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Dear Readers,

We are proud to present the first issue of the fourth volume of the Florida Medical Student Research Journal (FMSRJ). This journal was founded in 2015 by two medical students at the Florida International University (FIU) Herbert Wertheim College of Medicine (HWCOM) as a means to showcase the academic achievements of medical students. The FMSRJ publishes work from any health professional or student related to medicine for peer review by Florida medical student editor teams. Through the continued efforts and talent of the student editorial teams, the journal has developed to represent a venue for innovative, scholarly pursuits.

This year has been unprecedented. Manuscript submissions exceeded all previous years, readership and published materials have expanded beyond FIU, there is collaboration with FIU student journal Eloquor, and faculty experts were incorporated into the peer review process alongside student editors.

Our team presents original research representing a range of topics from the bedside to the trends followed by interesting cases of rare conditions, surgical innovation, and a reminder of the importance of providing thorough, quality care. Readers will then enjoy clinical reviews of related to the fields of dermatology and oncology topics as well as a historical narrative of the role of physicians in early Florida. We are honored to contribute to the existing academic discussions relevant to these areas. In addition to the articles, we also publish the proceedings of the 2019 FIU HWCOM research symposium.

This issue would not have been possible without the generous support of our Executive Advisory Board Drs. Sheldon Cherry, Joe Leigh Simpson, and Juan Acura as well as the numerous faculty advisors who served as expert reviewers and mentors to the student editors. Thank you to the student editors, authors, administrative personnel, and design team whose guidance, dedication, and work helped to realize the publication of this issue. A special thank you to Helen Rynor, Emily Gesler, and Eloquor for the beautiful cover art and art pieces amongst the research. It was truly our pleasure to have this opportunity to work alongside and manage such an incredible team. Lastly, thank you to our families whose unwavering support and example continue to inspire and motivate us to achieve our goals.

We hope this issue will inspire your curiosity and encourage you to continue on the pursuit of your academic aspirations.

Sincerely,

Nicole M. Millan
Editor in Chief

Komal P. Kinger
Editor in Chief
Dear Readers,

This is the first issue of The Florida Medical Student Research Journal published since I began my tenure as the Dean of Herbert Wertheim College of Medicine. It brings me great joy to be able to address you, the readers, in a forum that is dear to me. Medical education is grounded in social consciousness and a commitment to improving human welfare. As medical professionals involved in basic or clinical research, patient care, and medical education, we share in the noble mission to improve medical care and, thereby, realize better outcomes for all diseases.

Our efforts as scientists, clinicians, and educators are intertwined, addressing the social determinants of disease and the biological basis of disease to improve the human condition. Medical journals such as The Florida Medical Student Research Journal provide forums for disseminating knowledge gleaned through the research, and facilitating translation of that knowledge into actionable strategies that improve patient welfare.

Peer review is essential to the process of validating research findings. The Florida Medical Student Research Journal offers medical students the opportunity to participate in peer-review and to have their own work published. I look forward to collaborating with the students and the readership as we continue to promote scholarly productivity and innovation through medical research.

Our medical school is entering the digital age and presenting information for learning is challenging. The Florida Medical Student Research Journal will be at the forefront in enabling our goals of "bench to bedside" medical care.

On a personal level, I again want to state my great honor and privilege to have the opportunity to work with, and for, each of you to build a very special medical school.

Sincerely,

Robert Sackstein, M.D., Ph.D.
Senior Vice President for Health Affairs
Dean, Herbert Wertheim College of Medicine
Pseudomonas aeruginosa Anti-sigma Factor MucA Shows Essential Similarities to Escherichia coli RseA and Other Pathogens

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Abstract
Pseudomonas aeruginosa is a Gram-negative, ubiquitous bacterium that often causes respiratory infections in individuals with cystic fibrosis (CF). A major factor contributing to patient morbidity and mortality in these infections is the production of a polysaccharide called alginate that protects the bacterium from the host’s immune system and antibiotic therapies. Ordinarily, the sigma factor (AlgT/U) required for alginate biosynthesis is sequestered to the inner-membrane of the cell by MucA, an anti-sigma factor; if MucA is cleaved or mutated, AlgT/U is left free to guide RNA polymerase to transcribe the genes needed for alginate production. MucA is a crucial player in alginate regulation. However, not much is known about the active sites in MucA that play this critical regulatory role. The E. coli homolog, RseA, however, has been extensively studied and its active sites have been determined experimentally.

This study compared the two, as well as twelve other pathogenic bacteria with homologs to RseA. The protein sequences were aligned and two conserved domains were identified by batch search in PFAM. While there is low overall sequence homology between the various proteins, homology is much higher within the identified domains. Moreover, the residues within the active site necessary for sigma factor binding- as determined experimentally in E. coli- were conserved across all species analyzed. These findings will guide future work to verify the results in vitro and could lead to the development of an anti-alginate therapy by restoration of MucA functionality or the generation of a synthetic MucA that could sequester AlgT/U.

Key Words: alginate, exopolysaccharide, sigma factor, cystic fibrosis

Introduction
Pseudomonas aeruginosa is a gram-negative, ubiquitous bacterium that is the leading cause of death in those with cystic fibrosis (CF), a common autosomal recessive genetic condition in which a buildup of mucus provides an ideal environment for bacterial colonization. One of the major contributing factors to the morbidity associated with P. aeruginosa is the production of an exopolysaccharide called alginate, which is produced when the cell senses some stress in the environment, such as the oxidative radicals of the immune response, antibiotic therapy, or desiccation. The polysaccharide coats the cell and acts as a physical barrier to the stressor. Isolation of an alginate-producing strain from the lungs of a CF patient is indicative of a very poor prognosis. More than likely, the patient will die from the infection within five years.

Alginate production is metabolically expensive for the bacterium, and mortality in these infections is the production of a polysaccharide that coats the cell and acts as a physical barrier to the stressor. Isolation of an alginate-producing strain from the lungs of a CF patient is indicative of a very poor prognosis. More than likely, the patient will die from the infection within five years.

Alginate is produced when the cell senses some stress in the environment, such as the oxidative radicals of the immune response, antibiotic therapy, or desiccation. The polysaccharide coats the cell and acts as a physical barrier to the stressor. Isolation of an alginate-producing strain from the lungs of a CF patient is indicative of a very poor prognosis. More than likely, the patient will die from the infection within five years.

Ordinarily, MucA, an anti-sigma factor, sequesters AlgT/U to the inner membrane, preventing it from interacting with RNAP; however, when MucA is mutated or cleaved, AlgT/U is left free to guide RNAP to transcribe the genes necessary for alginate biosynthesis.

MucA is a 194 amino acid protein which is localized to the inner membrane of the P. aeruginosa cell. It has two domains: the cytoplasmic N-terminus that interacts with AlgT/U and the periplasmic C-terminus that interacts with MucB. The transmembrane AlgT/U-MucA-MucB complex plays a crucial role in regulating the expression of the alginate operon.

As a result, MucA is a prime target for potential anti-alginate therapies: restoring or enhancing the function of MucA would reduce AlgT/U activity, thereby making the bacterium more susceptible to traditional antibiotic therapies. Knowledge of its active sites could also lead to the development of a synthetic MucA which could effectively sequester AlgT/U. We investigated the relation of MucA to any functional or structural homologs in other pathogenic bacteria. The E. coli homolog, RseA, was selected for a central role in this analysis due to the great amount of information that is already known about this protein experimentally.

The phylogenetic information could then be used to predict active sites in MucA and initiate alginate biosynthesis by transcribing the algD operon. When MucA is mutated, it is unable to sequester AlgT/U and alginate production ensues.

The 12 whole protein sequences were then submitted to PFAM. After analyzing these results, Uniprot was used to identify the experimentally determined structure and active sites of the proteins. A review by Pandey and colleagues showed that while RseA in E. coli homologs and MucA in P. aeruginosa are functional homologs, they only share 28.3% sequence homology. Thus, there was a need to investigate if the active sites of the proteins are conserved between the two species.

Figure 1: The Pseudomonas aeruginosa alginate regulation pathway. Alginate production is controlled by the sigma factor AlgT/U which is ordinarily bound to the inner membrane by the anti-sigma factor MucA to prevent interaction with RNAP. AlgT/U must be freed from MucA to begin alginate production. When stress is sensed, MucA is cleaved (1) and induces periplasmic cleavage of MucA by AlgW (2). MucA is also cleaved by MucP (3) within the inner membrane on the cytoplasmic end to release AlgT/U. AlgT/U is now free to interact with RNAP and initiate alginate biosynthesis by transcribing the algD operon. When MucA is mutated, it is unable to sequester AlgT/U and alginate production ensues. (Adapted from Pandey et al., 2016.)

Methods
The MucA sequence (Accession: NP_249454.1) was retrieved from the PFAM database. The accession number was searched in PFAM to find the domain families it contains (PFAM ID: PF03872 and PF03873). The PFAM sunburst tree was used to identify the active sites in MucA and guide future studies to uncover the precise mechanism of interaction with the sigma factor AlgT/U.

The sequences were then aligned with Muscle in Jalview. After analyzing these results, Uniprot was used to identify the experimentally determined structure and active sites of the E. coli homolog RseA and then these were compared to the multiple sequence alignment (MSA) to check for conservation of sites across the various species.

Results
A review by Pandey et al. compared the homology of the E. coli and P. aeruginosa stress response pathway proteins (Table 1). This analysis showed that while RseA in E. coli and MucA in P. aeruginosa are functional homologs, they only share 28.3% sequence homology. Thus, there was a need to investigate if the active sites of the proteins are conserved between the two species.

The 12 whole protein sequences were then submitted to PFAM batch search to identify protein domains.
The MSA was used to determine conserved residues. The two PFAM domains are in the green.

The two domains for all proteins in the analysis. The first is near the C-terminus and interacts with another two domains for all proteins in the analysis. The second is near the N-terminus and interacts with another periplasmic regulatory protein RseB (PF03873; Figure 2).

Table 1: The numbers refer to percentage homology as determined using ClustalW. The shaded boxes compare the functional homologs. The protein sequences of E. coli and P. aeruginosa were retrieved from ecogene.com and pseudomonas.com respectively.

Figure 2: Domain graphic of the two domain families (PF03872 and PF03873) identified by batch search.

Figure 3: The MSA by Muscle with defaults. The MSA was used to determine conserved residues. The two PFAM domains are in the green boxes, and the conserved active sites are colored with Taylor and labeled by known function in E. coli.

Discussion

Although MucA is varied in sequence across species of pathogenic bacteria, this study suggests that what is learned from studies on E. coli RseA may be applicable to P. aeruginosa and the other species we analyzed as well.

It was seen that the same two PFAM domains are present in all the sequences. Despite the lack of sequence homology across the whole protein, the active sites identified experimentally by other authors in E. coli are conserved across all sequences. Alignment of the individual domains would further solidify this conclusion.

The analysis could also be expanded to include a larger set of pathogenic and non-pathogenic bacterial species.

While mutagenic studies are needed to confirm the active site predictions made in this study, the conservation across the species analyzed at the same locations as the active sites of RseA strongly leads to the hypothesis that these are indeed the active sites in the other species. This will help direct future investigations of MucA. Specifically, the newly-identified, potential active sites can be mutated to verify that they are the active sites in P. aeruginosa. Further in silico structural analyses could be performed to determine what effect the mutations in PDO300 and PA2192 may have on MucA function as compared to E. coli and the Pseudomonas with typeII. These two strains are of particular interest since PDO300 harbors the most common mucA mutation leading to alginate production (mucA22) and PA2192 is a clinical isolate that produces almost twice as much alginate than other mucoid strains of P. aeruginosa.

Conclusion

There is an urgent need for some form of an anti-alginate therapy. Mucoid P. aeruginosa infections are the lead cause of death in CF. This therapy will likely be a combination therapy with various classes of antibiotics: the bacteria allowing the antibiotic to be effective. As of yet there is no approved and effective anti-alginate therapy. The only current therapeutic option is higher and higher doses of last resort antibiotics that are nontherapeutically failed. The sum of the present analyses and the proposed studies could lead to therapies that enhance the functionality of MucA in P. aeruginosa or generate synthetic MucA homologs that sequester AlgT/U, thereby lowering the alginate production and alleviating the morbidity and mortality concomitant upon infection with an alginate producing strain of P. aeruginosa.

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Investigation of Fanconi Anemia: The Downstream Genetic Pathway

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Abstract

Introduction: A key response mechanism to DNA damage is the Fanconi Anemia (FA) repair pathway, which involves homologous recombination DNA repair. A FA repair deficiency is considered to increase the sensitivity of tumors to DNA-targeted agents and may prove to be a target of cancer treatment. We aim to explore the association between the FA repair pathways and downstream genes that influence tumor growth.

Methods: To generate FANCD2 knockdown cells, human lung cancer cell line A549 was transfected with FANCD2-specific short hairpin RNA (shRNA) expressing and puromycin-resistant lentiviral particles or control shRNA lentiviral particles. The cells were cultured and successful FANCD2 knockdown was confirmed by western immunoblot analysis. Significant gene expression changes between knockdown FANCD2 and control samples across the A549 cell line were determined, defined as a five-fold change in upregulation or downregulation. The fold change was calculated by dividing FANCD2 deficient expression by FANCD2 efficient expression.

Results: 13436 genes were evaluated and 10 selected genes demonstrated gene expression change by at least 5-fold with FANCD2 knockdown in the A549 cell line. Of the five downregulated genes, four of these genes had literature supporting oncogenic function. Three upregulated genes had literature supporting oncogenic function.

Conclusion: As FANCD2 is considered to promote cell proliferation, upregulation of tumor suppressor genes and downregulation of oncogenic genes expression was expected with FANCD2 knockdown. Our results provide a starting point for developing targets to downstream genes associated with FA deficient tumors, which may prove to limit cancer progression.

Key Words: Fanconi Anemia, Lung Cancer, Gene Expression, DNA Repair

Introduction

DNA repair processes are essential for cells to maintain genome stability and to prevent genetic mutation. Perturbations of DNA metabolism prevent the completion of replication and trigger DNA response pathways. It has been recognized that DNA repair checkpoints are critical for hindering induction of neoplasms, rooting from defects in DNA damage response pathways. Abnormalities in oncogenes and tumor suppressors can drive mutations to initiate onset and progression of cancers. Known DNA repair proteins such as BRCA1 and FANC2D can be detected in cancer cells and serve as markers for competent DNA repair function.

A key response mechanism to DNA damage is the Fanconi Anemia (FA) pathway, which involves homologous recombination DNA repair. The Fanconi Anemia pathway is activated through mono-ubiquilation of the FANC2D protein. Homologous recombination repair (HRR) is essential to prevent genomic instability related to double strand DNA damage and stalled DNA replication forks. Disregulation of homologous recombination repair genes such as FANC2D have been identified in Non-small cell lung cancer, although it is not known whether carcinogenesis is associated with a functional HRR deficiency. The identification of homologous repair-deficient tumors is a significant challenge in oncology research, particularly when taking into consideration the complexity of the DNA damage response system. HRR deficiency may increase the sensitivity of tumors to DNA-damaging agents such as platinum or targeted agents such as PARP inhibitors. FA homologous repair deficiency may therefore prove to be a target of cancer treatment, as long as appropriate biomarkers become available to identify patients with these tumors. Currently, there is a growing appreciation of DNA repair deficiencies in lung cancer prevention and treatment, given the high prevalence of NSCLC and increased efficacy of DNA-damaging drugs. A study conducted by Duan, et.al reported the detection of 22% of NSCLC to be FA functionally inactive by the Fanconi Anemia Triplet Staining Immunofluorescence test, indicating the clinical relevance of the detection and targeted treatment for patients with FA deficient tumors.

The FA pathway includes multiple genes which form foci of DNA repair on chromatin during the S phase of the cell cycle and during DNA damage. The FA proteins encoded by these genes are thought to work cooperatively in a common signaling pathway to repair intercross links. The FA repair mechanism contains 16 complementation groups, and eight of the proteins are subunits of the FA-core complex-1, which activate FANC2D in response to DNA damage. As deregulated FANC2D/FANC2D knock-down cell foci formation is associated with tumorigenesis, we hypothesize that lung cancer cells with reduced FANC2D expression will
demonstrate downregulation of associated tumor suppressor genes and we expect oncogenic genes to demonstrate upregulation1.

As the FA pathway is responsible for repairing DNA cross links and double-strand breaks in coordination with the HRR pathway, it is plausible that cancers with impaired FA pathways are more sensitive to platinum-based chemotherapy2. Given that multiple genes collaborate to influence the FA pathway, pinpointing downstream genes in FA deficient tumors can aid in understanding the FA repair response and the increased sensitivity of specific tumors to DNA damaging agents3. Evaluation of studies focusing on the FA pathway can aid in understanding how these genes collaborate to influence the FA pathway, pinpointing the genes with significant change expression changes, defined as a five-fold change in upregulation or downregulation. The fold change was calculated by dividing FANCD2 deficient expression by FANCD2 efficient expression. The function of the genes deemed to have significant change were determined via a PubMed search using the gene bank.

**Results**

Five selected genes demonstrated gene expression change by at least 5-fold with FANCD2 knockdown in the A549 cell line. The RNA5S16 gene demonstrated the most significant gene expression change. Gene expression profiles were evaluated for these significant genes, and three upregulated genes had literature regarding oncogenic functionality. The genes with significant alterations in expression with FANCD2 knockdown are listed in tables 1 and 2. Of the five downregulated genes, four of these genes had literature supporting oncogenic function.

### Downregulated genes

- **AC011558.5**
  - Fold change: -79448541.38
- **RP11-350N15.6**
  - Fold change: -8752073.04
- **PLA2G4B**
  - Fold change: -316608.70
- **RP4-635E18.7**
  - Fold change: -429666.13
- **RP11-321N4.5**
  - Fold change: -313697.26

**Table 1**: Downregulated genes associated with FANCD2 knock-down in A549 cancer cell line. Five selected genes demonstrated gene expression change by at least 5-fold with FANCD2 knockdown in the A549 cell line. The most significant gene expression change in the A549 cell line was the AC011558.5 gene, with a change of -79448541.38 to -3.04. No literature was found concerning the function of this gene. PLA2G4B displayed a significant downregulation with -316608.70 fold change in the A549 cell line. This gene was found to be expressed in head and neck squamous cell cancer (HNSCC)6. Our hypothesis, as we postulated that knockdown of FANCD2 was correlated with ovarian cancer risk 11. The PRPF31 gene is known to encode the ubiquitous splicing factor PRPF3112. Another study conducted by Lai, et al analyzed IncRNA expression profiles in GBM and found that this gene was involved in cell cell signaling, and was related to the mitogen-activated protein kinase signalling pathway13. This gene served as a biomarker for the prognosis of GBM, providing a more accurate prediction of survival, and suggesting oncogenic function of this gene10.

### Upregulated genes

- **RNA5S16**
  - Fold change: 19122373.25
- **RP11-801F7.1**
  - Fold change: 259353.62
- **RP11-360L7.7**
  - Fold change: 648539.22
- **RP11-29893.5**
  - Fold change: 30442.26
- **AC114546.1**
  - Fold change: 21818.55

**Table 2**: Upregulated genes associated with FANCD2 knock-down in A549 cancer cell line.

Gene expression profiles were determined in order to identify genes and associated pathways differentially regulated upon FANCD2 knockdown. Five genes were determined as very significant in terms of downregulation in response to FANCD2 knockdown. These genes include: AC011558.5, RP11-350N15.6, PLA2G4B, RP4-635E18.7, and RP11-321N4.5.

**Discussion**

Gene expression profiles were determined in order to identify genes and associated pathways differentially regulated upon FANCD2 knockdown. Five genes were determined as very significant in terms of downregulation in response to FANCD2 knockdown. These genes include: AC011558.5, RP11-350N15.6, PLA2G4B, RP4-635E18.7, and RP11-321N4.5.

