oval-irregular nuclei, finely granular chromatin, and indistinct nucleoli.[4] Apoptotic bodies and mitotic figures are typically found in abundance. Areas of geographic necrosis and divergent differentiation within the tumor, such as focal areas of squamous, sarcomatoid and scarcely, eccrine differentiation may also be present.[4] Generally, immunohistochemistry is positive for cytokeratin 20, which is the marker with the highest sensitivity and specificity for MCC. Other cytokeratin cocktails, such as Cam5.2, AE1/AE3, and neuroendocrine markers, including CD56, synaptophysin, chromogranin and neurofilament are also commonly positive.[3,5]

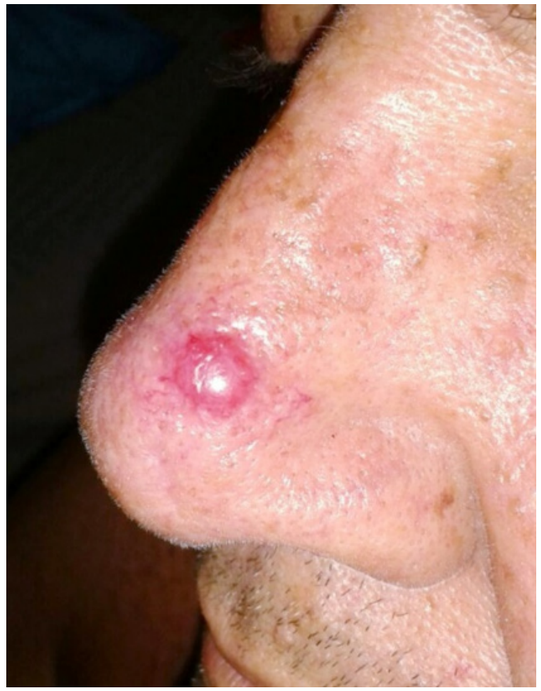

Figure 1. *Merkel cell carcinoma nodule at first evaluation.*

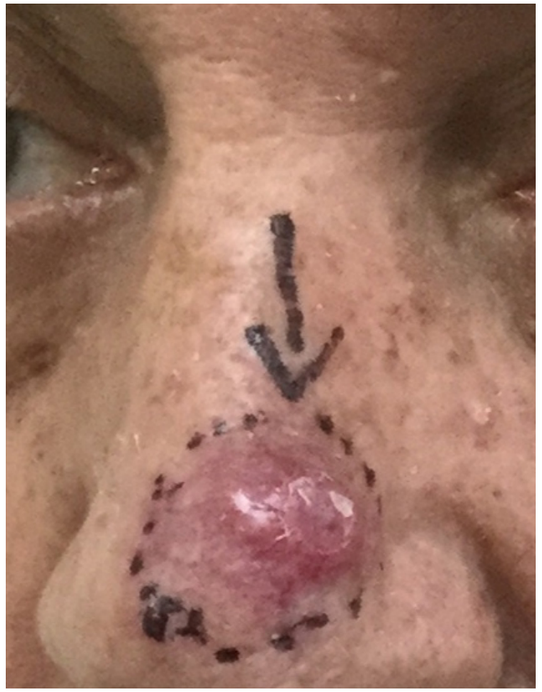

Figure 2. *Merkel cell carcinoma at 3 weeks after first evaluation, on the day of surgery.*

Contemporary management of MCC involves wide local excision (WLE) or Mohs micrographic surgery followed by lymph node dissection, adjuvant radiotherapy, systemic therapy, immunotherapy, or palliative care, depending on disease stage and patient comorbidities. For early stage MCC, surgical resection can control and even cure the disease.[6] For all stages of disease, early excision is encouraged. WLE is used in areas with ample surrounding tissue for closure. For areas with increased oncologic and reconstructive challenges, such as the head and neck, physicians have turned to tissue-sparing techniques such as Mohs micrographic surgery and have often had to develop individualized closure techniques at the time of surgery.[7] Literature discussing the surgical management of MCC of the nose is sparse. For non-MCC skin cancer of the distal nose, a dorsal nasal (Rieger) flap has been reproducible and effective in reducing many aesthetic or functional complications.[8] We describe successful use of the Rieger flap after surgical removal of MCC from the nose.

Case Report

A 61-year-old Caucasian male (Fitzpatrick skin type II) presented to the Hospital Universitário Gaffreé Guinle with an asymptomatic erythematous nodule on the left distal nose (**Figure 1**). The patient endorsed a prior nose injury to the area, followed by rapid growth of the nodule over several weeks. An excisional biopsy was performed demonstrating MCC, positive for CK20 in a dot pattern, synaptophysin, and CD56 with Ki-67 expression in 100% of neoplastic cells. The specimen was negative for chromogranin, CD20, CD3, CD30, CD23, CD8, CD4, and CD5. The patient was counseled on operative risks and pre-operative examinations were performed. Three weeks after biopsy, on the day of the surgery, a significant increase in the diameter and induration of the lesion from presentation was noted (**Figure 2**). Surgery was performed under general anesthesia in the hospital setting. After the nodule was excised, the tissue was intraoperatively frozen and examined by a pathologist who performed microscopic examination of the specimen and its margins. While maintaining the patient under general anesthesia, the nodule and part of the left nasal wing cartilage were resected after three recuts were needed in order to reach clear margins (**Figure 3**). Because the defect measured less than 2 centimeters in size, reconstruction could be performed using the Rieger flap (**Figure 4**). There were no surgical or post-surgical complications. The patient was instructed to complete appropriate wound care at home and was seen back in the office one and two weeks after surgery, after which stitches were removed. Three months after surgery cosmesis and functionality of the nose appeared to be maintained, however, positron emission testing (PET) demonstrated enlargement of the bilateral cervical lymph nodes, suggestive of metastatic disease. The patient was then referred to an oncologist who began therapy with avelumab (anti-PD-L1).

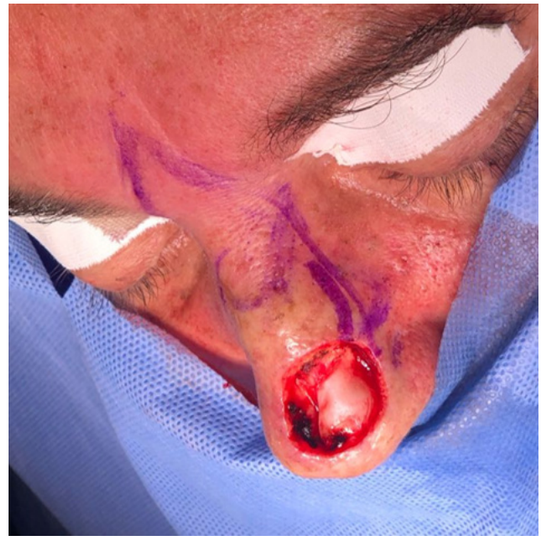

Figure 3. *Surgery with resection of part of the left nasal wing cartilage.*

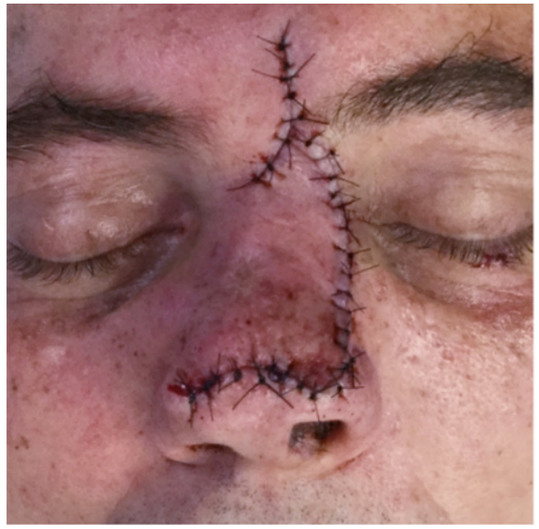

Figure 4. *Nasal reconstruction using the Rieger flap.*

Discussion

We describe a patient who underwent excision of a caudal nasal MCC with reconstruction utilizing the Rieger flap. This technique was first reported in 1967 and was described as a flap appropriate for the caudal nose when the diameter of the defect is less than 2 centimeters.[9] In 1970, Marchat et al altered the original design to an axial pattern dorsonasal flap, based on an axial vessel. The Rieger flap is a surgical technique designed as a laterally based, rotation-advancement flap. The pedicle is superolateral to the surgical defect and the curvilinear line is made from the defect laterally in the nasofacial sulcus to the superior aspect of the glabella. For maximum tissue movement, the pedicle must be completely mobilized down to the epicanthal ligament and the contralateral nasofacial sulcus. Advancement and rotation of the myocutaneous flap into the primary surgical defect complete the closure.[10]

The use of the Rieger flap, which is used for non-MCC skin cancers of the caudal nose, has not been described in the literature for use in MCC. Several limitations of this repair technique in general is that it cannot be used to treat surgical defects larger than 2-3 centimeters. It also may generate asymmetry or deviation of the nasal form, as with any repair. An alternative surgical option would have been a mid-forehead flap; however, this repair requires repeat operation. Therefore, based on our experience we believe the Rieger flap is an effective option for MCC of the caudal nose. Future studies could compile all published nasal repairs for MCC to compare their cosmetic and functional outcomes. Additional surgical and reconstructive techniques used for non-MCC skin cancer of the nose may also be effective for anatomically analogous cases of MCC. In conclusion, the Rieger flap, which is an appropriate repair technique for defects of the caudal nose less than 2 centimeters in size, can be used with good effect for MCC at the same anatomic site.

Acknowledgements

The authors thank the Plastic Surgery Department of the Universidade Federal of Rio de Janeiro.

References

1. Feng H, Shuda M, Chang Y, Moore PS. Clonal integration of a polyomavirus in human Merkel cell carcinoma. *Science*. 2008;319(5866):1096-100.

2. Becker JC, Stang A, DeCaprio JA, et al. Merkel cell carcinoma. *Nat Rev Dis Primers*. 2017;3:17077.

3. Loyo M, Guerrero-Preston R, Brait M, et al. Quantitative detection of Merkel cell virus in human tissues and possible mode of transmission. *Int J Cancer*. 2010 Jun 15;126(12):2991-6.

4. Tetzlaff MT, Nagarajan P. Update on Merkel cell carcinoma. *Head Neck Pathol*. 2018;12(1):31-43.

5. Uchi H. Merkel cell carcinoma: An update and immunotherapy. *Front Oncol*. 2018;8:48.

6. Cassler NM, Merrill D, Bichakjian CK, Brownell I. Merkel cell carcinoma therapeutic update. *Curr Treat Options Oncol*. 2016;17(7):36.

7. O'Connor, WJ, Roenigk, RK, Brodland, DG. Merkel Cell Carcinoma. *Dermatol Surg*. 1997; 23: 929-933.

8. Redondo P. Elongated dorsal nasal flap with superiorly based nasolabial flap for large nasal tip defects: 1-stage reconstruction. *Dermatol Surg*. 2014;40(8):912-5.

9. Rieger RA. A local flap for repair of the nasal tip. *Plast Reconstr Surg*. 1967;40(2):147-9.

10. Andea AA, Coit DG, Amin B, Busam KJ. Merkel cell carcinoma: histologic features and prognosis. *Cancer.* 2008;113(9):2549-58.

Prenuptial Agreements: Just What the Doctor Ordered

Parastoo E. Majd, Esquire

Corresponding Author: Parastoo E. Majd, Esquire, parastoo@hamiltonfamilylaw.com

In a world where the divorce rate continues to rise, a smartly executed prenuptial agreement is more than just a tedious and expensive legal document—it is an insurance contract for your marriage and financial future. As professionals with high-paying careers, doctors are understandably very concerned about protecting their assets. After all, doctors have worked extremely hard throughout medical school and residency, and their income is well deserved, hard earned, and should be protected. Doctors are forced to learn the skill of frugality very early in their career and are rightfully protective of their hard earned money.

Many high income earning individuals such as doctors start their career on the opposite end of the spectrum. In the start of your career, it is natural to think that you will never need a prenuptial agreement because doctors earn a meager income during residency. Instead of viewing it as a current need, perhaps frame your mind to view it as a future, potential need in case your marriage falls apart. In my practice, many of my clients have been doctors who wished they had entered into a prenuptial agreement at the start of their marriage. While we all would like to think our marriages will work out forever; unfortunately, this is often not the case.

When it comes to a prenuptial agreement, you get what you pay for. While it may seem tempting to download a form off the internet, it is imperative that you invest in the quality of your prenuptial agreement. For starters, you must ensure that your prenuptial agreement is drafted by a practitioner who specializes in the field of family law and drafting prenuptial agreements. Your prenuptial agreement signing should be videotaped, and you must go through extensive financial disclosure. There are many formalities to a prenuptial agreement that an internet form cannot cover and a Google search cannot properly explain. As a doctor, you would not use substandard equipment for your patient, so why use a substandard prenuptial agreement?

Prenuptial agreements are understandably not an easy topic to discuss with your wife or husband to be, but a few awkward conversations could potentially save you from years of financial hardship. Generally, prenuptial agreements:[1]

- ***Must*** be in writing and signed by both parties;[2]
- Allow the parties to address all substantive rights in the agreement;[3] and,
- Provide that after marriage, the agreement may only be amended, revoked, or abandoned by a written agreement signed by both parties.[4]

If you are a doctor who is heading to the altar soon, consider entering into a prenuptial agreement to protect your assets and control the method and manner as to how they are distributed in the event of a divorce, by incorporating the following suggestions tailored to your profession:

- Provide for your Spouse While Waiving Alimony. Create an equitable distribution schedule payout for your spouse and waive alimony. Since Florida is an equitable distribution state, in the event you and your spouse divorce, the marital estate must be divided in an equitable manner.[5] Alimony is based on income[6] and as you progress in your career, your income increases; thus, your alimony obligation increases. You can still provide for your spouse in an equitable distribution payout, meaning a payout of the value of the marital estate (usually 50%, but could be more or less depending on the circumstances at hand), and base the payout schedule on the number of years you were married, as the length of the marriage increases and you invest more time in your spouse.

Consider this simplified example: Spouse A and Spouse B divorce after a 10 year marriage. Spouse A earns $500,000 of net income per year at time of divorce and Spouse B is a homemaker and earns no income. The marital estate is worth $1,000,000.

If the parties do not have a prenuptial agreement at the time of divorce, Spouse B would likely be entitled to ½ of the marital estate, $500,000, in addition to alimony which is up to 40% of Spouse A's net income. Spouse A's maximum alimony exposure is $16,666 monthly, or $200,000 annually to Spouse B.

If the parties have a prenuptial agreement according to the above terms, Spouse A can provide for Spouse B in an equitable distribution payout. For example, the parties can contract in a way that Spouse A pays Spouse B $100,000 annually for a period of five years. Importantly, Spouse A would not be obligated to pay Spouse B alimony if the agreement waives it. This could save Spouse A up to one million dollars depending on the length of the alimony obligation.

1The Uniform Premarital Agreement Act (UPAA) governs any prenuptial agreement executed on or after October 1, 2007 in Florida and is located at Florida Statutes §61.079. You may read the statute on the Florida Legislature's website, *Online Sunshine*.
2 Fla. Stat. §61.079(3).
3 Fla. Stat. §61.079(4)(a)(1).
4 Fla. Stat. §61.079(6).
5 Fla. Stat. §61.075.
6 Fla. Stat. §61.08(2)(i).

- Protect your Personal Goodwill. Personal goodwill is defined as any value that attaches to the business solely as a result of one's reputation or skill, representing nothing more than probable future earning capacity, and is not proper in the consideration of dividing marital property.[7] In Florida, personal goodwill is not divisible as it is not a marital asset. Personal goodwill contrasts with enterprise goodwill, which is an intangible asset that arises from unique advantages of the business, such as its location, employees, strategy, and brand name recognition.[8] Unlike enterprise goodwill, personal goodwill is not considered a marital asset subject to equitable distribution in the State of Florida.

Doctors who train extensively and are equipped with unique skill sets that belong solely to them have a claim to personal goodwill. If you own or plan to own your own doctor's office, or plan to work in a previously established practice, you must add a provision in your prenuptial agreement protecting your personal goodwill. This will ensure that your practice, or your skill and knowledge that you incorporate in another practice, remains your personal goodwill and is not subject to equitable distribution.

As a doctor, you should strongly consider specifically defining in your prenuptial agreement that your practice and the passive and/or active appreciation of such is not subject to division, regardless of any change in law. While you are currently protected under the law, this protection is never guaranteed indefinitely because the law is always changing.

- Avoid Challenges. Prenuptial agreements may be challenged on two different levels upon establishing that:
    - The agreement was reached under fraud, duress, coercion, misrepresentation, or overreaching.[9]
    - The agreement makes an unfair or unreasonable provision for that spouse. Once unfairness is established, a presumption arises that there was either concealment or a presumed lack of knowledge of the defending spouse's finances at the time the agreement was reached. The defending spouse can overcome that presumption by showing he or she made a full and frank disclosure of their assets or that the challenging spouse had a general knowledge of the other party's assets and income.[10]

Knowing this, it is certainly possible to avoid a route wherein your spouse could challenge the agreement successfully. As mentioned earlier, it is imperative that you undergo a full and frank disclosure of your financial situation that provides not only a summary of your assets but extensive document production, ensure that your spouse has his or her own attorney to review the agreement, and videotape the prenuptial signing to avoid any claims that the agreement was not entered voluntarily.

- Prevailing Party Clause. Last but not least, include a prevailing party provision which awards attorney's fees to the prevailing party in any action to enforce the prenuptial agreement.[11] In the event your spouse does not want to abide by the agreement and you have to motion the court to enforce the agreement, this is a route to request payment for attorneys' fees.

Of note, temporary alimony and fees, as in alimony and attorneys' fees during the pendency of divorce proceedings, can never be waived under Florida law as this is against Florida public policy.[12] Likewise, the right to child support can never be waived.[13]

Invest in your prenuptial agreement the same way you invest in patient care, your education, and your career. It is not an easy or ideal topic of conversation but an insurance policy that can protect all that your hard work has helped to build. Remember to consult with an attorney who specializes in drafting complex prenuptial agreements.[14]

While having a prenuptial agreement in no way guarantees you from a spouse challenging it, an intelligently drafted prenuptial agreement greatly decreases your chances of that happening and allows for you to insure your future and rebuild your life.

7 *Thompson v. Thompson*, 576 So. 2d 267, 269 (Fla. 1991); *Schmidt v. Schmidt*, 120 So. 3d 31, 33 (Fla. 4th DCA 2013).
8 Twitchell, BVR's Guide to Personal Goodwill v. Enterprise Goodwill.
9 *Casto v. Casto*, 508 So.2d 330 (Fla. 1987); Fla. Stat 61.079. Florida courts read the statutory provision in tandem with the language of *Casto*.
10 *Id*.
11 *Lashkajani v. Lashkajani*, 911 So.2d 1154 (Fla. 2005).
12 *Aguilar v. Montero*, 99 Sp.2d 872 (Fla. 3d DCA 2008); *Belcher v. Belcher*, 271 So.2d 7 (Fla. 1972); *Lord v. Lord*, 993 So.2d 562 (Fla. 4th DCA 2008).
13 *Dechant v. Florida Dep't of Revenue ex rel. Rees*, 915 So. 2d 215, 216 (Fla. 3d DCA 2005).
14 You must consult with an attorney who specializes in prenuptial agreements when drafting your specific prenuptial agreement. This article in no way guarantees results or a particular outcome of any kind.

Appendicitis in the Older Adult: A Diagnostic Conundrum and Serious Issue

Molly A. Hulbert, M.S., and Sheldon Cherry, M.D.
Herbert Wertheim College of Medicine, Florida International University, Miami, FL
Corresponding Author: Molly A. Hulbert, M.S., mhulb001@med.fiu.edu

Abstract

Florida's population of people aged 65 years and older (the older adult) rose 37% in the last decade. The older adult is set to be the largest proportion of the Floridian population by the year 2040. As this change occurs, physicians will increasingly face illnesses in the older adult that previously predominated in younger age groups. One such disease is appendicitis. Appendicitis in the older adult may present differently and is associated with an increase in death, perforation, abscess, sepsis and wound dehiscence which is not seen as commonly in younger patients. This editorial provides for more robust considerations and dialogue among physicians regarding this new paradigm in the hope of earlier diagnosis and reduction in morbidity and mortality. Older adults themselves and their caregivers would also benefit from education regarding the potential for appendicitis and encouragement to seek early medical evaluation.

Introduction

In a 2010 census, Florida's population consisted of 3,359,602 people who were 65 years and older (the older adult), which correlates to 17.3% of the state's population.[1] In the 2010 to 2020 decade, this age bracket of older adults increased by 37%, which is the greatest rate of change among any age group within the state.[1] By 2040, older adults may hold the largest percentage of the population at 25.5%, or 6,642,622 people.[1] With a growing older adult population, Florida physicians need to recognize that the demographic may be changing for certain medical conditions. One such condition is appendicitis.

Approximately 7% of the general population in the United States has had appendicitis, most of whom are in their 2nd and 3rd decades of life.[2,3] In this patient population, morbidity and mortality is low with minimal length of stay, continued care, and co-morbidities.[2,3] In the older adult however, all of these parameters are increased. Spangler et al stated that the mortality rate is four to eight times higher in the elderly population and 50% of appendicitis-caused deaths are in the elderly.[4] Physicians in states with dominating older adult populations need to recognize atypical presentations of appendicitis to ensure early diagnosis and care for over 50% may be misdiagnosed according to Spangler et al.[4] The present literature on appendicitis in the older adult discusses multiple topics including abnormal presentation, complications, and cost of care. This editorial aims to emphasize this information and the need for further research on this topic; and recommend education of physicians, the older adults themselves and their caregivers in regards to this illness to ensure optimal care for this patient population.

Presentation

Appendicitis can be a clinical diagnosis. An excellent history and physical are the tools a physician needs to have a strong suspicion of appendicitis. Abdominal pain that is acute, sharp, and continuous dominates as the typical presentation for appendicitis.[5] Periumbilical pain migrates to the right lower quadrant as the inflammation worsens.[5] Anorexia, nausea, and vomiting may also occur, and fever may be present.[2,5] Several physical exam maneuvers exist to localize the abdominal pain. Eliciting pain upon palpation at McBurney's point suggests appendicitis at the suspected anatomical location of the appendix.[5] Reproducing pain when the patient raises the right knee into the physician's hand as pressure is applied in downward on the right thigh or extending the right leg at the hip while the patient is lying on his left side is the psoas sign which raises suspicion for appendicitis of the retrocecal appendix.[5] The obturator sign, which involves rotating the right hip internally while the patient is lying supine, may point toward appendicitis of the pelvic appendix.[5] Finally, replicating pain in the right lower quadrant (RLQ) while pressing on the left side is the Rovsing's sign which establishes right-sided peritoneal irritation.[5] Further tests for perforation and peritonitis include checking for voluntary and involuntary guarding and rebound tenderness.[5] Not every patient presents with these signs and symptoms and especially in the older adult.[4]

The older adult population may not feel pain with the same intensity and clarity as younger patients.[4] Less than one third may show the typical symptoms described above and up to 25% may not have right lower quadrant pain.[4] This aspect may delay diagnosis and lead to more complications such as abscess, perforation, and infection. Studies have also identified other issues leading to delays in diagnosis, such as altered mental status, communication problems, frailty, and comorbidities.[6]

Laboratory studies, namely complete blood cell count (CBC) are key. In the non-geriatric group, this test demonstrates infection through leukocytosis (WBC) with a predominance of neutrophils and increased platelet values, suggesting inflammation.[7] The older adult population may not demonstrate these changes in the

EDITORIAL

CBC.[7] The only predictive value for acute appendicitis found by Bayrak et al was a WBC value >12.11x10^3/ul with a sensitivity and specificity of 65.4% and 57.9%, respectively, and area under the curve (AUC) of 0.632+/-0.024 ($p<0.001$).[7] Neutrophil percentage (NWR) and mean platelet volume (MPV) were higher in the geriatric group, however both values were not found to be predictive with an AUC <0.6.[7] Fortunately, further evaluation is available to assess the patient.[7]

Today, most patients who have suspected appendicitis based on the clinical presentation receive confirmatory imaging. Recently, ultrasound has dominated as a more rapid, efficient, and convenient means of ascertaining the diagnosis.[3] The preferred modality for the adult population is the CT scan as it provides excellent visualization of soft tissue structures such as the appendix.[8] Inflammation of the appendix in addition to other possible issues such as abscesses or perforations, which may be more difficult to appreciate by physical exam, are evident and can ensure proper treatment of these complications.[8] Both modalities are acceptable methods for the purpose of diagnosing appendicitis.

Complications

A number of complications may arise particular to the older adult. First is the management of comorbidities. Diabetes, coronary artery disease, pulmonary disease, hypertension and others comorbidities are more prevalent in this patient population.[9] Storm-Dickerson and Horattas evaluated patients aged 60-98 years with appendicitis and found that 52% of their patients had at least one of the comorbidities above.[9] Furthermore, 88% of the patients who had complications from appendicitis had a comorbidity.[9] These comorbidities also correlate with increased use of medication, including anticoagulants. Treatment of appendicitis may be delayed because concurrent use of anticoagulants further increases the potential for complications. The average patient with appendicitis is in the 2nd and 3rd decades of life.[2,3] Those populations are usually healthy with minimal comorbidities and function at the optimal state of health. Most of these patients will not require delay to treatment due to medication use, increased length of stay (LOS) or further care after hospital discharge. Harbrecht et al evaluated four age groups (≤29, 30-64, 65-79, ≥80) in regards to acute appendicitis presentation, treatment, post-operative care and cost. According to Harbrecht et al, LOS doubled in the 65-79 age group compared to the ≤29 age group (6.0 days vs. 2.6 days, respectively) and tripled in the ≥80 age group (7.8 days), which were both statistically significant ($p<0.001$).[2] Furthermore, the number of patients who received home health, skilled nursing, and rehabilitation/long-term care facility care increased dramatically between the <65 and >65 age groups.[2] Of note, only 50.9% of the ≥80 age group went directly home vs 99% of those <65 ($p<0.05$).[2] Those extra resources mean that although older adult patients only compose 9.3% of those with appendicitis, 14% of total charges for this condition is due to care for older adults.[2]

Along those same lines, older adults have higher rates of mortality compared to younger patients. Harbrecht et al showed that the mortality rate of appendicitis increased with age.[2] The ≥80 age group had the highest mortality rate of 3.5% which was statistically significant when compared to the other age groups.[2] This value was followed by the 65-79 age group at 2.2% with a steep drop to those <65 (0.3%) and ≤29(0.1%).[2] Possible explanations for these findings include the increased rates of abscess and perforation prior to surgery and complications such as wound dehiscence and sepsis post-operatively.[3,10,11] Franz et al showed that 16 out of 18 patients with appendicitis >50 years of age had a perforation or abscess formation at the time of presentation and those >70 were more likely than any other age group to have an abscess with appendicitis.[10] Furthermore, the majority of deaths in the Franz et al study "were directly attributable to infectious complications of perforated appendicitis".[10] Further studies have shown that there is an increase rate of sepsis in those 60 years or older post-appendectomy.[3,11] Omari et al demonstrates this relationship as complications occurred in 75% of perforated appendicitis cases versus only 25% in non-perforated cases in patients >60 years of age.[3] The majority of the cases had wound infection followed by sepsis and wound dehiscence.[3] Ninh et al confirmed this finding and suggested that this ailment was more likely in patients who were African-American, morbidly obese, had acute renal failure or dialysis, and had disseminated malignancy.[11]

A new complication, particular to the older adult addressed by Mohamed et al in 2019 is the possible association of appendicitis with a malignancy.[12] This study discussed the increased number of appendicitis cases due to cecal pathology, such as a polyp or cancer in patients over the age of 55.[12] The study recommended that patients over the age of 55, following appendectomy, be offered a colonoscopy to "exclude coexistent caecal pathology".[12] This colonoscopy would be independent of the general recommendations by the USPSTF for older adults.

Discussion

Presentation is different in the older adult patient with appendicitis. Given the knowledge that older adults may present atypically, instituting guidelines for the management of the older adult with abdominal pain may need to occur. In addition to completing a full and detailed history and comprehensive physical exam, imaging is a necessity when it comes to the elderly patient.[4] Ultrasound is becoming more common as Omari et al reported 40% of the appendicitis cases identified in their study utilized ultrasound for diagnosis versus only 29% received CT.[3] Yet, this method is operator dependent and may not visualize structures clearly.[3] The CT scan provides clear visualization of the appendix and surrounding structures; however it has higher levels of radiation, costs more, and may delay diagnosis as the time required to complete the imaging and attain a report by a radiologist postpone care. New technologies have addressed the issue of radiation. Zinsser et al studied reduced scan range abdominopelvic CT, which had equal diagnostic accuracy as standard abdominal CT with 39% lower total effective dose of radiation.[13] That being said, levels of radiation may not be the dominating factor when evaluating standard abdominal CT as an imaging modality for the elderly as the technique described by Zinsser et al was proposed for young children.[13] In this light, new innovation in faster imaging modalities with equal clarity to a standard abdominal CT scan are needed. At this time, ultrasound may be the best option but requires exceptional education in the technique to minimize operator dependency.