The Phospholipase A2, group IVB (PLA2G4B) gene was downregulated with FANCD2 knockdown and exhibited a -316608.70 change in the A549 cell line. Fusion of PLA2G4B with JMJD7 has been reported in head and neck squamous cell cancer (HNSCC)6. This read-through fusion gene modulates phosphorylation of Protein Kinase B (AKT) to promote HNSCC tumor survival8. This suggests the oncogenic function of PLA2G4B, as ablation of this fusion gene inhibited proliferation of cancer cells by promoting G1 cell cycle arrest and increased starvation-induced cell death compared to JMJD7 only knockdown HNSCC cells9. Additionally, basal expression of this gene was higher in breast cancer cells HCC1143, further supporting the oncogenic function of this lipolytic gene10.

RP4-635E18.7 is a long noncoding RNA (lncRNA) that is associated with glioblastoma multiforme (GBM)8. A study conducted by Lai, et al analyzed IncRNA expression profiles in GBM and found that this gene was involved in cell cell signaling, and was related to the mitogen-activated protein kinase signalling pathway13. This gene served as a biomarker for the prognosis of GBM, providing a more accurate prediction of survival, and suggesting oncogenic function of this gene10.

Five significantly upregulated genes in response to FANCD2 knockdown include RNA5S16, RP11-801F7.1, RP11-29893.5, RP11-360L7.7, AC114546.1. These findings do not correlate with our hypothesis, as we postulated that knockdown of FANCD2 was associated with upregulation of genes promoting cell cycle arrest. The upregulated genes may be related to cell cycle arrest; however, there is no current literature reporting this function. RNA5S16 and AC114546.1 genes did not have literature supporting gene function.

Five variants of RP11 were identified with at least a five-fold change gene expression. Two RP11 variants were downregulated, and three variants were upregulated. RP11, also identified as pre-mRNA processing factor 31 homolog (PRPF31), was found to be associated with risk of invasive disease in a study assessing gene correlation with ovarian cancer risk13. The PRPF31 gene is known to encode the ubiquitous splicing factor PRPF3113. Another study by Rose et al in 2012 found that one functional polymorphism was identified in the PRPF31 promoter that increased transcriptional activation14. RP11-350N15.6 and RP11-321N4.5, exhibited significant downregulation in the A549 cell line, which...
is consistent with our hypothesis of gene downregulation with FANCD2 knockdown. Conversely, RP1-110F7.1, RP1-160L3.7, and RP1-19803.5 genes resulted in a significant upregulation in the A549 cell line, suggesting that different isoforms of RP11 are influenced by different regulatory mechanisms with FANCD2 knockdown.

Genes related to cell proliferation are expected to be downregulated with FANCD2 knockdown, as FANCD2 is considered to promote cell growth through interactions with cell proliferation pathways such as PI3K-AKT-mTOR pathway. Inhibited oncogenic function due to the FA pathway knockdown is expected to reduce cell proliferation. However, the literature suggests that the 3 upregulated genes also have oncogenic function. These genes may have other functions beyond the scope of carcinogenesis, which may explain gene upregulation with FANCD2 knockdown.

Evaluation of genes in FA deficient tumors was assessed by FANCD2 knockdown and evaluating concurrent gene expression changes. Identifying genes with significant expression change in FA deficient tumors, such as PLA2G4B and RP1-350N15.6, can direct the genetic-based therapy for treatment of NSCLC with alterations in the FA repair pathway. Genes such as RP4-636E18.7 and PLA2G4B were found in other cancers, further supporting the role of gene regulation in tumorigenesis for these specific genes. Given that these genes expressed significant change in regulation in lung cancer cells with FANCD2 knockdown, it may be valuable to further investigate the role of these genes in normal and malignant cells. FA homologous repair deficiency may prove to be a target of cancer treatment, as long as appropriate biomarkers become available to identify patients with these tumors.

Our results provide a strong starting point for the development of treatments targeting genes associated with the FA pathway and the understanding of the mechanism of action of the repair pathways in lung cancer cells. Identification of FA downstream genes may provide insight on DNA repair networks which alter or compensate for defective FA repair pathways and consequently affect tumor growth. It is possible that the microRNA associated with these genes were upregulated upon FANCD2 knockdown, causing increased degradation of mRNA for the genes listed in Table 1 and 2. Further investigation is needed to determine how FANCD2 interacts with these genes to promote cell proliferation.

References


Clinical Perspectives on Using a Standardized Hand-off Protocol to Reduce Medical Error

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Abstract

Introduction: Various forms of medical error exist: misdiagnosis, miscommunication, and malpractice. A standardized handoff checklist is a common medical error reduction initiative designed to improve transfer of medical information in a clinical setting. Few studies exist regarding clinicians’ perspectives around such initiatives. This study examines clinicians’ perspectives on medical error reduction initiatives, adds to the limited literature, and seeks to answer the question: “What are clinicians’ views toward a standardized checklist used as an approach to reducing miscommunication-related medical error in an in-patient setting?”

Methods: This is a qualitative pilot study of the implementation of a standardized handoff checklist conducted at a large academic hospital between April and May 2017. Clinician interviews were conducted using a standardized, semi-structured guide, recorded, and transcribed for analyses using a comprehensive, iterative coding process. Major themes were identified.

Results: Definitions of medical error amongst the interviewed were diverse. Most appreciated the standardization and structure the checklist provided, found the introduction aspect to the checklist helpful for team dynamic, and had an overall positive view on medical error reduction initiatives.

Conclusions: Clinicians’ views on defining medical error and appreciation for standardization are important to consider when constructing and implementing new medical error reduction initiatives. Healthcare institutions should consider studying clinical perspectives and implementing medical error reduction initiatives aligning with clinician preferences in order to prevent medical error.

Keywords: Medical Error Reduction, Patient Hand-Off, Checklist

Introduction

The ambiguity of defining and identifying medical error systematically, the subjectivity of clinical decisions from provider to provider, and the complexity of healthcare delivery, adds to the current persistency of medical errors within healthcare systems across the United States. It has been well established over the years that medical error is an unintended act (either of omission or commission) or one that does not achieve its intended outcome. Other generally accepted definitions of medical error include “the failure of a planned action to be completed as intended (an error of execution), the use of a wrong plan to achieve an aim (an error of planning), or a deviation from the process of care that may or may not cause harm to the patient.” Within the literature, the definitions of medical error, underlying the need for a universally accepted definition to categorize mistakes and standardize improvement initiatives.

In recognizing the diversity of medical error, its definition should encompass both the outcome-dependent and process-dependent aspects of medical care. The outcome-dependent aspect refers to the occurrence of adverse outcomes and injuries such as malpractice (i.e. amputating the wrong leg or negligence (i.e. giving the wrong dosage of a medication that results in prolonged hospitalization). On the other hand, the process-dependent aspect of medical care refers to “near-misses.” “Near-misses” are systems failure that cause error by exposing patients to risk, but that do not result in harm (i.e. giving a patient in a shared room the other patient’s medications, but the patient realizing the mistake and informing the nurse). A common factor within these two categories of medical error is miscommunication.

Miscommunication is a complex, yet important factor in regard to medical error occurrence. The hand-off of patients between departments is a crucial point where miscommunication-related medical errors occur. Therefore, a group of physicians at Boston Children’s Hospital developed a hand-off curriculum for pediatric residents between June 2010 and February 2014 as a component to the Inpatient Settings Accelerating Safe Sign-outs (PASS) Study. Elements of the disseminated handoff process that is a part of the curriculum follows the same mnemonic: ‘I’ for illness severity, ‘P’ for patient summary, ‘A’ for action items, ‘S’ for situation awareness and contingency planning, and ‘B’ for synthesis by receiver. A prospective intervention study of the hand-off program during 10,740 patient admissions demonstrated an association between the implementation of the i-PASS hand-off and significant reductions in medical error. In regards to the rates of medical error and its persistence over the years, the most cited estimate of the incident rate of death from medical error, suggesting 44,000 to 98,000 deaths per annum, is the
Few studies have sought to examine clinicians’ perspectives on such United States. These findings paper hopes to shed light on how actors at the frontline of healthcare standardized the hand-off of patients from one in-patient department at an academic medical center in New England that systems at an academic medical center in 2016. Along with more recent Makary et al. used studies since the IOM report and extrapolated to the total number of hospital admissions in 2013 to calculate an average rate of death from medical error; they estimated an annual incidence rate of 251,464 deaths from medical error. When compared to CDC rankings, this estimate suggests medical error is the third leading cause of death as well. Systematic patient safety initiatives are often preventative in nature and seek to reduce medical error rates. They are often referred to as “medical error reduction initiatives.” Some examples include hospital root-cause analysis committees, departmental morbidity and mortality conferences, and standardized hand-off of patients and information. An in-patient department of a large academic medical center in New England recently implemented a medical error reduction initiative by standardizing the patient hand-off between the department and another in-patient department within the hospital in 2016. Along with incorporating all of the I-PASS elements (detailed in Figure 1), the new standardized hand-off is a checklist that also requires introductions of all care team members (Figure 1). The checklist is used primarily by the physicians and the residents but contains tasks and responsibilities for other care team members present during the handoff as well. This study seeks to further explore the complexity of miscommunication in healthcare delivery and its relationship to medical error in healthcare systems at an academic medical center in New England that standardized the hand-off of patients from one in-patient department to another. By understanding clinical perspectives around the medical error reduction initiative that was implemented within this hospital, this paper hopes to shed light on how actors at the forefront of healthcare delivery view medical reduction initiatives that are intended to instill greater patient safety and positively change practice. These findings may potentially be extrapolated to other healthcare systems in the United States.

Few studies have sought to examine clinicians’ perspectives on such initiatives, and this study seeks to add to the limited literature. Attention needs to be directed towards understanding clinicians’ perspectives around medical error reduction initiatives in order to improve upon the ways of reducing medical error. This study seeks to answer the question: “What are clinicians’ views towards a standardized hand-off checklist protocol as an approach to reducing miscommunication-related medical error in an in-patient setting?”

Methods

The qualitative method of grounded theory was used to accomplish the research goal. Grounded theory is useful when relevant existing framework exists, and important themes emerge upon the analysis of collected data on participants’ own experiences. Semi-structured individual telephone and in-person interviews were used as the method of collecting data because it encourages open commentary and allows for the in-depth exploration of individual experiences. The experience of using a hand-off protocol such as a standardized hand-off protocol revealed the opportunity to delve deeper into specific aspects of people’s views and thoughts on the hand-off protocol. Because different levels of participants (attending physicians, residents, and other clinical staff such as nurses and physician assistants) interact in a hierarchical manner which may lead to sensitivities and unique perspectives in regards to the new hand-off protocol, interviews were conducted on an individual basis.

All clinicians who had experience of both the old and new hand-offs within an in-patient department at an academic medical center in New England were invited to participate via e-mail by the convenience sampling method in April 2017. Those that did not respond received a follow-up e-mail 20 days later. Participation was voluntary. The study was approved by the Dartmouth Committee for the Protection of Human Subjects. Within an in-patient department of a non-profit academic medical center in New England, 60% of the clinicians were recruited to participate in this study. The clinicians included physicians, physician assistants, and nurse providers. During May 2017, phone interviews were conducted with physicians and other clinicians within the in-patient department. All participants received and acknowledged an information sheet for the study prior to the phone call that served as the consent form. Each interview lasted approximately 20 minutes and was audio-recorded. Each interview was conducted using a scripted, semi-structured interview guide and followed-up with probes as necessary. Interview guide can be provided upon request.

The interview guide was drafted, piloted on non-participants, and refined on the basis of their comments. All but one of the audio-recordings were transcribed verbatim using Transkriptor™, a secure online audio transcription software, and were de-identified before analysis. One audio-recording was not transcribed verbatim due to a lack of recording clarity; however, notes were taken while listening to the recording. These notes were then coded using the same coding structure as the rest of the transcribed data. The total number of participants (9) whose comments were coded under respective themes are only provided if the count is ten or more. This approach was used to maintain participant confidentiality. Consistent with the grounded theory methodology, analysis started simultaneously with data collection to establish that the interviews were capturing intended collected data and to consider potential new topics to include in subsequent interviews. Transcripts were read dually and semi-structured process a group of researchers met to compare and discuss emerging themes. The coding structure was refined over two weeks until no further codes or categories emerged from the collected data, the coding structure seemed stable, and the group of advisors agreed upon the coding structure. Upon reaching consensus of the coding structure, theoretical saturation was reached. All interviews were coded with the coding structure and the coded data were analyzed to elicit themes surrounding medical error, the old handoff method, and the new standardized checklist. Major themes as they emerged from the coding process were the term “positive code” refers to coding that suggested dislike or disapproval of a topic and the term “positive code” refers to coding that suggested liking, appreciation or approval of a topic. Overall, negative codes were used to describe the old handoff and positive codes were used to describe the new standardized checklist. The only concern mentioned about the change in the handoff was that the other department felt that the new standardized checklist might take too much time; this concern was only cited by physicians. All of the physicians also mentioned that the change in the handoff instilled a culture of improvement within the department.

Participants defined medical error as harming the patient and a systematic failure. Medical error was also described as having an unplanned element and being related to care. The complexity of healthcare and the fact that mistakes are inevitable were also cited during participants’ discussions of medical error. Participants felt that they were not receiving enough information and often received contradictory information from the other department. A lack of structure, format, and standardization was also attributed to the old handoff method. Clinicians also mentioned the issues of not knowing people and criticism of the old handoff method. In terms of the new standardized hand-off checklist, all participants cited greater structure and standardization. All of the participants also appreciated the introduction aspect to the checklist. Many participants felt they knew who was in the room and what each person did. They also felt that colleagues were better able to record and paying more attention during the handoff. It is interesting to note that only one participant mentioned a negative code when describing the new handoff. Although appreciative of the introduction’s purpose, a participant found the introduction piece of the new checklist to be somewhat artificial in nature. It could be possible that other participants might have felt similarly but may not have felt comfortable opening up about negative aspects to the new checklist. Other clinicians that were not interviewed within the two in-patient departments could also have had a handoff checklist similar to the new one, and if this was the case, the new checklist would take considerably longer after hearing about the process from others. However, they also mentioned the standardized checklist instilled a culture of quality improvement in the department and was worth the marginal increase in time.
Since this was a small pilot study, there were significant limitations in study sampling and logistics. Logistical limitations included a 1-month period of data sampling and collecting interview data remotely. In regard to the study sample, there were four main limitations. First, a convenience sampling method was used because it was the quickest and easiest way to recruit participants. This is not the most ideal form of sampling and introduces sampling bias; therefore, the results of this study may not be generalized to the rest of the population. In addition, the sample size was small. In order to maintain confidentiality, counts were not provided and an in-depth comparison across different provider roles was not done; only a surface level comparison and analysis of role differences was done. It should also be noted that only one of the two in-patient departments (the receiving department) involved with the new hand-off checklist, and the other in-patient departments should have been interviewed. Lastly, since the nature of clinicians’ daily schedules is generally busy and hectic, recruiting participants was difficult, leading to scheduling difficulties and a small sample size.

Future studies should use a larger sample size—this would allow for a comparison of perspectives of different types of providers and a more robust analysis in terms of numbers and statistics. Future studies should also look at both departments involved in a hand-off initiative such as the one studied; participants should be from both the department giving the information and the department receiving the information in order to get a more accurate representation of how clinicians feel towards a particular handoff initiative. Larger studies could compare clinicians’ perspectives from multiple departments on standardized hand-off checklists within the same hospital or between different hospitals. Future studies could also look at how clinicians view the “standardized checklist” initiative as compared to other hand-off medical error reduction initiatives specifically or other medical error reduction initiatives in general.

Clinicians within an in-patient department of an academic medical center in New England had a diversity of definitions for the term “medical error.” They also found a recently implemented standardized hand-off checklist to be a helpful and effective medical error reduction initiative. Since this pilot study was limited in scale, identified diversity in defining medical error, and elucidate a positive response from clinicians in regard to a new standardized handoff checklist, further research should be conducted on clinical perspectives on medical error definitions and reduction initiatives in order to better understand and support healthcare quality improvement projects. This study underlines the benefit of and appreciation for more standardized processes such as checklists; therefore, healthcare institutions should continue to implement such medical error reduction initiatives.

**References**

Abstract

Introduction: Medical Students Working to Improve Society and Health (MedSWISH) is a student run organization, whose goal is to provide health screenings, health education and referrals for long-term care to community members at health events in Miami-Dade County. The purpose of this paper is to describe the health event population that MedSWISH has seen thus far so that future services may be tailored to meet the community’s needs.

Method: A group of medical students from Florida International University, supervised by a licensed physician, attended 10 different health events in Miami-Dade County. The purpose of this paper is to describe the health event population that MedSWISH has seen thus far so that future services may be tailored to meet the community’s needs.

Results: Out of the 331 participants consented from the ten individual health events, 41.3% of them were obese, 38.1% fell within the hypertensive range and 13.0% fell within the diabetic range. There was a significant difference in the screening metrics between the individual health events.

Conclusion: This preliminary analysis provided valuable insight as to the characteristics of participants that attend MedSWISH health events. Though much more research is needed to fully understand the characteristics of the different populations, this research is integral in MedSWISH’s mission to improve and individualize the patient care. Long-term care is available through household visits and the Mobile Health Center a mobile clinic that provides patients with free medical care by FIU HWCOM health professionals.

In order to better cater to the medical and educational needs of the local community, MedSWISH has begun an Institutional Review Board (IRB) approved research project to assess the population served at its health events. The purpose of this paper is to describe the population that MedSWISH has served over the last year. By evaluating the demographics and health metrics of the local community, MedSWISH has begun an Institutional Review Board (IRB) approved research project to assess the population served at its health events.
Dade County. The events were organized by roman numerals I - X, in the order in which they were attended in 2018. The descriptive analysis of the participants’ data was assessed using SPSS version 23. Frequencies and central tendencies of the participants data were compared to that of the average population in Miami-Dade County quick facts, population estimates as of July 1st, 2017. Data was taken from Miami Matter’s project from the Health Council of South Florida.

Table 1: Description of MedSWISH Health Events. Abbreviations: PCP, primary care physician; BMI, Body mass index. Superscript: a: anyone with systolic Blood Pressure ≥140 or Diastolic Blood Pressure ≥90. b: Anyone with a fasting blood sugar ≥126 or a non-fasting blood sugar ≥200. c: only patients younger than 65 years old. *, Data was taken from the US census bureau, Miami-Dade County quick facts, population estimates as of July 1st, 2017. Data was taken from Miami Matter’s project from the Health Council of South Florida.

Table 2: Description of Miami-Dade Population. Abbreviations: PCP, primary care physician; BMI, Body mass index; N/A, Not Available. Superscript: a: anyone with systolic Blood Pressure ≥140 or Diastolic Blood Pressure ≥90. b: Anyone with a fasting blood sugar ≥126 or a non-fasting blood sugar ≥200. c: only patients younger than 65 years old. *, Data was taken from the US census bureau, Miami-Dade County quick facts, population estimates as of July 1st, 2017. Data was taken from Miami Matter’s project from the Health Council of South Florida.

For each metric collected, there was a significant difference in the results between individual events (Table 3). There was a lower percentage of female participants in events II and VI compared to the other fairs (P = 0.016). The percent of uninsured participants was 28.3%. The highest prevalence of insurance was in event I, II, III and V (P = 0.07). The percentage of people who lacked a PCP was 27.3%. A higher percentage of participants had access to a PCP in events I, II and III compared to the other health events (P = 0.012). The average BMI of the total sample was 29.4 (SD = 6). Event V had the lowest rate of obesity compared to event I, IV, IX and X (P = 0.007). Event I, III, IV, IX and X had the highest percentage of participants in the hypertensive range (P=0.003). Finally, 13.0% of the sample’s blood sugar readings fell within the diabetic range. Event X had the highest prevalence of participants with a blood sugar reading in the diabetic range. On the other hand, health events II, V, VI and VIII had the lowest prevalence of participants with a blood glucose reading in the diabetic range (P = 0.009).

Discussion

This study aimed to describe the different health fair participants who received health screenings by health event. The goal of this range was defined as any individual with a one-time fasting blood sugar level greater than or equal to 126 mg/dL or a non-fasting blood sugar greater than or equal to 200 mg/dL. Results

The dataset comprises 331 participants from 10 health events in Miami-Dade County. Demographic characteristics of the data reveal that 25% of the sample was aged 65 years or older. As for gender, it showed that 69% of the sample was female. When measuring the rate of insurance, 28.3% of the sample reported not having had insurance at the time of the screening. As for the health screening results, 41.3% of the sample was obese. Furthermore, 38.1% of the participants that fell within the hypertensive range while 13.0% of the participants fell within the diabetic range (Table 1).