Another confounding problem in the older adult is the proven delay in seeking medical help.[9] By educating the older adult to pursue medical attention when symptoms arise, such as those described in the "Presentation" section, the older adult will then be better informed and empowered to address abdominal pain rather than delay seeking treatment. In the case of the older adult with altered mental status or difficulty communicating, educating the patient's caregiver(s) – professional, family, etc. - may ensure more rapid assessment, diagnosis, and treatment of this problem and decrease the chance of complications. This education can occur during any healthcare encounter with a simple pamphlet provided to the family by the physician or reception office. Furthermore, small presentations at nursing homes or long-term care facilities for the older adult and the caregiver could ensure dispersion of the information to the appropriate audiences.

Complications increase in the older adult with appendicitis: comorbidities, increased LOS and post-discharge care, increased morbidity and mortality, higher incidence of perforation and abscess, and previously unknown malignancy. To minimize these complications, proper care is critical. Physicians need to have an increased suspicion when presented with an older adult with abdominal pain and use imaging services available to diagnosis and treat expeditiously to decrease complications. Post-operative and post-discharge care must be of the highest standard with proper antiseptic technique, wound cleaning, donning of protective equipment when necessary, appropriate management of comorbidities and early mobilization for all patients. Researching care practices at each level may elucidate areas of improvement within the older adult's care to improve his/her outcome. Furthermore, more research to evaluate Mohamed et al's conclusion of colonoscopy post-appendectomy will help to determine if this additional test is essential.[12]

Conclusion

The older adult population is rising in the United States, particularly in Florida. With this rise, older adults are increasingly presenting with acute illnesses that are more prevalent and better defined for a younger age group. One such illness is appendicitis, which, in this age group, is associated with a significant increase in morbidity and mortality. In order to ensure the optimal care of the older adult, the (Florida) physician must stay up-to-date in recognizing the obscure presentations of appendicitis, utilize resources appropriately, and identify complications early to address each one fully throughout the duration of the patient's care. Primary care providers are in a position to educate older adults and their caregivers to the possibility of appendicitis in their age group and to seek early care. Further education of physicians and their elderly patients has the potential to improve patient care and decrease the high levels of morbidity and mortality in the older adult with appendicitis.

References

1. Florida Demographic Estimating Conference, February 2015 and the University of Florida, Bureau of Economic and Business Research, Florida Population Studies, Bulletin 172, June 2015. Available at: http://edr.state.fl.us/Content/population-demographics/data/Pop_Census_Day.pdf. Accessed November 11, 2019.
2. Harbrecht BG, Franklin GA, Miller FB et al. Acute appendicitis--not just for the young. *Am J Surg.* 2011;202(3):286–90.
3. Omari AH, Khammash MR, Qasaimeh GR et al. Acute appendicitis in the elderly: risk factors for perforation. *World J Emerg Surg*. 2014;9(1):6.
4. Spangler R, Van Pham T, Khoujah D *et al.* Abdominal emergencies in the geriatric patient. *Int J Emerg Med.* 2014;7:43.
5. Bickley LS, Szilagyi PG. Abdomen. In: *Bates' guide to physical examination and history taking*.12th ed. Philadelphia: Lippincott Williams & Wilkins. 2017:449-508.
6. Hofman MR, Van den Hanenberg F, Sierevelt IN et al. Elderly patients with an atypical presentation of illness in the emergency department. *The Netherlands Journal of Medicine*. 2017; 75(6):241-246.
7. Bayrak S, Tatar C, Cakar E, et al. Evaluation of the predictive power of laboratory markers in the diagnosis of acute appendicitis in the elderly. *North Clin Istanb*. 2019;6(3):293–301.
8. Smith MP, Katz DS, Lalani T, et al. ACR Appropriateness Criteria® Right Lower Quadrant Pain--Suspected Appendicitis. *Ultrasound Q*. 2015;31:85.
9. Storm-Dickerson TL, Horattas MC. What have we learned over the past 20 years about appendicitis in the elderly? *Am J Surg*. 2003;185(3):198-201.
10. Franz MG, Norman J, Fabri PJ. Increased morbidity of appendicitis with advancing age. *Am Surg*. 1995;61(1):40-44.

11. Ninh A, Wood K, Bui AH et al. Risk factors and outcomes for sepsis after appendectomy in adults. *Surg Inect (Larchmt).* 2019;20(8):601-606.

12. Mohamed I, Chan S, Bhangu A et al. Appendicitis as a manifestation of colon cancer: should we image the colon after appendectomy in patients over the age of 40 years? *International Journal of Colorectal Disease.* 2019;34:527-531.

13. Zinsser D, Maurer M, Do P. *et al.* Reduced scan range abdominopelvic CT in patients with suspected acute appendicitis - impact on diagnostic accuracy and effective radiation dose. *BMC Med Imaging*. 2019;19:4.

Blan

Kushali Shah

Miller School of Medicine, University of Miami, Miami, FL

Corresponding Author: Khushali Shah, k.shah12@med.miami.edu

To the Editor,

While volunteering at my medical school's health fair in a predominately Haitian neighborhood, I naively practiced the French I studied in the classroom as an attempt to interact with patients who spoke Creole. As they noticed me struggling to communicate with them in a language that may have triggered memories of French colonization, they smiled and encouraged me to adjust my conjugation. Despite the language barrier, I instantly connected with them in the midst of measuring blood pressures, checking vitals, and providing education on nutrition. Our conversations developed with assistance from a translator, and my role gradually transitioned from teacher to learner. I soon came to appreciate their central focus on spirituality and the importance of honoring long-standing traditions, two principles that transcended borders as they immigrated to America from their home country of Haiti. It was evident that everyone whom I encountered worked their hardest to earn a living and provide for their families, an element engrained in Haitian Vodou.

This brief yet meaningful interaction with the Haitian community inspired me to embark on a journey to Haiti, working at a non-profit medical organization called Project Medishare. Our team, consisting of University of Miami medical students and faculty, arranged mobile health clinics in rural communities of Central Plateau to provide medical screenings and medications for patients. As we organized trainings with community health workers and conducted home visits, I witnessed the extremes of poverty – families living under tarps used as roof-substitutes and people defecating near local water sources due to lack of latrine access. I began to understand the extent of poor sanitation afflicting the country and was fascinated by the tremendous spirit and lespwa (hope) that brought those living together closer despite difficult circumstances. As we packed our suitcases to return home at the end of our trip, I couldn't help but feel uneasy. Providing fleeting care somehow felt as if we betrayed the Haitian natives. How could we leave behind children suffering from severe malnourishment or women caring for eight children, while remaining silent about the domestic violence they encountered behind closed doors? I knew I had to return; this time, with the priority of understanding before diagnosing.

Two months later, I traveled to the Sud (South of Haiti) with my professor to conduct an ethnographical research study on disaster risk reduction and community governance through economic recovery. Our goal was to understand the challenges faced by people living in remote rural areas of Haiti, rather than delivering direct medical care. The drive from the capital, Port-au-Prince, to the Sud took nearly ten hours simply due to the lack of road accessibility in these communities – a symbol of their extreme marginalization.

I remember feeling out of place when I walked down the dusty roads of Les Anglais, an obsolete and barren community devastated by Hurricane Matthew. Children pointed at me and screamed, "Blan!" A direct translation of this word is "white," but in this situation, it meant "foreigner."

A greater perception of my new environment developed as I further explored the sociopolitical climate of Haiti. I recognized the deeper meaning behind the word blan in the context of helping those I met transform their collapsed communities from the aftermath of large-scale disasters. These disasters, which exceed the current coping capacity of socioecological systems, are increasing in number. In particular, an unequal gap exists for indigent communities in Haiti that have limited resources, poor infrastructure, and high levels of social and cultural marginalization.

As my professor and I drove up the hills of Les Anglais and took a second look at our surroundings, my professor turned to me and said, "Health is not a medication. It is exactly this. It is the way we live, inhabitants and humanity." These words resonated

with me and served as a reminder of why I returned to Haiti – to respond to those struggling to survive amidst denuded conditions, to support neglected and unheard voices, and to represent those communities that are trapped between river and sea, living in fear of when the next disaster will strike.

I can still feel the innocent tug on my shirt from a little boy in Anse d'Hainault, a fishing community in the Sud. He lived in a tiny mud shack a mere five feet from the shore line.

"My mom says we won't be here for long. The ocean will take us."

My heart felt heavy, and I was at a loss for words. Who takes responsibility to safely shelter these families whose lives depend on the unpredictability of natural disasters?

The way in which we respond to crises is critical. The vision of creating self-sustaining communities is often overshadowed by dependence on foreign aid and non-governmental organizations. The challenge lies in understanding the complex fragility of vulnerable communities hit by disasters. How do we empower

these communities to stabilize social and economic systems and encourage collaboration with governmental entities to strengthen cooperatives? Establishing locally-rooted initiatives according to surveillance of needs as well as reinforcing disaster risk reduction practices promises effort toward recovery and reconstruction.

Nevertheless, prior to identification of community barriers, we must move past our own initial biases to understand the world of somebody in-situ. I was called blan for a reason, and the people I met are justified in their hesitancy to rely on transient international aid. It is a myth that more economically stable countries know exactly how and where to assist in ameliorating systemic issues that span throughout a country's governmental, economic, and political framework. We must ask questions to determine how to build partnerships and honor values of a country that has embraced a way of life since the 19th century.

While the people I met in Haiti endure great difficulties, I believe their strength, resilience, and spirit are key pillars that allow them to stand tall and

rebuild their communities from catastrophes far beyond their control. Despite the diversity of perspective across the globe, we must all agree on one underlying notion: to fight, with incredible passion, for the respect that vulnerable countries like Haiti deserve.

Female Genital Mutilation: The Physician's Need for a Standardized Approach

Thomas Vazquez[1], Mahtab Forouzandeh[2], Maria Stevens, M.D.[1]

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Miller School of Medicine, University of Miami, Miami, FL

Correspondence: Thomas Vazquez, tvazq020@med.fiu.edu

To the Editor,

It is estimated that nearly two hundred million women worldwide have undergone female genital mutilation (FGM), also known as female circumcision.[1] This religious ritual involves the removal of some or all parts of the female genitalia and is rooted in gender inequality. The World Health Organization estimates that 200 million women and girls are victims of FGM and that 3 million girls are at risk of undergoing FGM each year.[2] Gender and sexuality are central to many of the reasons women are subjected to FGM, including virginity guarding, establishing marriageability, and coercively promoting fidelity.[3] The Middle east, Africa, and Southeast Asia account for the majority of cases of FGM. Egypt, Ethiopia, Somalia, and Nigeria make up the four countries with the highest risk of FGM.[3]

The practice of FGM is usually carried out before the age of five and can lead to serious health consequences both acutely and later in life.[4] Common short-term complications include swelling, excessive/fatal bleeding, anemia, pain, urine retention, wound infection, urinary infection, septicemia, gangrene, tetanus, necrotizing fasciitis, and endometritis. Moreover, the use of shared instruments in this setting is thought to propagate the transmission of HIV and hepatitis B and C.[5] No standardized guidelines currently exist for the physician's approach to FGM in the clinical setting.

Late complications of FGM are dependent on the amount of external genitalia removed. These complications include scars and keloid formation leading to obstructions, infected epidermoid cysts, neuroma formation, painful urination, incontinence, vesicovaginal or rectovaginal fistulas, and painful sexual intercourse and painful menstruation.[6]

While many countries and international organizations have pushed to criminalize FGM and classify it as a human rights violation, it remains an ethical, moral, and legal debate around the world. From a western physician's standpoint, the practice of FGM is commonly viewed as a violation of the Hippocratic Oath; however, physicians who come across patients with FGM may be uncertain about their health-provider responsibilities and may be poorly-equipped with providing specialized health services such as defibulation (i.e. releasing the scar from the narrowed vaginal opening) under these circumstances.[3] The lack of knowledge and training surrounding this topic often leaves health professionals feeling inadequate or unclear about how to manage patients who have undergone FGM.

We report on a 59-year-old Nigerian woman who presented to the community health clinic requesting her first Pap smear. She had emigrated from Nigeria 13 months prior to her visit and was now temporarily living with family in the United States. Due to language and cultural barriers, obtaining the history from the patient was challenging despite a family member interpreter. In Nigeria, the patient had never received preventative health screenings and she was interested in receiving a Pap smear while she was in the United States.

Her niece, who accompanied her during the visit, reported that the patient may have been circumcised as a child and requested that we confirm the type or staging of FGM based on our exam. On exam, the patient appeared to have a reduced vaginal introitus and debulked labia majora. Additionally, her clitoris and labia minora were absent. Her vaginal orifice appeared to be unaffected, so we decided to proceed with the bimanual and speculum exam. We were able to successfully perform the Pap smear. The speculum exam was unencumbered by her anatomy. Her introitus, though reduced in size, did not cover the vaginal orifice (as seen in type III FGM). The cervix was difficult to visualize due to its anterior location; however, we don't believe her surgically altered anatomy affected visualization. Additionally, the patient did not report any pain during the procedure. The rest of her exam was unremarkable.

Four types/categories of FGM have been established to stratify the degree of anatomic mutilation in victims of FGM:

Type I: excision of the clitoral hood with or without removal of parts of the entire clitoris.

Type II: Excision of the clitoris together with parts or all of the labia minora.

Type III: Excision of parts or whole of the clitoris, labia minora and majoria, and stitching or narrowing of the introitus, with a very small outlet for passage of urine and menstruum.

Type IV: Other harmful procedures of the female genitalia for non-medical purposes. (e.g. pricking, incising, scraping, and cauterization.)[7]

As medical providers who were encountering a patient who had undergone FGM for the first time in a clinical setting, we were unaware of how to proceed in this circumstance. Several questions arose during this time – are we equipped to stage FGM or does this patient need referral to a specialist? Would there be any legal or immigration ramifications to documenting this information? Could an official staging from a physician be used to exploit the patient? Are there any long-term effects or health risks associated with the procedure that might affect our management?

Ultimately, we were able to perform the Pap smear and documented the patient's physical exam findings to the best of our ability. Staging the patient was difficult on exam findings alone without proper training or knowledge of the procedure.[7] Of course, we were glad to provide her with the screening that she needed, but left the encounter feeling unsettled. While this challenging dilemma is not new, standard guidelines for providers are lacking. More training is desperately needed across all levels of medical education. This is especially true in developed countries where FGM is not frequently encountered.

In the United States, clinicians who encounter these patients will likely encounter them as immigrants or refugees.[3] Until we receive proper training, physicians will continue to encounter these patients in practice and struggle with uncertainty.

The development of a standardized approach is imperative to ensure that all medical care providers have the ability to provide the best possible service for this exceedingly vulnerable patient population. Through compassion and understanding, we hope to provide better quality care to girls and women living with FGM in the future.

References

1. Khosla R, Banerjee J, Chou D, Say L, Fried ST. Gender equality and human rights approaches to female genital mutilation: a review of international human rights norms and standards. *Reprod Health.* 2017;14(1):59.

2. WHO T. WHO Guidelines on the Manajement of Health Complications from Female Genital Mutilation. *Swiss: WHO Publication.* 2016.

3. Mishori R, Warren N, Reingold R. Female Genital Mutilation or Cutting. *Am Fam Physician.* 2018;97(1):49-52.

4. Cappa C, Shell-Duncan B. *Female Genital Mutilation/Cutting: A statistical overview and exploration of the dynamics of change.* New York: United Nations Children's Fund2013.

5. Reisel D, Creighton SM. Long term health consequences of Female Genital Mutilation (FGM). *Maturitas.* 2015;80(1):48-51.

6. Abdulcadir J, Margairaz C, Boulvain M, Irion O. Care of women with female genital mutilation/cutting. *Swiss Med Wkly.* 2011;140w13137.

7. Odukogbe AA, Afolabi BB, Bello OO, Adeyanju AS. Female genital mutilation/cutting in Africa. *Transl Androl Urol.* 2017;6(2):138-148.

Proceedings of the 2020 FIU Herbert Wertheim College of Medicine Research Symposium

A VERY SPECIAL THANK YOU

On behalf of the directors and participants of the Sixth Annual FIU Herbert Wertheim College of Medicine Research Symposium and the Division of Medical and Population Health Sciences Education and Research, we would like to extend a warm thank you to the amazing reviewers who have worked tirelessly to support and recognize FIU research. We are tremendously appreciative of their selfless involvement in this process and are particularly grateful for their help in continuing and improving this event.

These Proceedings would not have been possible if it were not for their generosity with their time and expertise. They completed more than 280 abstract reviews. Because of their efforts and support, it was possible to prepare the Symposium which, regretfully, had to be cancelled later given the COVID-19 pandemic.

Working together, we are preparing students for their future careers and driving FIU research to new heights. We hope that their generosity will inspire others to follow in their footsteps and volunteer their time and effort to support our FIU student researchers and the Herbert Wertheim College of Medicine community at large. Please join us once again in thanking these incredible women and men.

Oral Abstracts

O1

Association Between Delivery Methods (C-Section vs Vaginal Delivery) and Childhood Asthma

Ariel Wolf. Samora Dorismond. Fatimat Shotande. Grettel Castro, MPH. Marcia H. Varella, MD, PhD, MHS. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Childhood Asthma, Method of Delivery, Vaginal Delivery, Cesarean Section

Introduction and Objectives: Asthma is one of the most common chronic diseases of childhood in the US, and cesarean section rates have been increasing over the past decades. There are two proposed theories linking C-section to asthma. Our goal is to assess if there is an association between the method of delivery (C-section vs. vaginal birth) and development of asthma in children (6 years old and younger).

Methods: We conducted a retrospective cohort study using data from the CDC's 2005 Infant Feeding Practice Study II and its Six-Year Follow Up. The inclusion criteria were healthy women (18 years and older) who gave birth to a singleton, full or near-term infant (at least 5 pounds at birth). The independent variable was the method of delivery (C-section vs. vaginal birth). The main outcome was childhood asthma, which was self-reported by mothers based on the diagnosis by a health professional. A bivariate analysis determined the association between the baseline characteristics and exposure, as well as the outcome. A multivariate regression model focused on the association between the predictors of interest and asthma, controlling for confounders.

Results: Our sample included 1517 women (90% White, non-Hispanic with higher education), 1070 vaginal births (70.5%), and 447 C-sections (29.5%). 10% of children had a diagnosis of asthma. Our study found no association between method of delivery and childhood asthma (crude OR 1.1, 95% CI 0.8-1.6). Adjusting for confounders did not change the statistical significance (aOR 1.1, 95% CI 0.7-1.9, p-value 0.716). Children with a positive family history were two times more likely to be diagnosed (aOR 2.1, 95% CI 1.3-3.4, p-value 0.002). The odds of asthma decreased by 40% among infants without antibiotics exposure during the first 12 months of life (crude OR 0.6, 95% CI 0.4-0.9, p-value 0.015). However, the association was lost after adjustments (aOR 0.6, 95% CI 0.4-1.1, p-value 0.085).

Conclusions-Implications: We did not find an association between method of delivery and asthma. Our study may have had limited power, as suggested by the relatively wide CI for the association between our exposure and main outcome, due to the relatively low frequency of childhood asthma in our cohort. Therefore, further studies should include larger sample sizes.

O2

Association Between Gender and Survival of Patients in Florida with Various Stages of Papillary Thyroid Carcinoma

Edmond Benedetti, BA. Alex Breslin, BA. Eric Chung, MS. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Thyroid, Papillary Thyroid Carcinoma, Gender

Introduction and Objectives: The incidence of thyroid cancer is one of the greatest worldwide. There are differences between men and women on the incidence rates of metastatic development in papillary thyroid carcinoma. Our study seeks to identify the association between gender and survival rates of Florida patients with varying stages of papillary thyroid cancer between 1981 and 2013.

Methods: This is a retrospective cohort study that utilized data from the Florida Cancer Data System (FCDS). The independent variable of interest was gender, while the main outcome was survival. The analysis utilized Cox proportional hazards regression models to control for confounders (age, race, stage at diagnosis, decade at diagnosis, insurance status and smoking status) and obtained hazard ratios along with corresponding 95% confidence intervals.

Results: After excluding 12 patients due to missing information on gender, we ended with 38,256 patients total. We observed baseline differences between males and females regarding stage at diagnosis, with males having more diagnoses as the "regional" and "distant" (30.5% vs 22.0% and 10.4% vs 5.3%) and females with more "local" diagnoses (at 72.7% vs 59.1%). There was also a greater proportion of males that were "current" and "former" smokers (15.1% vs 12.1% and 30.1% vs 16.4%). Our main finding was that males had increased mortality. The unadjusted hazard ratio was 1.8 (95% CI 1.7-1.9, p value <0.001). After adjusting for confounding variables the hazard ratio fell to 1.2 (95% CI 1.1-1.3), still with a p value of <0.001.

Conclusions-Implications: The results supported that male patients diagnosed with papillary thyroid cancer die faster than female patients with the same condition. Future research can be done into why the association of male gender and increased hazard ratio of death exists. Looking into factors such as gender differences in pursuing healthcare, general annual exams, physical and mental wellness, and biological differences may yield more information on this association.

O3

Association Between Race and 5-Year Survival in Patients with Clear Cell Renal Cell Carcinoma

Dhaval Jivanji. Scott Jamieson. Vivian Wong. Chase Mallory. Sidney Barrau. Elias Atri. Grettel Castro, MPH. Alan M. Nieder, MD. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Renal Clear Cell Carcinoma (RCCC), Race, Survival

Introduction and Objectives: In recent years, the incidence of renal cancer has been on the rise with over 73,820 diagnoses and 14,770 deaths estimated in 2020. Previous studies have shown varying levels of evidence regarding the relationship of race and survival outcomes in patients diagnosed with clear cell renal cell carcinoma (CCRCC). This study aims to analyze if race impacts 5-year cause-specific survival in patients with CCRCC.

Methods: This retrospective study was conducted using data from the Surveillance Epidemiology and End Results (SEER) database. The SEER database collects cancer-based data through the use of population-based cancer registries. Patients with a confirmed diagnosis of renal clear-cell adenocarcinoma (ICD code C649-831) were included in the study. Children, patients without data for race, 5 year survival or insurance status were excluded from the study. Additional confounders include age, sex, surgical treatment, insurance, marital status and stage of tumor at diagnosis. Kaplan Meier curves were generated whil unadjusted and adjusted multivariable Cox regression was used to determine any association between race and CCRCC.

Results: A total of 8,421 subjects were included in the analysis. Unadjusted Cox regression showed a statistically significant difference in 5-year cause-specific survival among Black/African American (p= 0.006), American Indian/Alaskan Native (p=0.011) races as compared to White. Asian/Pacific islander did not reach significance (p=0.193). Subsequent multivariable Cox regression analysis was performed to adjust for potential confounders, which showed no association between race (Black: p=0.349, American Indian/Alaskan: p=0.715, Asian Pacific Islander: p=0.882) and 5-year cause-specific survival in patients with CCRCC.

Conclusions-Implications: When considering racial biases in the health care landscape and minority health outcomes, our results yielded no statistical significance between race and 5 year cause-specific survival when confounders were adjusted. Further studies with larger sample sizes are necessary for a more complete investigation of the potential association between race and survival from CCRCC.

O4

Association Between Sex and tPA Administration in Florida Hospitals

Alexandra Dadrat. Jeffrey Wei. Raed Narvel. Juan M. Lozano, MD, MSc. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Sex, Stroke, tPA, Health Disparities

Introduction and Objectives: Each year, 795,000 people in the United States experience an ischemic stroke. Treatment with tPA is effective in reducing morbidity and mortality from stroke if given up to 4.5 hours after symptom onset. Prior studies examining differences in tPA administration differ regarding whether sex is associated with tPA administration. Our goal is to identify whether sex is an independent predictor of administration of tPA for patients admitted for ischemic stroke in Florida hospitals.

Methods: Historical cohort using secondary data from the Florida Hospital Discharge Database for Stroke between 2008-2012 (n = 333367). Inclusion criteria were all adult (age>18) patients with ischemic stroke by ICD-9 criteria and exclusion criteria was any absolute contraindication to tPA administration. The independent variable was sex and depdent varibale was administration of tPA. We included descriptive analysis of baseline characteristics as well as bivariate analysis to assess associations between baseline characteristics and rate of tPA administration. Multivariate logistic regression was performed to adjust for confounders including age, race, ethnicity, insurance status, and comorbidities. Adjusted and unadjusted odds ratios with 95% confidence intervals were reported.

Results: The final sample consisted of 129,384 patients, of which 67,119 were female and 62, 265 were male. We found no statistically significant association between sex and tPA administration in our study population (Adjusted OR: 1.03, 95% CI: 0.75-1.08). Incidentally we found that Lack of insurance, Black Race, and Older Age were associated with lower odds of tPA administration. Comorbidities associated with increased odds of receiving tPA included Atrial Fibrillation, Smoking Exposure, and Obesity, however only Atrial Fibrillation remained associated with increased odds of receiving tPA in our adjusted analysis.

Conclusions-Implications: Our study found that sex was not an independent predictor of administration of tPA for patients admitted for ischemic stroke in Florida hospitals. Further research is warranted to explore the association of other incidental findings with tPA administration as they may guide research and policy aimed at addressing lack of administration of tPA for ischemic stroke patients.

O5

Comparing Surgical Site Infections in Women Undergoing Minimally Invasive Hysterectomy Techniques Versus Traditional Abdominal Hysterectomy

Diana Cardero. Reginald Deligent. Oscar Hernandez. Emery Salom, MD. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Surgical Site Infection, Hysterectomy, Minimally-Invasive, SSI, TAH

Introduction and Objectives: Surgical site infections (SSI) are one common postoperative complication. Minimally invasive surgical techniques, including transvaginal hysterectomy (TVH) and laparoscopic/robotic hysterectomy (LRH), have been developed to curtail the rate of postoperative complications. This study looked at the association between minimally invasive hysterectomy techniques and SSI rates as compared to total abdominal hysterectomy (TAH).

Methods: We conducted a historical cohort study using data provided in the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. Women aged 18-95 who underwent hysterectomies during 2015-2016 were included. The independent variable was the surgical procedure (TAH vs minimally invasive techniques (LRH or TVH)). The dependent variable was the diagnosis of SSI. Our data analysis comprised the following: a descriptive analysis of the baseline characteristics of our sample; a bivariate analysis to determine the association between baseline characteristics and surgical procedure, as well as the association between the type of surgery performed or the covariates and SSI; a multivariate analysis to measure the association between our independent variable and SSI while adjusting for confounders.

Results: Our sample included 89,584 women. The majority of our patients were women under 50 years of age (59%) and identified as white (67%). Bivariate analysis indicated that TAH was associated with approximately double the occurrence of SSI (4.5%) as compared to LRH (2.1%) and TVH (1.6%) (p-value <0.001). Multivariate analysis yielded an adjusted 44% and 45% reduction in the odds of SSI in patients undergoing TVH (AOR 0.56, 95% CI 0.47 – 0.66) and LRH (AOR 0.55, 95% CI 0.49 – 0.62), respectively, as compared to TAH. Other variables independently associated with SSI include, but are not limited to, BMI ≥40 (AOR 1.66, 95% CI 1.43-1.94), intraoperative time > 163 minutes (AOR 2.08, 95% CI 1.81-2.40), and smoking (AOR 1.59, 95% CI 1.42-1.78).

Conclusions-Implications: Both TVH and LRH were associated with a lower risk of SSI than TAH. In addition, our study also identified various independent factors that were associated with the development of SSI. Future studies should be performed which can more effectively control other covariates to elucidate further confirmation of our findings.

O6

Incidence of Postoperative Venous Thromboembolism in Patients with and without Bleeding Disorders

Kaushik Ravipati, BS. Bhavya Sheth, BS. Bilal Arif, BS. Rebecca Toonkel, MD. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: DVT, Pulmonary Embolism, Bleeding Disorders, Postoperative, ACS NSQIP

Introduction and Objectives: Postoperative venous thromboembolism (VTE) is a risk of all surgical procedures and is associated with significant morbidity and mortality. Knowing an individual patient's risk for postoperative VTE is particularly important as it may guide the choice of perioperative VTE prophylaxis. One of the major factors that determines a patient's risk is the presence of an existing bleeding disorder preoperatively. Therefore, the primary aim of our study was to assess the relationship between preoperative bleeding disorders and postoperative VTE.

Methods: A retrospective cohort study was done by performing a secondary analysis of data obtained from the 2017 American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database. Our population consisted of 1,000,393 adults from 708 NSQIP participating sites across all 50 states and Washington DC age 18 and older with and without bleeding disorders who underwent a major surgical procedure. The exposure was whether or not the patient had a bleeding disorder preoperatively. The outcome was postoperative deep vein thrombosis and pulmonary embolism. Logistic regression was used to assess whether preoperative bleeding disorders were associated with postoperative VTE.

Results: At baseline, of the 1,000,393 participants in the study, 8,029 (0.8%) had postoperative VTE, while 40,456 (4.0%) had preoperative bleeding disorders. As compared to patients with no preoperative bleeding disorders, patients with bleeding disorders had 2.05 (95% CI: 1.89-2.22) times higher odds of postoperative VTE before adjustment. Even after adjusting for age, gender, race, ethnicity, smoking, cancer, steroid use, ventilator dependence, and congestive heart failure, patients with bleeding disorders had a 32% increase (OR 1.32, 95% CI: 1.20-1.45) in postoperative VTE. Males, African Americans, Non-Hispanics, and patients with disseminated cancer, steroid use, ventilator use, and congestive heart failure all had significantly higher odds of postoperative VTE.

Conclusions-Implications: Preoperative bleeding disorders were associated with an increased risk of postoperative VTE. Due to the relative heterogeneity among guidelines for preoperative VTE prophylaxis for patients with bleeding disorders, this data implies that bleeding disorders are being managed too aggressively preoperatively, leading to a shift in balance to postoperative thrombosis. Further research is needed to more reliably establish the relationship between preoperative bleeding disorders and postoperative VTE.

O7

Insurance Status and In-Hospital Mortality in Acute Stroke Patients in Florida from 2008-2012

Michelle Freilich. Takeiya Lynch, MHA. Natalia Ravelo. Pura Rodriguez de la Vega, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Insurance, Stroke, Mortality, Medicare, In-Hospital

Introduction and Objectives: Stroke is the leading cause of death and disability worldwide. In the United States, stroke prevalence is highest in the southeast. Studies have shown that uninsured patients face an increased risk of all-cause in-hospital mortality compared to their insured counterparts. In Florida, the proportion of uninsured has been among the highest in the nation. Few studies have examined the relationship between insurance status and mortality among acute stroke patients. The objective of our study was to evaluate the association between insurance status and in-hospital mortality in acute stroke patients in Florida between 2008 and 2012.

Methods: A retrospective cohort study was conducted using secondary data from The Florida Hospital Discharge Database for Stroke 2008-2012. Our study analyzed patients 18 years-of-age and older admitted for acute stroke to Florida hospitals during 2009-2012. Patients that had missing or unclear information about their insurance were excluded due to unclear definitions (n=3,921). The final sample included 158,182 patients. The main independent variable was insurance status (private insurance, Medicare, Medicaid, uninsured, or other) and the main outcome was in-hospital mortality. The covariates used in the analysis were age, gender, race, ethnicity, smoking, and comorbid conditions. Unadjusted and adjusted logistic regression analyses were used to calculate odds ratios (OR) and corresponding 95% confidence intervals (CI).

Results: The in-hospital mortality rate of our sample was 6.87%. The adjusted logistic regression indicates that those with other types of insurance had a two-fold increased risk of mortality (OR 2.11; 95% CI 1.90-2.34), followed by uninsured status (OR 1.15; 95% CI 1.04-1.26) when compared with private insurance patients. Medicare recipients had the lowest rates of in-hospital mortality (OR 0.62; 95% CI 0.58-0.66). Other variables that were independently associated with in-hospital mortality include atrial fibrillation (OR 1.34, 95% CI 1.28-1.41) and congestive heart failure (OR 1.50, 95% CI 1.42-1.59). **Conclusions-Implications:** Uninsured patients and those with other government insurances have an increased risk of in-hospital mortality. We recommend health professionals, educators, and caregivers be aware of these disparities in health outcomes. Further research is needed on health outcomes based on insurance status.

O8

Retinoblastoma Co-repressor 1 (RB) and Cyclin-Dependent Kinase Inhibitor (CDKN) as a Two Gene Panel for Differentiating Pulmonary from Non-Pulmonary Origin in Metastatic Neuroendocrine Carcinomas

Kritika Krishnamurthy, MBBS, MD[1]. Vathany Sriganeshan, MD[1,2]. Robert Poppiti, MD[1,2].

[1]*Mount Sinai Medical Center, Miami Beach, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Neuroendocrine Carcinoma, RB1, CDKN 1B, CDKN 2A, Molecular Markers

Introduction and Objectives: Neuroendocrine carcinomas (NECs) often present with metastases even with small and undetectable primary tumors. NECs arise from neuroendocrine cells present throughout the body, with lung and GI tract being the most common primary sites. Additionally, neuroendocrine differentiation can be seen in undifferentiated carcinomas of non-neuroendocrine origin further complicating the landscape of metastatic NECs. Organ specific immunohistochemical markers such as TTF1, CDX2 and PAX8 are often lost in high grade tumors and may be non-contributory in localizing the primary site. Thus in patients presenting with metastatic NEC, identifying the primary tumor can be challenging. Though NECs share a common cellular origin, they exhibit great variability in biologic behavior, prognosis and treatment based on the primary organ of origin. In this study we analyze the molecular alterations identified by next generation sequencing to identify possible organ specific molecular markers for NECs.

Methods: Twenty one cases of metastatic NECs were retrieved from our archives and were classified based on location of the primary tumor derived from clinical and radiological findings. Next generation sequencing data was retrieved and analyzed for recurrent genetic abnormalities in these cases. Statistical analysis was performed using IBM SPSS25 software.

Results: Genetic alterations were found in 128 genes in the 21 cases studied RB1 mutations were exclusive to NECs metastasizing from lung primary and were detected in 5 of 12 (41.6%) cases (p=0.04). The RB1 mutation frequency did not vary significantly between small cell or large cell NEC of the lung. CDKN gene family (CDKN1B and

2 A) mutations were limited to metatstatic NECs of non-pulmonary origin and were detected in 4 of 9 (44.4%) cases (p=0.02).

Conclusions-Implications: The location of the primary tumor in metastatic NECs appears to have significant prognostic and therapeutic implications. But due to the morphological homogeneity, higher grade of tumor, variable sensitivity of immunohistochemical markers, and small, often undetectable primary tumors, the localization of the primary tumor in cases of metastatic NECs is a challenge. In this scenario, the detection of molecular variations specific to organ of origin may aid in establishing the location of the primary tumor and effect its further management. In this study, RB1 and CDKN gene family mutations are identified as possible markers for differentiating pulmonary and non-pulmonary origin in metatstatic NECs.

O9

Stroke Mortality in Patients Receiving tPA Based on ED Arrival in Florida

Astrid Casin. Daniel Puebla, MSc. Michael Elias. Grettel Castro, MPH. Melissa Ward-Peterson, PhD, MPH. Juan G. Ruiz, MD, MMedSci. Juan C. Zevallos, MD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: tPA, Stroke, Mortality, Off-Hours, On-Hours

Introduction and Objectives: Studies have shown that there are differences in mortality rates for patients receiving stroke care who arrive to the hospital during weekend hours, off-hours, or on-hours. The main objective was to determine if the mortality of acute stroke patients receiving tPA is higher in those arriving during off-hours compared to those arriving during on-hours.

Methods: A historical analytical cohort of patients who were diagnosed with ischemic stroke and received tPA while in the hospital was obtained from the Florida Hospital Discharge Database for Stroke (2008-2012). Exposure was defined as arriving on-hours (weekday 7 AM-7 PM) versus off-hours (all other weekday hours and weekends) and outcome was defined as in-hospital mortality. Control variables included age, gender, insurance, hospital location (rural vs urban), race, and ethnicity. Both crude and adjusted (multiple logistic regression) odds ratios, and 95% confidence intervals were estimated. Worse-best case scenarios analyses were conducted to examine the effect of missing data.

Results: There were 6,278 patients who suffered an acute ischemic stroke and received tPA between 2008-2012. From this, 2,947 patients arrived during on-hours and 3,331 arrived during off-hours. Overall mortality was 7.6%. There was no difference in the odds of dying between on and off hours arrival time (OR: 1.10, 95%CI 0.92-1.33), not even after adjusting for potential confounders (Adjusted OR: 1.11, 95%CI 0.92-1.35). The only statistically significant predictor of mortality in the analysis was age, with an odds ratio of 1.03 (CI: 1.02-1.04, P<0.001).

Conclusions-Implications: Patients that arrived during off-hours did not have a higher rate of in-hospital mortality when compared to those patients who arrived during on-hours. Given the selection criteria of the two groups, requiring all members to have received tPA, we conclude that the standardized protocol of tissue plasminogen activator administration and the quick recognition of patients suffering an ischemic stroke failed to show a difference in mortality. More direct studies using a chart review need to be done to properly confirm the findings.

O10

Survival Differences Between Races in Pediatric Acute Lymphoblastic Leukemia Patients

Nicole Birrer. Vadine Eugene. Catilyn Gallagher. Pura Rodriguez de la Vega, MPH. Noël C. Barengo, MD, MPH, PhD. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: ALL, Pediatrics, Mortality, Race, Disparity

Introduction and Objectives: Acute Lymphoblastic Leukemia (ALL) is the most common form of pediatric cancer in the United States. In spite of improving treatments and decreasing mortalities, differences in survival between races continue to persist. Our research intends to (1) quantitatively distinguish differences in cause-specific mortality among four groups of races; (2) determine if differences previously found have persisted when solely analyzing data from the twenty-first century; and (3) estimate the association between race and mortality in ALL patients after controlling for potential biological factors.

Methods: The study is a historical cohort using data from the National Cancer Institute's Surveillance Epidemiology and End Results 18 (SEER-18) Registry. The study population includes all newly diagnosed pediatric (ages 0-19) ALL cases during 2001-2014. We classified pediatric ALL cases by race, defined as Non-Hispanic White (NH White), Non-Hispanic Black (NH Black), Hispanic, and Asian/Pacific Islander (API), and its association to mortality in pediatric ALL. Control variables included age, sex, phenotype, and cytogenetics with respect to their prognostic classification as seen in WHO taxonomy. We calculated unadjusted and adjusted hazard ratios through Cox Regression models for cause-specific mortality in these racial groups when being compared to NH Whites.

Results: Our study sample of 2,975 children was analyzed for 5-year survival within each race group. Unadjusted hazard ratios for NH Blacks, 2.05 (1.30-3.23), and Hispanics, 2.01 (1.49-2.72), were found to have statistically significant worse outcomes than NH Whites, which is consistent with previous studies. These differences persisted after running three Cox regression models to control for confounders. When adjusted for age, sex, and phenotype, hazard ratios were 1.81 (1.14-2.87) and 2.06 (1.52-2.80), respectively. When adjusting for risk groups - based on age and cytogenetic prognosis - NH Blacks (1.80 [1.14-2.84]) and Hispanics (1.99 [1.47-2.70]) continued to show worse outcomes.

Conclusions-Implications: Our study found that previously reported racial differences in survival among US pediatric cases of ALL are still present. Even after controlling for biological prognostic factors, NH White survival is better than that of all other racial/ethnic groups, strongly suggesting that these differences may represent a true healthcare disparity.

O11

The Association Between Maternal Education Level and Infant Breastfeeding Practices in the U.S.

Caroline Epstein. Dominique Pinzon. Sarah Zajd. Grettel Castro, MPH. Pura Rodriguez de la Vega, MPH. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Breastfeeding, Education, Maternal

Introduction and Objectives: Despite breastfeeding proven as the optimal form of nourishment for infants, and professional recommendations for duration of breastfeeding to be longer than 12 months, 73% of mothers stop breastfeeding their child before 12 months postpartum. Maternal education has been identified as an important social determinant of health for children. The goal of this study is to determine if there is an association between maternal education and breastfeeding duration.

Methods: We performed secondary analysis of a cohort study, the Infant Feeding Practices Study II (IFPSII), done from 2005 to 2007. The dependent variable was maternal education status (classified as high school degree or less, some college, college degree, and post-graduate) and the outcome was breastfeeding duration (< or ≥ 4 months). Independent associations were assessed using binary logistic regression.

Results: We studied 2,387 woman-infant pairs. About 18.3% of the mothers had high school degree or less, 40.8% had some college, 30.2% college degree, and 10.5% had post graduate degree. After adjusting for characteristics of age, race, Hispanic, employment, poverty, parity, previous breast feeding history and prenatal care received, women with postgraduate degrees had 3.8 times the odds to breastfeed for durations of 4 months or more (OR= 3.8, 95% CI= 2.5, 5.7), women with a college degree have 3.3 times higher odds (OR= 3.3, 95% CI= 2.3, 4.7), and women with some college degree have 1.7 times higher odds (OR=1.7, 95% CI= 1.2, 2.4) as compared to women who have a high school degree or less.

Conclusions-Implications: Higher maternal education was associated with longer durations of breastfeeding. Health professionals should be aware that lower maternal education could serve as a marker of risk for suboptimal breastfeeding practices, thus, possibly marking the need to provide more tailored counseling/interventions that could improve breastfeeding practices.

O12

The Impact of Cultural Stress and Gender Norms on Alcohol Use Severity in Latino Male Immigrants

Gauthami Balagopal, BS[1]. Steward Davidson, BS[1]. Sabrina Gill, BS. Noël C. Barengo, MD, MPH, PhD[1]. Mariana Sanchez, PhD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Robert Stempel College of Public Health and Social Work, Center for Research on U.S. Latino HIV/AIDS and Drug Abuse (CRUSADA), Florida International University, Miami, FL*

Keywords: Alcohol Use, Cultural Stress, Latinos, Immigrants, Gender Norms

Introduction and Objectives: Alcohol abuse affects 16 million US residents with disproportionately higher rates and negative consequences in Latino versus Caucasian men. Latinos constitute approximately 18.1% of the total US population, making them the largest and fastest growing ethnic minority group in the nation. Considering these trends, alcohol abuse in this population is a significant public health concern. Previous studies offer limited insight into the effects of traditional gender roles (i.e. machismo) and factors of cultural stress on the alcohol use of recently-immigrated Latino males. This study examines 1) the impact of cultural stressors and gender norms on alcohol use severity (AUS) among adult Latino immigrant men and 2) if gender norms moderate the association between cultural stressors and AUS.

Methods: Secondary cross sectional data for the present study was collected from 2017 to 2018 on 279 Latino immigrant men (M age= 34.9, SD age= 4.86) who immigrated to the US approximately 10 years prior. Participant's countries of origin included Cuba (39.8%), Central America (38.7%), and South America (21.5%). The main outcome and exposure variables were cultural stress and alcohol use severity, respectively. Covariates were age, country of origin, income, education, marital status and pre-immigration alcohol use. Data was analyzed using hierarchical multiple regression (HMR) analysis using SPSS v.25 to calculate beta coefficients and the 95% confidence interval. Moderation analysis was conducted using PROCESS v3.2.

Results: Findings from the HMR model illustrated that, after controlling for demographic covariates, 13.5% of the variance in AUS was explained by cultural stressors and machismo. The final model revealed that cultural stressors assessed through Hispanic Stress Index (HSI) (=0.125, p<0.05) and the Negative Context of Reception (NCR) (=0.154 p<0.05), and machismo (=0.165, p<0.05) were significantly associated with AUS. Moderating effects suggested that higher levels of machismo exacerbated the positive association between NCR and AUS (=1.05, p ≤0.001).

Conclusions-Implications: Factors of cultural stress (i.e. NCR and HSI) are associated with increased AUS, which is modified by gender norms (i.e. machismo). These findings can help inform culturally relevant intervention strategies to assist in mitigating alcohol use problems among Latino men early in the immigration process. Further research should be conducted to identify which Latino groups are most at-risk for increased AUS.

Poster Abstracts

P1

A Stitch in Time: Changing Presentations of Aorto-Right Ventricular Fistula Complicating Aortic Valve Replacement

Elan Baskir, BA[1]. Mario Zevallos, MD[2]. Steven Borzak, MD[3,4].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Universidad de San Martin de Porres, Lima, Peru*

[3]*Charles E. Schmidt College of Medicine, Florida Atlantic University, Boca Raton, FL,*

[4]*University of Miami, Miller School of Medicine, Miami, FL*

Keywords: Aortic Valve Repair, Transcatheter, Surgical, Fistula, Continuous Murmur

Introduction and Objectives: An aorto-right ventricular fistula is an uncommon finding in patients after surgical aortic valve replacement (SAVR). It can present as a new continuous murmur, and first sign of prosthetic valve infective endocarditis. How the mechanism and approach of this rare complication differs from transcatheter aortic valve replacement (TAVR) is debated. We conducted a comprehensive literature review of aorto-cavitary fistulae after SAVR and TAVR. Then, we conducted a convenience case review of two patients in our clinic with aorto-right ventricular fistulae, complications from a SAVR and TAVR, respectively. Notes and imaging from clinic visits and hospital charts were analyzed.

Case Presentation: Case 1: A 78-year-old male with a history of symptomatic mixed aortic valve disease and atrial fibrillation underwent SAVR and ascending aortic aneurysm repair. At 18 months post-SAVR, a new continuous murmur was heard at the left sternal border. A transthoracic echocardiogram revealed a dilated aortic root, and an aorto-right ventricular fistula. 4 months later, the patient developed fever and Strep viridans bacteremia with a negative transesophageal echocardiogram for vegetations. He underwent homograft aortic root replacement and recovered uneventfully. Case 2: An 82-year-old male with a history of minimally symptomatic critical aortic stenosis, persistent atrial fibrillation, coronary artery disease, hypertension, and hyperlipidemia underwent TAVR. At 4 weeks post-TAVR, he was readmitted for edema, heart failure, and failure to thrive. Although no continuous murmur was heard, an earlier echocardiogram showed an aorto-right ventricular fistula, confirmed by transesophageal echocardiogram and right heart catheterization. The fistula was closed percutaneously and he recovered uneventfully.

Conclusions-Implications: Aorto-RV fistulae may be more common in TAVR than SAVR populations, less likely infectious, and have a less typical clinical presentation, with a poorly audible continuous murmur. With the decreasing incidence of peri-prosthetic aortic insufficiency, aorto-cavitary fistula should be considered as a cause of failure to thrive after TAVR.

P2

Abdominal Striae: An Expected Complication Developing Unexpectedly

Irfan A. Khan, ATC[1]. Samara Khan, BS[1]. Vitra Gosine, MD, FACP, FACE[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Diabetes, Thyroid, and Endocrine Associates, Pembroke Pines, FL*

Keywords: Abdominal Striae, Hydrocortisone, Medication, Side Effects

Introduction and Objectives: Abdominal striae (striae distensiae) have many etiologies, including Cushing's syndrome, exogenous steroid utilization, obesity, pregnancy, and puberty. Exogenous steroid use has been linked to abdominal striae, due to exogenous steroids causing a state of hypercortisolism. Abdominal striae caused by exogenous steroid use that causes the cortisol levels to remain at sub-physiological levels (hypocortisolemia) has never been reported. The objective of this case report is to highlight the importance of informing patients about the side-effects associated with steroid utilization, even at low doses, to prevent them from experiencing psychological alarm.

Case Presentation: A 21-year-old female, with a history of central adrenal insufficiency and two pituitary microadenomas (2mm and 1mm), presented to her endocrinologist's office with complaints of weight gain and purple marks on her abdomen. The symptoms began within two weeks of starting hydrocortisone therapy (20 mg at 7 am, 10 mg at 7 pm), and the marks increased in quantity and size for the following ten weeks. Upon physical examination of the abdomen, four abdominal striae were observed along the anterior abdomen, varying from 4-6 cm in height. The striae were not tender to palpation. Upon being diagnosed with central adrenal insufficiency, the patient's initial cortisol levels were 3.26 (5.27-22.45 ug/dL), and ACTH levels were <5 (6-50 pg/mL). After being treated for 12 weeks, the patient's fasting morning cortisol level was only at 1.6 (4.0-22.0 mcg/dL). A diagnosis of abdominal striae secondary to hydrocortisone therapy was made. Since the patient still had hypocortisolemia, even with compliance to the hydrocortisone medication, the patient's dosage of hydrocortisone was not altered. The patient was educated about the necessity of exogenous steroids, so she does not have symptoms associated with low cortisol levels, such as postural hypotension. While frustrated with the abdominal striae, she was motivated to exercise and eat a better diet to lose weight.

Conclusions-Implications: While current literature says that elevated levels of cortisol, caused by chronic exposure to exogenous steroids, can cause abdominal striae, we are reporting an unusual and rare case where a hypo-physiological dose of hydrocortisone caused abdominal striae rapidly. This supports that hydrocortisone and other steroids may have a direct impact on the skin, rather than the hypercortisolemia causing abdominal striae. It is imperative for clinicians to educate their patients about the side effects of medications they are taking, and to perform physical examinations on patients to screen for the presence of these side effects. Further research needs to be conducted to discover the exact mechanism by which hydrocortisone and other steroids cause abdominal striae.

P3

Association Between Insurance Status and Survival in Patients that Underwent Surgical Removal of Glioblastoma Between 2007 and 2015: A Cohort Study

Beverley Cruz Alfonso. Lorena Carbajal Carballo. Pilar Zaldivar Alonso. Pura Rodriguez de la Vega, MPH. Grettel Castro, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Neoplasm, Prognosis, Adult, Delivery of Healthcare

Introduction and Objectives: Glioblastoma is the most common primary malignant neoplasm of the brain affecting adults; with an incidence rate of 3.19 per 100,000 persons in the United States in 2015. Furthermore, the median survival rate is less than 2 years, and the 5-year survival rate is less than 5%. A number of researchers have suggested that socioeconomic and insurance status may be related to shorter glioblastoma survival. However, current scientific information is scant. Understanding and removing barriers to optimal therapy is imperative.

Methods: Using the Surveillance, Epidemiology, and End Results (SEER) database, this historical cohort evaluated patients 18-65 years old who underwent surgical removal of glioblastoma between 2007 and 2015. Patients with missing information on insurance status and survival were excluded from the study. The independent variable, insurance status, was subdivided into uninsured, Medicaid, and private insurance at the time of diagnosis. The main outcome was survival time (measured in months) after surgery. The covariates included were age, sex, marital-status, comorbidities, and grade, size and location of the tumor, race, ethnicity, sex, and extent of surgery, and post-surgery treatment. Unadjusted and adjusted Cox regression analysis were used to assess the association between insurance status and survival. Hazard ratios (HR) and 95% confidence intervals (CI) were calculated.

Results: Out of 2734 glioblastoma patients that underwent surgery, 1616 died in the first two years. The 2-year survival among those with Medicaid was decreased by 36% compared with those with a private insurance (HR) 1.36; 95% CI 1.15-1.61). No statistically significant associations were found between being uninsured and survival (HR 1.23; 95% CI 0.96-1.59).

Conclusions-Implications: Compared with insured patients, those with any Medicaid have a decreased survival after surgery. Interventions are needed to improve access to healthcare and guarantee insurance coverage in patients with brain malignancies. We propose that further studies may focus on the improvement of not only quantity of life but also quality of life, which could ultimately lead to a further increase in overall survival of GBM patients.

P4

Unusual Presentation of Castleman's Disease Encroaching on the Brachial Plexus

Rahil H. Shah, BS. Pooja Gurnani, BS. Maureen Cioffi-Lavina, DO, FCAP. Abraham Jaguan, MD. Marcia H. Varella, MD, PhD, MHS.

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Mercy Hospital, Miami, FL*

Keywords: Castleman Disease, Brachial Plexus, Supraclavicular Mass

Introduction and Objectives: Castleman's Disease (CD), also known as angiofollicular lymphoid hyperplasia, is a rare, benign lymphoproliferative disorder first described by Dr. Benjamin Castleman in 1954. CD is classified as unicentric Castleman's disease (UCD) or multicentric Castleman's disease (MCD) depending on the extent of lymph node involvement. We report an unusual case of a 52 year old female a supraclavicular mass extending onto the brachial plexus found to be UCD. This case highlights the importance of clinical judgement, imaging and surgical technique in removing a mass encroaching on the brachial plexus.

Case Presentation: A 52 year old female was referred to an ENT clinic with a progressively growing right lateral neck mass. She noticed occasional paresthesia in her right arm. The patient denies weight loss, night sweats, fatigue, nausea, muscle spasms, hoarseness, or neck stiffness. On physical exam, a 4x3 cm supraclavicular mass (level IV) rubbery, non-tender, non-erythematous, and with no associated warmth was noted on the right side. The differential diagnosis included lymphoma, malignancy, mycobacterial infection, Castleman's Disease, Kikuchi's Disease, Kimura Disease, among others. CT and MRI showed a well-circumscribed neck mass that appeared solid and homogenous in nature. The mass was positioned very close to the brachial plexus. Malignancy was suspected and surgical removal was recommended. During the six weeks leading up to surgery,

the mass had grown deeper into the neck now extending into the subclavicular region. The mass attached itself to the subclavian artery and vein, resulting in a very difficult dissection. The mass was ovoid shaped, tan-brown in color, non-tender and surrounded by a thick fibrous capsule. Histopathology analysis showed an enlarged lymph node with prominent vascular proliferation. Numerous germinal centers were present, characterized by thickened mantle zones comprised by lymphocytes arranged in layers "onion skin appearance" and atretic germinal centers traversed by vessels "lollipop follicles." These findings were consistent with unicentric Castleman's disease, hyaline vascular variant. Patient was asymptomatic at 14 days post-op. Typical follow up regimen for UCD includes annual PET/CT scans, and lab studies (CBC, LDH, CMP, IL-6, CRP, serum free light chain assay, and quantitative immunoglobulins.) If normal for 5 years, testing may be discontinued.

Conclusions-Implications: We present an unusual case of Castleman's disease that extended onto the brachial plexus. CD presents in many ways, ranging from nonspecific symptoms to potential paraneoplastic syndromes, but very rarely has it been seen involving the brachial plexus. Histopathological analysis is needed to determine the subtype of CD which will determination treatment. This case highlights the importance of clinical judgement, imaging and surgical technique when faced with a supraclavicular mass.

P5

Current Tobacco Use Status and its Influence on Length of Post-Operative Stay in Patients Receiving Total Knee Arthroplasty

David Tran, BS[1]. Robert Hassan, BS[1]. Vibhu Banala, BS[1]. Charles Jordan, MD[2]. Juan M. Lozano, MD, MSc[1].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Miami Orthopedics and Sports Medicine Institute, Miami, FL

Keywords: Arthroplasty, Knee, Tobacco, Post-Operative, Length of Stay

Introduction and Objectives: Tobacco smoking is a known risk factor for insidious post-operative complications. However, little is known if smoking has immediate post-surgical effects that can lead to prolonged length of stay (LOS). The main objective of this study was to determine whether current tobacco use status is associated with prolonged postoperative LOS in patients undergoing a total knee arthroplasty.

Methods: This was a retrospective cohort study conducted using data from the 2015 ACS-NSQIP database. This database comprises of patients undergoing major surgical procedures in both the inpatient and outpatient setting. Patients within the age ranges of 18-65 years old who underwent a total knee arthroplasty in 2015 and have documented information regarding smoking status and LOS were included. The independent variable was smoking status, defined as patients that smoked within one year before data collection. Patients that stayed in the hospital for longer than 4 days were considered to have prolonged LOS. Our data analysis included: 1) a descriptive analysis of sample baseline characteristics, 2) a bivariate analysis to assess the association between baseline characteristics and both exposure and LOS, and 3) a multivariate analysis (logistic regression) to assess the association between the exposure and LOS while controlling potential confounders.

Results: 26,036 patients were included in the study (60.7% females, 72.6% non-Hispanic Whites); 13.4% and 4.9% of patients were smokers and had a prolonged LOS, respectively. No association was found between smoking status and prolonged LOS (aOR 1.0, 95% CI 0.9-1.3). Other variables independently associated with prolonged LOS included congestive heart failure within 30 days of surgery (aOR 3.8, 95% CI 1.9-7.8) and functional dependency (OR 3.2, 95% CI 2.1-4.9). No association was found to exist with other variables such as (but not limited to) age, sex, ethnicity, and BMI.

Conclusions-Implications: Our study found that current smoking does not result in an increased risk for prolonged LOS in patients undergoing a total knee arthroplasty. Other factors such as congestive heart failure and functional dependency had a significant association on patients having a prolonged LOS. Further studies should be conducted to determine if prolonged LOS is influenced by the severity or duration of smoking prior to surgery.