To help put this data in perspective, according to the United State Census bureau’s 2017 Population Estimate Program, in Miami-Dade County, 16.0% of the population was aged 65 years or older, while 51.4% of the county was female (Table 2). According to the Census bureau’s 2016 Small Area Health Insurance Estimates, 19.4% of the population under the age of 65 was uninsured. According to Miami Matters, an interactive information platform initiated by the Health Council of South Florida, as of 2016, 25.3% of the population of Miami-Dade County is obese. In addition, 32.7% of the population has been diagnosed with hypertension while 9.2% has been diagnosed with diabetes.

For each metric collected, there was a significant difference in the results between individual events (Table 3). There was a lower percentage of female participants in events II and VI compared to the other fairs (P = 0.016). The percent of uninsured participants was 28.3%. The highest prevalence of insurance was in event I, II, III and V (P = 0.07). The percentage of people who lacked a PCP was 27.3%. A higher percentage of participants had access to a PCP in events I, II and III compared to the other health events (P = 0.012). The average BMI of the total sample was 29.4 (SD = 6). Event V had the lowest rate of obesity compared to event I, IV, IX and X (P = 0.007). Event I, III, IV, IX and X had the highest percentage of participants in the hypertensive range (P=0.003). Finally, 13.0% of the sample’s blood sugar readings fell within the diabetic range. Event X had the highest prevalence of participants with a blood sugar reading in the diabetic range. On the other hand, health events II, V, VI and VIII had the lowest prevalence of participants with a blood glucose reading in the diabetic range (P = 0.009).
participants to worsened health outcomes and a potential increased utilization of emergency services as mode of primary care. An increased focus by MedSWISH on ways to increase access to care is warranted.

This data though preliminary, has brought valuable insight as to the population that attended different health events in which MedSWISH was present. Based on this analysis, MedSWISH will plan to take the services provided at different health events, to improve its ability to meet the anticipated needs of the respective communities. For example, the data collected from event II reveals an elevated prevalence of participants in the obese, as well as the hypertensive range. Interestingly however, none of the participants screened for this same event had a blood sugar reading that fell within the diabetic range. These important differences provide MedSWISH the opportunity to focus on interventions for blood pressure and obesity in the future. Interventions may include more frequent education on evidence based dieting programs such as the DASH diet, presentations on ways to lead a more active lifestyle, informational sessions on the risks associated with obesity and hypertension, and information on local pharmacies with discounted prices for blood pressure medications.

This study has several limitations. First, many participants, though diagnosed with hypertension or diabetes, had their metrics well controlled with medication. This, compounded by the fact that only one time point was taken per participant, limited the study’s ability to capture the prevalence of hypertension and diabetes in the study population. Second, ethnicity data in three health events were not collected, which might have skewed the population average for these important traits. Third, data on the participant’s race and ethnicity was not collected separately, which could have clouded this study’s ability to better characterize the population seen. Finally, the only patient health information (PHI) collected was zip code, making it impossible to ascertain whether any of the data points belonged to the same participant.

Conclusion

This study is an interim analysis, characterizing the health metrics of the populations screened at MedSWISH health events between January and October 2018. The results of this study will be used to guide the services that the organization provides at future health events. Event volunteers will be advised on the specific commodities present at each event and will be provided with community specific resources to help them better individualize their care and education to each participant. MedSWISH plans to expand this study to include a larger number of participants and health events. MedSWISH will also begin to collect additional variables, including race, smoking history, personal history of diabetes as well as hypertension, and information on the referrals made. These additional variables will increase MedSWISH’s ability to study the impact that the organization may have on the event participants’ awareness and access to, the ultimate goal of improving participant awareness of chronic diseases and improving participant health outcomes.

References

Introdução: Community acquired pneumonia (CAP) is a common cause of hospital admission for pediatric patients. Evidence of racial disparities were reported for the diagnosis and management of CAP in pediatric patients in the Emergency Department (ED). We investigated whether Hispanic/Latino pediatric patients presenting to the ED throughout the United States with a differential of pneumonia received different quality of care when compared to non-Hispanic/Latino patients.

Métodos: Secondary data analyses were conducted using the National Hospital Ambulatory Medical Care Surveys from 2009 to 2014. Pediatric (ages 1-17) ED visits including “pneumonia” in the differential were analyzed using ICD-9 codes 480 through 487. The outcome was receiving a Chest X-Ray (CXR), and the independent variable was ethnicity (being Hispanic or Latino vs. non-Hispanic and non-Latino). Multivariate logistic regression was used to assess independent associations of ethnicity with performance of a CXR.

Conclusions: We fail to find evidence for disparities in the use of CXR for diagnosis of pneumonia for Hispanic/Latino patients presenting to the ED with symptoms of pneumonia. However, power limitations might have contributed to these results. Further research is warranted.

Keywords: pneumonia, disparity, emergency, CXR, chest X-ray, pediatrics

Diagnosis and management of pediatric CAP in the Emergency Department (ED) presents multiple challenges, including the efficient, cost-effective use of diagnostic tests, and selecting the appropriate treatment. Due to these challenges, the World Health Organization (WHO), British Thoracic Society (BTS) and other health organizations have developed guidelines to help healthcare providers to provide appropriate care to pediatric patients presenting with pneumonia-like symptoms. Particularly, diagnosis and management of CAP in pediatric patients who present to outpatient settings such as the Emergency Department (ED) presents unique challenges, including the efficient and cost-effective use of diagnostic tests and treatment for the appropriate causal pathogen.

In the developed world, chest X-rays (CXR) are considered the standard diagnostic test for pneumonia in adult patients. However, the use of CXR for diagnosing pneumonia in children tends to be more conservative to reduce the lifetime exposure of children to radiation. Diagnosis depends on clinical presentation and physical examination. In the past decade, the WHO and other health organizations have developed guidelines to aid doctors in making the right decisions in choosing diagnostic tests and treatment options. Some of these guidelines are targeted for pediatric patients with pneumonia symptoms in both inpatient and outpatient settings.¹ However, disparities in the utilization of these guidelines were reported among different ethnic groups.² Recent studies have shown that there are disparities in the effective healthcare received by ethnic populations, such as blacks and Hispanics, leading to economically inefficient healthcare.³

Assuming that adherence to established guidelines is considered a marker of adequate quality of care, we aimed to identify whether health care disparities existed among Hispanic/Latino and non-Hispanic/non-Latino pediatric patients when providing care for lower respiratory infections, particularly CAP. Being able to understand and identify potential racial and ethnic disparities could lead to the effective healthcare received by these patient groups.
help in the design of policies to decrease healthcare disparities and improve childhood health.

Methods

Design

We performed a secondary analysis of data from participants of the National Hospital Ambulatory Medical Care Survey (NHAMCS) from 2009 to 2015. The NHAMCS survey collects data on ambulatory care services in hospital emergency and outpatient departments, and in ambulatory surgery centers annually since 1992. Trained interviewers visited every location prior to participation to describe survey procedures and obtain eligibility. Each location was randomly assigned to a 4-week reporting period.

Sample Selection

The target population was all patients less than 18 years old that presented to the emergency department with suspicion of pneumonia. We made an assumption that neonates or premature infants would present less often to the emergency room, and instead may remain in the hospital from birth; additionally, the sample size of this subgroup was likely to be small. As such, we did not deem it necessary to exclude patients less than 1 month of age. To identify patients that presented with suspicion of pneumonia, we looked for pneumonia-based ICD-9 codes 480 through 487.

Due to the high-likelihood of having a CXR secondary to a previous diagnosis that predisposes to cardiopulmonary pathology, children with a medical history of cancer, congestive heart failure, and HIV/AIDS were excluded from this study. The data available from before 2012 did not include diagnosis of cancer and thus data collected before 2012 may or may not have included children with a previous diagnosis of cancer. These might have affected our results if any specific group had a higher number of patients with the diagnosis.

Variables

To determine differences in quality care by ethnicity, our independent variable was the patients’ ethnicity (Hispanic/Latino and Non-Hispanic/Latino) as self-reported. Our dependent variable was whether or not patients received a chest X-ray during the same visits. Hispanic/Latino patients were slightly less likely to receive chest X-rays (80.8%) when compared to their Non-Hispanic/Latino counterparts (84.1%); however, this was not statistically significant. Age was the only baseline feature that showed a significant association with the use of X-rays, with younger patients having CXR less often than older children.

Results

Over the 6-year window of 2009 through 2015, 587 pediatric patients met the criteria of this study. Table 1 presents the characteristics of the sample. Hispanic/Latino patients predominantly identified as White (95.4%) were more likely to be located in the South (38.4%) and Western (38.4%) regions of the United States. They were also significantly more likely to have government insurance (80.6%) as opposed to private insurance when compared to their Non-Hispanic/Latino counterparts.

Table 2 shows the characteristics of subjects as it pertains to usage of chest X-rays during the same visits. Hispanic/Latino patients were slightly less likely to receive chest X-rays (80.8%) when compared to their Non-Hispanic/Latino counterparts (84.1%); however, this was not statistically significant. Age was the only baseline feature that showed a significant association with the use of X-rays, with younger patients having CXR less often than older children.

Table 1. Characteristics of pediatric patients presenting to the emergency department by ethnicity, NHAMCS 2009-2014.

Table 2. Characteristics of subjects as it pertains to usage of chest X-rays during the same visits.
### Table 2

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<td>Other</td>
<td>9 (72.2)</td>
<td>2 (27.8)</td>
<td></td>
</tr>
<tr>
<td>No Insurance</td>
<td>32 (81.8)</td>
<td>4 (18.2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Characteristics of pediatric patients presenting to the emergency department by use of chest X-Ray, NHAMCS 2009-2014.

### Table 3

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Unadjusted</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>0.8 (0.3-1.9)</td>
<td>0.500 (0.3-2.5)</td>
</tr>
<tr>
<td>Non-Hispanic/Latino</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>0.4 (0.3-0.6)</td>
<td>0.003 (0.2-0.6)</td>
</tr>
<tr>
<td>1 to 4</td>
<td>0.3 (0.1-0.8)</td>
<td>0.2 (0.1-0.8)</td>
</tr>
<tr>
<td>5 to 17</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Female</td>
<td>1.1 (0.7-1.8)</td>
<td>0.581</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Black or African American</td>
<td>1.5 (0.8-3.1)</td>
<td>0.233 (0.4-3.1)</td>
</tr>
<tr>
<td>Other</td>
<td>3.1 (0.8-11.7)</td>
<td>0.079</td>
</tr>
<tr>
<td><strong>Location</strong></td>
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<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Midwest</td>
<td>1.5 (0.7-3.3)</td>
<td>0.251 (0.4-3.3)</td>
</tr>
<tr>
<td>South</td>
<td>2.2 (1.0-4.9)</td>
<td>0.109 (0.4-2.9)</td>
</tr>
<tr>
<td>West</td>
<td>1.4 (0.5-3.7)</td>
<td>0.470 (0.2-2.4)</td>
</tr>
<tr>
<td><strong>Insurance Type</strong></td>
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<td></td>
</tr>
<tr>
<td>Private</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Government</td>
<td>1.2 (0.6-2.2)</td>
<td>0.599 (0.6-2.2)</td>
</tr>
<tr>
<td>Other</td>
<td>0.6 (0.1-2.6)</td>
<td>0.612 (0.1-2.6)</td>
</tr>
<tr>
<td>No Insurance</td>
<td>1.0 (0.3-3.8)</td>
<td>0.895 (0.3-3.8)</td>
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<tr>
<td><strong>Visit Day</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekday (Mon-Fri)</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Weekend (Sat-Sun)</td>
<td>1.5 (0.8-2.7)</td>
<td>0.140</td>
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<tr>
<td><strong>Arrival Time</strong></td>
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<td></td>
</tr>
<tr>
<td>Day</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Night</td>
<td>0.7 (0.4-1.3)</td>
<td>0.303</td>
</tr>
<tr>
<td><strong>Triage Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1.1 (0.5-2.1)</td>
<td>0.722</td>
</tr>
<tr>
<td>Non-severe</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>1.1 (0.5-2.0)</td>
<td>0.754</td>
</tr>
<tr>
<td>No Fever</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td><strong>Oxygen Sat</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;93%</td>
<td>1.4 (0.4-4.0)</td>
<td>0.530</td>
</tr>
<tr>
<td>≥93%</td>
<td>ref</td>
<td>ref</td>
</tr>
</tbody>
</table>

Table 3. Unadjusted and adjusted associations between ethnicity and use of chest X-Ray in pediatric patients presenting to the emergency department, NHAMCS 2009-2014.
One hundred-twenty eight patients in the study did not have the use of X-rays. Location, and insurance type did not yield significant differences on chest X-rays (adjusted OR 0.3; 95% CI 0.1 to 0.6). Gender, race, and those excluded from the study (no ethnicity data) remained unchanged (adjusted OR 0.8, 95% CI 0.3- 2.5). Before adjusting for potential confounders, we found an unadjusted odds ratio of 0.8 (95% CI 0.3-1.9) for Hispanic/Latino patients receiving chest X-rays. After adjusting for variables, the odds ratio remained unchanged (adjusted OR 0.8, 95% CI 0.3- 2.9) (Table 3). Younger patients (<1 year old) were again less likely to receive chest X-rays (adjusted OR 0.3; 95% CI 0.1 to 0.6). Gender, race, location, and insurance type did not yield significant differences on the use of X-rays.

One hundred-twenty eight patients in the study did not have information for ethnicity, the main exposure in our study. Sensitivity analysis based on an expanded inclusion criteria showed that unadjusted and adjusted odds ratios for the association between ethnicity and use of X-rays did not change significantly whether or not these patients were included in the analysis (Table 4). There were no significant differences in major baseline characteristics (Table 5) such as age, race, or insurance type between patients with and without information about ethnicity.


definitions of care that found health care disparities in pediatric ED patients presenting with pain, asthma, or other conditions. Moreover, Hambrook found that in pediatric patients presenting with chest pain, Caucasians and those with private insurance were more likely to undergo testing compared to African Americans or those with public insurance (Medicaid). Additionally, Jones et al. studied asthma pediatric patients in the ED and found that African Americans and Hispanics were 80 and 70% more likely to have used urgent care, respectfully, compared to their Caucasian counterparts. Factors contributing to seeking urgent care include trouble getting care before the ED, symptom severity, and Medicaid enrollment. Guidelines are presented on the management of CAP in children 3 months and older. Specifically, decisions on CXRs are based on signs of respiratory distress, including tachypnea, dyspnea, retractions, grunting, nasal flaring, apnea, altered mental status, and pulse oximetry on room air. These guidelines are intended to make healthcare decisions non-biased, however, ordering CXRs or further tests are the decision of the healthcare provider and can be subjective. Although our study did not find an association between ethnicity and disparities in the pediatric population, Washington et al. found variations in patterns of care among different US ethnic/racial pediatric patients with pneumonia. For example, minorities (African Americans, Hispanics, and Asians) were less likely to receive bronchoscopy or mechanical ventilation, as well as incurred higher charges during their stay in the hospital.

We further decided to investigate our inclusion criteria. We included patients based on differential diagnosis of pneumonia via ICD-9 codes. Other may have had CXRs ordered based on presenting symptoms even if pneumonia diagnosis was not provided, which may have narrowed the subset of our intended population. When we conducted an additional analysis to consider a presenting symptom of “cough” as the inclusion criteria, our results differed in terms of sample size and significance, while the odds ratio stayed the same. This suggests that an association may exist, yet we did not have enough power in the initial analysis to verify it. A possible limitation in our study design is the adjustment for triage level to classify severity of pneumonia symptoms. It is possible the triage staff had racial or ethnicity-related bias. A study of 78 million adult ED visits using NHAMCS found that Caucasians with chest pain were more likely to be triaged emergently than African Americans and Hispanics. If Caucasian patients in our study were inappropriately assigned more urgent triage scores, our study results could underestimate the association between ethnicity and quality of care of pediatric pneumonia.

Another limitation of our study is the inability to explore English proficiency as a potential confounder. Language preference was not included in the NHAMCS surveys used, which may underestimate the association between ethnicity and quality of care. Finally, some hospitals may rely on self-reporting of race and ethnicity. Staff may assume a child or family is non-Hispanic if they are fluent English speakers. Inconsistent staff assignment of race and ethnicity could subject the study to misclassification bias, which could lead to falsely finding a lack of association.

While this study did not find an association between ethnicity and the management of pneumonia in pediatric ED patients, studies of other health problems documented clinically significant disparities. Additional research is necessary to investigate the circumstances where disparities exist, with the goal of improving patient care in vulnerable populations.

Table 4. Association between ethnicity (Hispanic/Latino vs Non- Hispanic/Latino) and use of X-rays - Sensitivity analysis for patients with and without information about ethnicity and sensitivity analysis with expanded inclusion criteria

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Ethnicity Information – N (%)</th>
<th>p-value</th>
<th>adjusted ( OR ) (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>334 (63.9)</td>
<td>55 (73.7)</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>Black or African American</td>
<td>118 (29.5)</td>
<td>27 (26.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>42 (6.7)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Insurance Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>181 (27.1)</td>
<td>42 (33.5)</td>
<td>0.451</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>348 (65.7)</td>
<td>64 (58.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>8 (1.8)</td>
<td>3 (0.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Insurance</td>
<td>28 (5.5)</td>
<td>8 (7.2)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients</th>
<th>Unadjusted ( OR ) (95% CI)</th>
<th>p-value</th>
<th>adjusted ( OR ) (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only those with data on Ethnicity</td>
<td>0.8 (0.3-1.9)</td>
<td>0.600</td>
<td>0.9 (0.5-2.6)</td>
<td>0.857</td>
</tr>
<tr>
<td>Counting all missing as Hispanic/Latino</td>
<td>0.8 (0.4-1.6)</td>
<td>0.502</td>
<td>1.0 (0.4-2.7)</td>
<td>0.921</td>
</tr>
<tr>
<td>Counting all missing as Non-Hispanic/Latino</td>
<td>0.9 (0.4-2.0)</td>
<td>0.710</td>
<td>0.7(0.2-1.9)</td>
<td>0.455</td>
</tr>
</tbody>
</table>

1. Adjusted for race, age, region, severity and health insurance

Table 5: Characteristics of pediatric patients presenting to the emergency department who were included in the study (with ethnicity data) and those excluded from the study (no ethnicity data)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Yes</th>
<th>No</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-ray</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>482 (83.0)</td>
<td>104 (80.6)</td>
<td>0.718</td>
</tr>
<tr>
<td>No</td>
<td>105 (17.0)</td>
<td>24 (19.4)</td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>113 (19.4)</td>
<td>15 (14.3)</td>
<td>0.707</td>
</tr>
<tr>
<td>1 to 4</td>
<td>285 (50.5)</td>
<td>74 (55.9)</td>
<td></td>
</tr>
<tr>
<td>5 to 17</td>
<td>189 (30.1)</td>
<td>39 (29.8)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>334 (63.9)</td>
<td>55 (73.7)</td>
<td>0.158</td>
</tr>
<tr>
<td>Black or African American</td>
<td>118 (29.5)</td>
<td>27 (26.3)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>42 (6.7)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Insurance Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>181 (27.1)</td>
<td>42 (33.5)</td>
<td>0.540</td>
</tr>
<tr>
<td>Government</td>
<td>348 (65.7)</td>
<td>64 (58.5)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>8 (1.8)</td>
<td>3 (0.8)</td>
<td></td>
</tr>
<tr>
<td>No Insurance</td>
<td>28 (5.5)</td>
<td>8 (7.2)</td>
<td></td>
</tr>
</tbody>
</table>

References
8. Johnson TJ, Weaver MD, Borrero S, Davis EM, Myaskovsky

A case report of dizygotic twin pregnancy concordant for non-syndromic cleft lip and palate with differing severity

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Special Acknowledgements: Joseph Burns

Abstract

Introduction: Oral clefts are among the most common congenital malformations in the United States. The literature regarding oral clefts in twin gestations is limited. Concordance rates for cleft lip and palate in monozygotic and dizygotic twins have been reported in the literature, demonstrating 50% vs 8%, respectively. In this report, we present the case of a diamniotic, dichorionic twin gestation of male fetuses identified by ultrasound to have cleft lip (Baby A) and cleft lip and palate (Baby B).