P6

Hallux Flexion Deformity and Entrapment of Flexor Hallucis Longus Tendon After Open Reduction Internal Fixation of Ankle Fracture

Gina H. Nalbandian, DPM[1]. Dickran H. Nalbandian, MS2[2]. Molly Hulbert, MS2[2]. Sara Shirazi, DPM[1]. Sarah D. Cullen, DPM[1]. Alfred J. Phillips, DPM, FACFAS[1].

[1]St. Elizabeth's Medical Center, Department of Podiatric Surgery, Boston, MA

[2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Checkrein, HFD, Scar Entrapment, Malleolar, ORIF

Introduction and Objectives: Entrapment of the flexor hallucis longus (FHL) tendon within the posterior ankle is a rare complication that can occur secondary to trauma, compartment syndrome, or iatrogenic etiology with ankle open reduction internal fixation. This phenomenon, described as the checkrein deformity, also can occasionally involve the lesser digits due the biomechanical connection at the Master Knot of Henry (MKH). Treatment of checkrein deformity requires surgical intervention which has been described previously through many different approaches including release of scar tissue adhesions, FHL tendon lengthening and tenotomy at the midfoot and rearfoot as well as hallux IPJ fusion. The aim of this study is to report an alternative approach for treatment of the checkrein deformity following ORIF of tri-malleolar ankle fracture. Our approach involved reinforcement through tenodesis at the MKH and proximal transection of the FHL tendon.

Case Presentation: A 59 year old female smoker presented status post ORIF of a posterior malleolar ankle fracture with posterior plate in 2015 with subsequent hardware removal in 2016. Initial complaint of continued non-reducible flexion at the hallux IPJ, pain at the posterior medial and posterolateral ankle, and difficulty ambulating. Clinical assessment and imaging reveals scar tissue along posterior ankle resulting in checkrein deformity. Surgical intervention was done in 7/2019. Intraoperatively, the FHL and FDL tendons are were visualized crossing each other and subsequently tenodesed. The FHL is then confirmed and transected proximal to MKH. Patient is non weight bearing for 2 weeks post op. Hallux is put through a range of motion with no flexion contracture when dorsiflexing the hallux. Additionally, when pulling at the tenodesed tendons, there is noted to be power at the hallux and all lesser toes. Patient has returned to full activity with preserved function and pain free.

Conclusions-Implications: The posterolateral approach for ankle ORIF procedures is typically used for access to the lateral and posterior malleolus. Given the close relationship between this procedure and the tibial nerve and FHL, excessive scarring in this area could result in this deformity. In our case, the MKH was selected as the midpoint of the foot. Performing the procedure just proximal to the MKH allowed for the resolution of the deformity and restoration of the function of the hallux. The lack of scar tissue in this area is less likely to develop a recurrence of adhesion in the future. This intervention improved function, pain, and quality of life measures. Further review of this procedure in comparison to other modalities should be evaluated to institute a standard of care for patients presenting with this deformity.

P7

Hyperprolactinemia; Looker Farther than a Prolactin-Secreting Pituitary Adenoma

Irfan A. Khan, ATC[1]. Samara Khan, BS[1]. Vitra Gosine, MD, FACP, FACE[2].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Diabetes, Thyroid, and Endocrine Associates, Pembroke Pines, FL

Keywords: Hyperprolactinemia, Thyroid Carcinoma, Endocrine Workup, Thyroid Ultrasound

Introduction and Objectives: The differential diagnosis of hyperprolactinemia includes a pituitary adenoma, stress, exercise, pregnancy, polycystic ovarian disease, hypothyroidism and chronic renal failure. Patients with hyperprolactinemia may also have papillary thyroid carcinoma, which has not been reported in the literature. In this case, the patient's prolactin levels were checked due to suspicion for polycystic ovarian disease. The objective of this case is to highlight the importance of a thorough endocrinology workup in the setting of hyperprolactinemia to accurately diagnose its cause.

Case Presentation: The patient is a 20 year-old female with no significant medical history who saw her primary care physician with a chief complaint of excess body hair growth. Upon physical examination, excess hair growth on the face and abdomen were noted. Initial laboratory results revealed a CBC w/ Differential that was within normal limits, a TSH w/ Reflex to FT4 of 4.16 (0.41-4.50 mIU/L), and a CMP within normal limits. The lipid panel revealed a mildly elevated total cholesterol of 201 (<200 mg/dL) and a mildly elevated LDL-Cholesterol of 127 (<100 mg/dL). Serum Vitamin B12, Folate, Ferritin, FSH, and LH levels were within normal limits. The serum prolactin level was elevated at 52.0 (2.0-18.0 ng/mL). Due to the hyperprolactinemia, the patient was referred to an endocrinologist. The endocrinologist performed a thyroid ultrasound, which revealed a nodule in the left lobe of the thyroid gland, measuring 1.16cm. Additionally, a brain MRI was done, which revealed a pituitary microadenoma measuring 2mm. A fine-needle aspiration (FNA) of the left lobe of the thyroid revealed follicular cells with atypia, and a ThyroSeq test found a BRAF V600E point mutation, diagnostic of papillary thyroid carcinoma. An endocrine surgery specialist was consulted, who performed a complete thyroidectomy and left anterior cervical chain lymph node dissection, which revealed metastasis to 16/65 lymph nodes and the presence of chronic lymphocytic thyroiditis.

Conclusions-Implications: This unusual presentation of asymptomatic papillary thyroid carcinoma in a 20-year-old patient with normal thyroid hormone laboratory values despite chronic lymphocytic thyroiditis, and only hyperprolactinemia highlights the importance of doing a full endocrine workup, rather than stopping at what a normal suspected cause of hyperprolactinemia might be (a pituitary adenoma), to ensure you are not missing a life-threatening diagnosis such as papillary thyroid carcinoma. A thorough endocrine workup of hyperprolactinemia is warranted, including a thyroid ultrasound. Young patients with papillary thyroid carcinoma typically have an RET/PTC chromosomal rearrangement. Further research needs to evaluate the prevalence of BRAF mutations in young patients with thyroid carcinoma, and further research needs to evaluate the association of chronic lymphocytic thyroiditis with papillary thyroid carcinoma.

P8

Identification of Diazoxide Analogues that Stimulate Oligodendrocyte Proliferation

Christopher C. Wendler, PhD[1]. Ying Zhu, PBACC[1]. Keith P. Shopa, MS[2]. Scott Rivkees, MD[1].

[1]*University of Florida Health Shands Children's Hospital, Gainesville, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Oliogdendrocyte, Diazoxide, Proliferation, High Throughput Screening

Introduction and Objectives: Up to 30% of low birth weight preterm infants manifest some form of periventricular white matter injury (PWMI) making it the most common form of brain injury affecting premature infants. It is believed that loss of oligodendrocyte progenitor cells (OPCs), which are proliferative cells that develop into myelinating OLs, plays a major role in PWMI causation. Presently, few pharmacological approaches specifically target OPCs resulting in increased proliferation of these cells and increased brain myelination. We discovered that diazoxide (DZ), an activator of ATP-sensitive potassium channels (KATP), promotes OPC proliferation and attenuated hypoxia induced brain injury in neonatal mice. Out of 610 Diazoxide derivatives, compound K261-0298 (ChemDiv) was identified as the most potent stimulator of myelination among our lead compounds.

Methods: Using in vivo toxicology studies we assessed the approximate LD50 for K261-0298 in a stepwise approach. Next compound kinetics were examined via liquid chromatography/mass spectrophotometry (LC/MS) on mice blood samples. Myelination studies in newborn mice reared in room air were performed to determine markers of myelination and oligodendrocyte proliferation. Hypoxia exposure with follow-up ventricular area measurements were conducted to determine effect on ventriculomegaly in hypoxia exposed mice.

Results: In the juvenile mice that were treated from P7-P17 or adults treated from P40-P50, no abnormalities were seen. Blood samples from male and female were collected prior to dosing and after 0.5, 2, 4, 8 and 24 hours with 100 mg/kg of K261-0298. Data from serum LC-MS/MS revealed that peak drug levels were 21.5 +/- 2.3 M and the circulating half-life was 2.2 +/- 0.2 hrs. Tissue slices were stained for markers of myelination (MBP) and oligodendrocyte development (O1, O4). This analysis revealed a 27 ± 4% increase in MBP labeling, a 44 ± 4% decrease in O4 labeling, and a 26 ± 5% increase in O1 labeling vs. vehicle (n= 6; p<0.02; ANOVA). These data suggest that there is increased maturation of oligodendrocyte lineage favoring the development of O1-positive myelinating oligodendrocytes. At the end of the treatment period mice were examined for ventriculomegaly, as reported. We observed a marked reduction in ventriculomegaly in the K261-0298 (0.0054 +/- 0.00013 m2) vs. vehicle-treated (0.0156 +/- 0.0039 m2) mice (n= 4) per treatment, p<0.03).

Conclusions-Implications: Collectively, we show that we identified a compound that is non-toxic, has favorable pharmacokinetic properties, promotes the development of myelinating oligodendrocytes, and stimulates myelination in vivo and in vitro. The next phase will be focused on testing K261-0298 in two different models of white matter injury (hypoxia and LPS) to establish the ideal dose and the effects of 298. Extensive toxicology studies will also be done to ensure safety for potential future human trials.

P9

Investigating the Association Between Depressive Disorders and Binge Drinking in US Veterans

Jacob Neir, BS. Jaclyn Arvedon, BS. Natalie Wharton, BS. Juan C. Zevallos, MD. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Depression, Binge Drinking, U.S. Veterans

Introduction and Objectives: U.S. Veterans comprise a unique population with healthcare needs different from the general population. Higher rates of mental illness are a major healthcare burden shouldered by U.S. Veterans. Veterans hospitalized for a depressive disorder and/or an alcohol use disorder had an increased risk of suicide. Our objective was to determine whether there was an association among U.S. Veterans with depressive disorders and binge drinking behavior.

Methods: Cross-sectional study based on secondary data from the 2017 Behavioral Risk Factor Surveillance System (BRFSS). We hypothesized there would be a positive association between depression and binge drinking in veterans. We selected individuals who identified as U.S. Veterans, and who answered all questions pertaining to our variables. The independent variable was reporting being told they had a depressive disorder. Our dependent variable was reporting binge drinking behavior in the last 30 days. Both unadjusted and adjusted (multiple logistic regression) for potential confounders, OR, and their respective 95% CI were computed as a measure of the direction and magnitude of the association between depression and binge drinking.

Results: Our sample included 54,050 U.S. Veterans. Prior to adjustment, the OR of binge drinking according to the presence or absence of depression was not significant (OR 1.07, 95% CI 0.93, 1.21). After adjusting for multiple potential confounders, the odds of binge drinking were reduced amongst depressed veterans (adjusted OR = 0.82, 95% CI 0.70, 0.98).

Conclusions-Implications: Having a depressive disorder seemed to paradoxically confer a protective effect. Incidentally, a different variable measuring acute poor mental health demonstrated an increase in the odds of binge drinking behavior. Further research should be conducted investigating acute versus chronic depressive symptoms and concomitant alcohol use. Furthermore, research investigating veterans with more specific questions about combat exposure, depression, and drinking behavior should be performed in order to attempt to understand these behaviors, elucidate potential protective health behaviors, and alleviate the high rates of suicide in U.S. Veterans.

P10

Knowledge and Use of Breast Cancer Risk-Assessment Models Among South Florida Physicians

Joann M. Gold, BS. John D. Ehrhardt Jr., BS. Jared L. Weingart, BS. David Brown, MD. Sheldon Cherry, MD. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Breast Cancer, Gail Model, Chemoprevention, Risk Assessment, South Florida

Introduction and Objectives: Risk-assessment tools are available to determine an individual's risk of developing breast cancer and assess need for chemoprevention with selective estrogen receptor modulators in high-risk patients. To describe primary care physician's knowledge and patterns of use of risk-assessment models in addition to related attitudes and beliefs towards chemoprevention.

Methods: Cross-sectional study conducted by emailing an anonymous survey link to 718 practicing South Florida primary care physicians in 2018 for a convenience sample. Prevalence of the knowledge of risk-assessment models overall and by clinician demographics was analyzed. Secondary outcomes including attitudes towards chemoprevention, frequency of model utilization, and referral of high-risk patients for genetic counseling were also assessed. Comparisons were assessed for significance using Fisher exact test.

Results: Fifty-nine respondents (8.1% overall response rate) from internal medicine, family medicine, and OB/GYN completed the survey. Among respondents, 22.5% reported no knowledge of breast cancer risk-assessment models, and 10% do not routinely assess breast cancer risk. The Gail model was the model most frequently known (36%). Forty percent of surveyed physicians reported not utilizing a specific model for qualifying patients. While most respondents (62.5%) agreed that benefits of chemoprevention outweigh risks in high-risk patients, 50.8% rarely or never counseled patients for chemoprevention. Obstetric and Gynecology specialty was associated with a higher likelihood of referring high-risk patients for genetic counseling or testing (90% vs 50% in the other specialties assessed, P=0.003).

Conclusions-Implications: In this exploratory survey, there appears to be potential knowledge gaps among South Florida physicians with respect to knowledge and use of breast cancer risk-assessment models. Further research with larger and more representative samples to confirm the magnitude of the potential gap is needed to assess the need for physician education to ensure that women receive comprehensive breast cancer prevention from at least one of their primary care physicians.

P11

Patterns of Care in the Use of Adjuvant Radiotherapy and Chemotherapy in Low Grade Glioma Patients in the United States from 2010-2016

Warren Rehrer[1]. Muni Rubens, PhD[2]. Katherine Von Werne, APRN, NP-C[2]. Yazmin Odia, MD[2]. Rupesh Kotecha, MD[2]. Minesh P. Mehta, MD[2]. Matthew D. Hall, MD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Miami Cancer Institute, Baptist Health South Florida, Miami, FL*

Keywords: Low Grade Glioma, Radiation Therapy, Chemotherapy

Introduction and Objectives: Radiation Therapy Oncology Group (RTOG) 9802 reported an overall survival advantage with the addition of chemotherapy to adjuvant radiotherapy in high-risk low grade glioma (LGG) patients, with initial results presented in 2012 and published in 2016. In this study, we used the National Cancer Database (NCDB) to measure trends in the use of radiotherapy and chemotherapy in LGG patients from 2010-2016, a period when no published Level 1 evidence existed on the role of trimodality therapy in this population.

Methods: The NCDB was queried for patients with WHO Grade II glioma treated from 2010-2016 who met the inclusion criteria for treatment with radiotherapy plus chemotherapy on RTOG 9802. Adjusted logistic regression was used to assess the association of treatment year with the annual percentage of patients who received adjuvant radiotherapy and chemotherapy. Relative percent change and average annual percentage change (AAPC) were compared to determine if a significant change (defined a priori as <0.01) occurred in the use of adjuvant therapy in LGG patients during this period.

Results: The final analytic cohort consisted of 5,039 patients; 64.3% of patients were ≥40 years of age and 35.7% were <40 years old and had less than gross total resection (GTR). The use of adjuvant radiotherapy and chemotherapy increased from 2013-

2016 from 18.9% to 49.7% (p for trend <0.001), with no change observed prior to 2013. The AAPC in the use of trimodality therapy was +39.6% per year (p<0.001). Corresponding declines in patients treated with surgery alone (p<0.001) and surgery plus radiotherapy (p<0.001) were observed during this period. On logistic regression, patients who were <40 years old (Odds Ratio 0.561, 95% CI 0.475-0.663, p<0.001) were significantly less likely to receive adjuvant radiotherapy and chemotherapy. In the dataset, 1,042 patients had oligodendroglioma based on 1p19q codeletion status. In this subset, use of adjuvant radiotherapy and chemotherapy increased from 12.5% to 45.1% from 2013-2016 (p for trend<0.001).

Conclusions-Implications: From 2013-2016, an increasing number of LGG patients were treated with surgery followed by adjuvant radiotherapy and chemotherapy in the absence of Level 1 evidence. Future studies may characterize the use of single agent vs. multiagent chemotherapy in this population and the adoption of trimodality therapy by tumor molecular subtype.

P12

Predictors of Adherence to Physical Activity Guidelines in Patients with Diabetes Mellitus in the US in 2017

Greisy Martinez Harvell. Florencia Goluboff. Pura Rodriguez de la Vega, MPH. Grettel Castro, MPH. Noël C. Barengo, MD, MPH, PhD.

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Diabetes Mellitus, Physical Activity, Predictors, Adherence, Guidelines

Introduction and Objectives: Despite the benefits of exercise in the management of diabetes, 36% of diabetes patients report no physical activity and almost 50% do not meet the exercise recommendations (150 minutes or more of moderate-to-vigorous activity, or 75 minutes of vigorous-intensity or high-intensity training per week). Current scientific evidence on the associations between socio-economic, demographic, or lifestyle factors and exercise adherence is inconsistent. This study aimed to identify predictors associated with adherence to physical activity guidelines in adult patients with diabetes in the US.

Methods: This secondary analysis of a cross sectional study used data obtained from the 2017 Behavioral Risk Factor Surveillance System survey (n=25,980). Only participants who reported having non-gestational diabetes and who answered questions regarding the outcome variable, physical activity, were included. Those who had pre-diabetes, severe difficulty climbing ambulating, or did not answer all questions about the studied variables were excluded. Respondents were dichotomized into whether they met the current physical activity recommendations or not. Predictors tested were sociodemographic and socioeconomic characteristics, chronic disease conditions, and lifestyle habits. Unadjusted and adjusted logistic regression analysis was performed to calculate odds ratios (OR) and their corresponding 95% confidence interval (CI).

Results: Our data showed that 46.5% of participants with diabetes adhered to the exercise guidelines. Daily smokers were 25% less likely to adhere to the physical activity guidelines (95% CI= 0.59-0.95) compared with non-smokers, while patients with obesity were 37% less likely (95% CI= 0.53-0.74) and those with chronic kidney disease were 24% (95% CI 0.61-0.94) less likely to do so. The odds of adhering to exercise guidelines was reduced by 20% (95% CI 0.70-0.92), 42% (95% CI 0.49-0.68), and 47% (95% CI 0.32-0.57) in good health, fair health, and poor health respectively when compared to those with excellent or very good health. None of the other predictors were associated with adherence to physical activity guidelines.

Conclusions-Implications: Patients with poor health, smoking, obesity, or kidney disease may benefit from targeted interventions in order to accomplish their physical activity recommendations. Future research should study the cause of the associations found and what interventions may improve exercise adherence.

P13

Primary Spontaneous Pneumothorax: Could this be Attributed to Ecigarette Product Use-Associated Lung Injury (EVALI)?

Mythili Penugonda, MD[1]. Muhammad Aziz, MD, MPH[1]. Chitra Gotluru[2].

[1]*West Kendall Baptist Family Medicine, Miami, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: EVALI, Vaping, Spontaneous, Pneumothorax, Ecigarette

Introduction and Objectives: Spontaneous pneumothorax can occur as a primary event in individuals without a preceding lung disease or as a secondary event in individuals who suffer from a lung disease. Cigarette use has been a well-documented reason for a primary spontaneous pneumothorax; however, it is unknown if e-cigarettes ("vaping") can also cause pneumothorax.

Case Presentation: Patient is a 32-year-old Caucasian male with no significant past medical history who presented in the Emergency Department with a sudden-onset of shortness of breath and right sided, moderate intensity, sharp, non-radiating chest pain which was aggravated by movement and inspiration. Stat Chest X-ray (CXR) was notable for a right-sided large pneumothorax exhibiting some degree of tension with no mediastinal shift. Pigtail chest tube catheter was placed without complication and resulted in re-expansion of the lung following placement. After his air leak was resolved, he was moved to water seal. The following day repeat chest x-ray showed no evidence of pneumothorax and the chest tube was safely removed. The patient was using incentive spirometry, ambulating and was observed for next 24 hours for recurrence of symptoms. He was discharged home on hospital day three in a stable condition. He reported a 10 pack years cigarette smoking history, followed by one year of dual use of cigarettes and e-cigarettes, and for the past two years was using e-cigarettes, or vaping, exclusively. He transitioned from cigarettes to vaping because of his perception that vaping is less harmful to health. Since the time he started vaping exclusively, he was increasing the concentration of nicotine in vaping on daily basis and participating in "cloud" competitions with his friends. He also endorsed the habit of prolonged breath holding to enhance nicotine delivery. He vowed to quit vaping upon pneumothorax diagnosis during hospital admission.

Conclusions-Implications: E-cigarettes are a multimillion-dollar industry and have been gaining in popularity with former smokers as well as non-smokers who perceive these to be safer than conventional cigarettes. Over the past 12 months, there has been an increasing recognition of the possible harm associated with the use of e-cigarettes, particularly E-cigarette product use-associated lung injury (EVALI). To date, over 1299 cases of EVALI have been reported to Center of Disease Control (CDC) with 26 deaths as of October 2019 in United States. As more is learned about the pathophysiology and natural course of lung disease in EVALI, we speculate that pneumothorax may be part of the clinical presentation of EVALI. Patients who use e-cigarettes are at risk for EVALI and may also be at risk for pneumothorax. Pneumothorax should be considered if someone with e-cigarette or vaping use presents with sudden onset pleuritic chest pain and shortness of breath. Large population-based studies are needed to clarify this relationship.

P14

Race and Ethnicity as Effect Modifier of Suicide Attempts in Sexual Minority Youth

Wilson A. Mourad, MS. Peter Truong, MS. Grettel Castro, MPH. Juan G. Ruiz, MD, MMedSci. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: LGB, Sexual Minority, Suicide, Suicide Risk, Adolescent Health

Introduction and Objectives: To examine whether race/ethnicity modifies the association between identifying as Lesbian/Gay/Bisexual (LGB) and attempted suicide in high school students. Suicide is the second leading cause of death in adolescents, and previous studies have shown that the risk of attempted suicide is higher in both sexual minorities and racial/ethnic minorities.

Methods: A secondary data analysis was conducted using the 2015 Youth Risk Behavior Survey data (n=14,427) to examine attempted suicide across four sexual identities (Gay/Lesbian, Bisexual, and Not Sure) and five racial/ethnic groups (White, Black, Hispanic/Latino, Asian, and Other). Bullied at school, cyberbullying, cigarette use, alcohol use, marijuana use, cocaine use, prescription drug use, and other drug use were included as covariates. Unadjusted and adjusted odds ratios (OR) and their respective 95% confidence intervals (CI) were calculated.

Results: Gays/Lesbians (OR 2.5; 95% CI: 1.3-5.0), and Bisexuals (OR 4.1; 95% CI: 3.1-5.4) had a higher odds of reporting attempted suicide than Heterosexuals. Race/ethnicity was found to modify the association between sexual identity and attempted suicide. While White Gays/Lesbians had an odds ratio of 4.3 (95% CI: 1.8-10.6) compared to White Heterosexuals, the association became statistically insignificant for Hispanic/Latino and Black Gays/Lesbians compared to Heterosexuals of the same background. The elevated risk of attempted suicide remained statistically significant for all racial/ethnic groups for Bisexuals.

Conclusions-Implications: LGB youth continue to have a higher risk for attempted suicide. However, this issue requires a nuanced approach as teenagers' overlapping identities have a contribution to their risk. Schools can implement anti-bullying and anti-cyberbullying initiatives to create a safe and inclusive environment for all of their students. Physicians should have LGB sensitivity training and develop practice guidelines for this vulnerable population. Keywords: LGB; sexual minority; suicide; suicide risk; adolescent health

P15

Relationship Between Depression and Disability in Adults with Arthritis: Analysis of 2015 BRFSS Data

Michael Delgado, MPH. Cathy Ng, BA. Randi Seidel, BS. Grettel Castro, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Arthritis, Rheumatic Conditions, Depression, Major Depressive Disorder, Disability

Introduction and Objectives: Arthritis and other rheumatic conditions are some of the most common causes of musculoskeletal pain and disability. Comorbid conditions have been noted to be a predictor of poor prognosis among patients with rheumatic diseases. However, there is little research examining the effect of comorbid physical and mental conditions on functional disability. The objectives for the study were to determine whether there is an association between depressive symptoms and perceived arthritis-attributable limitations in social, occupational, and general functioning.

Methods: This was a cross-sectional study using data from the 2015 Behavioral Risk Factor Surveillance System (BRFSS). The exposure of current major depression was assessed through Patient Health Questionnaire-8 (PHQ-8) Days depression measure. Arthritis-attributable disability in social, occupational, and general functioning were assessed as outcome variables. Other covariates that were included in the study were age, sex, race/ethnicity, health care access, marital status, employment status, smoking status, physical activity participation, joint pain, and comorbid chronic conditions. Unadjusted and adjusted logistic regression models to test for associations. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Results: Of the 29,886 adults from the five states who responded to the 2015 BRFSS, 11,711 (39.2%) reported having been diagnosed with arthritis or another rheumatic condition. Approximately 11.7% of arthritis patients in our sample met criteria for current major depression, based on the PHQ-8 measure, while 28.6% of our sample reported having a past history of depression. Arthritis patients with current major depression had significantly higher odds of reporting arthritis-attributable occupational disability, even after adjusting for employment status and lifetime history of depressive disorders (OR 1.48; 95% CI 1.03–2.13). However, there were no statistically significant associations between current depression and self-reported limitations in either social activities or general activities.

Conclusions-Implications: Current major depression is associated with increased arthritis-attributable occupational disability. Depression is likely to worsen the disease profile among arthritis patients. Regular screening of patients with chronic illnesses for major depressive disorder (MDD) in primary care settings should be emphasized as a public health goal in order to address both physical and mental morbidity.

P16

Seroepidemiology of *Burkholderia pseudomallei*, Etiologic Agent of Melioidosis, in the Ouest and Sud-Est Departments of Haiti

Thomas Weppelmann, PhD, MPH. Marcelo Farias. Zakaria Abdulla. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Melioidosis, Haiti, Seroepidemiology, *Burkholderia pseduomallei*

Introduction and Objectives: Melioidosis is a potentially fatal neglected tropical disease that has been increasingly identified around the globe. The causative bacterium, *B. pseudomallei*, has the potential to be used as a bioterroism agent and has recently been identified in Puerto Rico. Currently, *B. pseudomallei* is hypothesized to be endemic throughout the Caribbean, including the impoverished nation of Haiti. Due to the protean clinical manifestations, presence of asymptomatic infections, and limited medical diagnostic capacity, the identification of active melioidosis cases in Haiti remains challenging. To assess the prevalence of serological reaction to *B. pseudomallei* from a large sample of native Haitians as to provide evidence of potential undiagnosed human melioidosis in Haiti.

Methods: A cross-sectional, seroepidemiological study was conducted using data previously generated with an enzyme-linked immunosorbent assay (ELISA) to detect antibodies toward *B. pseudomallei* in the native population. Serum originated from afebrile population members (n=756) from three clinics in the Ouest Department of Haiti and was screened for polyvalent (IgM/IgG/IgA) and monoclonal (IgG or IgM) immunoglobulins. Seropositive population members were defined by a threshold absorbance value three standard deviations above the sample population average. The number of IgG and IgM positives were tabulated by location, gender, and age-group. Logistic regression models were used to determine the associated between seroprevalence and demographic factors (crude and adjusted models).

Results: The seroprevalence for *B. pseudomallei* was 11.5% (95% CI: 9.2, 13.8) for polyvalent immunoglobulins, 10.1% (95% CI: 7.7, 11.9) for IgG, and 1.7% (95% CI: 0.8, 2.6%) for IgM. The seroprevalence was not significantly different by gender (P =0.173) but increased significantly (P <0.001) with age (OR 1.03; 95% CI 1.01, 1.05). All IgM positive samples originated from Gressier; and the prevalence of IgG was higher in Jacmel than Gressier or Chabin, even after adjustment for age and gender (OR 1.72, 95% CI 1.05, 2.94 P=0.04).

Conclusions-Implications: This study provides serological evidence that *B. pseudomallei* is present in Haiti and supports the hypothesis that melioidosis is endemic throughout the Caribbean. These findings suggest that increased clinical suspicion for melioidosis and environmental sampling *B. pseudomallei* are warranted in Haiti.

P17

Shingles Infection Resulting from BCG Treatment for Bladder Cancer: A Case Report

Vivian Wong, MSMS[1]. Diana Lopategui, MD[2]. Elias Atri, BA[1]. Akshay Bhandari, MD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Mount Sinai Medical Center, Miami Beach, FL*

Keywords: Bladder Cancer, BCG, VZV Reactivation, Shingles

Introduction and Objectives: Bladder cancer is the fourth most common cancer in males, with non-muscle invasive bladder cancer (NMIBC) accounting for 80% of all bladder cancers. Bacillus Calmette-Guerin (BCG) bladder instillations has been long known to successfully treat non-muscle invasive bladder (NMIBC) cancer. A patient with bladder cancer presented with an extensive vesicular rash starting one day after instillation of intravesical BCG. Rash was identified as Varicella Zoster virus (VZV) shingles reactivation. The objective of this report is to highlight the first case to our knowledge of this adverse reaction to BCG.

Case Presentation: Patient is an 80 year old male with history of Parkinson's disease and high grade T1 bladder cancer. He underwent TURBT at two occasions one year and one month apart and afterwards completed a full 6-cycle induction and maintenance of BCG. He tolerated the maintenance treatment poorly, experiencing significant dysuria and flu-like symptoms despite 1/3 dilution of the last dose. One year and 8 months after completion of maintenance treatment, a small area of recurrence was encountered at the bladder floor on follow up cystoscopy. TURBT was repeated, and recurrence pathology was reported as high grade, non musculoinvasive tumor. Decision was made to repeat BCG treatment. Five days after first instillation, patient presented to the emergency room with a progressively worsening rash that started one day after treatment. The rash consisted of fluid-filled <5mm vesicles and was characterized by infectious diseases specialists as VZV shingles reactivation. He was admitted for intravenous acyclovir treatment, with rapid clinical improvement.

Conclusions-Implications: Infectious complications are an uncommon but well known adverse effect of BCG instillation. In these cases, if a causal microorganism was isolated, it was most likely Mycobacterium Bovis or another bacteria. In this case, reactivation of dormant VZV infection may be a reaction to BCG intravesical instillation. This is, to our knowledge, the first documented case of this complication. Although coincidence cannot be completely ruled out, the timing of this case and the context of immunosupression-immunomodulation inherent to BCG therapy make causality plausible.

P18

The Association Between Breastfeeding Education and Infant Breastfeeding Practices in the U.S.

Nicole M. Millan. Teresita Gonzalez. Jovans Lorquet. Noël C. Barengo, MD, MPH, PhD. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Breastfeeding, Education, Child Health

Introduction and Objectives: Educational interventions improve breastfeeding (BF) practices exist, but with high heterogeneity of timing, population, and study type in the literature, it is unclear which methods are most effective. We aim to assess the potential association between the timing of BF education and BF duration and to assess if the provider of education is associated with BF duration.

Methods: This is a secondary analyses of data from the Infant Feeding Practices Study II (IFPS-II). The independent variables were: (1) timing of BF education (prenatal, postnatal, neither or both) and (2) provider of BF education (doctor, midwife, nurse, lactation consultant or peer counselor/support/family/friend). Time from birth to end of exclusive and non-exclusive BF were the outcomes. Time-to- event regression models were used to assess independent relationships accounting for age, race/ethnicity, and maternal education. STATA was used for all analyses.

Results: We studied 2586 women; most were white (83.7%), between the ages of 25-34 years (61.91%), and received at least some college education (82.15%). A total of 178 women reported not having received breastfeeding education. For the outcome non-exclusive breastfeeding, adjusted analysis showed as compared to both prenatal and postnatal education, prenatal education resulted Hazard ratio (HR) =0.77, 95% confidence interval (CI)=0.64 – 0.91; p-value: 0.002. Receiving neither prenatal or postnatal education as compared to receiving both prenatal and postnatal BF education, resulted in a non-exclusive BF duration (HR 0.67 (0.51 – 0.89, p-value: 0.006). No differences were found for those educated in the postnatal period only. For the outcome exclusive breastfeeding, there were not differences for BF duration according to the timing where education was received. Regarding the type of provider for the education, receiving education by other than a lactation consultant resulted in 25% higher hazard for cessation of non-exclusive BF (HR 1.25, 95% CI 1.03 – 1.52, p-value: 0.022 and 27% higher cessation of exclusive BF (HR 1.27, 95% CI 1.02 – 1.59, p-value: 0.032) as compared to receiving education by a lactation consultant. No statistically significant difference were found for the other types of education providers.

Conclusions-Implications: Timing of BF educational intervention can improve duration of breastfeeding. In addition, education from lactation consultants increased infant BF duration. Further investigation on breastfeeding educational practices may assist providers in choosing optimal interventions aimed at improving BF practices, ultimately improving childhood health.

P19

The Association Between Health Insurance Status and In-Hospital Case Fatality Rates Following Reperfusion Therapy for STEMI

Eric Sanchez Gomez, BS. Hunter Clonts, BS. Juan G. Ruiz, MD, MMedSci. Minh Nguyen.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Insurance Status, Reperfusion Therapy, STEMI, In-

POSTER ABSTRACTS

Hospital Mortality, Health Disparity

Introduction and Objectives: The association between health insurance status and in-hospital case fatality in patients presenting with ST-elevated myocardial infarction (STEMI) has not been well studied. Our primary objective is to determine if health insurance status is associated with in-hospital case fatality rates following reperfusion therapy for patients diagnosed with a STEMI.

Methods: Our retrospective cohort study conducted a secondary analysis of the Florida MI Discharge Database by assembling a non-concurrent cohort within the registry. The database collects information on all patient data admitted to Florida hospitals with a diagnosis of MI From 2010 to 2015. 49,593 patients corresponded to subjects with STEMI who were over the age of 18 years old and received reperfusion therapy (thrombolytic drug use, angioplasty, stent placement, or coronary artery bypass graft). The exposure variable (health insurance status) is multi-level with five categories: private insurance, Medicare, Medicaid, uninsured and "other." The exposure variable is measured against the main outcome mortality (Y/N, at discharge). We compared our participants according to exposure and outcome utilizing bivariate analysis with the chi-squared test for our categorical variables. Multivariate logistic regression modeling was then used to assess associations between exposure status and mortality.

Results: Compared to private insurance, the odds of dying during hospital stay are higher in all the other insurance groups, with the highest odds ratio observed among Medicare patients (OR = 3.40, 95%CI 3.01 - 3.84); followed by Medicaid (OR = 2.70 95%CI 2.26 - 3.22), Other insurance (OR = 1.36, 95%CI 1.03 - 1.80) and No Insurance (OR = 1.30, 95%CI 1.10 - 1.55) These associations persist after adjusting for demographics, comorbidities, unhealthy lifestyle habits and aspirin use.

Conclusions-Implications: If a patient does not have private insurance, they have a statistically significant increased odds of in-hospital mortality ranging from 36% (other insurances) to 279% (Medicaid). While we expected that in-hospital mortality rates of patients with Medicare would be higher compared to those with private insurance given the higher average age of Medicare patients, we did not predict that patients with Medicaid would have a 279% increase in the odds for in-hospital mortality compared to those with private insurance after adjusting for confounders. Our findings indicate that poverty has separate effects on health outcomes beyond type of insurance; additionally, the findings suggest that more research needs to be done on how the social aspects of health (health literacy, income status, medication compliance, unhealthy lifestyle choices, access to primary care, etc) affect a patient's outcomes aside from their insurance status.

P20

The Association Between Marijuana Use and LDL Cholesterol Levels

Dylan Ong. Nikolle Lambrinos. Haley McKissack. Pura Rodriguez de la Vega, MPH. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Marijuana, Cholesterol, LDL

Introduction and Objectives: Marijuana is currently the most widely-used illicit substance in the United States. Although advocated for by some as a potential treatment and adjuvant modality for a variety of conditions, controversy and conflicting evidence exist regarding the impact marijuana use may have on overall patient health, particularly metabolism. The purpose of this study was to determine whether an association exists between frequency of marijuana use and elevated LDL cholesterol levels.

Methods: A cross-sectional secondary analysis of the 2015-2016 National Health and Nutrition Examination Survey (NHANES) was conducted. Patients ages 18-59 years old with drug survey responses, physical examination data, and LDL laboratory levels were included. Patients with known liver conditions and/or statin use were excluded. Patients were categorized as "current heavy", "current light", "former", and "never" marijuana users. Lab values were used to identify patients with "normal" (<130 mg/dL) or "elevated" (>130 mg/dL) LDL cholesterol. Associations between marijuana use and elevated LDL were analyzed using odds ratios and 95% confidence intervals, estimated through bivariate analyses and binary logistic regression.

Results: A total of 1,223 participants were included in this study. The proportion of patients with elevated LDL did not differ significantly at baseline with respect to frequency of marijuana use. When compared to patients who never used marijuana, no evidence of a statistically significant association was seen between current heavy use (OR 1.2, CI 0.60-2.38), current light use (OR 1.3, CI 0.44 – 3.58), or former use (OR 1.5, CI 0.96-2.36) and elevated LDL levels. After adjusting for potential confounders, the odds of having elevated LDL levels remained non-significant among current heavy users (OR 1.2, CI 0.53-2.66), current light users (OR 1.3, CI 0.56-3.13), and former users (CI 1.1, OR 0.68-1.91).

Conclusions-Implications: There is no evidence to suggest an association between marijuana use and elevated LDL levels. Patients may be advised that although possible, it is unlikely that marijuana use will increase their LDL levels. Further analysis with a larger sample size and prospective study design is recommended.

P21

The Association of Inadequate Sleep with Increased Risk of Being Overweight or Obese in Children Aged 10-17 Years in the US in 2016

Amal Bhullar. Monica Kumar. Danielle Luz. Grettel Castro, MPH. Juan G. Ruiz, MD, MMedSci. Noël C. Barengo, MD, MPH, PhD.

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Pediatric Obesity, Sleep, Body Mass Index, Sleep Deprivation, Obesity

Introduction and Objectives: It has been estimated that 43 million pre-school children over 144 countries were overweight or obese in 2010. Sleep duration amongst adolescents has been suggested to be a risk factor of childhood obesity. However, recent studies in the US population are scant or tailored to answer different questions about sleep or obesity. Our aim was to determine whether there is an association between inadequate sleep and incidence of being overweight or obese in US children ages 10-17.

Methods: A secondary data analysis of a cross-sectional study using data from the National Survey of Children's Health (NSCH) 2016 was conducted. Addresses were randomly sampled if they were more likely to have children in the household. The main exposure variable was the amount of sleep (< 9 hours/night vs ≥ 9 hours/night). The main outcome was the prevalence of being overweight/obese (BMI ≥ 85th percentile). Information was obtained from the child's parents. Children aged 10-17 in the 2016 US NSCH were included. Exclusion criteria were participants who failed to complete the sections that included height, weight, hours of sleep, and the confounding variables being treated. Consistent bedtimes, screen time, and physical activity were added as covariates to the statistical models. Unadjusted and adjusted logistic regression models were used to calculate odds ratios (OR) and corresponding 95% confidence interval (CI).

Results: The prevalence of overweight/obesity in the study population was 26% (n=6436). After controlling for covariates, our data demonstrated that there was no statistically significant association between sleeping at least 9 hours per night and being overweight or obese for children 10-17 years old (OR 1.10; 95% CI 0.95-1.28). However, there was a statistically significant association between both insufficient physical activity (OR 1.62; 95% CI 1.41-1.85) and prolonged screen time (OR 1.68; 95% CI 1.46-1.92) and BMI above the 85th percentile.

Conclusions-Implications: Our study reports no association between hours of sleep and BMI. This warrants further research, focusing on detailed measurements and qualitative aspects of sleep. Limitations of our study include loss of participants in our analysis and data reported by parents rather than children themselves.

P22

The Association of Socioeconomic Factors and Autism Spectrum Prevalence in US Children Aged 3-17

Danielle Evelyn, BS. Edna Johnson, MS. Amaara Babwah, MS. Grettel Castro, MPH. Juan G. Ruiz, MD, MMedSci. Marcia H. Varella, MD, PhD, MHS.

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Autism, Socioeconomic Status, Prevalence, Disparity

Introduction and Objectives: Autism Spectrum Disorder (ASD) is a life-long neurodevelopmental condition characterized by deficits in social interaction, the presence of repetitive and restrictive patterns of behavior or interests that appear in the early developmental period. The prevalence of ASD has increased from .7% in 2000 to 1.7% in 2014. While early identification and intervention have improved outcomes, it remains one of the most common developmental conditions. ASD is multifactorial with theorized genetic and environmental risk factors, though many of these specific factors are unknown. The objective of our study was to determine the association between socioeconomic status (SES) and ASD prevalence.

Methods: We performed a retrospective cross-sectional study using the 2017 National Survey of Children's Health (NSCH), which randomly sampled households nationwide. Our study population consisted of 3-17 year old children, whose parents responded to questions regarding the exposure and outcome. The main exposure was SES using Federal Poverty Level (FPL) as a proxy and the outcome was ASD diagnosis. The association between variables was analyzed using bivariate analysis and binary logistic regression.

Results: A total of 43, 032 participants were included and 2.9% had our outcome, ASD. There was a statistically significant association between FPL and ASD, with the strongest association in the lowest FPL category, <100%. There was a higher odds of ASD in the <100% (OR 1.66, CI 1.20-2.29) and 300-399% groups (OR 1.37, CI 1.01-1.87), as compared to the highest income group, >400%. After adjustment, the magnitude of association increased in the <100% (OR 2.33, CI 1.59-3.42) and 300-399% categories (OR 1.57, CI 1.13-2.18) and became statistically significant in the 100-199% category (OR 1.55, CI 1.06-2.25). Other variables that were independently associated with an increased odds of ASD include: male sex (OR= 3.86, CI 2.90 - 5.14) and more than one personal doctor (OR 1.81 CI 1.40-2.34).

Conclusions-Implications: Our data demonstrate a significant association between socioeconomic status and the prevalence

POSTER ABSTRACTS

of ASD. Our findings contrast with those from similar US studies. Future research should aim to better classify autism severity and insurance status should be classified into private, public or out-of-pocket to better characterize healthcare access.

P23

The Effect of Children's Race on Measles Vaccination Non-Adherence in US Children Aged 19-35 Months for the Year 2017

Mortatha Al-Bassam, BS. Estevao Santos, BS. Eric Tong, BS. Pura Rodriguez de la Vega, MPH. Marcia H. Varella, MD, PhD, MHS. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Measles Vaccine, Race, Vaccination Coverage, Ethnic Groups, National Immunization Survey

Introduction and Objectives: Vaccination eradicated debilitating and fatal diseases. However, social media misinformation has discouraged the use of vaccinations. Specifically, some claim that measles has been eradicated and the vaccine is linked to autism. Such misinformation spreads within social circles and may lead to decreased vaccination coverage. Therefore, it is important to explore whether specific populations are at risk of not vaccinating due to the information they receive. The goal of this study is to determine the impact of race on measles vaccination adherence in children in the United States.

Methods: This cross-sectional analytical study conducted a secondary data analysis using the 2017 National Immunization Survey-Child (NIS-Child). The study population was children in the U.S between the ages of 19-35 months surveyed by the NIS-Child 2017. The independent variable was children's race and the dependent variable was measles vaccination. Unadjusted and adjusted (multiple logistic regression) OR's and 95% CI's of the association between race and measles vaccination were estimated. A worst-best case scenario sensitivity analysis of the effects of missing information on measles vaccination was conducted.

Results: Our effective sample was 15,333 children from the 2017 NIS-Child. Measles vaccination proportion among difference races varied from 88.1% to 92.8%. Prior to adjusting, the odds of measles vaccination non-adherence were significantly higher for non-Hispanic black children than for non-Hispanic white children (P= 0.047; OR 1.35, 95% CI 1.004-1.811). After adjustment, there was no longer a difference in these odds (P=0.525; OR 1.1, 95% CI 0.81-1.50). There was no significant difference in the measles vaccination non-adherence for children of other races when compared to white children, in both adjusted and unadjusted analysis. These results did not change after sensitivity analysis, except under the assumption of one extreme and unlikely scenario.

Conclusions-Implications: While the proportion of measles vaccination coverage varies slightly among children of difference races, odds of vaccination non-adherence was not independently associated with race. Our study suggests other factors related to race such as poverty status, maternal education and language spoken in household might explain these differences.

P24

Vaping-Associated Lung Injury: A Confounded Diagnosis

Evan Ales, BS. Sharan Kapoor, BS. Annellys Hernandez, MS, MD.

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: EVALI, Vaping, THC-Oil

Introduction and Objectives: E-Cigarette or Vaping-Associated Lung Injury (EVALI) is a medical phenomenon under investigation by the CDC with 2290 cases and 47 deaths in 2019. There is no established etiology or diagnostic criteria, however, the CDC has released a case definition of EVALI including (1) use of an e-cigarette (vaping) or dabbing 90 days before symptom onset, (2) pulmonary infiltrates such as ground-glass opacities on chest CT, and (3) absence of pulmonary infection on initial workup. The objective of this case report is to illustrate a common presentation for this new medical phenomenon and to contend that this diagnosis should be considered using historical questions with little hesitation.

Case Presentation: A previously healthy 27-year-old male presented with one week of shortness of breath and chest pain. He was febrile, tachypneic, tachycardic and had an O2 saturation of 94% on 2L nasal cannula. His chest CT demonstrated diffuse ground-glass alveolar opacities. After initially being diagnosed with bilateral pneumonia and started on antibiotics, four days after admission, historical questioning revealed he had been vaping 1000mg of THC oil per week for the past two years. A negative respiratory infection panel, history revealing significant THC oil vaping, and CT bilateral ground-glass opacities met the criteria for the CDC's EVALI case definition. The patient was thus started on the CDC's recommended treatment of intravenous corticosteroids. Two days after starting IV methylprednisolone, the patient began reporting subjective improvement in shortness of breath, and repeat chest x-ray demonstrated a mild improvement of opacity in the left lung field. Over the next few days, the patient's symptoms and condition further improved and ultimately he was discharged with a tapering course of oral prednisone after passing a six-minute walking test. 10 days after discharge he was seen in an out-patient office with reported daily improvement in his symptoms and denied continued use of his vaping device.

Conclusions-Implications: Our patient presented with a picture fitting the CDC case definition and consistent with the most common presentation from the available literature, though this is limited by the recency of the condition. What confounds the case, as in most EVALI cases, is that he presented with signs and symptoms highly suggestive of bilateral infectious pneumonia. However, the possibility of EVALI can and should be considered before the exclusion of other possible etiologies to reduce time to diagnosis/proper treatment and avoid improper treatment once confirmed, considering the ease of posing historical questions

Additional Abstracts

A1

8p23.1 Microdeletion Syndrome and Obstructing Myxomatous Heart Valve Nodules

Kei Shing Oh, MD[1]. Christopher A. Febres-Aldana, MD[1]. Liset Pelaez, MD[2,3]. John Alexis[2,3].

[1]Mount Sinai Medical Center, Miami Beach, FL

[2]Nicklaus Children's Hospital, Miami, FL

[3]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: 8p23.1 Microdeletion Syndrome, Congenital Heart Defects, Valvar Dysplasia, Myxomatous Nodule, GATA4. SOX7

Introduction and Objectives: The 8p23.1 microdeletion syndrome is a rare multisystem disorder characterized by congenital diaphragmatic hernia, congenital heart disease, cognitive impairment, facial dysmorphisms, and microcephaly. The objective of our study is to discover the pathogenesis of haploinsufficiency of genes contributing to cardiac defects in a patient with 8p23.1 microdeletion syndrome.

Case Presentation: An 8-week female infant, with 8p23.1 microdeletion syndrome, was born via cesarean section at 37 weeks for severe intrauterine growth restriction. The echocardiography revealed an atrioventricular (AV) canal defect, small primum atrial septal defect, moderate ventricular septal defect and abnormal chordal attachment of the anterior papillary muscle to the left ventricular outflow tract with moderate to severe obstruction of the left ventricular outflow tract. Ultrasound confirmed the presence of congenital diaphragmatic hernia (CDH) of the left side with hypoplastic left lung. She then underwent surgery to repair CDH. During the postoperative period, she developed refractory septic shock in conjunction with cardiogenic shock as a result of severe left-sided obstructive lesion along with severe biventricular systolic dysfunction. Multiple attempts to resuscitate the patient were unsuccessful, and an autopsy was performed. The heart dissection showed multiple pink, fleshy myxomatoid nodules on the common AV valve leaflets, especially in the aortic valve and subaortic region, resulting in severe left ventricular outflow tract obstruction. Such myxomatous change in heart valves is also termed "valvar dysplasia". Within 8p23.1 deletion, haploinsufficiency of GATA4 and SOX7 are the putative genes causing cardiac defects in humans. The expression GATA4 and SOX7 are coordinated to ensure a normal AV valve development. GATA4 is expressed in the endothelium and mesenchyme of the AV valves and plays a role in valvulogenesis by promoting endothelial-to-mesenchymal transition (EMT) as well as the growth and fusion of the AV cushions. Inactivation of GATA4 within the endothelial-derived cells can lead to failure of EMT, forming hypocellular cushions, and subsequently leading to AV septal defects. On the other hand, SOX7 is required to downregulate pro-EMT signals, necessary to limit the cellular expansion during leaflet elongation. Overall, SOX7 inhibits GATA4 transcriptional activity. The cellular context and chromatin-specific interactions between GATA4 and SOX7 may explain the spectrum of congenital heart defects reported in patients with 8p23.1 microdeletion syndrome.

Conclusions-Implications: This case is the first report describing myxomatous changes, also known as valvar dysplasia leading to severe left ventricular outflow tract obstruction in a patient with 8p23.1 microdeletion syndrome.

A2

A Comparison of Lead levels in Children by Family Purchasing Behavior of Organic Baby Food

Lee Seifer. Kristen Ashourian. Liane Zwetzich. Juan G. Ruiz, MD, MMedSci. Pura Rodriguez de la Vega, MPH. Grettel Castro, MPH. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Lead, Organic, Baby Foods, NHANES, Blood Lead Levels

Introduction and Objectives: Exposure to lead during childhood has been associated with a wide spectrum of disease, most notably affecting the developing central nervous system. While the majority of lead exposure in children of 1 to 2 years of age can be attributed to food, little is known about organic foods impact on blood lead levels. Aim of the study is to investigate the potential association between household purchase of organic baby foods and blood lead levels in children 1-3 years old.

Methods: We included children ages 1-3 years old whose family participated in the Flexible Consumer Behavioral Survey (FCBS) for the NHANES in 2009-2010 and for which on blood lead levels were available. Exposure groups were categorized as never buying organic food (reference group), always/most of the time buying organic baby food, and sometimes/rarely buying organic baby food. Blood lead levels were not normally distributed, thus lead levels were assessed as geometric means. Multivariate linear regression analysis was employed for adjusted comparisons and relative differences of the geometric means and corresponding 95% confidence intervals (CI) were reported in relation to the reference group.

Results: Analysis included 401 children. The average lead levels in the sample was 1.71 ug/dL. While in the unadjusted model there existed a significant relative difference of blood lead levels in the sometimes/rarely buying organic baby food group (0.78, 95% CI of 0.61-0.99, p-value of .04), the association disappeared once adjusted for race, education, income and breastfeeding (0.87, 95% CI of 0.69-1.06, p-value of 0.21). Additionally, there existed no difference of blood lead levels to the reference in regards to the always/most of the time buying organic baby food group (1.02, 95% CI 0.80-1.28, p-value 0.89).

Conclusions-Implications: We found no evidence that consuming organic baby foods is associated with lower levels of blood lead. Thus,

organic food may not be a reliable method to reduce lead toxicity in children. Yet, further studies using more accurate assessment of organic food consumption and a larger sample size are needed to better guide feeding recommendations in children.

A3

A Retrospective Cohort Study on Operative Complication in Open vs Laparoscopic Appendectomy

Hayley Musial. Palina Woodhouse. Daniella Anderson. Marica H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Appendectomy, Laparoscopic Appendectomy, Complication, Open Appendectomy

Introduction and Objectives: Appendicitis is one of the most common causes of acute abdominal pain, and is, by definition, a surgical emergency. Definitive management is by means of appendectomy, either performed laparoscopically or open. The aim of this project was to assess the frequency of operative complications in individuals undergoing either laparoscopic or open appendectomy in an effort to ensure the safest surgical practices when treating patients with this appendicitis.

Methods: Retrospective cohort study using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database. Our population consisted of individuals over the age of 18 undergoing appendectomy from 2015-2016. Bivariate analysis was performed to determine the association between baseline characteristics with exposure (open or laparoscopic appendectomy) and outcome (operative complications).

Results: Analysis of 83, 580 persons revealed that 5.1% of individuals in our population received open surgery while 94.9% of individuals received laparoscopic surgery. The odds of having complications is 2.2 times greater in open versus laparoscopic appendectomy (OR=2.2, 95% CI=2.0-2.4). After adjusting for demographics and comorbidities, the association was slightly attenuated but remained significant (OR=2.0, 95% CI=1.8-2.2).

Conclusions-Implications: An association was found between open appendectomy and operative complications. A higher frequency of operative complications was found among individuals receiving an open appendectomy. Based on this information, all individuals with appendicitis should be considered for laparoscopic appendectomy unless a compelling contraindication exists.

A4

A Systematic Review of the Association Between Early Age at Coitarche and Cervical Cancer Risk

John Hoff, BS. Ashley Mila, BSc. Daphney Dorcius, BS, MPH. Juan M. Lozano, MD. Marcia H. Varella, MD, PhD, MHS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: First Coitus, Early Coitarche, Abnormal Pap Smear, Cervical Dysplasia, Cervical Cancer, First Sexual Intercourse (FSI)

Introduction and Objectives: HPV is widely accepted as the main risk factor for cervical cancer. Yet, other factors might be independently related to cervical cancer risk. Specifically, age at coitarche is of interest because the migration of the transitional zone of the cervix at younger ages is more susceptible to insult. To perform a systematic review of the literature to assess the association between age at coitarche and risk of cervical cancer.

Methods: Search was performed at PUBMED, MEDLINE, EMBASE, COCHRANE, and GOOGLE SCHOLAR. Terms searched were: “Cervical cancer”, “precancerous dysplasia”, “Coitarche”, “First sexual intercourse (FSI)”, “Age at first coitarche”, “Uterine Cervical Neoplasms”, “First Coitus”, “Early Coitarche”, “abnormal pap smear”, “evidence of dysplasia”. There were no limits placed on date, type of publication, etc. Two independent reviewers read the title, abstracts, and subsequently the manuscripts for selection, data abstraction, and bias assessment (through modified Cochrane criteria).

Results: Out of 474 non duplicated studies, 3 cohort studies were found to have information on the association between age of coitarche and risk of cervical cancer. Each of the three studies varied in the measurement of both age at coitarche as well as the outcome. Risk of bias was deemed low, associations varied from equivocal to statistically significant.

Conclusions-Implications: Out of 474 non-duplicated studies, Three cohort studies were found to have information on the association between age of coitarche and risk of cervical cancer. Associations varied among the three studies; increased risk for earlier coitarche in years (adjusted RR=0.9, 95% CI=(0.8-1.0)), no association (adjusted OR= 0.98, 95% CI =(0.9-1.0)), and increased risk for coitarche < 19 years (adjusted RR= 2.6 , 95% CI (1.2-5.3)). Each of the three studies varied in the measurement of both age at coitarche as well as the outcome. The risk of bias was deemed low, associations varied from equivocal to statistically significant.

A5

Adequacy of Healthcare by Insurance Type in Traumatic Brain Injury Patients

Drew Smith, MS. Juan Santiago, BS. Grettel Castro, MS. Pura Rodriguez de la Vega, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Traumatic Brain Injury, Concussion, Insurance, Adequacy of Healthcare, Brain Injury

Introduction and Objectives: Traumatic brain injury (TBI) is a significant contributor to disability, especially among patients younger than 18 years old in the United States. While insurance is often needed to receive services, studies investigating whether TBI treatment adequacy is dependent on the insurance type are scant. Our objective was to determine whether private insurance in pediatric TBI patients is associated with a higher perceived adequacy of healthcare when compared with non-private insurance.

Methods: This was a cross-sectional study utilizing secondary data collected from the National Survey of Children Health 2011/12, conducted by the Center for Disease Control and Prevention. The main exposure of interest was the insurance status of children at the time of a TBI (private vs non-private [uninsured, Medicaid, or Children’s Health Insurance Program]). The study outcome was the perceived adequacy of healthcare, defined as having coverage needs that were usually or always met by insurance. The covariates sex, Hispanic status, race, language, poverty level, prior health status, birthweight, and total number of children in the household were included in the analysis. Unadjusted and adjusted logistic regression analysis were used to test the association between health insurance coverage and perceived adequacy of healthcare. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Results: After adjustments for the covariates, the odds of adequate healthcare among those with non-private insurance compared with those with private were not statistically significant (OR 1.49; 95% CI 0.87-2.55). When grouping by poverty level, children in the 100-133% poverty level had a 3.51-fold increased likelihood of adequate healthcare when compared to those over 200% of the poverty level (95% CI 1.69-7.27). Good/fair health status increased the odds of adequate healthcare by 49% in children compared with those with excellent health (95% CI 0.31-0.77).