Objective: To describe a unique case, in the absence of risk factors, of diamniotic, dichorionic twins concordant for non-syndromic CL and CLP of differing severity.

Conclusion: With a multifactorial inheritance pattern, the etiology of this non-syndromic malformation may be due to unidentified genetic causes or environmental causes affecting the shared intrauterine environment of twin gestations. There is no increased risk of oral cleft associated for twins when compared to singletons. As in this case, early detection of this congenital malformation enables providers to adequately organize appropriate and specialized care for the duration of the gestation and for future surgical correction.

Key Words: oral clefts; cleft lip; palate; di-di twins; intrauterine diagnosis

Introduction

Non-syndromic orofacial clefts are among the most common congenital malformations. Orofacial clefts may be divided into three distinct phenotypes: cleft lip (CL), cleft palate (CP) and cleft lip with cleft palate (CLP).1 These birth defects arise due to failure of the normal fusion of facial structures during weeks 4-10 of embryologic development.2 According to the Centers for Disease Control, approximately 2,650 babies are born each year in the United States with a cleft palate and 4,440 babies are born with a cleft lip with or without a cleft palate.3 Prevalence depends on several factors including sex, maternal age, and race/ethnicity.1 Of those affected, males demonstrate a higher prevalence of CL and CLP when compared to females, who more commonly have isolated CP.4 Prevalence has also been shown to increase with maternal age ≥ 35 years.5 Furthermore, American Blacks demonstrate the lowest prevalence (10.2/10,000 live births) while American Indian and Alaskan Natives demonstrate the highest prevalence (20.5/10,000 live births).6 Diagnosis of this congenital defect can be made during pregnancy via routine ultrasound or upon delivery and inspection of the newborn. Those affected initially face difficulties with feeding and will ultimately require multiple corrective surgical procedures. Despite surgical correction, patients may continue to face clinical problems related to speech, hearing, and identity that require additional therapy.7,8 It is important to identify these congenital malformations as early as possible to provide the opportunity to plan surgical correction and identify a syndromic etiology if present. While the literature provides information regarding oral clefts, studies concerning the risk of oral clefts in twins are limited due to small sample sizes. The purpose of this article is to describe a unique case, in the absence of the aforementioned risk factors, of diamniotic, dichorionic twins concordant for non-syndromic cleft lip and palate with differing severity.

Case

A 33 year old gravida 3 para 1011 female with no significant past medical history presented for routine obstetric care of a twin gestation conceived through in vitro fertilization (IVF) with preimplantation genetic screening. Other genetic testing included a karyotype of the patient demonstrating a 46, XX female with no chromosomal abnormalities identified. IVF was considered for this pregnancy due to male factor infertility of the partner. Testing during the pregnancy included first and second trimester screening tests for aneuploidy and neural tube defects, all of which were negative. Routine anatomical survey performed at 19 weeks gestation demonstrated a diamniotic, dichorionic twin pregnancy with no significant discordance. A cleft lip was identified in both twin A and twin B. Twin A’s cleft appearing to extend into the palate. The remainder of the fetal anatomy ultrasound (US) identified no other anomalies. The patient’s history identified no risk factors such as family history of cleft lip, cleft palate, or other birth defects. Both partners denied history of tobacco, alcohol, or substance use.

Newborns were delivered via an uncomplicated cesarean section at 37 weeks gestational age. Upon inspection, Baby A was identified to have a unilateral cleft lip as noted in the ultrasound and seen in Figure 1A. Baby B was identified to have a bilateral cleft lip and palate as demonstrated in Figure 2A. Following initial inspection, the infants were assessed for ability to feed and resist without complications. After 6 months, both underwent surgical repair by the pediatric craniofacial surgical specialists that had been following them since the initial diagnosis. Both babies were discharged home with their parents and are happy and healthy infants.

Discussion

Orofacial clefts arise from failure of the normal fusion of facial structures during embryologic development.1 The basic morphologic architecture of the face is established between the fourth and tenth weeks of development by the joining of five facial prominences: frontonasal, maxillary, mandibular, and two lateral nasal prominences. During the fifth week of development, paired maxillary prominences enlarge and grow ventromedially.1,9 Simultaneously, a pair of nasal placodes form on the frontonasal prominence.1 During the sixth week, the ectoderm found at the center of each of the nasal placodes invaginates to form a nasal pit, dividing the frontonasal prominence into the lateral and medial nasal processes.1 During the sixth and seventh weeks of development, the lateral nasal processes fuse with the maxillary processes.1 They then merge with the medial nasal process, forming the upper lip and primary palate.1 Failure of the maxillary prominence to join with the medial nasal process results in a cleft lip.1 The secondary palate begins development during the seventh week when the palate shelves grow vertically along the tongue and later elevate to merge at the midline.1

Medications used during the pregnancy were limited to prenatal vitamins. Consultations with maternal fetal medicine (MFM), pediatric cardiology, and craniofacial surgical specialists were immediately organized. The MFM specialist recommended amniocentesis to further explore the possibility of fetal chromosomal abnormalities. The patient declined amniocentesis despite discussing the risks, benefits, and limitations of the testing. The pediatric cardiologist performed a complete fetal echocardiogram at 20 weeks gestation demonstrating normal heart anatomy in both fetuses. The pediatric craniofacial surgical specialists discussed management of children with cleft lips both before and after surgical repair. Upon further imaging via ultrasound Baby B was identified to have a bilateral cleft lip with extension into the palate as demonstrated in Figure 2B. The pregnancy remained uncomplicated. Serial growth ultrasounds were performed showing adequate growth of both twins with no significant discordance. Amniotic fluid volumes were within normal limits. Fetuses with cleft lip and palate have difficulty swallowing and have increased their risk for polyhydramnios and preterm labor. For this reason, weekly biophysical profiles starting at 32 weeks were performed with consistently normal results.

The twins were delivered via an uncomplicated cesarean section at 37 weeks gestational age. Upon inspection, Baby B was identified to have a unilateral cleft lip and palate as noted in the ultrasound and seen in Figure 1A. Baby B was identified to have a bilateral cleft lip and palate as demonstrated in Figure 2A. Following initial inspection, the infants were assessed for ability to feed and resist without complications. After 6 months, both underwent surgical repair by the pediatric craniofacial surgical specialists that had been following them since the initial diagnosis. Both babies were discharged home with their parents and are happy and healthy infants. The twins were delivered via an uncomplicated cesarean section at 37 weeks gestational age. Upon inspection, Baby A was identified to have a unilateral cleft lip as noted in the ultrasound and seen in Figure 1A. Baby B was identified to have a bilateral cleft lip and palate as demonstrated in Figure 2A. Following initial inspection, the infants were assessed for ability to feed and resist without complications. After 6 months, both underwent surgical repair by the pediatric craniofacial surgical specialists that had been following them since the initial diagnosis. Both babies were discharged home with their parents and are happy and healthy infants.

As mentioned previously, males demonstrate a higher prevalence of cleft lip with or without cleft palate. This apparent sexual dimorphism has been explored via a genome-wide interaction study in the attempt to identify sex-specific risk alleles for non-syndromic orofacial clefts. The results of this study supported observed dimorphism by finding a novel locus 1q12.11 with a genome-wide significant gene by sex interaction for multiple single nucleotide polymorphisms.4 Data regarding twins and the association to orofacial clefts is limited. Studies in the past have suggested a possible relationship between twinning and increased risk of oral clefts. However, a more recent study exploring the risk of oral clefts in twins by Grogan et al.2,4 suggested that there is no excess risk of oral clefts for twins compared to singletons.2,4 This cohort study compared the oral cleft occurrence among singletons and twins using a 69-year Danish nationwide registry of isolated oral clefts.2 Concordance rates for cleft lip and palate for monozygotic and dizygotic twins were identified demonstrating 50% vs 8%, respectively. Despite these results suggesting a strong genetic etiology, the incomplete concordance among monozygotic twins supports the theory that twins B, with a bilaterally cleft lip and palate, are non-twin siblings.2 This finding was postulated to be the result of a shared intrauterine environment.
Baby A – Bilateral Cleft Lip and Palate

Assessment and treatment requires planning and coordination among an interdisciplinary team of specialists dedicated to the treatment of congenital anomalies. Wide use of routine ultrasonographic screenings can identify congenital anomalies such as orofacial clefts in utero. Despite the advancements in ultrasonography its accuracy at times may be limited. The sensitivity of routine transabdominal ultrasound at 20 weeks gestation may vary from 16% to 93%.12,13 The variation in sensitivity may result from several factors such as experience of the ultrasonographer, maternal body habitus, fetal position, amount of amniotic fluid, and type of cleft.11 When the diagnosis is made in utero, early access to prenatal coordination of care may be established. An accurate prenatal diagnosis ensures proper counseling with the parents when discussing prognosis and surgical planning.

Initial evaluation of the child is recommended within the first few days of life with attention focused on feeding and breathing. Those with palatal clefts cannot generate negative pressure while sucking.14 As a result, a specialized nurser is needed to dispense milk into their mouths. Once adequate feeding and breathing are ensured, subsequent interval evaluations are conducted in order to assess the extent of the cleft anomaly and plan for surgical repair. In order to prepare for the first surgery at 3 to 6 months of age, attempts are made to reduce the deformity via a process known as pre-surgical infant orthopedics.14 This serves to enhance the position of the maxillary alveolar segments.15 It may also improve the nasolabial aesthetic outcomes prior to surgical closure of the cleft lip in some infants.16 The goals of repair differ depending on the severity of the congenital malformation. For cleft lip, restoring normal function and anatomy is sufficient. For those with cleft palate, the goals of repair are slightly different as its aims to achieve normal function for speech and swallow.17

Conclusion
This case described a rare incidence of dizygotic twins identified in utero concordant for an orofacial cleft malformation with differing severities: unilateral cleft lip (Baby A) and bilateral cleft lip and palate (Baby B). While it is well known that oral clefts such as cleft lip and palate are among the most common congenital malformations, there is a paucity of information available regarding its association among dizygotic twins. Thus far, the literature fails to demonstrate an increased risk of oral cleft associated for twins when compared to singletons. With a multifactorial inheritance pattern, the etiology of this non-syndromic malformation may be due to unidentified genetic causes or environmental causes affecting the shared intrauterine environment of twin gestations. As demonstrated in this case, early detection of this type of congenital malformation enables providers to adequately organize appropriate and specialized care for the duration of the gestation and for future surgical correction.

To the best of our knowledge, this is the first reported case of concordant cleft lip and palate of differing severity in dichorionic diamniotic twins conceived by IVF.

References

Figure 1A: Baby A with bilateral cleft lip and palate. Figure 1B: Both, 2D transabdominal ultrasound demonstrating coronal view of lips and nose. Imaging significant for unilateral cleft lip in Baby A. Figure 1C: 2D transabdominal ultrasonography depicting profile of Baby A. Figure 1E: 3D transabdominal ultrasonography at 26w6d demonstrating bilateral cleft lip in Baby A. Figure 2A: Baby B with unilateral cleft lip and palate. Figure 2B: 2D transabdominal ultrasound demonstrating coronal view of lips and nose. Imaging significant for unilateral cleft lip in Baby B. Figure 2C: 2D transabdominal ultrasonography transverse view of upper lip and hard palate in Baby B. Figure 2D: 2D transabdominal ultrasonography depicting profile of Baby B. Figure 2E: 3D transabdominal ultrasonography at 26w6d demonstrating unilateral cleft lip in Baby B.
Go With the Flow: A Case Report of Trans-Transjugular Intrahepatic Portosystemic Shunt (TIPS) Complete Esophageal Variceal Embolization Using Liquid Embolic n-Butyl Cyanoacrylate Glue (nBCA)

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Abstract

Introduction: Variceal embolization during trans-jugular intrahepatic portosystemic shunt (TIPS) placement reduces the rate of post-TIPS hemorrhage. Embolic agents used for variceal embolization include metal coils or detachable plugs with or without additional sclerosing agents; however, these methods can result in lengthy procedural time and incomplete embolezation. n-Butyl Cyanoacrylate (nBCA) glue, however, is a liquid embolic agent approved for the treatment of arteriovenous malformations. We present a case where post-TIPS nBCA embolization of extensive esophageal varices was performed using nBCA glue.

Methods: A 28-year-old male with alcoholic cirrhosis presented with bleeding esophageal varices refractory to repeat endoscopic interventions. Interventional Radiology consulted for TIPS placement. Persistent filling of an extensive esophageal variceal complex was noted after TIPS placement, despite a decrease in portosystemic gradient. Trans-TIPS access was obtained very distally into the variceal complex. A 1.2 nBCA: lipiodol glue mixture was instilled as the catheter was withdrawn back to the feeding left gastric vein achieving immediate, complete embolezation of the entire extensive variceal complex.

Results: Successful TIPS with immediate, complete embolization of the entire esophageal variceal complex was obtained using nBCA glue.

Discussion/Conclusion: Post-TIPS variceal embolization with nBCA glue provided a highly controllable way to achieve immediate, complete cast-like embolization of extensive variceal complexes. n-Butyl Cyanoacrylate (nBCA) glue is a liquid embolic agent approved for the treatment of arteriovenous malformations. It is radio-opaque when mixed with lipiodol. The extent of embolization can be predicted based on vessel flow and glue polymerization rates. In experienced hands, glue embolization can be precisely deployed to create a complete plug of the target vessel, decreasing non-target embolization while conforming to the vessel framework. Because of its liquid nature, nBCA glue embolization is particularly useful in the setting of coagulopathy as it is not reliant on intact coagulation cascade to obtain occlusion. It has been shown to be effective in failed coil embolization.

Therefore, nBCA glue can provide a highly controllable way to achieve immediate, complete cast-like embolization of extensive variceal complexes. We present a case where post-TIPS nBCA embolization of extensive esophageal varices was performed resulting in immediate embolezation of the entire variceal complex.

Case Presentation

A 28-year-old male with history of alcoholic cirrhosis and family history of cirrhosis (MELD 14; Child Pugh Class B) presented to our institution with hematemesis. On first admission, bedside esophagogastroduodenoscopy (EGD) was performed with banding of grade 3 esophageal varices. Two days after discharge, the patient presented with recurrent hematemesis and underwent repeat EGD by gastrointestinal with unsuccessful banding and sclerosis of the variceal complex. A computed tomography (CT) scan demonstrated extensive esophageal and gastric varices, but no clear gastro-splenoportal shunt (Figure 1). Interventional radiology was consulted, and the patient was deemed a candidate for TIPS.

TIPS Creation:

A pre-TIPS portal venogram demonstrated contrast filling the extensive gastroesophageal variceal complex (Figure 2A). The right hepatic vein was catheterized via right internal jugular vein access. The portosystemic gradient was 14 mmHg. A right hepatic vein through right portal vein TIPS was created via right internal jugular vein access with an 8-10 x 8 x 2 cm Viatorr stent graft deployed to 8mm, with a post TIPS portosystemic gradient of 10 mmHg.

Variceal Catheterization:

A portal venogram demonstrated persistent flow through an extensive gastroesophageal variceal complex. A 5 Fr 100cm angled glide catheter was used to select the left gastric vein. A 0.016” Fathom wire (Boston Scientific, Marlborough, MA) and a 2.4 Fr Progreat microcatheter (Terumo, Japan) were passed deep into the extensive, tortuous variceal complex.

Glue Embolization:

The glue mixture was prepared in a 1:2 nBCA: lipiodol ratio mixture (TRUFLILL, DePuy Synthes, West Chester, PA). 3 mL of DSW was used to flush the microcatheter of ionic substances (blood, saline) to prevent intra-catheter glue polymerization. 1mL of glue mixture was then flushed through the microcatheter and a glue plug was allowed to form into a plug at the tip of the catheter to occlude the variceal outflow.

As the catheter was slowly withdrawn through the variceal complex feeding the left gastric vein, another 1mL of glue mixture was injected into the variceal complex. Once the feeding left gastric vein was reached, the catheter was flushed multiple times with...
Clinical use of NBCA in cerebral arteriovenous malformations11; pseudoaneurysms12; has proven useful. Additionally, sclerotherapy with NBCA has been shown to be safe and effective in the control of bleeding and eradication of gastric varices12. Yonemitsu et al. evaluated the long-term efficacy and safety of endoscopic treatment of gastroesophageal varices was performed. This resulted in immediate, precise embolization of the esophageal varical complex, providing a controllable and time effective treatment. We propose it should be considered in preoperative planning for all hemorrhagic etiologies, whether elective or emergent.

References
A Case of Endovascular Management of Nutcracker Syndrome Presenting as Spontaneous Left Renal Vein Thrombosis: A New Age Interventional Approach to a Classic Ballad

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Abstract
Introduction: Nutcracker syndrome (NCS) is a condition that occurs when the left renal vein (LRV) is compressed, most commonly between the aorta and the superior mesenteric artery (SMA). NCS can predispose a person to left renal vein thrombosis (RVT). We present a case where successful aspiration thrombectomy was performed using the Penumbral Indigo CAT8 system, a mechanical thrombectomy device that uses an 8F catheter, to treat RVT in a patient with NCS.

Methods: A 20-year-old female with a past medical history of systemic lupus erythematosus (SLE) and lupus nephritis presented to the emergency department with acute flank and abdominal pain. The urinalysis was significant for proteinuria and hematuria. Contrast-enhanced CT of the abdomen and pelvis demonstrated isolated left RVT with compression of the vein between the SMA anteriorly and the aorta posteriorly, consistent with underlying NCS. Given the patient’s age and severe pain, the decision was made to undergo pharmacomechanical aspiration thrombectomy with the Penumbral Indigo CAT8 system. The procedure was completed successfully.

Discussion/Conclusion: Spontaneous isolated RVT is a rare initial presentation of underlying NCS. Through a review of the literature, we aim to review the pathophysiology of this condition. We also introduce our successful use of the Penumbral Indigo CAT8 system for pharmacomechanical aspiration thrombectomy, a novel endovascular treatment regimen of this clinical entity.

Keywords: Nutcracker, Thrombosis, Pharmacomechanical Thrombectomy

Introduction
Nutcracker syndrome (NCS) is a condition that occurs when the left renal vein (LRV) is compressed, most commonly between the aorta and the superior mesenteric artery (SMA). Without treatment, NCS can predispose a person to left renal vein thrombosis (RVT). Advances in biomedical engineering have expanded venous thromboembolism treatment beyond anticoagulation, specifically, catheter-directed pharmacologic thrombosis, mechanical and pharmacomechanical thrombectomy, and aspiration thrombectomy.

Pharmacomechanical thrombectomy involves the combination of direct infusion of lytic agents into the thrombus and removal of the clot with an endovascular mechanical device via maceration or aspiration. The Penumbral Indigo system is for aspiration thrombectomy has catheter sizes of up to 8F. Power-aspiration-based extraction of peripheral arterial thromboembolism with the Penumbral Indigo system has been shown to be safe and effective, both as a primary treatment and adjunct therapy.

We present a case where successful aspiration thrombectomy was performed using the Penumbral Indigo CAT8 system, a mechanical thrombectomy device that uses an 8F catheter, to treat RVT in a patient with NCS.

Case Presentation
A 20-year-old female with a past medical history of systemic lupus erythematosus (SLE) complicated by lupus nephritis with no relevant family or social history presented to the emergency department with severe left flank and abdominal pain. Contrast enhanced CT of the abdomen and pelvis demonstrated compression of the LRV as it curved between the SMA and the abdominal aorta. Delayed left nephrogram indicated the presence of a left RVT. These findings were consistent with NCS. Further, extension of the thrombus into the left gonadal vein was noted (Figure 1).

Interventional Radiology was consulted for further evaluation and intervention. Given the patient’s failed triple anticoagulation therapy, persistent severe pain, and signs of decreased renal perfusion on CT, the decision was made to perform a left renal venogram with possible LRV thrombolysis and possible stenting of the LRV.