Conclusions-Implications: This study implicates that few groups of pediatric TBI patients believe they receive adequate healthcare independent of insurance status. Clinicians, policy makers, and researchers need to better evaluate and address this issue. Future studies should re-examine these factors considering the many changes in insurance legislation since 2012 to recognize if these results remain consistent.

A6

An Assessment on the Association of Depressive Symptom Domains with Alcohol Use Behavior Among Urban Latino Adolescents in South Florida

Dan Pham, MS[1]. Alexandra Held[1]. Jiajun Li[1]. Pura Rodriguez de la Vega, MPH[1]. Juan M. Lozano, MD, MSc[1]. Noël C. Barengo, MD, MPH, PhD[1]. Miguel Angel Cano, PhD, MS, MPH[2]. Patria Rojas, PhD, MPH, MSW[2].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Robert Stempel School of Public Health, Florida International University, Miami, FL

Keywords: Depressive Symptom Domains, Alcohol Use, Urban Latino Adolescents, CESD, CUIDATE

Introduction and Objectives: Substantial scientific evidence indicates an association between depression and alcohol use in adolescents. According to the Youth Risk Behavior Surveillance System, more Latino adolescents (64.7%) have ever drank alcohol compared to white (61.7%) or black (51.3%); 31.3% of Latino adolescents currently use alcohol. Previous studies focused on depression as a single construct and its association with alcohol use in adolescents but have not investigated the association between depressive symptom domains (DSDs) (negative affect, anhedonia, somatic complaints, and interpersonal complaints) and alcohol use in ethnic adolescents. Our study investigates the association between four DSDs and alcohol use in Miami-Dade Latino adolescents.

Methods: Secondary data analysis of a cross-sectional study of the CUIDATE community-based intervention dataset was used. A local convenience sample of 201 adolescents were surveyed in Miami-Dade through several agencies in 2017. Inclusion criteria: Latinos, ages 13-18 years-old; exclusion criteria: missing information on the main outcomes or exposure variable. The final sample size was 151. The main exposure variables were the four DSDs. The main outcome variable was ‘current alcohol use.’ Age, gender, socioeconomic status, years of residence in the US, and behavioral acculturation were included as covariates. Unadjusted and adjusted logistic regression analysis were used to calculate odds ratios (OR) and corresponding 95% confidence intervals (CI).

Results: Of the 151, 58% were females and 42% were males. Prevalence of current alcohol use was 20.5%. After adjusting for age and gender, each unit increase in negative affect and interpersonal problems increased the odds of alcohol use by 1.13 times (aOR 1.13; 95% CI 1.01-1.27) and 1.31 times (aOR 1.31; 96% CI 1.00-1.72) respectively.

Conclusions-Implications: The current results modestly suggest an association of some facets of depression with current alcohol use among Latino adolescents. Understanding the association between DSDs and current alcohol use in Latino adolescents may be a more clinically relevant indicator of depression that is vital for a targeted approach to early intervention and treatment. Future studies with larger sample sizes and geographical variance with high rates of Urban Latino adolescents can better establish this relationship.

A7

Association Between Age and Self-Reported Reason for Non-Adherence with Cervical Cancer Screening

Michele Benjamin, MSc. Pura Rodriguez de la Vega, MPH. Grettel Castro, MPH. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Cervical Cancer Screening, Pap Smear, Adherence, Older Women

Introduction and Objectives: National data estimates that 71-81% of U.S. women are up-to-date with cervical cancer screening (CCS). This is far from the Healthy People 2020 goal of 93% and CCS rates continue to steadily decline. Older women contribute most to cervical cancer incidence and mortality. Yet, studies have identified an inverse relationship between age and CCS rates. This study examines the association between age and self-reported reason for non-adherence, particularly a lack of doctor's recommendation for screening.

Methods: Cross-sectional study based on secondary analysis of data from the 2018 National Health Interview Survey (NHIS). The study includes women age 21-65 years without hysterectomy who never received a pap smear or did not receive a pap smear in the last 5 years. Bivariate analyses were used to compare baseline characteristics of each age group (21-49 vs 50-65 years) and asses the association between age and lack of doctor's recommendation as the reason for CCS non-adherence. Multivariable binary logistic regression was used to adjust for race, ethnicity, education, and insurance.

Results: The older age group had a greater percent of women of white race, non-Hispanic origin and publicly insured, and less with higher education. Older women were 21% less likely (aOR 0.79; 95% CI 0.49-1.27) to report lack of doctor's recommendation, however, these results lack statistical significance. Publicly insured women and those with some college or higher are twice as likely (aOR > 2.0; $p<0.05$) and women of Hispanic origin are 59% less likely (aOR 0.41; 95% CI 0.17-0.81) to report lack of doctor's recommendation as the reason for CCS non-adherence.

Conclusions-Implications: No association was identified between age and lack of doctor's recommendation as the reason for CCS non-adherence. Women with insurance and higher education are more likely and women of Hispanic origin are less likely to report lack of doctor's recommendation. These findings are likely a reflection of whether or not socioeconomic barriers take precedence. In order to realize the full potential of CCS, the nation needs objective measurements of adherence and a multi-stakeholder effort to address disparities in CCS rates.

A8

Association Between Body Mass Index and Targeted Health Demographics in Participants of Miami-Dade County Health Events

Dan Tran. Kelsea Grant. Eli Levitt. David Dorcius. Pura Rodriguez de la Vega, MPH. Jake Levine. Greisy Harvell Martinez. Maryse Pedoussaut, MD. Julia Bisschops, MD. Frederick Anderson, MD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Body Mass Index, Health Education, Community Health, Public Health Obesity

Introduction and Objectives: MedSWISH (Medical Students Working to Improve Society and Health) is a medical student-led organization that partners with local community groups to provide health screenings and education around Miami-Dade County. Body Mass Index (BMI) screenings are an essential component in order to screen for obesity and tailor appropriate lifestyle modification counseling to prevent obesity-related long-term health risks. Maintaining healthy body weight is multifactorial with many biological and social determinants playing a role. The objective of this study is to determine the relationship between elevated BMI screenings and other key health demographics for individuals attending MedSWISH health events to integrate this knowledge into assessing the importance of targeted educational interventions around Miami-Dade County.

Methods: MedSWISH's research protocol was approved by the Florida International University Institutional Review Board in January 2018. Health screening participants provided verbal consent with IRB-approved informed consent procedures available in English, Spanish, and Creole to collect data on their health demographic and screening results for age, gender, BMI score, blood pressure reading, blood glucose reading, health insurance status, and primary care provider (PCP) status. Data from 536 individuals were collected between January 2018 and September 2019. BMI readings were characterized as "overweight/obese" if ≥ 25.0 kg/m2 and "underweight/normal" if < 25.0 kg/m2. Frequencies and percentages for BMI and the key health demographics were used to describe the characteristics of the study cohort. Stata 16 was used to compare overweight/obese BMI rates across the key health demographic variables using Chi-square statistics and the p-value was considered significant for < 0.05 for a Two-Tail test.

Results: Of the health demographic variables analyzed, overweight/obese BMI was highly associated with both elevated systolic and diastolic blood pressure readings ($p<0.001$, $p<0.001$). However, no significant association was found between overweight/obese BMI and gender, elevated blood glucose readings, health insurance status, or PCP coverage status ($p>0.05$). The average age of overweight/obese BMI individuals was 51.8 years as compared to 50.7 years for underweight/normal BMI individuals ($p>0.05$).

Conclusions-Implications: Health event participants with overweight/obese BMI were significantly more likely to have concurrently elevated blood pressure readings. For individuals covered by health insurance and a PCP, further benefit may be provided from personalized medical student-led health education sessions at community health events to supplement advice from often time-limited PCP visits. Our study emphasizes the need for providing quality educational interventions on positive health behavior change to lower obesity rates and associated hypertension risk around Miami-Dade County.

A9

Association of Maternal Race/Ethnicity on the Incidence of Primary Cesarean Section

Jasmine Abram. Lisa David. Marja Gillette. Pura Rodriguez de la Vega, MPH. Juan G. Ruiz, MD, MMedSci. Juan M. Acuña, MD, MSc, FACOG.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Cesarean, Disparity, Race, Maternal, Delivery

Introduction and Objectives: Properly indicated cesarean section (CS) should reduce both morbidity and mortality of mothers and newborns. As CS rates in the United States have increased, concerns regarding possible overuse and unnecessary risk have grown. Meanwhile, persistent racial disparities in maternal and infant health are also increasingly coming to light. Further exploration is warranted to elucidate how CS might be related to the observed disparities in maternal and neonatal outcomes.

Methods: This was a population-based historical cohort study of all term, primiparous women ages 15 to 44 assembled from the 2017 CDC Natality Public Use File. The association between self-reported maternal race/ethnicity and method of delivery was estimated, adjusting for potential confounders, including biological, socioeconomic, and gestational comorbidities, by means of binary multivariable logistic regression.

Results: In total, 932,474 primiparous women ages 15 to 44 were included in the analysis, and CS was performed in 27%. After adjusting for potential confounders, the likelihood of CS was 33% higher in non-Hispanic Black (NHB) women (OR 1.33, 95% CI 1.33-1.35) and 4% higher in non-Hispanic Asian women (OR 1.04, 95% CI 1.02-1.06) as compared to non-Hispanic white women.

Conclusions-Implications: The increased incidence of CS for NHB women may represent a racial disparity. Further research should address potential causes and mediators for this disparity including socioeconomic and pre-conception health status differences, access to quality health care, and biases in physician decision making.

A10

Atypical Presentation of Canal of Nuck Cyst in an Adult Female: Case Report

Teresa Evans, MD[1]. Bar Ainuz, BS[2]. Aymun Ahmed, BS[2]. Mia Shapira, MD[1]. Christopher Seaver, MD[1].

[1]*Memorial Healthcare System*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Canal of Nuck, Canal of Nuck Cyst, Inguinal Mass, Laparoscopic Excision

Introduction and Objectives: The canal of Nuck is a tubular peritoneal invagination in females extending to the labia majora resulting from a failure of closure of the processus vaginalis in females. Canal of Nuck abnormalities are exceptionally rare, with only about 400 cases reported in literature worldwide. The canal of Nuck has been implicated in the formation of a cyst, hydrocele, and indirect inguinal hernia containing internal organs that can adversely affect quality of life and may lead to detrimental complications. We present an exceedingly rare case of an adult female with atypical presentation of a canal of Nuck cyst.

Case Presentation: A 29-year-old nulliparous female was referred to us from the Emergency Department (ED) with a one-month history of painful right inguinal mass. Physical exam revealed an exquisitely tender 6cm reducible mass in the right groin. Abdominal CT completed reported an inflamed complex cystic tubular structure consistent with a cyst of Canal of Nuck. The cyst was successfully removed by laparoscopic excision and peritoneal dissection during an urgent surgical repair. Closure of the formed inguinal hernia was secured using a 3D max Bard mesh. Final histopathology of the dissected specimen confirmed the diagnosis.

Conclusions-Implications: Canal of Nuck abnormalities are rare. When diagnosed, these structures typically present as a painless inguino-labial swelling in adolescent females. To the best of our knowledge, this is the first case in the literature describing a canal of Nuck cyst presenting as a tender mass in an adult female requiring prompt urgent surgery. Ultrasound is the preferred imaging modality to assess for inguinal masses due to the superficiality of the lesion, but MRI and CT scans may also be used to visualize the defect. Definitive treatment involves surgical excision and the diagnosis is confirmed with histopathology. Canal of Nuck cyst should remain notable in the differential diagnosis for an adult female with the atypical presentation of an acutely tender inguino-labial mass.

A11

Catamenial Pneumothorax due to Thoracic Endometriosis

Juan Carlos Alvarez, MD[1]. Fernando Safdie, MD[2]. Monica Recine, MD[1].

[1]*A.M. Rywlin, Department of Pathology, Mount Sinai Medical Center, Miami Beach, FL*

[2]*Department of Surgery, Mount Sinai Medical Center, Miami Beach, FL*

Keywords: Endometriosis, Catamenial, Pneumothorax

Introduction and Objectives: Endometriosis is a common disorder that affects approximately 10% of women of reproductive age and approximately 35–50% women with infertility.The most common presenting symptoms are menstrual pelvic pain and/or cramping, non-menstrual pelvic pain and/or cramping, and dyspareunia. It is difficult to ascertain an accurate prevalence for endometriosis; as the diagnosis does require invasive testing. Endometriosis is characterized by the presence of endometrial tissue, including the stroma and glands, located outside the uterine cavity. Endometriosis most commonly occurs in the pelvis, leading to symptoms like dyspareunia, dysmenorrhea, and dysuria. It can, however, involve other sites as well.We present a rare case of catamenial pneumothorax secondary to pleural endometriosis. The objective of this case report is to highlight the unusual presentation of endometriosis aswell as part of the differential etiology of pneuomothorax in young patients.

Case Presentation: The patient is a 27 year old woman with history of endometriosis and recurrent pneumothorax. She presented with two weeks of right sided pleuritic pain occurring at the same time as her menstrual period. Thoroscopic surgery revealed patchy hemorrhagic implants on the pleural surface Multiple lung wedges were received showing pleural adhesions. Microscopic examination revealed two minute foci of endometrial glands with associated endometrial stroma on the pleural surface. Immunohistochemistry staining showed PAX-8(fig c), PR and ER positivity of the glandular component and CD10 positive staining (fig d) of the stromal component supporting the diagnosis of endometriosis.

Conclusions-Implications: Catamenial is an adjective meaning of or relating to menstruation. Catamenial pneumothorax is defined as a pneumothorax ocurring in association with menstruation and is believed to be caused primarily by endometriosis. Patients usually have catamenial symptoms, occurring within 24-48 hours of onset of menses. The most common presentation is chest pain (90%), followed by dyspnea (31%), hemoptysis (7%), and cough (rare). Thoracic endometriosis (TES) is a rare condition defined by presence of endometrial implants in airways, pleura, and lung parenchyma. Amongst the women diagnosed with TES, 50-85% also have pelvic endometriosis. The percentage of women with pelvic disease who develop TES in their disease course is largely unknown. The average age at presentation with TES is 35 years, with a range from 19 to 54 years. In 1938, Schwarz was the first author to characterize endometriosis of the lung parenchyma. The mechanisms suggested for pathogenesis of TES are as follows: (1) tissue migration through pelvic vessels and (2) reflux of endometrial tissue through fallopian tubes into peritoneal cavity, then leading into thoracic cavity through diaphragmatic fenestrations/ defects. Our case details this rare presentations of endometriosis.

A12

Development of In Vitro Model to Understand the Effect of Electrical Stimulation on Inner Ear

Camron Davies, BA[1]. Jeenu Mittal, BS[2]. Mario M. Perdomo, BS[2]. Elijah J. Horesh, BS[2]. Zaid Al-Zaghal, BS[2]. Christopher O'toole, BS[2]. Jorge Bohorquez, PhD[2]. Carolyn Garnham, PhD[3]. Rahul Mittal, PhD[2]. Adrien A. Eshraghi, MD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*University of Miami, Miami, FL*

[3]*MED-EL Hearing Implants*

Keywords: Cochlear Implant, Hearing Loss, Inner Ear, Organ of Corti

Introduction and Objectives: Historically thought to be lost post-Cochlear Implantation (CI), recent evidence has shown that many patients may have hearing preservation post-operatively. This, combined with recently developed electric and acoustic stimulation (EAS) implants, which support the patient's natural residual hearing by amplifying low-frequency sounds and high-frequency restoration via CI, has increased cochlear implantation in patients with residual hearing. However, the implantation itself may cause the loss of part or all residual hearing as a result of the procedure or by repeated electrical stimulation from the implant. While the direct effects of the electrode implantation on the macroscopic structures of the inner ear are already well described, the effects of the electrical field generated by the implant have not been investigated to date. Consequently, there is a need to develop in vitro models of electrical stimulation of CI, which closely mimic human clinical conditions to better understand the precise contribution of electrical stimulation in cochlear damage.

Methods: A custom stimulator circuit that allows the study of several parameters, including stimulation amplitude, pulse width, and total stimulation duration was designed. The organ of Corti explant cultures from postnatal day three (P3) rats were used and placed in microchannel slide (Ibidi GmbH) in the incubator and exposed to stimulation or left unstimulated. We also determined the efficacy of an otoprotective compound in providing protection against the adverse effects of electrical stimulation. Parameters (amplitude, pulse width and duration) were changed one at a time. The organ of Corti explants were subjected to FITC phalloidin staining to visualize hair cells using confocal microscopy. The number of surviving hair cells were counted. The organ of Corti was also subjected to CellROX and cleaved caspase 3 staining to determine the levels of oxidative stress and apoptosis, respectively.

Results: In vitro testing suggests that the electrical stimulation may cause some damage to hair cells, mainly with higher stimulation levels and longer times of stimulation. The identified otoprotective compound provides significant protection against the loss of hair cells in response to electrical stimulation. The molecule mechanisms behind otoprotection involve abrogation of activation of oxidative stress and apoptosis pathways.

Conclusions-Implications: The stimulator circuit we designed and constructed very closely simulates the electrical field of a cochlear implant. It has enough task flexibility to be used as an in vitro model of electrical stimulation. The models developed in this study using electrical stimulation can be used to understand the effect of the electrical field on inner ear sensory cells and to screen future otoprotective drugs for the preservation of residual hearing post CI using a similar approach as used in this study.

A13

Diffuse Infantile Myofibromatosis with a Triphasic Growth Pattern Presenting as Blueberry Muffin Baby: A Lethal Pictoral Differential Diagnosis

Odille Mejia, MD[1]. Christopher Febres-Aldana, MD[1]. Pukhraz Basra, MD[1]. Lydia Howard, MD[1,2].

[1]*A.M. Rywlin, Department of Pathology, Mount Sinai Medical Center, Miami Beach, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Blueberry Muffin Baby, Infantile Myofribomatosis, Glomus-Like, Primitive, Spindle

Introduction and Objectives: The blueberry muffin baby (BMB) has been used to describe cutaneous, non-blanching, blue, maculo-papular lesions observed in newborns infected with rubella. Since then, congenital TORCH syndrome and hematologic dyscrasias have been associated with BMB. Infantile myofibromatosis (IM) is a mesenchymal disorder characterized by firm nodules with a purplish or normal skin tone, located in the subcutaneous tissue. We discuss an unusual case of lethal infantile myofibromatosis (IM) presenting as BMB.

Case Presentation: A 5-day-old baby boy was born via spontaneous vaginal delivery to a 29-year-old woman with adequate prenatal care and negative screening for TORCH infections. The APGAR scores were low at birth requiring advanced medical support. An abdominal and pelvic ultrasound revealed multiple hypoechoic lesions involving the GI and GU tracts. Despite the medical efforts the patient expired and an autopsy revealed diffuse IM. The predominant growth pattern in the lung was an intravascular spindle cell proliferation arranged in interlacing bundles with a whorled appearance which was immunoreactive for vimentin and actins (HHF35, actin 1A4) and negative for CD31, CD34, desmin and smooth muscle-myosin heavy chain: myofibroblastic differentiation. A glomus-like component seen in intraabdominal organs was composed of small round cells with amphophilic cytoplasm, indistinct cell borders, and small nuclei, which was positive for vimentin and CD-34, while negative for CD-31, desmin, and actins. There was a proliferation of smaller irregularly shaped cells with abundant eosinophilic cytoplasm and small hyperchromatic nuclei with a primitive appearance which was positive only for CD-34. Both, glomus-like and primitive components contained branching dilated vessels as seen in hemangiopericytoma.

Conclusions-Implications: IM is a rare congenital tumor of infancy that can involve the skin and internal organs. The diffuse involvement in newborns is a cause of BMB, and those with visceral involvement show increased mortality, as in our case, in which an extensive intravascular pulmonary component lead to death. Although IM can display divergent growth with biphasic morphology, we describe the coexistence of three growth patterns with distinctive morphologic and immunohistochemical features. The broad morphologic spectrum seen in IM suggests that this tumor arises from pluripotent perivascular cells capable of differentiating along myofibroblastic, pericytic, and glomus cell lines.

A14

Effect of Ethnicity on the Amount of Emergency Room Visits in Pediatric Patients with Asthma

Joseph Staffetti. Chika Nwosu. Grettel Castro, MPH. Juan G. Ruiz, MD, MMedSci. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Asthma, Pediatrics, Emergency Room, Race, Ethnicity

Introduction and Objectives: Pediatric asthma is one of the most common diseases in the United States. Evidence suggests that there are differences in the frequency of asthma amongst different ethnic groups and access to a primary care, which can translate into poor asthma control and overutilization of emergency room visits. Our objective is to examine if there are differences in emergency room utilization between white versus non-white pediatric asthma patients.

Methods: Cross-sectional study based on secondary analysis of the 2016 data from the National Survey of Children's Health. Our study selected all patients ages 0-17 years diagnosed with asthma and with information regarding visits to the ER. The independent variable was ethnicities (white vs. non-white) and the outcome was rates of emergency room visits. Associations between exposures and outcome were analyzed estimating odds ratios and 95% confidence intervals, through bivariate analyses and logistic regression.

Results: Our sample included 4,979 children. The unadjusted logistic regression showed that black children were 96% more likely as compared to whites to have visited the ER. After adjustment, the odds of visiting the ER between black and white children were no longer significant (aOR = 1.51, 95% CI 0.87-2.60). Incidental findings included higher odds of visited the ER among: households who report insurance gaps or no insurance, problems paying for healthcare, those who report rarely having difficulty covering basic needs, parents with more than a high school education and those with children with breathing problems.

Conclusions-Implications: Our study found that there was no association between race and ethnicity and the number of ED visits in pediatric asthmatic patients. Other factors such as lack of insurance coverage or problems paying for healthcare had a significant influence on the number of ER visits in these patients. Further research should focus on addressing these underlying health disparities. Nevertheless, we do not have enough evidence to rule out the existence of an association between race and the number of ER visits. Limitations include limited knowledge on type of insurance coverage, household income and reasons for ER visits.

A15

Evaluating the Necessity of Pseudomonas Coverage for Empiric Treatment of Diabetic Foot Infections: A Quality Improvement Initiative

Dickran Nalbandian, MS[1]. Gina Nalbandian, DPM[2]. Sara Shirazi, DPM[2]. Katherine Adams, DPM[2]. John Marcoux, DPM[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*St. Elizabeth's Medical Center, Department of Podiatric Surgery, Boston, MA*

Keywords: Pseudomonas, Diabetic Foot, Empiric Antimicrobial, Quality Improvement

Introduction and Objectives: This is a retrospective quality improvement study that was performed at a single institution, St. Elizabeth's Medical Center (STEMC). In an effort to limit antibiotic resistance, our purpose of this QI study is to determine the prevalence of Pseudomonas in our diabetic population at STEMC and reduce overtreatment with antimicrobials.

Methods: Our study included patients with a diagnosis of diabetes mellitus that underwent a surgical debridement. Exclusion criteria includes any individual that does not have deep cultures from the operating room or non-diabetic patients. The primary outcome of the study is to evaluate the prevalence of Pseudomonas aeruginosa from the diabetic population based on microbiology final report of intraoperative deep tissue cultures.

Results: Results showed that 2 out of the 46 patients with intraoperative deep cultures showed any Pseudomonas aeruginosa growth. **Conclusions-Implications:** Based on these results, we believe that empiric therapy directed at Pseudomonas aeruginosa is usually unnecessary, but should still be used until culture results return and antimicrobial therapy can be tailored.

A16

Insurance Status and Cervical Cancer Stage at Diagnosis: SEER Database 2010-2015

Alisa Goldrich. Amy Ho. Karina Hofstee, MS. Sheldon Cherry, MD. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Cervical Cancer, Insurance, Health Disparities

Introduction and Objectives: Cervical cancer carries an 80-93% survival rate when diagnosed at stage 1, compared to 15-16% at stage 4. The objective of this study was to build on the knowledge regarding the inverse relationship between insurance status and stage at diagnosis using the most current, comprehensive data available. In addition, to assess if this association is modified by race. They

Methods: This is a retrospective case control study of females aged 21-64 diagnosed with cervical cancer between 2010 and 2015. Data was collected from the national SEER Database (Surveillance, Epidemiology, and End Results). The patients were grouped based on early or late stage disease and their insurance status was compared at the time of diagnosis. Data analysis included a descriptive analysis of baseline characteristics (age, partner status, area of residence, race/ethnicity, histology), bivariate analyses, collinearity analysis, and binary logistic regression to determine the association between insurance status and stage at diagnosis. The following confounders were included in the adjusted analysis: age, race/ethnicity, partner status, and histology.

Results: In the final sample of 2,969 patients, 7% were uninsured, 29% had Medicaid, and 64% had private insurance. The frequency of the outcome (stage at diagnosis) was evenly distributed. The unadjusted odds of being diagnosed at a late stage increased by 60% (OR 1.6, CI 1.2-2.2) in patients who were uninsured, and by 84% (OR 1.8, CI 1.6-2.2) in patients who had Medicaid, compared to those with other insurance. After adjustment, the odds of being diagnosed at a late stage decreased for both uninsured (aOR 1.4, CI 1.01-1.9) and Medicaid patients (aOR 1.7, CI 1.4-2.0). Race/ethnicity did not act as an effect modifier of insurance status on stage at diagnosis.

Conclusions-Implications: There is an association between insurance status and cervical cancer stage at diagnosis. In those who were uninsured or have Medicaid, there were statistically significant higher odds of having a later stage of cervical cancer at the time of diagnosis. This association persisted when adjusting for confounders. Our study suggests that enhancing insurance coverage may be extremely beneficial in improving cervical cancer detection and, by inference, outcomes.

A17

Is "Adenomyomatous Hyperplasia" Truly Myomatous? A Comparative Analysis of Myofibroblastic Proliferation in Adenomyomatous Hyperplasia, Chronic Cholecystitis and Gall Bladder Carcinoma by Immunohistochemistry

Kritika Krishnamurthy, MBBS, MD[1]. Christopher Febres-Aldana, MD[1]. Vathany Sriganeshan, MD[1,2]. Robert Poppiti, MD[1,2].

[1]*Mount Sinai Medical Center, Miami Beach, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Adenomyomatous Hyperplasia, Myofribroblasts, Gallbladder Disease, Immunohistochemistry for Spindle Cells

Introduction and Objectives: Adenomyomatous hyperplasia(AH) of the gallbladder, reported in 1%-8.7% of cholecystectomies, is hypothesized to be an exaggerated form of chronic cholecystitis but the exact pathogenesis of this entity is still unknown. AH consists of cystically dilated sinuses/glands with a surrounding spindle cell proliferation which is thought to be composed predominatly of smooth muscle cells. Myofibroblasts are contractile and secrete a variety of biochemical modulators, influencing the microenvironment by the "field-effect". Myofibroblasts can be immunohistochemically distinguished from smooth muscle cells by their desmin negativity. The primary objective of this study is to quantify and compare the myofibroblastic proliferation in AH, chronic cholecystitis and gallbladder carcinoma.

Methods: Eighteen cases of AH and five cases each of chronic follicular cholecystitis, chronic cholecystitis and gallbladder carcinoma were stained with actin and desmin. The percentage of myofibroblasts was estimated by the difference between actin and desmin staining.

Results: The percentage of actin staining was significantly higher in AH and gallbladder carcinoma as compared to chronic follicular and chronic cholecystitis($p=0.04$). The percentage of desmin staining did not show any significant difference between the four groups. The estimated myofibroblastic population was significantly higher in AH and gallbladder carcinoma as compared to chronic follicular and chronic cholecystitis($p=0.005$).

Conclusions-Implications: The spindle cell proliferation around cystically dilated glands in AH is composed predominantly of myofibroblasts and not smooth muscle cells as previously described. This finding suggest that a derangement in epithelial-stromal interactions to be the underlying pathophysiology in AH. This in turn raises the suspicion of possible neoplastic nature of the glandular component in this entity.

A18

Learning Specialist Interventions and Performance-Based Measures in Medical School: A Cohort Study

Thomas Vazquez. Anabelle Andon, PhD. Noël C. Barengo, MD, MPH, PhD. Winnie Chang, EdD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Learning Specialist, Learning Science, Medical School, Academic Support, Learning

Introduction and Objectives: Many medical schools have begun to offer services to their students regarding learning strategies and study skills. An increasingly popular service being offered is a Learning Specialist (LS). However, information on the efficacy of LS on student performance is scant. Our objective was to determine if utilizing the LS service among medical students at the Herbert Wertheim College of Medicine (HWCOM) from 2016 to 2019 was associated with academic success in medical school.

Methods: Data from the HWCOM Office of the Registrar from 2016 to 2019 was analyzed in a retrospective cohort study of medical students from the graduating classes of 2019 to 2021 (n=368). The inclusion criteria for this study was all medical students enrolled at the Herbert Wertheim College of Medicine in the graduating classes of 2019, 2020, and 2021. Our main outcome variable was average weighted medical school grades and United States Medical Licensing Exam Step 1 Scores. The main exposure variable was the number of LS appointments. We conducted a multilinear regression model.

Results: In medical school, LS non-utilizers achieved higher medical school grades and Step 1 scores than their LS utilizer peers ($p<0.001$). LS non-utilizers earned an average medical school grade of 89.38 and Step 1 score of 247.55, whereas utilizers' average medical school grade was 86.11 and Step 1 score was 236.87. Our models with the retired MCAT ($F(5, 199)=62.66$, $p<.0001$) and new MCAT ($F(4, 126)=33.49$, $p<.0001$) were statistically significant. In comparison to their counterparts, students who sought LS services at least once achieved -1.18 points lower (retired MCAT model) or -1.87 points lower (new MCAT model) in their average grade, controlling for other variables in the model.

Conclusions-Implications: Premedical metrics of academic success are associated with academic achievement in medical school. Future research should aim to quantify the effect of LS services on these students and explore the difference between high-risk students who use these services and those who do not.

A19

Marijuana Use and Overweight/Obesity Status in US Adolescents Ages 13-17

Gabriel Correa. Fabiana Juan. Danielle Rioux. Grettel Castro, MPH. Juan M. Lozano, MD, MSc. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Marijuana Use, Overweight/Obesity Status, US Adolescents Ages 13-17

Introduction and Objectives: Adolescents are a vulnerable population, and are at risk for many adverse health outcomes such as substance abuse and overweight/obesity status. The objective of our study was to determine the association between marijuana use and prevalence of overweight/obesity status in US adolescents ages 13-17.

Methods: We conducted a cross-sectional study through secondary analysis of data from the 2017 YRBSS. Our study population included respondents to the 2017 YRBSS who were U.S. adolescents between 13 and 17 and had valid responses to questions about height, weight and lifetime marijuana use. Overweight or obese status was determined from BMI, calculated from height and weight. Overweight status was defined as BMI 85th percentile and obesity as BMI 95th percentile. We performed an exploratory analysis, a bivariate analysis of potential confounders to exposure and outcome, and a multivariate logistic regression analysis to obtain an adjusted estimated association.

Results: Marijuana use among high school students was categorized by never users, experimenters, and frequent users. We found a statistically significant relationship between age and marijuana use frequency. Non-marijuana users were predominantly White whereas Blacks and Hispanics reported more frequent marijuana use. Alcohol use, smoking, steroid use, and asthma were associated with an increased marijuana use response rate, however, there was no association between physical activity and marijuana use. The odds of being overweight in experimenters increased by 20% and decreased by 20% in frequent users but these results were not statistically significant. Even after adjustment, the odds of being obese in experimenters increased by 30%. For frequent users there was no significant association between marijuana use and obese status.

Conclusions-Implications: We found a statistically significant association between marijuana use and obesity in the experimenter category. A prospective cohort study would be most useful to confirm our findings and determine causality.

A20

Medical Students: Wellness Center Resources and Student Outcomes

Diana Rodriguez, BS. Helen Rynor, BS. Nathaly Desmarais, PsyD, BCB.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Wellness, Counseling, Mental, Burnout, Students

Introduction and Objectives: Medical school denotes a change in environmental, academic, and interpersonal stressors. In an effort to combat these stressors, Herbert Wertheim College of Medicine provides holistic and preventive care to their medical students. One such method is through their outreach program, Fit & Well, in which students attend workshops that cover three important dimensions of wellness: physical, emotional, and social. Attending workshops encourages student participation in individual counseling, allowing for further development of coping mechanisms and improved mental health. Objectives: To quantify the usage of the Fit and Well events and determine the impact on the graduate questionnaire (GQ) survey.

Methods: Student attendance at Fit & Well events was either recorded manually or electronically, while students who attended counseling through Medical Student Counseling and Wellness Center (MSCWC) were added to the confidential electronic medical record.

Results: 95% of matriculated students attended a Fit & Well program at any given year of their training. Of those, 65% sought out individualized services at the MSCWC. Results from the HWCOM's AAMC GQ survey for the past three years indicate above average satisfaction of wellness programs, personal counseling, and mental health services, which is 15-20% higher than the national average for these dimensions.

Conclusions-Implications: Wellness services for medical students at HWCOM is advantageous. Over the years, students have increased their use of both individual wellness services and group Fit & Well events. Given the high prevalence of burnout and suicidality amongst physicians, this preventive program may help ameliorate the stigma associated with help-seeking behaviors.

A21

Minimum 2 Years Outcomes of Powerlifters and Bodybuilders with Advanced Glenohumeral Arthritis, Managed with Stemless Aspherical Humeral Head Resurfacing and Inlay Glenoid

Matan Ozery, BS[1]. Luis Vargas, MD[2]. John Uribe, MD[2]. John Zvijac, MD[2]. Jacob Seiler, MD[2]. Kristina Kuklova, BS, MBA[3]. Valerie Zaid, BS[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Miami Orthopedics and Sports Medicine Institute, Miami, FL*

[3]*American University of Antigua, Antigua and Barbuda*

Keywords: Weightlifters, Glenohumeral Arthritis, Function, Aspherical-Surfacing, Inlay-Glenoid

Introduction and Objectives: Symptomatic Glenohumeral Arthritis (GHA) among high-level bodybuilders and powerlifters is relatively common. Once conservative management fails, the surgical options for these athletes are limited and pose challenges due to their relatively young age and their desire to continue weight-lifting. The benefits of arthroscopic management are limited and short-lived. Hemi or Total shoulder arthroplasty as management remains. A series of competitive or high-level recreational bodybuilders and powerlifters with advanced GHA who expressed a strong desire to continue their sport were managed utilizing a novel stemless aspherical resurfacing of the humeral head (HHR) combined with an inlay glenoid (IG). To our knowledge, there are no published studies documenting the efficacy of this unique approach.

Methods: Our series consists of 18 shoulders corresponding to 14 male athletes with an average age of 45.6 years, range (25-57 years), who were prospectively followed. Pre- and post-operative evaluations included physical examinations, radiographic assessment, the American Shoulder and Elbow Surgeons (ASES) Standardized Shoulder Assessment Form, the Western Ontario Osteoarthritis of the Shoulder Index (WOOS), Pain Visual Analog Scale (VAS-P), Forward Flexion (FF), External Rotation (ER), Internal Rotation (IR), and patient satisfaction rating questionnaires.

Results: All procedures were performed on an outpatient basis. No intraoperative complications were encountered, and no blood transfusions were required. The mean follow-up was 38 months, with a range (25-51 months). The mean ASES score improved from 26 to 93, and the mean WOOS score improved from 18 to 87. The mean VAS-P score decreased from 9 to 1, mean FF increased from 115o to 145o, mean ER improved from 30o to 60o, and IR improved from the level of the sacrum to L3. 11/14 patients rated their preoperative shoulder satisfaction as poor. At last follow-up, all patients rated their shoulder satisfaction as good to excellent. Radiographic follow-up revealed no evidence of component loosening, glenoid migration, or evidence of device failure. All patients were satisfied with the procedure and 12/14 returned to a moderate or higher level of weight-lifting activities. One patient required an arthroscopic capsular release from arthrofibrosis which significantly improved function. 4 of these patients requested contralateral surgery within 6 months of the initial procedure.

Conclusions-Implications: Stemless aspherical humeral head resurfacing combined with inlay glenoid replacement provides substantial pain relief and functional improvement and is a promising option for the management of symptomatic osteoarthritis in this challenging patient population. The procedure allows for a return to activities without restrictions and leaves multiple arthroplasty options if revision becomes necessary. Our results need to be reconfirmed in a larger cohort with longer follow-up.

A22

Mistaken Identity; Metastatic Testicular Cancer or Disseminated Infection? The Crucial Role of the Autopsy in Clinicopathological Correlation

Pukhraz Basra[1]. Christopher Febres-Aldana[1]. Michael Pagacz[1]. Vicky Loescher[2]. Robert Poppiti[3]. Cristina Vincentelli[3].

[1]*Department of Pathology and Laboratory Medicine, Mount Sinai Medical Center, Miami Beach, FL*

[2]*Department of Radiology, Mount Sinai Medical Center, Miami Beach, FL*

[3]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

Keywords: Tuberculosis, Autopsy, Infectious Disease

Introduction and Objectives: Historically, the benefits of the autopsy are widely documented; allowing confirmation, clarification and correction of premortem diagnoses, as well as the identification of new and reemerging diseases, even in patients who have received extensive evaluations. There has been a worldwide decline in autopsy rates. The clinicopathological correlation provided by autopsy pathology is critical in the education of residents and physicians, as highlighted by our case.

Case Presentation: We report a case of a 43 year-old Haitian man with a two-week history of intermittent, progressive headaches, and a two-day history of altered mental status, ataxia and urinary incontinence. CT imaging revealed consolidative changes in the lower lobes of the lung, multiple nodules in the brain and left adrenal gland, diffuse lymphadenopathy, and a right testicular mass. The premortem diagnosis was that of a testicular malignancy with widespread metastases and a "postmortem testicular biopsy" was requested by clinicians for confirmation. Our department recommended a full autopsy and consent was obtained.

Conclusions-Implications: Autopsies were once an integral part of the educational, patient care and quality assurance measures of hospitals. Once performed on 50% of all hospital deaths in the USA, autopsy rates have now declined to less than 5%.1,2 Among the reasons postulated for this decline are improvements in diagnostic medical technology, hesitancy of physicians to request consent, financial limitations, and the misbelief that autopsy reports will promote malpractice lawsuits. In an effort to increase autopsy rates, our department continues to educate clinicians on the value of autopsies in medical practice, education and research, and providing accurate information regarding the possible limiting factors listed above. In the present case, a full autopsy not only led to the correct diagnosis, but it also assured that those in close contact with the patient received appropriate workup and management. Despite advances in diagnostic medical technology, autopsies continue to

reveal unexpected findings. Hospitals must take measures to reverse the declining autopsy rates, including facilitating the process of autopsy request and consent. Communication between pathologists and clinicians must be encouraged to ensure that the value of the autopsy is not forgotten.

A23

Oseltamivir (Tamiflu) Induced Severe Behavior Disturbances in a Young Healthy Subject: A Case Study

Muhammad Aziz, MD, MPH. Gabriel Suarez, MD, MBA. Marien Yanes, DO. Deepa Sharma, DO. Mythili Penugonda, MD.

West Kendall Baptist Hospital, Miami, FL

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Influenza, Oseltamivir (Tamiflu), Suicidal, Panic Attacks, Anxiety

Introduction and Objectives: This case study describes a relatively rare but very important behavioral complication of commonly prescribed Oseltamivir for prophylaxis and treatment of Influenza, which may include delirium, severe behavior disturbances, and self-injury including fatal.

Case Presentation: 35 years old male with no significant past medical history presented to clinic with acute severe anxiety (GAD7 score of 16/21), frequent panic attacks and mild depression (PHQ9 score of 8/27). Symptoms started 7 days after diagnosis of Influenza B infection and he completed five days of Oseltamivir. Two days after, he presented to emergency room with severe dizziness diagnosed as a vasovagal episode. Next day, he started having acute symptoms of unprovoked severe anxiety. He reported more than dozens of "brain zaps" per day, described as electrical shocks in brain followed by panic attacks which would last from few minutes to up to 45 minutes without any suicidal and homicidal ideation. Social history included smoking marijuana and using Doxylamine (Unisom) to help with sleep 2-5 times per week for about 10 years. We encouraged patient to taper down both. On 6 week follow up, he was able to stop Doxylamine and decreased Marijuana use to up to 1-2 times per week. He was back to his baseline at 12 weeks follow up.

Conclusions-Implications: Oseltamivir, neuraminidase inhibitor, is commonly prescribed antiviral drug in United States. This medication is generally well tolerated; however, evidence shows that it may cause behavioral disturbances ranging from mild delirium to severe neuropsychiatric events that may include fatal self-inflicted injuries, predominantly in adolescents. Mechanism of behavior changes is not fully known and it is speculated that alterations in anion transporters' activities in brain might have an effect on behavior in susceptible individuals. The incidence of these psychiatric effects would potentially increase in patient with underlying psychiatric illness or patient using substances that can affect central nervous system, like in our patient. Cochrane Neuraminidase Inhibitors Review Team reported that Tamiflu has not been shown to prevent serious bacterial infections that may occur as a complication from influenza and taking Oseltamivir within 48 hours of getting sick may recover symptoms only 1 day faster than natural course. Furthermore this is not clear whether people who have flu are less contagious after taking Tamiflu. The trade-off between benefits and harms of using Oseltamivir and shared decision with patient may help decreasing unnecessary use of Oseltamivir when it is not needed.

A24

Outcomes After Surgical Repair of Medial Meniscal Root Tears: A Review

Chad A. Edwards, DO[1]. Jeffrey Turley, BA[2]. Daniel Kalbac, MD[2].

[1]Larkin Community Hospital, South Miami, FL

[2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Knee Surgery, Meniscus, Meniscal Repair

Introduction and Objectives: At the present time, there is a paucity of literature regarding medial meniscal posterior root repair and outcomes. This review seeks to examine the currently available data to further elucidate the clinical risks and benefits and any associated risks of medial meniscal posterior root repair.

Methods: A systematic literature search was performed up to July 2018 in the databases of Medline via Pubmed, EBSCOhost, and EMBASE. The results were reviewed independently by two authors and appropriate articles were reviewed and eligibility determined based on established criteria. A best-evidence synthesis was subsequently used.

Results: Thirteen studies (324 patients) were included in this review with a mean patient age of 54 years. There were no control studies with nonoperative treatment medial meniscal posterior root tears. All studies included a minimum of 10 patients in a case series or case-control manner. Of patients treated with medial meniscal posterior root repair, 62.43% demonstrated complete healing on follow up MRI or second look arthroscopy. 33.60% demonstrated incomplete healing, loosening of the construct, or excessive scar tissues formation. 4.97% demonstrated complete failure or re-tearing of the construction. At a mean follow up period of 33 months, patients demonstrated a mean improvement in Lysholm score of 30.5 (P<.00001), IKDC score of 31.9 (P<0.00001), and HSS score of 38.3 (P<.00001).

Conclusions-Implications: Surgical repair of medial meniscus posterior root tears appears to result in subjective highly satisfying outcomes. Patients included in the review meet criteria for both statistically and clinically significant improvement, based on published guidelines for minimal clinically important difference. Despite this, however, postoperative MRI and second look arthroscopy demonstrate a relatively high rate of loosening and incomplete healing (33.60%) or re-tearing and failure of the construct (4.97%). More highly powered studies are required to confirm these findings.

A25

Parenting Styles and Family Dynamics

Cheily Gonzalez, MS, MSEd. Juan C. Gonzalez BS.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Mindfulness Based Stress Reduction, Cognitive Behavioral Therapy, Metacognition, Mindfulness Based Therapy

Introduction and Objectives: Educators and counselors recognize the impact parenting has on influencing students' academic achievement. The parenting style the families adopt can affect their level of involvement on all levels. As a result, the parenting style that is practiced is further translated into functionality of family dynamics. Children develop in an environment of relationships that has a major effect on their later development and well-being. Research carried out by Bluth, Roberson, Billen & Sams, 2013 created a model to show how stress controls family dynamics in families with a child with Autism Spectrum Disorder (ASD). Their research also found that Mindfulness Based Stress Reduction (MBSR) improved family dynamics and relationships. This therapy can apply for all families that are experiencing stress.

Case Presentation: I had the privilege of interviewing Carlos. Carlos is a young male teenager, 19 years old, that is the middle child and lives at home with his parents. Carlos described his parents as having mainly an authoritative parenting style although he mentioned that occasionally there were small instances of authoritarian and permissive parenting. Carlos mentioned how his mom worked hard to maintain a healthy relationship with him during his childhood. His father, however, was often preoccupied. Nevertheless, his father held strict rules which his mother supported. Carlos felt, that as he grew, he experienced more freedom to make his own decision with little guidance. Whenever he made a poor decision, it was often greeted with negative consequences. Carlos feels that he does not have a strong relationship with his parents. As a result, he struggles to communicate his needs to them or never speaks about what he is currently struggling with. As a result, Carlos mentions that he feels he is independent and yet unsure what might be the consequences of certain actions and if they will make him happy.

Conclusions-Implications: At this current stage, I recommend learning, practicing, and implementing techniques of MBSR. Carlos could benefit from either a psychoanalytic therapy approach or a cognitive behavioral approach. At this stage, CBT would be helpful as it would focus primarily on his current cognitive distortions and would work to provide guidance on how to change his current way of thinking. CBT would also be useful as it is accompanied with many techniques for self-help. Carlos could benefit from learning these self-help techniques to better understand his emotions and perhaps help him choose a career path that he has been procrastinating. Metacognition is a key element of learning self-help. Mindfulness based therapy (MBT) implements techniques for focusing on one's current behaviors and how to be in tune with our feelings and emotions. MBT also implements mediation techniques such as breathing, to help relieve distress(Brown,Marquis,&Guiffrida, 2013).

A26

Primary Histiocytic Sarcoma with h-Caldesmon Expression in Adult Polycystic Kidney Disease

Ruben Delgado, MD[1]. Kritika Krishnamurthy, MD[1]. Ana Maria Medina, MD[1,2].

[1]A.M. Rywlin, Department of Pathology, Mount Sinai Medical Center, Miami Beach, FL

[2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Histiocytic Sarcoma, Adult Polycystic Kidney Disease, Sarcoma

Introduction and Objectives: Autosomal dominant polycystic kidney disease (APKD) is the most common inherited kidney disease. Renal cell carcinoma (RCC) associated with APKD has been frequently reported. However, only a few cases of nonepithelial neoplasms arising in APKD have been reported. Histiocytic sarcoma (HS) is a malignant neoplasm that accounts for less than 1% of hematologic malignancies. Herein we describe the first case of primary HS occurring in APKD.

Case Presentation: A 61-year-old man with ESRD secondary to APKD presented to the emergency room with fever and malaise. Laboratory studies revealed neutrophilia and imaging revealed enlarged kidneys with increased peripheral gadolinium uptake in one of the cysts in the left kidney. Clinical suspicion favored an infected cyst. His condition did not improve despite antibiotic therapy and drainage of the concerning cyst. Bilateral nephrectomy was performed. Examination of the left kidney revealed multiple simple cysts and an 11 cm complex cyst with an irregular lining. The microscopic examination of this cyst revealed a spindle cell neoplasm with extensive necrosis. The neoplastic cells had a moderate amount of eosinophilic cytoplasm and exhibited a high degree of pleomorphism, vesicular nuclear chromatin, prominent nucleoli and scattered giant cells. Immunohistochemical stains for CD68, CD163, Vimentin, and h-Caldesmon were positive. Stains for PAX8, GATA3, CAM 5.2, SMA, Desmin, HMB45, S100 protein, CD21, and CD23 were negative. A diagnosis of histiocytic sarcoma was made.

Conclusions-Implications: HS is a rare lymphohematopoietic malignant neoplasm. Positivity for h-Caldesmon in a spindle cell neoplasm could lead to an inaccurate interpretation of myoid differentiation. This case highlights the importance of morphology in guiding diagnostic workup and reiterates the necessity of maintaining

a high index of suspicion for neoplastic entities in APKD.

A27

Racial/Ethnic Disparities in Emergency Department Wait Times for Patients with Respiratory Illnesses

Ronaldo Nuesi, BS. Blake Brown, BS. Ian Landis, BS. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Racial Ethnic Disparities, Respiratory Illness, Emergency Department, Wait Times

Introduction and Objectives: Emergency departments rely on a triage system to evaluate patients. Our primary objective was to examine whether an association exists between race/ethnicity and wait times in patients presenting to the emergency department with respiratory illnesses.

Methods: We conducted a secondary data analysis using the National Hospital Ambulatory Medical Care Survey (NHAMCS) database for the years 2012 and 2014 in which we assembled a historical analytical cohort of adult patients presenting to the emergency department with diagnoses of asthma, emphysema, pneumonia, bronchitis, and other respiratory illnesses as coded in the database and corresponding to discharge diagnosis. The exposure of interest was race/ethnicity as recorded in the NHAMCS. The primary outcome was wait time (greater than 30 minutes and 30 minutes or less). Both unadjusted and adjusted (multivariable logistic regression) odds ratios for the association between race and waiting time were examined. Potential confounders assessed include sex, age, insurance type, region, triage, and arrival by ambulance.

Results: The overall frequency of patients that waited longer than thirty minutes was greatest in Hispanic-Whites (41.8%), followed by Non-Hispanic Blacks (30.5%), and then Non-Hispanic Whites (27.3%). When compared to Non-Hispanic Whites, the odds of experiencing extended emergency room wait times was significantly greater in Hispanic Whites (OR 1.92, 1.12-3.30) but not statistically different than Non-Hispanic Blacks (OR 1.17, 0.65-2.12) before adjustment. After adjustment, the odds of experiencing extended wait times was no longer statistically significant between Hispanic-Whites and Non-Hispanic Whites (OR 1.72, 0.88-3.35).

Conclusions-Implications: Based on previous findings in the literature, we hypothesized that there would be disparities in wait time for Non-Hispanic Black patients, but the results demonstrated that this was not the case. Instead, we found that Hispanic patients were more likely to wait longer despite similar presentation to Black and White patients before adjustment and no demonstrable changes were observed after adjustment. We were limited to the degree of information we were able to collect due to the nature of the NHAMCS database, such as hospitalization rate. Future studies should attempt to investigate whether disparate wait times led to increased rates of hospitalization amongst these patients.

A28

Racial and Ethnic Disparities in Primary Malignant Neoplasms of the Appendix

Armando Perez, BS. Anthony Tuzzolo, BS. John Michael Bryant, BS. Pura Rodriguez de la Vega, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Gastrointestinal Neoplasms, Intestinal Neoplasms, Colorectal Neoplasms, Socioeconomic Factors

Introduction and Objectives: Primary Malignant Neoplasms of the Appendix (PMNAs) are a rare and poorly studied group of diseases for which treatment guidelines have been intensely debated. The association between race and appendiceal cancer survival outcomes remains undescribed in the scientific literature. The purpose of this study is to determine the association between the races and categories of non-Hispanic white, black, and Asian/Pacific islander on survival outcomes in patients with appendiceal cancer.

Methods: This is a retrospective cohort study utilizing data gathered from the SEER Database that included patients diagnosed with PMNAs between 1975-2016. Patients were categorized based upon race category which included white, black, and Asian/Pacific Islander (API). Cox proportional-hazards regression model was used to estimate the 5-year cancer-specific mortality rate among these race categories as well in patients of Hispanic ethnicity. Unadjusted and adjusted hazard ratios and their corresponding 95% confidence intervals were reported.

Results: Mucinous adenocarcinoma was the most common appendiceal cancer subtype in both whites and API (31.63% and 39.63%), while non-mucinous adenocarcinoma was the most common subtype in blacks (32.63%). Black race (HR: 1.45; 95% CI: 1.21-1.73) and Hispanic ethnicity (HR: 1.34; 95% CI: 1.07-1.68) was found to be associated with a statistically significant increase in 5-year hazard of death compared to non-Hispanic whites.

Conclusions-Implications: Based on the results of this study, appendiceal cancer survival disparities exist and resemble those seen in colorectal cancer, wherein black patients are disproportionately affected. Public health efforts aimed at studying and addressing cancer disparities should also take appendiceal carcinoma into account.

A29

Racial Differences in Quitting Smoking Among People with Depression: A Nationally Representative Sample (NHANES 2005-2016)

Patrick Shipman, MSPH[1,2]. Taghrid Asfar, MD, MSPH[1,3]. Tatiana Perrino, PsyD[1]. Tulay Koru-Sengul, PhD[1,3].

[1]*Department of Public Health Sciences, Miller School of Medicine, University of Miami, Miami, FL*

[2]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[3]*Sylvester Comprehensive Cancer Center, Miami, FL*

Keywords: NHANES, Race, Ethnicity, Depression, Quitting Smoking

Introduction and Objectives: To examine national estimates of prevalence, time-trends, and correlates of quitting smoking by race/ethnicity among adults with depression. Racial/ethnic minorities have greater difficulty quitting smoking than white smokers in the United States (US). Depression is an important barrier for quitting among those seeking treatment to quit. This study aimed to examine national estimates of prevalence, time-trends, and correlates of quitting smoking by race/ethnicity among adults with depression compared to those without depression in the US.

Methods: Former/current adult (<20 years) smokers who answered the depression questionnaire from the 2005-2016 National Health and Nutrition Examination Surveys (NHANES) are included in these analyses. Former smokers were those who self-reported smoking 100 or more cigarettes during their lifetime and did not smoke cigarettes at present. Individuals were considered depressed if their Patient Health Questionnaire-9 (PHQ-9) sum score was 5 or above (n=3,608 with, n=8,823 without). Quitting prevalence rates by year/race and multivariable logistic regression for quitting smoking among those with depression by race/ethnicity were performed by taking into account NHANES complex survey design. Adjusted odds ratios (aOR) and corresponding 95% confidence intervals (95%CI) were calculated. Data management and statistical analysis were performed using SAS version 9.4.

Results: Compared to those without depression, quitting smoking in people with depression was lowest in non-Hispanic (NH) blacks (28.8% vs. 41.5%), then NH-whites (45.6% vs. 61.9%) and Hispanics (45.8% vs. 56.7%). From 2005 to 2016, quitting among those with depression increased the least among NH-blacks (1.6%), followed by NH-whites (5.8%), and Hispanics (13.0%). In multivariable logistic regression analysis, people with depression were less likely to quit if younger (aOR:1.05; 95%CI: 1.04-1.06), less educated (<high school: 0.50; 0.38-0.65 and high school: 0.52; 0.41-0.67), never married (0.68; 0.51-0.91), divorced (0.63; 0.51-0.78), lacking health insurance (0.64; 0.49-0.83), below poverty level (0.60; 0.47-0.76), unemployed (0.70; 0.56-0.87), or with risky alcohol use (0.74; 0.60-0.91). In NH-whites, younger age, less education, being unmarried, no health insurance, poverty status, unemployment, and risky alcohol use were significantly associated with failure to quit smoking. In NH-blacks, younger age, less education, never marrying, and no health insurance were significant. In Hispanics, younger age, less than high school education, divorced/widowed/separated status, and unemployment were significant correlates of quitting smoking.

Conclusions-Implications: Racial/ethnic health disparities in quitting smoking exist among those with depression, with non-Hispanic blacks being the most affected group. Smoking cessation interventions that address comorbid depression among blacks are urgently needed to improve cessation rates.

A30

Readmission Following Resection for Patients with Brain Metastases in the United States

Alexandra Townsend, BS[1]. Muni Rubens, PhD[2]. Sergio Gonzalez-Arias, MD[2]. Vitaly Siomin, MD[2]. Matthew Hall, MD[2]. Yazmin Odia, MD[2]. Michael Vogelbaum, MD, PhD[2]. Minesh P. Mehta, MD[2]. Rupesh Kotecha, MD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Miami Cancer Institute, Baptists Health South Florida, Miami, FL*

Keywords: Brain Metastasis Resection, Readmission Rate, Unplanned Readmissions, Stratifying Risks, Comorbidities

Introduction and Objectives: The purpose of this study was to critically analyze the risk of unplanned readmission following resection of brain metastasis as well as identify key risk factors in an effort to allow for early intervention strategies in high-risk patients.

Methods: This study was a retrospective analysis of data from the Nationwide Readmissions Database (NRD) from 2010-2014. We included patients who underwent craniotomy for brain metastasis, identified using ICD-9-CM diagnosis (198.3) and procedure (01.59) codes. The primary outcome of the study was unplanned 30-day all-cause readmission rates. Secondary outcomes included predictors and costs of readmissions.

Results: During the study period, there were 44,846 index hospitalizations for patients who underwent resection of brain metastasis. Among this cohort, 17.8% (n=7,965) had unplanned readmissions within the first 30 days after discharge from the index hospitalization. The readmission rate did not change significantly during the four-year study period (P=0.286). The odds of unplanned readmission were significantly greater in patients with thromboembolic complications (aOR, 1.53; 95% CI: 1.18-2.01), patients with Elixhauser comorbidities >3 (aOR, 1.35; 95% CI: 1.22-1.50), male patients (adjusted odds ratio [aOR], 1.29; 95% CI: 1.17-1.42), and patients with an initial length of stay ≥5

days (aOR, 1.02; 95% CI: 1.01-1.03). The median per-patient cost for 30-day unplanned readmission was $11,109 and this accounted for a total cost of $132.1 million during the study period.