Figure 1: Marked compression of the LRV (orange arrow) as it courses between the SMA (yellow arrow) and the abdominal aorta (arrowsmetsentric angle 40 degrees, beck angle of 47 degrees), with resultant thrombosis of the LRV (blue arrow). Delayed venous nephrogram (white arrow) is noted. A filling defect in the left gonadal vein indicating thrombosis is not pictured.

Procedure
A left renal venogram demonstrated an expanded thrombus in the LRV and filling of distal collateral venous channels (Figure 2A). The thrombus was laced with 10 mg of tissue plasminogen activator (tPA) and allowed to dwell for 10 minutes. Subsequently, the Penumbral Indigo CAT8 system was used to perform aspiration thrombectomy of the LRV. Post thrombectomy intravascular ultrasound (IVUS) showed minimal residual thrombus within the LRV and a left renal venogram showed markedly improved vessel caliber (Figure 2B). However, severe compression of the LRV as it passed between the SMA and aorta was noted, consistent with NCS.

A systolic pressure gradient of 4 mmHg was measured in the poststenotic LRV (18/14 mmHg) and inferior vena cava (14/12 mmHg). Given the non-significant pressure gradient across the region of stenosis (4mmHg) and the patient’s young age, stent placement was deferred.

Post-operatively, the patient was started on Enoxaparin, a factor Xa inhibitor, and was switched to Apixaban, a different factor Xa inhibitor, for outpatient therapy.

Discussion
Similar to deep vein thrombosis or a pulmonary embolism, symptomatic RVT is initially treated with unfractionated or low molecular weight heparin (LMWH) followed by warfarin. A study by Wu et al. reports successful treatment of RVT with LMWH in 3 patients with nephrotic syndrome, highlighting its safety, efficacy profile, and feasibility for outpatient treatment. Lam et al. reported successful treatment of acute inferior vena cava thrombosis and unilateral RVT by local infusion of recombinant tPA. They recommend thrombolysis therapy as a second line treatment (after failed heparin therapy) in patients with bilateral involvement, acute renal failure, or severe flank pain, similar to our patient presentation.

Percutaneous catheter-directed thrombectomy with or without fibrinolysis has been shown to restore renal function rapidly with a low incidence of morbidity due to pulmonary emboli or hemangionic complications in the treatment of RVT. Boosting the efficacy profile of percutaneous catheter-directed thrombectomy, Kim et al. demonstrated no RVT recurrence after a median follow up time of 22.5 months.

With a rare presentation of “complicated” NCS, where left RVT occurs, invasive treatment is indicated in patients who fail medical therapy or with persistent recurrence to preserve renal function. Endovascular stenting of the LRV, transposition of the SMA or LRV, and autotransplantation of the left kidney have all been described as successful therapies with some literature recommending stenting as first line when clinically indicated.

Interventionalists, however, are reshaping traditional therapy. Based on the data above, treatment should first be initiated with anticoagulants, changing the site of coagulation cascade inhibition if therapy fails with subsequent targets being Vitamin K (Warfarin) and Factor Xa (Rivaroxaban). Angiography is considered for refractory cases with initial analysis encompassing pressure gradient measurements. Advancements in biomedical engineering have permitted venous thromboembolism disease to be treated with catheter directed thrombolysis and pharmacomechanical thrombectomy, with adjunct stenting when indicated. We suggest the use of IVUS for precise endoluminal assessment pre and post treatment. The Penumbral Indigo CAT8 aspiration system allows for single session, prompt thrombectomy, decreasing radiation, procedure time, and complications compared with traditional lytic therapy.

In the case presented, given the patient’s age, failed triple anticoagulation therapy, and considering thrombosis extension into the left gonadal vein, initial thrombosis was performed, allowing for prompt and uncomplicated aspiration thrombectomy with no residual clot on IVUS. Adjunct stenting was not deemed necessary secondary to lack of a significant pressure gradient. Preventative treatment with Apixaban was initiated after the procedure with no evidence of recurrence to date.

Conclusion
Various thrombosis, a common disease elsewhere in the peripheral system, can present as a rare presentation of underlying NCS. The
Herpes Zoster: Case Review and Discussion
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Abstract
We report a case of herpes zoster ophthalmicus complicated by post-herpetic neuralgia. A 63-year-old female with history of hypertension, anxiety, depressive disorder, and a recent traumatic fall presented to clinic with sudden onset of severe right frontal headache. Forty-eight hours later, her pain worsened and she developed a localized rash on the right upper eyelid. On physical exam, an erythematous eruption involving the right fronto-temporal and periorbital regions, and marked edema of the right upper eyelid were noted. A diagnosis of herpes zoster ophthalmicus was made. She was treated with oral valaciclovir, prednisone, and acetaminophen with codeine. After one week, eyelid edema resolved and most lesions had matured. At a four-week follow-up, she continued to have significant pain at the site of prior eruption. She was diagnosed with post-herpetic neuralgia and prescribed gabapentin. Five months after the diagnosis of herpes zoster ophthalmicus, she still reported significant pain and discomfort. Herpes Zoster and its sequelae are painful and debilitating, but are preventable with the zoster vaccine. It is critical for healthcare providers to counsel their patients regarding the importance of timely vaccination.

Keywords: Herpes zoster, herpes zoster ophthalmicus, post-herpetic neuralgia, vaccination

Introduction
The varicella-zoster virus belongs to the alpha-herpesvirus family. Primary infection causes varicella or “chickenpox,” which is usually a benign viral illness that presents in childhood as a generalized vesicular eruption with malaise and low-grade fever. In adults, illness can be more severe, and complications such as pneumonia or encephalitis may ensue. Reactivation of the varicella virus may happen many years after primary illness can lead to herpes zoster or “shingles.” This reactivation is possible because after initial infection the virus establishes latency in the dorsal root ganglion and cranial nerve ganglia and is not completely eradicated.

Herpes zoster presents as a painful rash in a dermatomal distribution. It can involve dermatomes in the head, chest and abdominal regions, and does not cross the midline. Involvement of the ophthalmic division of the trigeminal nerve is particularly painful, and is referred to as herpes zoster ophthalmicus. Factors that have been associated with reactivation of the virus and resultant “shingles” later in life, include autoimmune disease, inflammatory bowel disease, immunodeficiency states, and depression. Reactivation may also be related to the normal decline in immunity that occurs as individuals get older or after exposure to certain medications. There are numerous complications from herpes zoster. The most common is post-herpetic neuralgia, a debilitating neuropathic pain that persists after the resolution of the rash. Here we report a case of herpes zoster ophthalmicus with post-herpetic neuralgia, in the setting of recent physical trauma and depressed mood as risk factors.

Case Presentation
A 63-year-old female with a past medical history of hypertension, hypothyroidism, and depressive disorder presented to her physician with complaints of pain in the right forearm and left chest wall after a recent traumatic fall. She states that while at a wedding, her vision was slightly blurred and she missed a step, falling on her left knee, left chest, and right wrist. She also bruised her forehead and eyelashes impacted the area lateral to her eyes. Her medications include levoxylthryoxine 112 mcg daily, olmesartan 20 mg daily, and pravastatin 20 mg daily. Social history was significant for increased psychosocial stressors, with patient assuming primary caregiver duties for a terminally ill relative and the recent loss of her mother and cousin. On review of systems, patient had multiple painful sites due to eye discomfort. When she exited the bathroom, her vision gone to the bathroom to change her contact lenses for glasses due to eye discomfort. When she exited the bathroom, her vision was gone to the bathroom to change her contact lenses for glasses.
Two months later patient called with complaints of sudden onset of severe right frontal headache. She was advised to come to the clinic as potential etiologies that warranted further immediate evaluation included temporal arteritis and uncontrolled hypertension. Patient declined visit to the clinic. She started a regimen of acetaminophen alternating with ibuprofen for the headache and monitored her blood pressure, which she reported as normal. Forty-eight hours later, she developed increased pain and a localized rash involving the right upper eyelid (Figure 1) and presented to her ophthalmologist. Vital signs were as follows: systolic blood pressure 118/86, pulse 89, and respiratory rate 16. Physical examination showed an erythematous eruption involving the right fronto-temporal region and right periorbital region, with marked edema of the right upper eyelid and mild conjunctival erythema. Erythema of the skin region and right periorbital region, with marked edema of the right.

She was seen for follow up in the outpatient clinic after four weeks, and while skin lesions had resolved, she continued to have significant localized pain at the site of the prior eruption. Laboratory studies at that visit were similar to baseline labs, and showed glucose 90, HbA1C 5.6, WBC 5.2, hemoglobin 14.2, hematocrit 42.8, platelets 203, TSH 0.464, and vitamin D level of 21.3. Antinuclear antibody levels were negative. She was given the diagnosis of post-herpetic neuralgia and started on oral gabapentin (300 mg capsule twice a day) and vitamin D supplementation. Patient discontinued gabapentin after several days due to excessive somnolence, and pain was moderately controlled with alternating ibuprofen 600 mg and acetaminophen 500 mg twice a day. Stronger opioid therapy was avoided due to concerns for chemical dependency and respiratory depression. At follow-up several months later, she still had persistent moderate pain and numbness with paresthesias at the site of the previous eruption. She was started on duloxetine 30 mg daily by mouth to assist with both neuropathic pain as well as ongoing anxiety and depression.

At the time of her three-month follow up, patient did not show for her appointment and was contacted over the phone. She had improved, but still reported chronic discomfort in the right periorbital region, which she described as moderate pain with associated numbness. She reported improvement in her anxiety with duloxetine and family support. Patient was contacted via phone two months later after failing to attend her scheduled appointments. Several months later she was again contacted and reported some improvement in her pain and diminishing social stressors, though still experienced significant difficulty sleeping at night. Gabapentin 300 mg at bedtime was added to her medication regimen and she was scheduled for a follow-up appointment. Though she continues experiencing difficulties related to the post-herpetic neuralgia, she notes more effective coping with her medical and psychosocial situation.

### Discussion

In the general population, the lifetime risk of developing herpes zoster is approximately 20% to 30%, and the risk increases up to 50% in those living beyond the age of 85. In the United States, the Centers for Disease Control (CDC) estimates that there are 1 million cases of herpes zoster annually. Almost half of all individuals with herpes zoster develop complications, with postherpetic neuralgia being the most common. Postherpetic neuralgia is described as a neuropathic pain that persists more than thirty to sixty days after resolution of the rash and may last for more than one year in 30-50% of patients. The pain can interfere with activities of daily living and consequently result in depression and loss of independent living. Postherpetic neuralgia is the number one cause of suicide in patients with chronic pain over the age of 70.

Additional complications of herpes zoster include aseptic meningitis, bacterial superinfection, hearing impairment, Bell’s palsy, Ramsay Hunt syndrome, motor neuropathy, transverse myelitis, vasculopathies, and herpes zoster opthalmicus. Among patients with herpes zoster, approximately 10 to 20% will have herpes zoster ophthalmicus. Some of the manifestations of herpes zoster ophthalmicus include keratitis, episcleritis, iritis, and conjunctivitis, and neuritis. These complications can decrease the quality of life and interfere with activities of daily living.

Studies have shown that multiple risk factors are associated with the risk of developing herpes zoster. The risk is higher among women, individuals with a family history, and immunocompromised individuals such as organ transplant recipients and those with leukemia, lymphoma, or human immunodeficiency virus infection. A large study conducted in the United Kingdom by Forbes et al found that certain medical conditions were associated with an increased risk of herpes zoster. These high risk conditions included rheumatoid arthritis, systemic lupus erythematosus, inflammatory bowel disease, chronic destructive pulmonary disease, asthma, kidney disease, type 1 diabetes, and depression. A 2017 Danish study by Schmidt et al, reported similar risk factors, with the addition of type 2 diabetes, and the recent use of glucocorticoids. A systematic review and meta-analysis by Kawai et al, reported that statin use and physical trauma were also independent risk factors for herpes zoster. Kawai also found that smokers had a reduced risk of developing herpes zoster. Forbes et al found an increased risk for the development of postherpetic neuralgia in smokers. In summary, risk factors for herpes zoster are varied, and include trauma and genetic, medical, psychosocial, iatrogenic factors.

Our patient’s potential risk factors included recent physical trauma, recent steroid use, chronic statin use, and increased stressors. A patient history that explores risk factors is important for identification of high-risk patients and important when counseling patients about the importance of vaccination. The suffering due to herpes zoster and its serious long-term sequelae are completely preventable through vaccination. Providers should focus on identifying risk factors and prophylactically educate and offer vaccination to patients to decrease incidence of herpes zoster.

There are currently two vaccines available for the prevention of herpes zoster in adults. Zostavax, a live attenuated vaccine, has been in use since 2006. Zostavax is similar to the varicella vaccine that is used in children to prevent chickenpox, but with an increased antiviral potency. Shingrix, a recombinant subunit vaccine, was recently approved for use in the United States by the Food and Drug Administration (FDA) in 2017. Shingrix has greater effectiveness (85%) compared to 50-55% reported effectiveness for Zostavax. Shingrix offers greater protection against the post-herpetic neuralgia and a prolonged period of protection. Shingrix has the disadvantage of requiring two doses given several months apart, compared to the single dose needed for Zostavax. Although immunocompromised individuals have an increased risk for the development of herpes zoster, live attenuated vaccines are contraindicated in this population; the Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP) does not recommend vaccination in this population. Current recommendations from the ACIP include vaccination of immunocompetent patients with Shingrix that can begin at age 50 as a two-dose vaccination series with the second dose given 2-6 months after the initial dose. Individuals who have previously received the Zostavax vaccine are encouraged to receive the additional two-dose Shingrix vaccine. If Shingrix vaccine is unavailable in an area, then the CDC recommends vaccination with the Zostavax. There is no age limit as to when the vaccines can be given. As more that 99% of individuals living in the United States over the age of 40 have had exposure to chickenpox, vaccination is particularly important. These CDC vaccine recommendations are supported by the U.S. Preventive Services Task Force.

### Conclusion

Our case demonstrates the classic presentation and course of herpes zoster, including the sequelae of chronic neuropathic pain. Herpes zoster is caused by reactivation of the varicella zoster virus. It presents as a painful dermatomal rash that may involve the head, thorax or abdominal regions. Herpes zoster affecting the ophthalmic division of the trigeminal nerve, known as herpes zoster ophthalmicus, can cause severe and debilitating pain and affect the eye. The most common chronic complication of herpes zoster is post-herpetic neuralgia, which can have devastating consequences for patients especially those who are fragile or have underlying emotional disorders. Post-herpetic neuralgia negatively
affects quality of life and can lead to depression and even suicide. Identifying patients with risk factors can lead to more effective counseling regarding the benefits of vaccination. Given the serious sequelae and mental health concerns related to post-herpetic neuralgia, we strongly urge healthcare providers to counsel their patients proactively regarding the benefits of timely vaccination.

References


The Impacts of Gender, Age, and Anatomical Location on Cutaneous Thickness Evaluated by Ultrasound: A Review of the Literature

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Abstract

Variability in skin thickness is an important consideration during dermatologic procedures, as it may have medical, cosmetic, and surgical implications. Thus, dermatologic surgeons may benefit greatly from a thorough understanding of the numerous factors that can affect skin thickness; these factors include age, gender, and the anatomical location of the skin. Ultrasound has proven to be a valuable tool in visualizing the skin layers, especially where precise interrogation of the skin’s thickness and density is necessary. In this paper, we outline current literature to explore the factors that contribute to skin thickness variability and evaluate the utility of ultrasound to measure these changes.

Keywords: Skin thickness, aging, ultrasound

Introduction

In order to measure skin thickness, a variety of tools have been used and described in the literature. Scanning electron microscopy and light microscopy have both been used to measure thickness of skin in vitro. ² To measure the thickness of the skin in vivo, a skin caliper instrument has been used, however, it is less commonly used today as it is not a precise measurement. ² Interestingly, ultrasound scanning offers a more modern, noninvasive, and reliable method for direct in vivo measurement of epidermal and dermal thickness.² Two types of ultrasonography, including modes A and B, as well as different frequencies can be used. The dermis and hypodermis are measured well with 20MHz ultrasound; however, the epidermis is much thinner, indicating that high frequency ultrasonography (HFUS) up to 100MHz should be used to better visualize the epidermis. ² The purpose of this review is to discuss the differences in skin thickness with respect to sex, anatomic location, and age as measured by ultrasound. This review also discusses the utility of ultrasound in measuring skin thickness when indicated for various clinical situations.

Factors influencing skin thickness and echo density

Skin thickness and echo density can be influenced by factors such as increasing age, gender, and the particular anatomical site on the body. Factors, such as sun exposure, medication use, atrophic skin diseases, and various other dermatoses should also be taken into consideration. Echo density can provide helpful information regarding the keratin and collagen status of the epidermis and dermis, respectively, as ultrasound of the skin demonstrates an entrance echo. ² In particular, evidence suggests that skin thickness is typically higher in males than females, as opposed to echo density, which is typically higher in women.² ³ Although age was not reported to significantly affect echo density,² it has a considerable impact on skin thickness. The dermis is often thinner in the elderly, with progressive loss of thickness with age.² ³ ⁴ In addition to its importance within a number of other clinical scenarios, information regarding the factors that influence skin thickness is particularly vital to the success of skin graft harvests and wound healing efforts.

Firooz et al. used HFUS to assess influencing factors such as gender, age, and the location on the skin to further determine how these variables affect skin thickness and echo density.² Epidermal entrance echo thickness, dermal thickness, and dermal echo density were measured in 30 individuals, 17 female and 13 male. With the use of 2D HFUS at 22 and 50MHz ultrasonic probes, five anatomic locations were measured, and healthy participants were placed into groups based on age. The age range was 24 – 61 years old; the young skin group consisted of subjects less than 35 years old and the old skin group consisted of subjects over 35 years old. Subjects were not included in the study if they met any of the following exclusion criteria: any skin disorders, application of corticosteroid drugs, BMI >30, chronic systemic diseases, constant sun exposure in previous 3 months, and/or hard physical activity. The five skin locations measured included the cheek, neck, palm, sole, and dorsum of the foot. The study was done in the winter to avoid prior sun exposure in subjects over the previous 3 months due to the fact that sun exposed areas atrophy at a different rate than protected areas.⁵ Dermal Thickness

Firooz et al. found that dermal thickness was higher in males compared to females, showing statistical significance on the neck and dorsum of foot. Shuster et al. also showed that the thickness
Echo density

Lastly, the echo density of the dermis was found to be higher in females on all sites, showing significance on the neck only. Similar to epidermal entrance echo thickness, the echo density on the dorsum of the foot was almost equal in men and women. When comparing age groups, however, there was no significant difference in echo density.

Supporting these findings, Saidenari et al. concluded that the skin thickness of the dermis was higher in women than men using a 20MHz 2D scanner. The skin thickness and echo density of the dermis was analyzed on sites of 48 individuals divided into two groups each with 27 subjects, from 27-31 years of age and over 60 years of age respectively. This same study also concluded that skin thickness on the forehead, cheek, volar forearm, dorsal forearm, and upper abdomen was higher in males compared to females.

Skin thickness variation by anatomic location

Different locations on the body also influence skin measurements. Taking the overall mean of all the sites measured, Fiorco et al. reported that the palm had the thickest dermis, the sole had the highest epidermal entrance echo, and the neck showed the highest echo density of the dermis. This may be a result of some sites receiving more sun exposure or mechanical stress than others. Additionally, Lyngø et al. showed that different locations of the face have varying thicknesses, further demonstrating the importance of considering anatomic location. This study also utilized ultrasound at 15.0 MHz for analysis of a depth of 1.5 cm to 2cm and 18.0 MHz for 0.8 cm. This methodology underscores the need to not only take into account skin thickness for procedures like skin surgery, but also for selecting the appropriate scanning technique for a certain region. As an effective tool for measuring skin thickness, ultrasound lends utility to managing inflammatory dermatoses as well as skin atrophy with steroid therapy.23, 24

LITERATURE REVIEW

**Echo Density**

**Literature Review**

**LITERATURE REVIEW**

LITERATURE REVIEW
Wilms’ Tumor: A Clinical Review of Doxorubicin Use in Pediatric Postoperative Treatment
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Abstract

Background: Wilms’ tumor (WT) is a pediatric nephroblastoma commonly affecting children in the first few years of life. Advances in treatment have increased five-year survival rates from 5% in the early 1900s to presently over 90%. Doxorubicin is a common chemotherapeutic agent used both preoperatively and postoperatively in the treatment of WT. Though it has benefitted patient survival, it is also a known cardiotoxin that may predispose WT survivors to heart failure in later life. The purpose of this work is to investigate the literature on the clinical use of doxorubicin in the pediatric treatment of WT.

Methods: Comprehensive literature review on pre- and postoperative anthracycline use in WT patients due to staging based on the two main research groups, the Children’s Oncology Group (COG) and the International Society of Pediatric Oncology (SIOP).

Results: Green et al. found cumulative dosage of doxorubicin exceeding 300 mg/m² in the chemotherapeutic regimen of WT pediatric patients to be the most significant variable in increasing the likelihood of developing congestive heart failure later on in life. Pritchard-Jones et al. investigated 583 patients diagnosed with WT between the ages of 6 months and 18 years, which found that doxorubicin had a negligible benefit in the 5 year survival rates of stage II-III intermediate risk WT patients.

Discussion/Conclusion: With WT’s excellent prognosis, the focus of treatment has shifted from maintaining high five-year survival rates to mitigating the long-term effects of chemotherapy. Investigation of multiple studies suggest alternative anthracyclines and accurate staging of WT to prevent overtreatment since cumulative dosage has been directly correlated to risk of developing congestive heart failure.

Keywords: Wilms Tumor, Pediatric Nephroblastoma, Anthracycline

Introduction

Wilms’ tumor (WT) is the most common renal malignancy of early childhood, affecting one out of every 8,000-10,000 children each year in North America, typically presenting as a unilateral tumor. WT occurs via loss of function mutations of tumor suppressor genes WT1 or WT2 on chromosome 11.

HT is typically categorized into different stages based on the severity of the nephroblastoma. Staging is of particular importance in WT management due to variance in recommended chemotherapy and associated side effects. WT is typically diagnosed using imaging tests such as ultrasounds and computed tomography (CAT) scans. Once the diagnosis is made, the WT is surgically removed and histologically staged, and further evaluated by the surgeon and pathologist to determine postoperative chemotherapy treatment.

Currently, treatment for WT at intermediate-risk Stage II and beyond involves partial to complete nephrectomy and the administration of chemotherapy, which involves the use of doxorubicin, vincristine, and actinomycin D. Doxorubicin belongs to the anthracycline family of antitumor agents and is one of the most effective cancer treatments. While use of doxorubicin in postoperative chemotherapy is extremely effective, shown by the high survival rate of WT patients, there are growing concerns over the cardiotoxic effects of all stages and its potential for excessive use secondary to over staging in intermediate-risk Stage II WT children.

Etiology

While a single cause of WT has yet to be found, there are several chromosomal mutations that appear in patients diagnosed with this malignancy. Currently, the most common mutation found in 30% of patients is the inactivation of the tumor suppressor FAM123B gene, which is located on the X chromosome that includes the gene WT1. When the WT1 gene is suppressed by the inactivation of FAM123B, embryologic metanephric blastema fail to differentiate, leading to
patches in the pediatric kidney that are believed to be the cause of the nephroblastoma.

Due to the location of FAM123B on the X chromosome, there appears to be a slightly higher incidence of WT in girls than in boys.2 Several other studies have also shown a higher incidence in African and African Americans, possibly because of higher rates of a separate nephrotic syndrome focal segmental glomerulosclerosis (FSGS) and HIV-1 infection in these populations, both of which are strongly associated with WT.2 Despite the varied genetic origins of the nephroblastoma, the survival rate of WT has increased to approximately 90%, compared with 5% in the 1980s.3

STAGING OF WILMS’ TUMOR

Treatment for WT will depend on patient age, tumor pathology, treatment efficacy, and tumor stage. Staging refers to the classification of the tumor based on its extent and magnitude.4 The two main WT research groups, the Children’s Oncology Group (COG) and the International Society of Pediatric Oncology (SIOP), suggest different staging methods. However, both COG and SIOP recommend sampling stage II tumors as those extending beyond the kidney capsule but still completely resected during surgery. COG staging does not indicate renal blood vessel involvement, whereas SIOP staging includes blood, lymphatic, and nearby organ invasion as long the tumor is completely removed. For SIOP criteria, stage II tumors are also biopsied prior to preoperative chemotherapy or surgery. Stage III tumors in both cases involve residual tumor following surgery, abdominal and pelvic lymph node metastases, tumor thrombi during surgical resection, and tumor rupture prior to or during surgery.4

Considering the importance of proper WT staging, Borgstein et al. investigated the relative agreement between surgical and pathological level staging of WT patients. This study found 84% majority agreement in the WT staging between the surgical stage and pathological stage assessment of the tumor, citing one of the difficulties of accurate WT staging occurring when histological tissue samples are collected during surgery. Occasionally, the sampled tissue does not encompass the area of greatest risk of rupture, which can lead to understaging of the tumor to stage II.5

General Treatments for Wilms’ Tumor

In general, all the stages of WT are treated with nephrectomy (partial or radical) and chemotherapy. In terms of surgical procedure, radical nephrectomy remains the primary treatment for unilateral WT.6,7 Here the surgeon removes the entire affected kidney, samples suspected lymph nodes, and evaluates for tumor metastases to determine accurate tumor stage. In addition to surgery, chemotherapy may be used preoperatively or postoperatively, depending on COG or SIOP recommendations. The two most commonly administered are vincristine and actinomycin D. Depending on the tumor’s severity and associated risks, such as in intermediate-risk stage II-III WT, doxorubicin may be included in treatment.8

Preoperative chemotherapy typically includes doxorubicin in addition to vincristine and actinomycin D. The benefit of preoperative chemotherapy includes reduction of tumor size and its vascular supply, which may subsequently reduce the risk of surgical complications.9

Recommended postoperative chemotherapy regimens for WT include Regimen EE-4A (vincristine, actinomycin D for 18 weeks postnephrectomy) for lower stages of WT and Regimen DD-4A (vincristine, actinomycin D, doxorubicin for 24 weeks with baseline nephrectomy or biopsy with subsequent nephrectomy) for higher stages of WT.10 The key distinction between the two regimens is the inclusion of doxorubicin. Dosage dependence of Doxorubicin

Doxorubicin has been an important antineoplastic used in the treatment of more aggressive stages of WT for the last three decades, despite its long-term cardiotoxic effects. Studies since the early 1990s have shown the cardiotoxic nature of anthracyclines, which includes doxorubicin.11 However, the efficacy of anthracyclines in increasing pediatric survival rates was thought to outweigh its adverse effects. In 2001, Green et al. looked into the development of congestive heart failure (CHF) as a consequence of the long-term cardiotoxic effect found in patients with WT treated with doxorubicin. Although there is a high survival rate of WT using doxorubicin, a significant cardiotoxic risk occurs at higher stages of WT.12

In the study there were two cohorts: Cohort 1 comprised of patients who received doxorubicin as part of their initial treatment plan for WT; Cohort 2 comprised of patients who were not given doxorubicin in their initial therapy, but were treated with a higher cumulative dose of doxorubicin compared to Cohort 1 after a relapse of WT. Patients were monitored for up to twenty years from diagnosis of WT to development of CHF.

Relative risk (RR) analysis revealed that the incidence of developing CHF in Cohort 1 was 4.4% and 17.4% in Cohort 2. The study analyzed several characteristics of the thirty-five patients that developed CHF of the 2,710 monitored patients. Females were four and a half times more likely to develop CHF as males; patients receiving lung radiation and left abdominal radiation had a two-fold increase in RR of CHF compared to those treated without radiotherapy.

However, the study states that “cumulative doxorubicin dose was the most important risk factor for the occurrence of CHF”.13 Patients receiving a cumulative dose of ≥300 mg/m² doxorubicin showed a six-fold increase in RR. Interestingly, those receiving a cumulative dose of 1-199 mg/m² saw no increase RR and those receiving 200-299 mg/m² of cumulative doxorubicin were only 50% more susceptible to CHF.

Finally, the study found that RR increased three-fold for every 100 mg/m² of doxorubicin given to patients who also had radiation therapy.13

The higher RR seen in Cohort 2 can be attributed to the increased amount of lung radiation and higher dose of doxorubicin used in conjunction to combat a relapsed WT. Gender and radiation both affect the RR of WT, but overall using ≥ 300 mg/m² doxorubicin was the most significant variable in increasing the likelihood of developing CHF. Because the median dose of doxorubicin given to patients in the study was 302 mg/m², at least half the patients received a dose of doxorubicin above the threshold of greatest RR.13

Overuse of Doxorubicin

A large study by Dr. Pritchard-Jones was conducted on behalf of the SIOP Renal Tumors Study Group. This study found that doxorubicin offered no significant difference in 2-year and 5-year survival rates of intermediate-risk stage II-III WT patients, bringing into question the chemotherapeutic value of doxorubicin and whether its benefit on short-term survival outweighs its known long-term risks of cardiotoxicity.

In this study 583 patients had been diagnosed with WT between the ages of 6 months and 18 years, ascertained from 251 hospitals in 26 countries, following these children carefully to investigate the “effects of placebo controlled omission of doxorubicin from their postoperative chemotherapy”.14 Doxorubicin had negligible benefit in the 5-year survival rates of stage II-III intermediate risk WT patients when “histological assessment of tumor response is positively received during in preoperative chemotherapy”.15

Doxorubicin was the only omitted chemotherapeutic agent from the standard regimen of doxorubicin, actinomycin D, and vincristine.14 All patients received the same timing and quantity of dosage of actinomycin D and vincristine with a median study follow-up of 60.8 months. Of the 591 children receiving treatment including doxorubicin, there were 24 cases of tumor relapse. From the group of 292 children receiving treatment without doxorubicin, there were
36 incidents of tumor relapse, suggesting that the difference in number of tumor relapses between the two groups is statistically insignificant.²

Alternative Anthracyclines

Doxorubicin and daunorubicin are the two most commonly used anthracyclines in cancer treatment. Past studies have not extensively compared their cardiotoxicities.² Feijen et al.¹ evaluated daunorubicin with accurate staging, doxorubicin’s established reduction in doxorubicin exposure. Additionally, Pritchard-Jones et al.³ found that with surgical and pathological staging that could offer a shift from maintaining high five-year survival rates to mitigating the long-term effects of chemotherapy. As WT prognosis continues to improve, the focus of treatment has warranted its associated risks. Minimizing the cumulative dosage of doxorubicin ≥300 mg/m² for developing heart failure as young to middle-aged adults.

Primary analysis of the data was restricted to those patients treated with either daunorubicin or doxorubicin. Only patients with a minimum survival of five years from diagnosis of cancer were included. Of all of these patients, the cumulative incidence of HF was 3.2% by the age of forty, and the primary model determined that the HF risk of daunorubicin to doxorubicin with all stipulations factored was 0.45. Therefore, it was concluded that daunorubicin was less cardiotoxic than doxorubicin.¹

Discussion

As WT prognosis continues to improve, the focus of treatment has shifted from maintaining high five-year survival rates to mitigating the long-term effects of chemotherapy. Ultimately, the cumulative dosage of doxorubicin ≥300 mg/m² leads to a six-fold increase in the relative risk of developing heart failure later on in life. Borgstein et al.⁴ found small discrepancies between surgical and pathological staging that could offer a reduction in doxorubicin exposure. Additionally, Pritchard-Jones et al.⁵ found that with accurate staging, doxorubicin’s established risk of cardiotoxicity could be avoided in intermediate-risk stage II-III WT patients. This raises the interesting question of whether daunorubicin, as proposed by Feijen et al.², could be used instead as an alternative to doxorubicin in WT treatment. These studies show that in specific cases of intermediate-risk stage II-III WT, doxorubicin may not provide sufficient benefit to warrant its associated risks. Minimizing the cumulative dosage of doxorubicin in postoperative treatment can lead to a better quality of life for childhood WT survivors by decreasing their relative risk for developing heart failure as young as middle-aged adults.

References

French Huguenots in the medical development of sixteenth century
Spanish St. Augustine, Florida

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Abstract

In 1564, French colonists led by René Laudonnière erected Fort Caroline, a riverside settlement in Timucua tribe territory near modern-day Jacksonville. French-Timucuan relations in northeast Florida undoubtedly served as a foundation for the Spanish who conquered in 1565 and controlled the region from their nearby fort at St. Augustine. French Huguenots lived with native Timucua at Fort Caroline through disease, famine, hostility, and supply shortages. Challenging times introduced French settlers to novel Timucua treatments, a catalyst for colonial medical progress. After the Spanish destroyed Fort Caroline, French surgeons cared for Spaniards and Timucua alike at St. Augustine. French collaboration with Timucuan healers and later surgical support at the Spanish fort influenced the formation and persistence of St. Augustine, today the oldest city in the continental United States.

Keywords: Huguenots; Fort Caroline; St. Augustine; Timucuan medicine; colonial medicine

Historical Background

Spanish forces led by Pedro Menéndez de Avilés established a colony at St. Augustine in 1565 that predated the famous British settlements at Jamestown, Virginia in 1607 and Plymouth, Massachusetts in 1620. Menéndez de Avilés’ became Florida’s founding colonial governor after forty years of conquistador voyages sponsored by the Spanish crown. From 1513 to 1559, the militia of Ponce de Léon, Narváez, De Soto, Cáncer, and De la Trémoille founded colonial governor after forty years of conquistador expeditions. The deaths of Ponce de Léon and Hernando De Soto highlighted limitations that prevented early Spanish efforts at Florida colonization.

Frequent food and medical supply shortages also hastened the deterioration of Spanish militia in precolonial Florida. Without adequate food or potable water, health dwindled and fevers became endemic among Hernando De Soto’s men. At one point during their trek, De Soto’s men fled from the natives into the Gulf of Mexico. His soldiers ate their horses as a last ditch effort to provide them the nutrition and strength to escape alive. Conquistador expeditions often lasted for several years on uncharted land, adding a dimension of logistic complexity that afforded few opportunities for supply reinforcements. Native tribes understood that medical supplies were scarce, crucial for survival, and conspired on several occasions to burn Spanish surgical supplies in retaliation for conquistador brutality.

Conquistador fleets often explored the interior of Florida with few surgeons and no nursing personnel. One extant narrative from the De Soto expedition noted, “There was not in the whole army more than one doctor, and he was not so skilful and diligent as was needed; on the contrary, he was stupid and practically useless.” Later, the expedition scribe described a surgeon who the soldiers distrusted. In reference to one soldier’s experience with the expedition surgeon, he became, “…Enraged at the clumsiness of that gentleman’s hands, [and] most insultingly told him that even though he knew himself to be dying, he would never call upon the surgeon again.” When medical attention was nowhere to be found, some Spanish soldiers entrusted native women with combat wound care. After one battle during the De Soto expedition, Spaniards “took the women and divided them among the most seriously wounded, in order that they [the women] might nurse them [Spanish soldiers].” It remains unclear if the conquistadors enslaved, employed, or exchanged goods for nursing services from the native women.

Firsthand accounts of trauma, contagious disease, starvation, and lackluster medical care trickled back to the Spanish crown. In 1561, King Philip II of Spain decided that settling Florida was no longer worthwhile and suspended all plans for future conquistador expeditions. Spain temporarily abandoned Florida, yet remained active in the New World with successful missions flourishing across the Caribbean, Central America, and South America. Without Spanish occupation, other Europeans began to express imperial interest in the Florida peninsula. In June 1564, French fleets made remarkable colonial progress along the unsettled northeastern coast of Florida under the guidance of René Laudonnière. His voyage led a French Protestant group collectively known as Huguenots in constructing and populating a fort near the mouth of a river many historians place at the St. John’s River near modern-day Jacksonville. They christened the settlement as Fort Caroline (Figure 1), making it the first fortified European settlement in the continental United States a French entity.

French-Timucuan Medical Exchange at Fort Caroline

Fort Caroline blossomed as the French forged amicable relationships with the native Timucua tribe. The French were far less military-centric than Spanish conquistadors and satisfied with living free of religious persecution in Florida. French colonists did not strive to conquer the entire peninsula, nor did they take efforts to enslave and religiously convert natives. The friendly disposition of the French earned them access to native food supplies. Timucua healers went to great lengths to instruct the Huguenots at Fort Caroline on methods for using local plants to make medicinal treatments for their ill settlers. One of the most important herbal medications introduced to the French was derived from the sassafras plant (Figure 2). The natives taught the French to take sassafras roots and brew medicinal teas. They used sassafras for nearly every ailment, believing in its ability to renew a person’s strength and help them overcome periods of illness. Fevers and dysentery weakened European settlers in the New World, leaving...
them without an appetite and vulnerable to further disease. Sassafras administered as a tea seemed to stimulate their appetite and ultimately restore vitality. The act of brewing sassafras roots also killed most of the microbes in the water supply, thereby reducing the risk of water-borne illnesses. Enamored by the wondrous drug, colonists at Fort Caroline shipped several loads of sassafras roots back to France. As time went on, sassafras gained popularity in both the New World and across Europe. While sassafras became the paramount plant for treating illnesses, the Timucua shared another tea known as casina that gained popularity among French settlers as a medicinal supplement for daily consumption. The potent, highly caffeinated “black drink” had the power to suppress the appetite and fortify the constitution of those who drank it. The casina elixir enabled settlers to continue laboring, scavenging, and skip meals when food became scarce. Without these Timucuan medications, illness and starvation might have led the French to abandon Fort Caroline.

In addition to the new medications acquired at Fort Caroline, the French brought an essential member of the healthcare team that the Spanish conquistadors before them did not emphasize. Captain Laudonnière brought a handmaid who served as a nurse in Florida. He mentioned in his journals she was, “a nurse for the soldiers in their sickness as well as my own sickness.” He discussed her instrumental role in life at Fort Caroline where she was “esteemed by each of the men” for her nursing. In little more than one year, the French created a settlement that integrated a European surgeon and nurse with Timucuan health beliefs and practices.

Huguenot survival and integration with the Timucua gained attention from the Spanish and swayed them to reconsider their laissez-faire stance on Florida the following year. On August 28, 1565, the feast day for St. Augustine of Hippo, a fleet of Spanish galleon directed by Pedro Menéndez de Avilés approached the Florida coast and made plans for invasion. Their raid on Fort Caroline resulted in French massacre, sparing only a few Huguenots who remained in custody of Spanish militia. The surviving French played an essential role in relaying information to the Spanish regarding nutrition, medicinal plants, treatment methods, and health rituals they learned from the Timucua at Fort Caroline.

Following Menéndez de Avilés’ massacre at Fort Caroline, the remaining French became medical liaisons who enlightened the Spanish militia at St. Augustine with their knowledge of local pharmaceutical plants and health rituals. A noteworthy 1565 medical tome published in Spain alluded to the French influence on medicine in St. Augustine. Spanish physician Nicolás Monardes wrote a monograph entitled Historia medicinal de las cosas que se traen de nuestras Indias Occidentales (Medical study of the products imported from our West Indian possessions) that became famous as the first comprehensive book about medicines from the New World (Figure 3). Within his work, a twenty-page discussion on sassafras revealed, “a Frenchman which had been in those parts [Florida], showed me a piece of it, and told me of its virtue thereof.” He went on to say that “After the Frenchmen were destroyed, our Spaniards began to ware very sick, as the Frenchmen had been, and some of which [French] remained, did show it [sassafras] to our Spaniards, and how they had cured themselves with the water of this marvelous tree… Our Spaniards began to cure themselves with the water of this tree, and it wrought in them great effects that are almost incredible.” Given the imperial rivalry between the Spanish and French, it was remarkable for a Spanish physician to credit the French with passing New World medical wisdom of Frenchmen during this period.

A similar series of events transpired for the utilization of “black drink” in St. Augustine. Throughout Florida’s colonial period, there were continual references to the habitual use of casina as a health supplement. A 1595 report from Florida noted that the Spaniards drank casina every day. A later account commented with satire that the only local products used by Spanish families in Florida were corn and casina. The Spanish revered the potent tea to the extent that they sent two native Florida Timucua back to Spain to cure the Canon of Seville of urinary tract disease, likely secondary to ureteral and bladder stones, with the diuretic casina.