Conclusions-Implications: Unplanned readmissions after resection for brain metastases involve substantial healthcare expenditures. Though there have been many interventions for improving surgical quality, post-operative care, and cost metrics, unplanned readmission rates have not changed. Key patient-specific variables and high rates of comorbidities should be considered to focus our efforts on patient selection for resection, and for strengthening existing interventions for high-risk patients.

A31

Reservoir or Malignancy? A Case Report of Large Bowel Obstruction in a Patient with a Penile Prosthesis

Elias Atri, BA[1]. Alejandra Perez, MD[2]. Vivian Wong, MA[1]. Billy Cordon, MD[2].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Department of Urology, Mount Sinai Medical Center, Miami Beach, FL

Keywords: Urology, Prosthetic, Obstruction

Introduction and Objectives: Inflatable penile prostheses (IPP) consist of two cylinders implanted into the corpora cavernosa, a pump placed in the scrotum, and a saline-filled reservoir placed in the space of Retzius or the high submuscular space. IPPs are used to treat refractory erectile dysfunction with few rare, but serious, complications. Cases of displaced reservoirs causing erosion into the bladder, small bowel obstructions, vascular compression, and inguinal herniation have been described in the literature. We present a case of large bowel obstruction in a patient found to have an adenocarcinoma of the sigmoid colon adjacent to the IPP reservoir.

Case Presentation: A 68-year-old man with a previous IPP placement presented with left lower quadrant abdominal pain, constipation and no flatus for 5 days. On exam, he was afebrile, mildly tachycardic, and was noted to have a firm, distended, tympanic abdomen. CT scan showed a distended cecum at 11 cm, and narrowing of the proximal sigmoid with adjacent inflammatory changes, and minimal peri-colonic air, suggestive of a localized perforation. The IPP reservoir was seen in the left iliac fossa, coinciding with the lead point of the obstruction, suggesting that the reservoir may have itself caused the obstruction. The patient was taken to the operating room for an emergent exploratory laparotomy. A hard mass was identified in the colon abutting to the IPP reservoir.

Conclusions-Implications: A left colectomy with transverse colostomy was successfully performed and the IPP reservoir was explanted. Intraoperative pathology revealed adenocarcinoma. Upon initial review of the imaging, it was thought that the IPP reservoir may have caused the obstruction, but intraoperatively, the colonic tumor was found to be the culprit. Although complications related to IPPs, including bowel obstructions, have been previously described in the literature, treatment for large bowel obstructions must take into account all possible etiologies, including malignancy.

A32

Ring-Enhancing Lesions in a Young Male

Gabriela Perez, DO[1]. Roberto Sanchez, MD[1]. Melissa Ramirez, MS[2]. Camila Del Rio, BS[2].

[1]Palmetto General Hospital, Hialeah, FL

[2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: CNS Lymphoma, Toxoplasmic Encephalitis, HIV, Hispanic/Latino, Opportunistic Infections

Introduction and Objectives: Distinguishing between central nervous system (CNS) lymphoma and cerebral toxoplasmosis in the HIV-patient population is a challenging, however clinically relevant task. Since both diseases generally present with similar neurologic complaints and imaging-findings, specific analytic methods must be implemented in order to appropriately differentiate the two as management varies. This case report seeks to not only emphasize the clinical task of differentiating the two presentations, but also highlight a rare case in which an individual patient was simultaneously diagnosed with both diseases.

Case Presentation: This is a 25-year-old Cuban male patient with past medical history of unspecified thrombocytopenia, required neurological evaluation for seizures. Of note, the patient reported progressive worsening 2-day onset of left temporal headache associated with intractable nausea and vomiting and fatigue prior to the episodes of seizures. He denied any known infectious disease including HIV; however, he has multiple repeated abscess required incision and drainage in the past. CD4 count was found to be 15 cells/mm3 and he was treated with sulfamethoxazole/trimethoprim and azithromycin for prophylaxis/treatment of opportunistic infections and dexamethasone for the underlying edema. Initial MRI showed multiple ring enhancing brain lesions with vasogenic edema and mass-effect on imaging. He was further evaluated with thallium-201 imaging which revealed low neoplastic potential. After minimal improvement with the current medication regimen, a follow up MRI spectroscopy was performed which depicted the enhancing lesions having decreased N-acetylaspartate and increased lactate and lipids when compared to the normal brain parenchyma indicating that there is no way to distinguish between the diagnosis of toxoplasmosis and CNS lymphoma. Once the patient's symptoms stabilized, he was able to be managed as an outpatient to continue his medical management.

Conclusions-Implications: In an age where the diagnosis of HIV is no longer a death sentence, as patients are being screened, diagnosed and treated more efficiently than they have ever been before, it would be absurd to allow the secondary infections to greatly disrupt the patient's life. It is imperative to have a high clinical suspicion of concomitant diagnoses versus one over the other.

A33

Risk Factors for Anemia in a Population with Hidradenitis Suppurativa

Emily Geisler[1]. Sydney Resnik, MS[1]. Nicolas Reyes[1]. Juan M. Lozano, MD, MSc[1]. Barry Resnik, MD[2].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Resnik Skin Institute, Miami, FL

Keywords: Hidradenitis Suppurativa, Anemia, Risk Factor

Introduction and Objectives: Hidradenitis suppurativa (HS) is a dermatologic disease that presents as tender, subcutaneous nodules, which have the potential to rupture and coalesce into deep dermal abscesses. HS has been associated with many complications, including anemia. Though some case studies have described anemia in HS patients, there are overall few studies reporting on the association between HS and anemia. This study sought to examine the prevalence of anemia among a population of HS patients as well as potential associations between risk factors for HS and development of anemia.

Methods: Records of patients with HS were provided to the student group by one of the co-investigators (BR). Intake forms were analyzed for the patients' responses and a list of suspected risk factors was compiled. Responses were grouped based on age, gender, ethnicity, body mass index, smoking status, and comorbidities to identify differences between patients with and without anemia. Data was then analyzed using STATA to perform a descriptive analysis followed by a bivariate analysis. Multivariate analysis was attempted but deemed not possible due to small sample size.

Results: Our overall patient sample was majority Caucasian (42.4%), female (75%), and older than age 30 years (43.5%). The prevalence of anemia was 41.3%. There was a statistically significant increase in the risk of developing anemia in HS patients that are males (OR 3.8, 95% CI 1.4-10.1) and Black (OR 3.5, 95% CI 1.3-9.2). Contrary to expectations, there was a minimal statistically significant decrease risk of developing anemia in current smokers (OR 0.1, 95% CI 0.0-0.6).

Conclusions-Implications: Our study demonstrated that 41.3% of our HS study sample had anemia, while the prevalence of anemia in the general U.S. population is estimated to be only around 5%. This supports the claim that there is an association between HS and anemia. We hope that physicians can recognize the importance of screening all patients with HS for anemia in order to medically optimize treatment for their patients.

A34

Risk Factors for Prolonged Postoperative Ileus in Partial Laparoscopic Colectomies with Anastomosis: An Exploratory Analysis

Ayesha Ali, BS. Don Truong, BS. Peter Qin, BS. Grettel Castro, MPH. Pura Rodriguez de la Vega, MPH. Noël C. Barengo, MD, MPH, PhD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Postoperative Ileus, Colectomies, Risk Factor, Laparoscopic Colectomy, POI

Introduction and Objectives: Laparoscopic colectomies can decrease postoperative complications, hospital length of stay, and cost, but prolonged postoperative ileus (POI) occurs in more than 10% of cases and thwarts such efforts. This study aims to identify risk factors for prolonged POI in patients undergoing partial laparoscopic colectomies with anastomosis.

Methods: This retrospective cohort study used the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database to examine patients who underwent partial laparoscopic colectomies with anastomosis between the years 2012-2016 in the United States. Nineteen predictors were assessed, including demographics, chronic medical conditions, and preoperative lab values. The study outcome was prolonged POI. Unadjusted and adjusted logistic regression analysis was used to calculate odds ratios (OR) and 95% confidence intervals (CI).

Results: A total of 18,532 patients were included. The odds of developing prolonged POI in patients undergoing partial laparoscopic colectomies with anastomosis were higher in patients with older age (aOR 1.01; 95% CI 1.01-1.02) male gender (aOR 1.44; 95% CI 1.27-1.64), black race (aOR 1.24; 95% CI 1.04-1.48), smoking (aOR 1.37; 95% CI 1.18-1.60), COPD (aOR 1.56; 95% CI 1.25-1.95), ASA II (aOR 2.14; 95% CI 1.20-3.84), ASA III (aOR 2.99; 95% CI 1.66-5.37), ASA IV/V (aOR 3.38; 95% CI 1.76-6.47), high hematocrit (aOR 1.77; 95% CI 1.01-3.09), and prolonged operation time (aOR 1.44; 95% CI 1.28-1.62).

Conclusions-Implications: Our findings provide additional evidence on the risk factors for prolonged POI. Future studies may further stratify exposures and their concurrent risk for developing POI, and identify mechanisms of prevention.

A35

Sleep Duration as a Predictor of Missed School due to Illness and/or Injury in School-Aged Children

Molly Hulbert, MS. Namrata Palsule, BS. Emily Hays, BS. Juan G. Ruiz, MD, MMedSci. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Missed School, Illness, Injury, School-Aged Children, Sleep

Introduction and Objectives: Previous studies have shown an association between lack of sleep and increased risk of injury in children and adolescents, but they have not evaluated their effect on school attendance. This study aims to examine the association between hours of sleep and missed days of school due to illness/injury in a nationally representative sample of children ages 6-17 years.

Methods: The data for this cross-sectional secondary analysis were obtained from the National Survey of Children's Health (NSCH) 2016. Data collection was conducted via mail and web-based questionnaires in all 50 states and DC from June 2016 to January 2017. The households surveyed had at least one child age 0-17 years. The sampling design included stratification by state and a child presence indicator to target households more likely to have a child. The final sample size of the original survey was 50,212 child-level interviews (approximately 958 per state). The main independent variable was sleep hours [adequate sleep (≥9 hours) vs. inadequate sleep (<9 hours)], while the main outcome was number of school days missed due to illness and injury [normal (<7) vs. increased (≥7)] in children ages 6-17 years. We further assessed confounders related to child, household, parent, and community characteristics using logistic regression.

Results: Among 34,728 students included in the final multivariate model, parents progressively reported inadequate sleep as children increased in age. We did not find a significant association between inadequate sleep hours and increased number of missed days of school due to illness or injury (adjusted OR= 1.0, 95% CI: 0.8-1.2). The study revealed that the following survey responses were risk factors for increased missed days of school due to injury/illness: Good or Fair/Poor health, being bullied, having a chronic illness, no sports participation, and living with someone with an alcohol/drug problem. Alternatively, protective factors included a race description of Black or African American and speaking a primary language other than English or Spanish.

Conclusions-Implications: The multivariate statistical model presented in this study provides empirical evidence for three important conclusions. First, inadequate sleep was not significantly associated with an increased risk of missed days of school due to illness or injury. Second, missed days of school is significantly associated with race, physical health of the child, and primary language of the household. Third, as previously described in the literature, increasing age is associated with decreased sleep duration in this study. Further study is needed to explore the relationship between sleep quality and missed days of school due to illness/injury.

A36

Sport Related vs. Non-Sport Related Anterior Cruciate Ligament Injuries: Are the Mechanism of Injury and Gender Predictive of Concomitant Knee Pathology

Hans Drawbert, MS[1]. Mia Weingart, BS[1]. Kristina Kuklova, BS[2]. John Uribe, MD[3]. John Zvijac, MD[3]. Keith Hechtman, MD[3]. Luis Vargas, MD, PhD[3]. Gautam Yagnik, MD[3].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*American University of Antigua, Antigua and Barbuda*

[3]*Miami Orthopedic and Sports Medicine Institute, Miami, FL*

Keywords: Knee, Anterior Cruciate Ligament, Meniscal Injury, Chondral Lesions, Athletes

Introduction and Objectives: Anterior Cruciate Ligament Reconstruction (ACLR) is an increasingly prevalent knee pathology seen in today's population. ACL injuries are often accompanied by concomitant injuries (CI). Some of these CI have shown to have incidence rates and laterality associated with a specific gender. Females have been shown to have a higher likelihood of having chondral lesions and posterior medial meniscal tears. There are still very few studies that attempt to demonstrate the increase on ACL injuries with CI and participation in sports. We hypothesized that athletes are at a higher risk of incurring a CI during ACL injuries then individuals that are not participating in sports. We further hypothesized that female athletes are at an even greater risk of CI when compared to females not participating in sports.

Methods: All patients underwent ACLR at our institution (MOSMI) between January 2015 and August 2019 were retrospectively reviewed. Mechanism of injury was determined from patient history and records. The presence of meniscal or chondral injuries was determined from operative reports and MRI images. Groups were compared using a one-way ANOVA and all statistics and figures were generated using Microsoft Excel.

Results: 1383 patients (912 males and 471 females) were analyzed. Of the 1383 patients, 1000 had CI (73%). 841 (84.1%) were athletes participating in sports when the injury occurred, 566 (67%) of which were males while 275 (33%) were females. There were 573 medial meniscus (MM) injuries, 324 (56.5%) of these were sports related. Of these, 102 were females participating in sports while 95 were in non-athletes. Lateral meniscus (LM) injuries totaled 605, 377 (62.3%) occurred in patients participating in sports and 63% of these were in female athletes. There were 448 chondral lesions, grade III and IV. 267 (60%) of chondral lesions were sports related with 177 (66%) occurring in males. Trochlear groove (TG) injuries totaled 60 (13.5%) and athletes made up 31 (51%) of TG injuries. There were 83 patellar (P) injuries with 46 (55.4%) being sport related. Medial femoral condyle (MFC) injuries totaled 146 with 75 (52%) being sport related. In lateral femoral condyle (LFC) injuries, 79 patients were sports related (76%) with only 25 (24%) being non sport related (P = .04). There were 54 tibial plateau (TP) injuries with 36 (67%) being sport related.

Conclusions-Implications: Our study revealed that athletes sustaining an ACL injury are at an increased risk of incurring a CI. Although we found no difference in incidence of type of meniscal tears, we found a significant increase in the incidence of grade III-IV chondral injury to the lateral femoral condyle in the setting of sport related ACL injuries. This knowledge can aid surgeons in preoperative planning and patient counseling.

A37

Survival Impact of Postoperative Radiotherapy Timing in Pediatric and Young Adult Ependymoma

Sunny Shah, BS[1]. Kevin Gates, BS[1]. Chase Mallory, BS[1]. Muni Rubens, MBBS, MPH, PhD[2]. Haley Happel, PA-C[3]. Ossama M. Maher, MD[4]. Toba N. Niazi, MD[4]. Ziad Khatib, MD[4]. Rupesh Kotecha, MD[2]. Minesh P. Mehta, MD[2]. Matthew D. Hall, MD[2].

[1]*Herbert Wertheim College of Medicine, Florida International University, Miami, FL*

[2]*Miami Cancer Institute, Miami, FL*

[3]*Baptist Health Medical Group Oncology LLC, Miami, FL*

[4]*Nicklaus Children's Hospital, Miami, FL*

Keywords: Ependymoma, Adjuvant Radiotherapy, Gross Total Resection, Subtotal Resection, Overall Survival

Introduction and Objectives: Postoperative radiotherapy is commonly utilized for WHO Grade II-III intracranial ependymoma. Clinicians generally aim to begin radiotherapy ≤5 weeks following surgery, but postoperative recovery and need for second look surgery can delay the initiation of adjuvant therapy. On ACNS 0831, patients were required to enroll ≤8 weeks following initial surgery. The purpose of this study is to determine the optimal timing of radiotherapy after surgery.

Methods: The National Cancer Database was queried for patients (age ≤39 years) with localized WHO Grade II-III intracranial ependymoma treated with surgery and postoperative radiotherapy. Overall survival (OS) curves were plotted based on radiotherapy timing (≤5 weeks, 5-8 weeks, and >8 weeks after surgery) and were compared by log-rank test. Factors associated with OS were identified by multivariate analysis (MVA). After 2009, complete data were available on whether patients underwent gross total resection (GTR) or subtotal resection (STR). In this subset, multivariable logistic regression was used to identify factors associated with delayed postoperative radiotherapy, defined as starting >8 weeks after initial surgery.

Results: In the final analytic dataset of 1,043 patients, no difference in 3-year OS was observed in patients who initiated radiotherapy ≤5 weeks, 5-8 weeks, and >8 weeks after surgery (89.8% vs. 89.1% vs. 88.4%; p=0.796). On MVA, anaplastic histology (HR 2.414, 95% CI 1.784-3.268, p<0.001) and STR (HR 2.398, 95% CI 1.519-3.788, p<0.001) were significantly associated with reduced OS. Timing of radiotherapy, total radiotherapy dose, age, insurance status, and other factors were not significant for OS. In patients treated in 2010-2016 (n=565) when GTR/STR status was known, age ≥21 years (OR 2.848, 95% CI 1.818-4.461, p<0.001) and STR (OR 1.575, 95% CI 1.011-2.451, p<0.01) were significantly associated with delayed time to initiating adjuvant radiotherapy. No difference in OS was observed based on radiotherapy timing in this subset (p=0.802), and anaplasia and STR remained significantly associated with reduced OS on MVA.

Conclusions-Implications: Delayed postoperative radiotherapy was not associated with inferior survival in patients with intracranial ependymoma, suggesting that delayed radiotherapy initiation may be non-inferior in patients who require longer postoperative recovery or referral to an appropriate radiotherapy center.

A38

The Association Between Electronic Cigarette Use During Pregnancy and Unfavorable Birth Outcomes

Nicole Izhakoff, BA. Alexandra Galbo, MS. Connor Courington, BS. Juan G. Ruiz, MD, MMedSci. Juan M. Lozano, MD, MSc.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: E-cigarettes, Pregnancy, Preterm Birth, Low Birth Weight

Introduction and Objectives: While electronic cigarettes (e-cigarettes) continue to gain popularity, literature focusing on the safety and risks of e-cigarette use is somewhat scarce, especially with regard to the use of e-cigarettes and their potential effects in fetal development. Our objective is to investigate the association between the use of e-cigarettes during pregnancy and unfavorable birth outcomes.

Methods: We did a retrospective cohort using secondary data analysis extracted from the Pregnancy Risk Assessment Monitoring System (PRAMS) 2016-2017 Phase 8 survey. This database contains both state-specific as well as population-based information on maternal attitudes and experiences before, during and shortly after pregnancy. . Women participating in the study are initially found through each state's birth certificate file. Eligible women include those who have had a recent live birth. Data collection procedures and instruments are standardized to allow comparisons between states. The independent variable was self-reported use of any e-cigarette products during pregnancy. The dependent variable

was dichotomized into the presence of at least one unfavorable birth outcome (preterm birth, low birth weight, extended postnatal hospital stay for the newborn) or the absence of all. Binary logistic regression analysis was used to calculate adjusted odds ratios (aOR) and corresponding 95% confidence intervals (CI).

Results: 71,940 women were included in our study. After adjusting for age, race, ethnicity, insurance, maternal education, prenatal care, abuse during pregnancy and complications during pregnancy, the odds of unfavorable birth outcomes increases by 62% among women who reported e-cigarette use during pregnancy versus women who did not (aOR = 1.62, 95%CI = 1.16-2.26, p-value 0.005).

Conclusions-Implications: Moving forward, it is imperative for consumers to understand the implications of utilizing e-cigarettes, such as the significant increased risk of unfavorable birth outcomes associated with use during pregnancy. Moreover, healthcare providers, particularly obstetricians, are expected to relay this novel information to at risk patients in both a clear and concise way. Overall, researchers must continue to study the long term effects of e-cigarettes, including those on fetal development, as there is still much to be uncovered.

A39

The Association Between Ethnicity and Length of Hospital Stay after Laparoscopic Cholecystectomy at the West Kendall Baptist Hospital

Marina Addario. Elaine Huang. Alisha Drayton. Marcia H. Varella, MD, PhD, MPH. Jaime Alberto Rodriguez, MD.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: Laparoscopic Cholecystemtomy, Gall Bladder, Cholecystitis

Introduction and Objectives: Gallbladder diseases affect up to 25 million people in the US. While the standard laparoscopic cholecystectomy for symptomatic gallbladder disease is relatively safe, certain groups, such as Hispanics, may have a higher risk of complications due to their insurance status, lower socioeconomic status, and comorbidities leading to a longer length of stay. To determine whether there is an association between ethnicity and length of stay in patients who receive laparoscopic cholecystectomy at the West Kendall Baptist Hospital.

Methods: We performed a secondary analysis of data collected by ACS NSQIP at West Kendall Baptist Hospital from 2011-2016. Adults 25-80 years old who underwent laparoscopic cholecystectomy and/or cholangiogram per CPT codes 47562 and 47563, respectively. The independent variable used was Hispanic ethnicity and the dependent variable used in the study was the length of stay (LOS) categorized as either being <2 days or ≥2 days. The independent associations were assessed using multivariate logistic regression models.

Results: We studied 216 patients, about 68% were Hispanic. The frequency of those staying ≥2 days was 25.9% for Hispanics and 25%for non-Hispanics (p=0.9). There was no association between Hispanic and Non-Hispanic patients neither the unadjusted or adjusted models (OR=1.05, 95% CI=0.46-2.4 and OR=1.23, 95% CI 0.49-3.09, respectively).

Conclusions-Implications: There was no significant difference in LOS between Hispanics and non-Hispanics who received laparoscopic cholecystectomy at WKBH but results should be taken in light of the study's limited power. Further studies using a larger sample size is warranted.

A40

The Effect of General vs. Regional Anesthesia on Early Postoperative Mortality in Hip Arthroplasty Patients

Irfan A. Khan, ATC. Raihan Noman, BS. Nabeel Markatia, BS. Juan G. Ruiz, MD, MMedSci.

Herbert Wertheim College of Medicine, Florida International University, Miami, FL

Keywords: General Anesthesia, Regional Anesthesia, Hip Arthroplasty, Postoperative Mortality, Epidemiology

Introduction and Objectives: Hip arthroplasty is performed in patients with hip joint dysfunction and is associated with complications including mortality. Studies have found conflicting results for mortality according to the type of perioperative anesthesia. The aim of this study is to identify the factors associated with increased early postoperative mortality in adults U.S. patients undergoing hip arthroplasty and assess the role of appropriate anesthesia management.

Methods: A retrospective cohort study of 60,897 adult hip arthroplasty patients was conducted utilizing the 2015-2016 American College of Surgeons National Surgical Quality Improvement Program database to examine whether the type of anesthesia is associated with early postoperative mortality while controlling for demographics and comorbidities through multiple logistic regression. Odds ratio (OR) calculations yielded from the logistic regression will be interpreted with their respective 95% confidence intervals.

Results: Of the 34,743 patients receiving general anesthesia, 268 experienced early postoperative mortality (0.77%) as compared to 85 out of 25,801 patients receiving regional anesthesia (0.33%) (p<0.05). The unadjusted odds of experiencing early postoperative mortality were 57% lower in the regional anesthesia group as compared to the general anesthesia group (OR = 0.43; 95% CI 0.33-0.55). After adjusting for potential confounders, the early postoperative mortality odds in the regional anesthesia group were 26% lower (OR = 0.74; 95% CI 0.56-0.99) than that of the general anesthesia group. Other factors independently associated with increased mortality include patient age of 75 years or older, underweight BMI, and an ASA Class III.

Conclusions-Implications: While the overall mortality in adult hip arthroplasty patients is low, the use of regional anesthesia can further lower mortality in these patients. These results may influence anesthesia management guidelines for hip arthroplasty moving forward.

A41

The Patterns and Correlates of Potentially Inappropriate Medication Use Among Community-Dwelling Individuals with Dementia

Krissie Lobon[1]. Halima Amjad, MD, MPH[2]. Deirdre M. Johnston MB, BCh[2]. Quincy Samus, PhD[2].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Johns Hopkins University

Keywords: Dementia, Beers List, Polypharmacy

Introduction and Objectives: Potentially inappropriate medication (PIM) and polypharmacy are well-known risk factors for poor outcomes among older persons, especially those with dementia (PWD). Relatively little is known about use of PIM among home-residing PWD. The objectives of these analyses were to (1) describe the prevalence and patterns of potentially inappropriate medications (PIM) use and polypharmacy among home-residing PWD and(2) examine the PWD correlates associated with PIM.

Methods: Cross-sectional data from 646 PWD living at home who participated in a baseline (BL) visit for either of two trials conducted in Maryland between 2015 and 2019 evaluating a community-based care coordination intervention (MIND at Home). Medication name, route, dose, and frequency was recorded for all prescription medications, over the counter medications, vitamins, minerals, and herbal supplements (including routine and as-needed) during an in-home "brown bag" review. PIMS Beers criteria were applied to categorize and count PIM medication categories: anticholinergics, benzodiazepines, nonbenzodiazepine/benzodiazepine receptor agonist hypnotics, antipsychotics, corticosteroids (oral / parenteral), and H2-receptor antagonists. Polypharmacy (>=5 medications taken) and excessive polypharmacy (>= 10 medications taken) was also was calculated. Sociodemographic, cognitive, functional, behavioral were also collected at BL.

Results: Seventy nine percent of PWD met criteria for polypharmacy and 36% for excessive polypharmacy. Thirty-nine percent were taking one or more PIM, with anticholinergics (33%) and antipsychotics (27%) being the most common types. Polypharmacy, excessive polypharmacy, having more neuropsychiatric symptoms, and lower self-rated quality were associated with higher odds of PIM use in adjusted models. Sociodemographic, cognitive, physical health, or functional dependence variables were not significant.

Conclusions-Implications: Polypharmacy and use of PIMs is very common in this vulnerable population. The most common PIM type was anticholinergics and antipsychotics, the former including use of over the counter medications that might not be discovered by primary care providers during typical clinic visits. A focus on medication simplification interventions and non-pharmacological behavior management are needed to address this issue.

A42

Use of Innovative Endoscopic Capsule, CapsoCam, to Find Indolent Gastrointestinal Pathology

Sabrina Gill, BS[1]. Natalie Ceballos, BS[1]. Javier Parra, MD[2,3]. Anthony Gonzalez, MD, FACS, FASMBS[3].

[1]Herbert Wertheim College of Medicine, Florida International University, Miami, FL

[2]Gastro Health, Miami, FL

[3]Baptist Hospital South Florida, Miami, FL

Keywords: CapsoCam SV1, Small Bowel Endoscopy, 360-Degree Panoramic View, Gastrointestinal Bleeds, Abdominal Pain

Introduction and Objectives: In order to improve diagnostic outcomes and patient satisfaction with capsule endoscopy (CE) the CapsoCam SV-1 was developed. The CapsoCam is superior to other CEs due to its 360-degree panoramic view while other models of CEs are just shy of a 180-degree field of view. Additionally, the use of four laterally placed cameras increases the number of images that can be taken, thus improving its diagnostic potential. A pilot study revealed that the Capsocam SV-1 detected the duodenal papilla in more than 70% of patients while other capsule systems utilizing a single camera had detection rates between 10 and 44%.. The CapsoCam also eliminates the need for an external receiver equipment due to its capability to store images within the capsule. The latest advancements of the CapsoCam provide a better outlook in the diagnosis of occult gastrointestinal bleeds. The primary objective of this study is to describe the use of the CapsoCam as emerging technology for identification of indolent gastroinstetinal pathology and review the literature to date on published information of the CapsoCam.

Case Presentation: A 45 year-old previously healthy male presented with one month history of intermittent vague abdominal pain. The patient denied changes in weight, nausea, vomiting, diarrhea, melena, or hematochezia. A CT of the abdomen and pelvis with IV and PO contrast revealed transient intussusception left upper quadrant jejunal loops. Small bowel series revealed no small bowel obstruction yet noted a small intussusception. Gastroenterology workup, which included endoscopy and single balloon enteroscopies from oral and anal approach, were unremarkable. Capsule endoscopy with CapsoCam revealed a mass in the mid-jejunum. The operative course included diagnostic laparoscopy, exploratory laparotomy, and small bowel resection. Findings included a small

ulcerated mass located approximately 105 cm from the ileocecal valve. Pathology report of small intestine specimen revealed an ulcer with acute inflammation and prominent fibrosis measuring 0.5 x 0.3 cm. Mesenteric lymph nodes were unremarkable.

Conclusions-Implications: This case report demonstrates the importance of interdisciplinary medicine with gastroenterologists and surgeons collaborating to treat patients. Additionally, it underscores the efficacy and value in the use of CapsoCam to identify indolent gastrointestinal pathology. With enhanced visualization quality, increased number of images captured, greater patient satisfaction, and higher detection rates, the potential use of the CapsoCam is promising. The use of the CapsoCam to identify indolent gastrointestinal pathology is an evolving area for future development.

NOTES

NOTES

NOTES

NOTES