Figure 2: Sassafras plant, drawn by Spanish physician Nicolás Monardes.

Figure 3: Folio within Nicolás Monardes’ 1565 monograph referencing the French acquisition of sassafras at Fort Caroline.
French Surgeons in Early St. Augustine

Medications were not the only French marks on medicine in sixteenth-century St. Augustine. Spanish authorities knew the liberty to import French surgeons to their fledging military town. Spanish ship surgeons passed through St. Augustine, but their presence often transient and short-lived. No salary or benefits package was large enough to keep a Spanish doctor stationed in the rural, dirt road, tidal marshland of St. Augustine. Spaniards addressed their doctor shortage in part by capturing French doctors and holding them as prisoners who then provided healthcare for the community.22

After the demise of Fort Caroline, the French continued efforts to become stakeholders once again along the Atlantic coast of the Florida territory. By the 1570s, the coast became peppered with Spanish and native outposts, but French ships sailed upon unclaimed land in central estuaries where they could settle and rebuild. One severe storm in the winter of 1576 blew a French ship named Le Prince ashore near Santa Elena, a Spanish post in modern-day South Carolina. Natives killed many of their crew and enslaved those who remained. Forty prisoners from the shipwreck lived and worked for the local tribe. In August of 1579, Florida governor Menéndez Marqués commanded an army that raided their village. Spanish forces kidnapped the native chiefman’s mother, wife, and sister and later released them in exchange for the surgeon’s appeal for a higher salary. The monarch returned the twenty-ducat request with an offer for ten ducats, still two-and-a-half times Le Compte’s original salary.

Le Compte’s work in St. Augustine represented a great deal of irony. The Spanish were not allies with France, but they were unable to recruit a competent doctor to their new Florida colony. It speaks volumes that Spanish authorities needed to capture a surgeon and hold him as prisoner in order to keep a resident doctor in St. Augustine. He did not practice medicine exclusively alone, but his support system of assistant surgeons and apothecaries were not as skilled. In an August 1583 letter Governor Menéndez Marqués wrote to the Crown, he mentioned Le Compte as the Frenchman who is “a surgeon, of which there are none Spanish in this land who are worth anything.” Not only was their medical competence questionable, but they came and went with each new breeze that brought ships through the mouth of the Matanzas River. The King wanted French prisoners like Le Compte sent to Spain, presumably for trial, but Governor Menéndez Marqués would not relinquish Florida’s only doctor. He believed that if Le Compte left St. Augustine, “he would be very much missed, and so I determined this time to leave him here.”23

Three other unnamed French surgeons appeared in letters during the latter half of the sixteenth century, demonstrating St. Augustine’s reliance on their training to meet their town’s healthcare needs as well as the demands of Spanish medical regulations that called for the provision of a surgeon at each Spanish military fort.

Conclusion

St. Augustine’s resilience through numerous fever epidemics and periods of famine speaks volumes of their community’s ability to overcome forces of disease with limited resources. Although the Spanish Empire oversaw an unprecedented system of regulated healthcare in their Caribbean settlements, delivering care on Florida’s peninsula presented unique challenges. The development of sustainable healthcare hinged on the difficult order of having navigators recruit surgeons to the nascent coastal colony. Shipments of medications and surgeons were unpredictable, forcing the Spanish to rely on native remedies passed along through the few French Huguenots who remained after the Fort Caroline massacre. During their short occupation of northeast Florida, they endeavored to understand Timucuan methods for medicine and healing, which included novel sassafras and casina medicinal teas, as well guiding them towards many other medications already introduced to Europeans elsewhere in the New World. To remedy the doctor shortage, a few French surgeons were held as prisoners during the early days of St. Augustine, notably Jean de Le Compte who garnered respect as the only competent doctor in the colony during the last two decades of the sixteenth century. Huguenot-Timucua medical exchange as well as the service of French surgeons contributed to the health and success of St. Augustine in becoming the oldest city in the continental United States.

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Proceedings of the 2019 FIU Herbert Wertheim College of Medicine Research Symposium & Awards Ceremony

"Heart No. 1" by Emily Geisler
M.D. Candidate, Class of 2020
Florida International University
Cross published in Eloquor, 2016
Friday, April 26, 2019

Student Academic Success Center

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AOA KEYNOTE SPEAKER BIO

ROBERT SACKSTEIN, M.D., Ph.D.

Robert Sackstein, M.D., Ph.D., is Dean of the Herbert Wertheim College of Medicine and Senior Vice-President for Health Affairs at Florida International University. He is also a Professor Emeritus at the Harvard Medical School, where he continues to serve as the Director of the Harvard Career Development Program in Translational Glycobiology. Dr. Sackstein’s clinical expertise is bone marrow transplantation, and he is widely recognized for his contributions to cell-based therapeutics. His scientific research efforts have defined the molecular processes that regulate the movement of cells in blood into different tissues throughout the body, and clinical applications of his research findings have led to improved outcomes for patients undergoing bone marrow transplantation, and for patients suffering from a variety of illnesses including cancer, autoimmune conditions, and osteoporosis.

Dr. Sackstein was born in Cuba and immigrated to Miami with his family in 1960. He attended Dade County public schools, and received his undergraduate degree in Biology from Harvard College, Summa cum Laude. Dr. Sackstein then obtained both his M.D. and Ph.D. degrees from the Harvard Medical School, where, upon graduation, he received the James Tolbert Shipley Prize for outstanding research. Dr. Sackstein was bestowed the Young Investigator Award from the International Society of Experimental Hematology for his pioneering work in identifying how blood-forming stem cells enter the bone marrow, the critical first hurdle in the success of bone marrow transplantation. These efforts placed him at the forefront of the field known as “translational glycobiology” and he is widely recognized for inventing a platform glycoengineering technology (known as “GPS”) that pilots the movement of blood-borne cells to sites of tissue injury. Based on his contributions to medicine and to medical science, Dr. Sackstein was elected as a member of the prestigious Association of American Physicians for his “pursuit of medical knowledge, and the advancement through experimentation and discovery of basic and clinical science and their application to clinical medicine.” Recently, he was awarded an honorary doctorate from the University of Murcia (Spain) for “improving the efficacy and safety of cell-based therapies, thereby enabling curative-intent treatments for a wide range of disabling and life-threatening diseases.”
A VERY SPECIAL THANK YOU

On behalf of the directors and participants of the Fifth Annual FIU Herbert Wertheim College of Medicine Research Symposium and the Department of Medical and Population Health Sciences Research, we would like to extend a warm thank you to the amazing judges and 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 the Second Annual Research Symposium Awards.

This symposium would not have been possible if it were not for their generosity with their time and expertise. They completed more than 240 abstract reviews and were tasked with judging the quality of more than 70 final presentations. Because of their efforts and support, this year’s symposium has proven to be the most successful to date.

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 Presentations I
Friday, April 26, 2019
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1:30 p.m. – 3:00 p.m. | SASC 160

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**Friday, April 26, 2019**

**12:00 p.m. – 1:30 p.m. | SASC 100**

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**O1**

**Race and prevalence of end-stage renal disease among U.S. type 2 diabetic patients with renal manifestations**


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

**Keywords:** ESRD, Race, Type 2 Diabetes Mellitus

**Introduction and Objectives:** Patients with Type 2 Diabetes Mellitus (T2DM) are at increased risk of developing microvascular disease, including chronic kidney disease (CKD). End-stage renal disease (ESRD) is a major cause of mortality among T2DM patients. Racial disparity in complications, especially ESRD, has been an ongoing issue and could be an important prognostic factor in these patients. Objective: To explore if there is an association between race and prevalence of ESRD among T2DM patients between age 15 and 64, with diabetic nephropathy.

**Methods:** We conducted a cross-sectional study (secondary analysis of National Hospital Discharge Survey [NHDS] data from 2010). Study population consisted of patients of age 15-64 from non-federal short-stay hospitals with confirmed diagnosis of T2DM and diabetic nephropathy. Our independent variable was race (white and non-white) and the outcome was prevalence of ESRD. We performed customary descriptive statistics and bivariate comparisons of distributions of control variables according to race and according to ESRD status. Both unadjusted and adjusted (multiple logistic regression) for potential confounders odds ratios (OR) and 95% confidence intervals between race and ESRD were computed.

**Results:** A total of 387 patients were included. With the exception of region of origin of cases there were no differences in the distribution of any control variables according to race nor according to ESRD status. There was no statistically significant relationship between race and the diagnosis of ESRD, and this estimation didn’t change even after adjusting for age (adjusted OR 0.95, 95% CI 0.53-1.76). Adjusted analysis also found a mildly elevated risk of ESRD in patients from age 40-54 years (adjusted OR 2.09, 95% CI 0.59-7.46), compared to patients between 15-39 and 55-64 years old.

**Conclusions-Implications:** We didn’t find evidence of a significant association between race and the prevalence of ESRD in T2DM patients with diabetic nephropathy. Due to insufficient statistical power and potential for selection bias, such an association cannot be ruled out. Further research with prospective collection of data, which allows for computing incidence rather than prevalence of ESRD is needed.

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**O2**

**The association between race and survival among pediatric patients with neuroblastoma in the US between 1973 and 2015**

Farouk Farouk, MS, Zaid Sheik, MS, Omar Vqar, MS, Grettel Castro, MPH, Grettel Castro, MPH, Noel C. Bareng, MD, MPH, PhD.

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

**Keywords:** Cancer, Child Health, Neuroblastoma

**Introduction and Objectives:** Neuroblastoma is the most common childhood cancer diagnosed during the first year of life and the third most commonly diagnosed childhood cancer overall. Information regarding the influence of race on survival among neuroblastoma patients is limited compared to other childhood cancers. This study investigates the association between race and 5-year cause-specific survival in pediatric patients diagnosed with neuroblastoma in the US between 1973 and 2015.

**Methods:** This was a retrospective cohort study using the Surveillance, Epidemiology, and End Result (SEER) database. Patients aged 17 and younger of Black, White or Asian Pacific Islander (API) race diagnosed with neuroblastoma from 1973-2015 were included (n=2,119). Those who had missing information and/or were diagnosed at autopsy were excluded. The exposure variable was race (White, Black, API), and the outcome variable was 5-year cause-specific survival. Covariates included age (<1 years, 1-4 years, 5-17 years), gender, ethnicity (Hispanic, Non-Hispanic), stage (localized, regional, distant, unstaged/unknown), tumor site (adrenal, non-adrenal), and year of diagnosis (1973-1999, 2000-2004, 2005-2015). Cox proportional hazard models were used to calculate unadjusted and adjusted hazard ratios with their corresponding 95% confidence intervals.

**Results:** After adjusting for potential confounders, there was not a statistically significant difference in the hazard of survival for blacks (HR 0.93, 95% confidence interval [CI] 0.74-1.16) or API (HR 1.02; 95% CI 0.76-1.37) compared with whites. In addition, patients diagnosed between 2000-2004 (HR 0.46; 95% CI 0.36-0.59) and 2005-2015 (HR 0.33; 95% CI 0.26-0.41) had decreased hazards of death when compared to patients treated during 1973 to 1999. Finally, patients with adrenal neuroblastoma were not found to have different survival when compared to those with a non-adrenal neuroblastoma (HR 1.16; 95% CI 0.99-1.36).

**Conclusions-Implications:** Our study did not find an association between race and 5-year survival among pediatric patients diagnosed with neuroblastoma. However, survival improved among all patients treated during 2000-2004 and 2005-2015, respectively, when compared with neuroblastoma patients treated before the year 2000. Future research that takes socioeconomic status, genetic factors, and changes in treatment into account should be conducted to further explore possible disparities by race.
Prescriptions of potentially inappropriate medications in older adults in the US: Results from the NAMCS 2013-2014
Rahil H. Shah, BS, Pooya Gumarsi, BS, Elan Bakpor, BA, Marcia H. Varella, MD, PhD, MHS, Pura Rodriguez de la Vega, MPH, Grettlo Castro, MPH, Jorge C. Mora, MD.
Herbert Wertheim College of Medicine, Florida International University, Miami, FL.

Keywords: Violence, Childhood, Depression

Keywords: Beers List, Potentially Inappropriate Medications, Geriatrics, Polypharmacy

Introduction and Objectives: The AmericanGeriatricsSociety (AGS) developed Beers Criteria for potentially inappropriate medications (PIMs), in which the risks outweigh the benefits in the elderly population. Yet, studies have shown that 42% of elderly American adults from 2006-2010 were prescribed at least one medication on Beers List. Objective: To assess the frequency of PIM use, and to determine if selected patient characteristics are associated with PIM prescriptions in adults 65 years or older in the United States.

Methods: We analyzed cross-sectional data from the 2013 and 2014 National Ambulatory Medical Care Surveys (NAMCS). All patients 65 years and older were included (n=25,506). We assessed the association of being prescribed a PIM with the following patient characteristics: polypharmacy (use of ≥5 medications), race/ethnicity, age, gender, source of payment, and physical activity. In this study, we defined polypharmacy as use of ≥5 medications. We used multivariable logistic regression to determine if selected patient characteristics are associated with PIM prescriptions in adults 65 years or older in the United States.

Results: We found that 14% of patients in our study received PIMs. The risk of being prescribed a PIM was highest for the lowest income (95% CI=1.05-1.3) compared to normal weight women. At lower levels of maternal income, obese women had a higher hazard of breastfeeding cessation compared to normal weight women (HR=1.56, 95% CI=1.15-2.12). At lower income levels, there was no difference in cessation of breastfeeding (HR=0.93, 95% CI=0.71-1.23). At higher income levels, obese women had a higher risk of breastfeeding cessation compared to normal weight women (HR=1.48, 95% CI=1.04-2.1). After adjusting for confounders, the HR was 1.13, 95% CI=1.01-1.27, for white obese women. Conclusions-Implications: Higher maternal prepregnancy BMI negatively impacts breastfeeding practices, and the impact is highest for white and black women. Health care providers and policy implementers can target these at risk populations to improve breastfeeding rates and reduce disparities. KEYWORDS: breastfeeding, breastfeeding, pregnant, pregnancy, body mass index (BMI), pregestational BMI, obesity, income, socioeconomic status, education, race, ethnicity, breastfeeding, race, obesity.

Association between prepregnancy BMI and breastfeeding initiation and duration by household income level and race/ethnicity
Christianna Carr, BA, Schuyler Hood, MS, David Lipsa, MS, Grettlo Castro, MPH, Juan M. Lozano, MD, MSc, Marcia H. Varella, MD, PhD, MHS.
Herbert Wertheim College of Medicine, Florida International University, Miami, FL.

Keywords: Breastfeeding, Pregnancy, Body Mass Index (BMI), Income, Socioeconomic Status

Introduction and Objectives: Maternal obesity has been consistently correlated with decreased incidence and duration of breastfeeding. Social determinants of health, including household income level and race/ethnicity, play a role in breastfeeding practices; however, the interaction between these factors and obesity regarding breastfeeding practices is less well explored. Aims: To assess if household income or race/ethnicity modify the association between maternal prepregnancy BMI and initiation and duration of breastfeeding.

Methods: We utilized data from the US infant Feeding Practices 2 (IFP-2, 2005-2007). Our independent variables were maternal prepregnancy BMI and the dependent variables were ever breastfeeding and duration of breastfeeding in weeks. Effect modifiers explored include household income as % of poverty line (<100%, >100% to ≤200%, >200% to 300%, >300% to 400%), and maternal race/ethnicity (white, black, Hispanic, other). Independent associations were assessed using multivariable logistic regression for the outcome ever breastfeeding and Cox proportional hazard model logistic regression. Results: Being obese was associated with decreased odds of breastfeeding initiation (OR=0.76, 95% CI=0.50-1.19) and Cox proportional hazard model logistic regression. Conclusions-Implications: Women with BMI ≥25 have higher hazards of breastfeeding cessation than those of white women (HR=2.8, 95% CI=1.4-5.36 for black overweight, HR=2.21, 95% CI=1.04-4.7 for black obese, and HR=1.13, 95% CI=1.01-1.27 for white obese) and for women in lower household income levels (HR=1.48, 95% CI=1.04-2.1). Conclusions-Implications: Higher maternal prepregnancy BMI negatively impacts breastfeeding practices, and the impact is highest for the lowest income and black women. Health care providers and policy implementers can target these at risk populations to improve breastfeeding rates and reduce disparities. KEYWORDS: breastfeeding, breastfeeding, pregnant, pregnancy, body mass index (BMI), prepregnancy BMI, obesity, income, socioeconomic status, education, race, ethnicity.

Lost in translation: The effect of interpreter use on colorectal cancer screening in North Miami-Dade
Thomas Cowan, BS, Pamela Duarte, BS, Franklin Zheng, BS, Michelle Arevalo, MS, MD, MHS, Juan G. Ruiz, MD, MMedSci
Grettlo Castro, MPH, Melissa Ward-Peterson, MPH, PHD, Pura Rodriguez de la Vega, MPH.
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Keywords: Colorectal Cancer Screening, Interpreter, Translator, Language, North Miami

Introduction and Objectives: In the United States, colorectal cancer (CRC) is the second leading cause of cancer death. The US Preventive Services Task Force (USPSTF) recommends screening in persons aged 50-76 years. Yet, screening rates are suboptimal in the Hispanic population, with only 50% of eligible Hispanic patients reporting adherence to screening guidelines in the National Health Interview Survey in 2015. Language has been proposed to be a crucial determinant of the utilization and quality of health services delivered to patients with limited English proficiency. Aim: To determine if interpreter use by North Miami-Dade households whose primary language was not English was associated with ever receiving CRC screening.

Methods: We performed a secondary analysis of data from the North Miami Benchmark Survey conducted between 2009 and 2010. This was a cross-sectional study of a representative sample of households (survey response was 79%). We included all households who reported a language other than English as their primary language and had at least one household member 50 years of age or older. The exposure variable was self-reported interpreter use in a medical visit. The outcome was CRC screening at any point in a household member’s life. The independent association between interpreter use and colorectal cancer screening was assessed using multivariable logistic regression via SPSS software v20 at an alpha level = 0.05.

Results: Of the 1,845 households who completed the survey, 309 were eligible for this study. Approximately 40% of eligible households reported CRC screening. About 10% (n=31) used interpreters. The screening frequency was 35.5% for households who used interpreter and 40.7% for households who did not use interpreter. The unadjusted odds ratio (OR) between CRC screening and interpreter use was 0.80 (95% CI=0.37-1.74). After adjusting for socioeconomic status, education, and insurance status, the adjusted OR was 1.02 (95% CI=0.31-3.35). Households reporting a gap in insurance coverage within the last 12 months had borderline significance for less CRC screenings (adjusted OR 0.52, 95% CI = 0.25-1.06).

Conclusions-Implications: Interpreter use was not found to be associated with CRC screening in households from North Miami. Further studies need to be conducted assessing standardized healthcare interpreters to confirm the results. Keywords: colorectal cancer screening, colorectal cancer, CRC, colonoscopy, sigmoidoscopy, fecal occult blood testing (FOBT), interpreter, translator, language, communication barriers, limited English proficiency, language discordance, North Miami, Miami-Dade County, and South Florida.

Association between knowledge of zika transmission and preventive measures and Latinas’ perceived childbearing age in farm working communities in South Florida
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Keywords: Latinas, Knowledge, Prevention, Transmission

Introduction and Objectives: Zika virus is a public health problem because the virus causes birth defects and is difficult to track socioeconomic status, education, race, ethnicity. Currently, there is no vaccine; therefore, use of preventive measures is the only method of avoiding transmission of Zika virus. The aim of this study was to evaluate the association between knowledge of zika transmission and the use of preventive measures taken. Methods: A secondary data analysis was performed on a cross-sectional study, carried out on a convenience sample of 100 Latina women aged 18-50 years who lived in or near farm working communities of South Florida. Three women who declared not having ever heard about Zika were excluded. It was hypothesized that there would be an association between knowledge of zika transmission and quality of preventive measures taken. Exposure variable was knowledge about preventive measures obtained from answers to specific questions about mode of transmission, and categorized as no knowledge, low and high level of knowledge. The outcome was the reported use of practices for initiation of breastfeeding as a method of avoiding Zika infection. Effect modifiers included demographics and socioeconomic status, English proficiency and perception of Zika related risk. Both crude and adjusted ORs were computed. The independent association between knowledge of Zika transmission and preventive measures taken was assessed using multivariable logistic regression via SPSS software v20 at a alpha level = 0.05.

Results: In total, 69% participants demonstrated a high degree of knowledge of Zika transmission and 68% were categorized as having taken good preventative measures. After adjusting for confounders, the HR was 3.89 (95% CI=1.10-13.73). Conclusions-Implications: Higher maternal obesity negatively impacts breastfeeding practices, and the impact is highest for white and black women. Health care providers and policy implementers can target these at risk populations to improve breastfeeding rates and reduce disparities. KEYWORDS: breastfeeding, breastfeeding, pregnant, pregnancy, body mass index (BMI), prepregnancy BMI, obesity, income, socioeconomic status, education, race, ethnicity. Florida Medical Student Research Journal 2019 82 April 2019 Florida Medical Student Research Journal 2019 83 April 2019
Seroepidemiology of Burkholderia pseudomallei, etiological agent of melioidosis, in the Ouest and Sud-Est Departments of Haiti

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Keywords: Haiti, Melioidosis, Seroepidemiology, Burkholderia Pseudomallei

Introduction and Objectives: Burkholderia pseudomallei, the etiological agent of melioidosis, has been hypothesized to be endemic throughout the Caribbean, including the impoverished nation of Haiti. However, due to the protean clinical manifestations, presence of asymptomatic infections, and limited medical diagnostic capacity, the identification of active melioidosis cases remains challenging. The objective of this study was to use a serological data collected from a large sample of native Haitians to provide evidence of 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 asymptomatic population members (n=775) from three clinics in the Ouest Department of Haiti and was screened for polyvalent (IgM/IgG/IgA) and monovalent (IgG or IgM) immunoglobulins. Seroepidemiological population members were defined by a threshold absorbance value greater than or equal to the three standard deviations above the sample population average. The number of IgG and IgM positives were tabulated according to area, gender, age, race/ethnicity, region, and school attendance variable. Logistic regression was used to determine the association between seroprevalence and demographic factors; multiple logistic regression was used to adjust for potential confounding and included all variables.

Results: The population seroprevalence 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 significantly different by gender (p=0.0173), but not significantly different by age (OR 1.72, 95% CI 1.05, 2.84 P=0.04). Conclusions-Implications: The detection of both recent (IgM) and previous (IgG) exposure to B. pseudomallei provides epidemiological evidence that melioidosis is endemic in Haiti and supports the hypothesis that B. pseudomallei is present throughout the Caribbean. These findings should encourage environmental sampling efforts and increase the level of clinical suspicion for melioidosis cases in Haiti.

ORAL ABSTRACTS

07

Maternal education level and human papillomavirus (HPV) vaccination series initiation in adolescent females

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Keywords: Adolescents/Female, Papillomavirus Vaccines/Administration and Dosage, Health, Knowledge, Attitudes, Practice, Uterine Cervical Neoplasms/Prevention and Control, Patient Compliance/Statistics and Numerical Data

Introduction and Objectives: Rates of vaccination against human papillomavirus lag behind those of other readily available childhood vaccines. The scientific evidence in regards to an association between maternal education and HPV vaccination is inconsistent. The aim of the study was to determine the association between maternal education and human papillomavirus (HPV) vaccination series initiation in adolescent females.

Methods: This cross-sectional study analysis used data provided by the Center of Disease Control’s National Immunization Survey (NIS-Teen) years 2008-2014. NIS-Teen is a random-digit-dialing survey conducted in the United States and Puerto Rico consisting of an initial telephone call to a random sample of adults aged 18 years or older with parents of adolescents. Inclusion criteria were female sex, age 13-17 years and participation in NIS-Teen. Exclusion criteria were non-completion of telephone survey and participating as part of non-state estimation areas. The exposure variable of the study was maternal education (measured in years). The main outcome variable was HPV vaccination initiation, defined as having received at least one injection of the complete three-injection HPV vaccine. Covariates included in the study were race/ethnicity, adolescent’s age, region, respondent type, maternal age, and maternal status. Unadjusted and adjusted logistic regression models were used to study the association between maternal education and HPV vaccination. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Results: A total of 9,445 respondents were included. Respondents with mothers who graduated college did not have increased odds of to be vaccinated than the reference group (OR 1.17, 95% CI=1.1-1.2). Participating with parents who did not complete high school were equally likely to be vaccinated as compared to those with higher education (OR 1.2, 95% CI=1.1-1.3). Participants with parents who completed some college, yielded similar results (OR 1.17, 95% CI 0.92-1.5). Fathers who responded to the survey had higher odds to report that their child had not completed their vaccinations (OR 0.78, 95% CI=0.64-0.96) than mother respondents.

Conclusions-Implications: Further study should assess whether maternal education status have different reasons for not vaccinating their daughter, and whether maternal education is associated with completion of the HPV vaccine.

08

Exploratory study of the association between selected demographic and socioeconomic factors and influenza vaccine uptake in U.S. adults

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Keywords: Influenza Vaccination, Vaccination Review, Social Determinants of Health, Cross-Sectonal, Demographics

Introduction and Objectives: Influenza vaccinations prevent hospitalizations and mortality due to flu. However, the rates of flu vaccine in the U.S. continue to fall below the Healthy People 2020 Goal (70% of the population). Therefore, this study evaluated associations between selected demographic, socioeconomic, and health-related factors associated with influenza vaccine uptake among U.S. adults.

Methods: We studied adult participants of the 2017 Behavioral Risk Factor Surveillance System (BRFSS). The main independent variables included demographic (age, gender, and race/Hispanic ethnicity) and socioeconomic (education status, income, and health status) factors. Health-related factors included diabetes (insulin, self-perceived health, comorbidities) were accounted for. The outcome was influenza vaccine uptake in the past year. Multivariable logistic regression analysis was performed to assess potential independent associations.

Results: Of the 304,582 participants studied, 46.5% received the flu vaccine in the past year. Factors independently associated with higher odds of flu vaccine uptake were age 65 years or older (odds ratio (OR)=2.2, 95% confidence interval CI [2.1-2.3]) being female (OR=.95, 95% CI [0.95-1.0]) and Asian/Pacific Islander (OR=1.1, 95% CI=1.0-1.2 compared to Whites, higher education (OR 1.1, 95% CI 1.0-1.1 and OR=1.5, 95% CI=1.5-1.6 for high school and college graduates, respectively, compared to high school graduates) and comorbidities (strongest association found for prevalent diabetes, OR=1.5, 95% CI=1.5-1.6). Lower independent odds of vaccine uptake were found for Black race (OR=0.7, 95% CI=0.7-0.8 compared to Whites) and “Other” race (OR=0.8, 95% CI=0.8-0.9 compared to Whites), age younger than 65 (OR=1.9, 95% CI=1.8-2.0 for the group of income between $15,000 and $25,000 compared to income between $35,000 and $50,000), not having health insurance (OR=0.8, 95% CI=0.9-0.9), yearly income lower than $25,000 (OR=0.9, 95% CI=0.9-1.0) for the group of income between $25,000 and $50,000 compared to income between $75,000 and $100,000, not having health insurance (9.6, 95% CI=9.5-9.7), and older intervals since last health check-up (OR=0.3, 95% CI=0.3-0.3 for check-up within >5 years compared to those who did check-up in past year).

Conclusions-Implications: The results suggest that groups traditionally targeted for influenza vaccination including the elderly and those with special health care needs have the unique advantage of being vaccinated. Additionally, women and those with higher income and educational level have higher odds of vaccination. Groups with the lowest odds of vaccine inclusion those with the greater than a year since last health check-up, those without health insurance, those of Black or “Other” race, and those without a college or technical school degree. This provides preliminary data that can be used to design interventions for at-risk populations identified.

09

Pseudo-progression of Merkel cell carcinoma after avelumab therapy

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Keywords: Merkel Cell Carcinoma, Pseudo-Progression, Immunotherapy, Avelumab, Immune-Related Response Criteria

Introduction and Objectives: The introduction of immunotherapies for the treatment of cancer has required the development of new diagnostic criteria to distinguish pseudo-progression from true progression. This case report describes a patient with Merkel cell carcinoma (MCC) treated with Avelumab (anti-PDL1 monoclonal antibody) who by the time he experienced an alarming increase in the size of his tumor followed by a near-complete response.

Case Presentation: The patient is a 69-year-old man who developed a painful erythematous cutaneous nodule underlyng a foream cast at the base of the right thumb. The lesion was excised and pathology was consistent with MCC. A PET/CT demonstrated a suspicious hypermetabolic lymph node in the right axilla which, after biopsy, was confirmed MCC. The patient was not a surgical candidate, so therapy with Avelumab was initiated. After three doses the node had increased in prominence. Repeat PET/CT demonstrated increased metabolic activity around the lesion, as well as in two right axillary lymph nodes. Avelumab was held and surgery was planned pending cardiac clearance. Two days prior to surgery there was dramatic near-complete regression of the lesion and significantly decreased axillary lymphadenopathy on exam. The decision was made to postpone surgery and reinstate Avelumab.

Conclusions-Implications: With recent FDA approval for the use of immunotherapies in MCC, data and clinical anecdotes regarding their responses in MCC are limited. Currently, no literature exists describing a pseudo-progression response to Avelumab or any other immunotherapies in patients with MCC. Because the incidence of pseudo-progression is relatively low and most cases of disease progression are true progression, it is important for physicians treating MCC to be familiar with the unique response patterns. Future studies investigating biochemical or radiologic markers to differentiate pseudo-progression from true progression are needed.
Race/ethnicity and the primary anatomical location of cutaneous melanoma in Florida patients

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Keywords: Melanoma, Dermatology, Ethnicity, Skin Cancer, Sun Protection

Introduction and Objectives: Melanoma is responsible for the majority of skin cancer deaths. Florida ranks second among US states for incidence of melanoma cases. Melanoma has been found to differ in location depending on patients’ race or ethnicity. With Florida’s ethnically diverse population, we sought out to compare the incidence of melanoma by anatomical location amongst the different race/ethnicities.

Methods: We used data from adult patients with melanoma from the Florida Cancer Data System (1984-2014). The independent variable was race/ethnicity [White Non-Hispanic (WNH), White Hispanic (WH), and Black Non-Hispanic (BNH)]. The dependent variable was the primary anatomical location of the melanoma (Face, Neck/Scalp, Upper Limbs, Trunk, and Lower Limbs). Multivariable multinomial logistic regression was used to determine the independent associations.

Results: We studied 36,713 melanoma cases. About 97% of patients were WNH. WH and BNH were 3% each. Race/ethnicity was associated with differences in the location of melanoma. BNH had the highest incidence of melanoma in the lower limbs and shoulders (OR=5.92, CI=5.05-6.93), but there was no evidence for effect modification. Other variables that were used to determine adjusted odds ratios (AOR).

Conclusions: The association between cutaneous melanoma and race/ethnicity remains an area of research that warrants further investigation. Physicians should tailor their approaches to the primary anatomical location of the melanoma according to race/ethnicity. Physicians should tailor their approaches to the primary anatomical location of the melanoma according to race/ethnicity. Physicians should tailor their approaches to the primary anatomical location of the melanoma according to race/ethnicity. Physicians should tailor their approaches to the primary anatomical location of the melanoma according to race/ethnicity.
BMI categories. It appears that a moderately high BMI may be protective in recovery. While morbid obesity is a risk factor for hypertension (OR 1.3; 95% CI 1.2-1.5), COPD (OR 1.9; 95% CI 1.3-95% CI 1.1-1.4), black (OR 1.4; 95% CI 1.2-1.6), or had a chronic infection and sick visits in the past year among 6-year-olds. However, they did not include ER visits for acute illness. Therefore, we examined the association between breastfeeding duration, and total acute care visits for illness (sick visits + ER visits) during the same time period.

Methods: A historical cohort was assembled using data from the CDC’s Infant Feeding Practices Study and its Year Six Follow-Up dataset. Records from mother-infant dyads who provided information on variables of interest at the Year 6 Follow-Up survey were included. Exposure was breastfeeding during the first year of life by mother-infant dyads for less than or equal to 6 months, and more than 6 months breastfeeding. Outcomes of interest at the age of six were: a) total number of acute care visits in the preceding year (sick visits + ER visits for acute illness) and b) ER visits for acute illness. By fitting multivariate binomial regression models, crude and adjusted measures of association (incidence rate ratios and 95% confidence intervals) were computed.

Results: Our sample included 1,444 mother-child dyads. After adjusting for potential confounding factors (zero-inflated negative binomial regression for total visits, and Poisson regression for ER visits) we found that when comparing children who were breastfed for 6 months or more and those who were never breastfed, incidence rates of total visits for both acute care and emergency room care decreased by 17% (IRR: 0.83, p: 0.045) and by 47% (IRR: 0.53, p: 0.058) respectively.

Conclusions-Implications: The rates of total acute care visits and ER visits are significantly lower among children of mothers who breastfed for more than 6 months as compared to mothers who never breastfed. We did not find evidence for effects of breastfeeding for 6 months or less as compared to never breastfeeding, but we cannot rule out such an effect. This highlights the importance of breastfeeding past 6 months for proven long-term health benefits. This may be due, in part, to the impact of extended breastfeeding on immune development. Future research with higher power should test whether there is some effect of shorter breastfeeding duration on long-term immune system. The final objective in this line of research is to reduce child morbidity and the associated burden on the healthcare system.

Introduction and Objectives: Secondary lymphedema, a common sequelae of breast cancer therapy, affects up to 200 million people worldwide and 3 million people in the United States. There is currently no curative treatment. Previous studies have demonstrated the efficacy of 9-cis Retinoic Acid, a vitamin A metabolite, in the prevention of secondary lymphedema through its pro-lymphangiogenic properties. The purpose of this study was to determine the minimal effective dosing regimen of continuous 9-cis Retinoic Acid for clinical and functional improvement of postsurgical lymphedema.

Methods: Lymphedema was induced in the tails of 50 C57BL/6 mice through microsurgical ablation of deep lymphatic vessels. The mice received daily intraperitoneal injections of either 100 µL vehicle solution (90 µL 0.8% saline and 10 µL 100% ethanol), 0.8 mg/kg 9-cis Retinoic Acid (9-cis RA) dissolved in 100 µL of vehicle solution. The animals were randomly assigned to one of five groups: control (vehicle for 45 days following surgery), 7 day (9-cis RA for 7 days), 14 day (9-cis RA for 14 days), 45 day (9-cis RA for 45 days), and delay (9-cis RA for 7 days beginning one week after surgery). All interventions were administrated on post-operative day (POD) 1. On POD 45, indocyanine green (ICG) lymphangiography was performed. Lymphatic fluid clearance was quantified over time using ICG imaging, and student-t tests were calculated between each group at various time points using GraphPad Prism 7. Animals were photographed every 7 days, and tail diameter was measured using ImageJ. Tail volume was then calculated using a truncated cone formula, and percent change in tail volume was recorded. Animals were sacrificed on POD 47. Tail and skin specimens were harvested, sectioned, and stained with hematoxylin and eosin. Dermal and epidermal thicknesses were measured using ImageJ. All measurements were taken by a blinded researcher, and all statistical analyses were performed using GraphPad Prism 7.

Results: At day 42, tail volume was significantly lower in the 45-day (p<0.0001) and delay (p<0.005) groups compared to control. A thinner epidermal layer was also observed in the 7-day (p<0.05), 14-day (p<0.0001), 45-day (p<0.001), and delay (p<0.001) groups.

Conclusions-Implications: Consistent with our previous studies, 9-cis Retinoic Acid treatment for 45 days resulted in significantly decreased tail volume and improved lymphatic function, as demonstrated by the significantly improved indocyanine green clearance. These results suggest that a dosing regimen involving continuous post-operative 9-cis Retinoic Acid administration may be a useful and efficacious treatment to prevent secondary lymphedema.
Introduction and Objectives: The aim of current influenza A virus (IAV) vaccines is to induce neutralizing antibodies against surface proteins of circulating IAV strains. This type of protection, known as ‘homotypic’ immunity, is only effective against IAV subtypes recognized by these neutralizing antibodies, and fails to protect if the vaccine does not match circulating IAV strains. However, it is well established that T cells can also provide immunity against IAV and, unlike antibodies, T cells can recognize internal viral proteins shared across diverse IAV subtypes. This form of protection is known as ‘heterosubtypic’ immunity. The cytokine interleukin 21 (IL-21) is best known to aid in optimal immunity by stimulating development of antibody responses. However, IL-21 also plays diverse roles in some models of infection in the function and survival of anti-viral T cells. Here, we examine the role of IL-21 in murine models of homotypic and heterosubtypic immunity against IAV.

Methods: Wild type (WT) or IL-21 receptor knock-out (IL-21r−/−) C57BL/6 mice were primed with a sub-lethal dose of the mouse-adapted IAV strain A/PR8 (H1N1) and challenged 28 days later with a lethal dose of A/PR8, or of the heterosubtypic IAV strain A/Philippines (H3N2). After challenge, mice were monitored for weight loss and morbidity. In addition, to model current intranasal vaccine strategies, mice were primed with the cold-adapted, attenuated vaccine strain A/Alaska (H3N2) and challenged after 28 days with a lethal dose of A/PR8 or A/Philippines. To directly assess the role of IL-21 in viral clearance, pulmonary IAV titers were determined after heterosubtypic challenge by quantitation of viral copy number.

Results: We saw no impact of IL-21 on weight loss or recovery during priming of WT and IL-21r−/− mice. Similarly, primed IL-21r−/− mice were equally protected when challenged with a lethal dose of homotypic IAV compared to WT controls. However, following heterosubtypic challenge, IL-21r−/− mice showed increased weight loss and mortality versus WT controls. Similar patterns were seen after heterosubtypic challenge of mice primed with PR8 or vaccinated with A/Alaska. Finally, decreased protection in the primed IL-21r−/− mice correlated with increased viral titers compared to WT mice.

Conclusions-Implications: Surprisingly, although IL-21 is best known in supporting maximal antibody responses, IL-21r−/− mice showed no defects in homotypic immunity against IAV. Unexpectedly, the primed IL-21r−/− mice displayed increased weight loss and death following heterosubtypic challenge. These studies indicate that IL-21 may contribute more to mechanisms associated with heterosubtypic rather than homotypic immunity. Understanding how to best stimulate T cell-dependent heterosubtypic immunity may aid in the development of improved IAV vaccines. Therefore, our future studies will examine how IL-21 signals impact the generation and function of protective heterosubtypic CD8 and CD4 T cell responses against IAV.

P2
Investigation of fanconia anemia pathway downstream genes

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Introduction and Objectives: A key response mechanism to DNA damage is the Fanconi Anemia repair pathway (FA), which involves homologous recombination DNA repair and is activated through mono-ubiquitination of FANCD2. Impaired regulation of DNA repair results in genomic instability. FANCD2 is considered to promote cell growth through interactions with cell proliferation pathways. We hypothesize that FA deficient tumors have a low growth rate and reduced ability for DNA repair compared to FA functioning tumor cells. We aim to explore the association between the FA repair pathways and downstream genes involved in cell cycle regulation that influence tumor growth.

Methods: To generate FANCD2 knockdown cells, human lung cancer cell lines A549 and H1299 were transduced with FANCD2-specific short hairpin RNA (shRNA) expressing and puromycin-resistant lentiviral particles or control shRNA lentiviral particles. The cells were cultured in growth medium, and successful FANCD2 knockdown was confirmed by western immunoblot analysis. RNA deep sequencing was completed with Illumina RNA-Seq. We compared gene expression between knockdown FANCD2 and control samples across three cell lines and ranked significant gene expression changes, defined as a five-fold change in upregulation or downregulation. The fold change was calculated by dividing FANCD2 deficient expression by FANCD2 efficient expression.

Results: 13436 genes were evaluated across three cell lines and 17 genes demonstrated gene expression change by at least 5-fold with FANCD2 knockdown in all three cell lines. FANCD2 knockdown resulted in 14 downregulated genes and 3 upregulated genes. The downregulated genes RP11-618G20.1, RP5-1343606H22R10, RP11-219A15.1, XXbac-BPG32J3.20, and BMS1P17 demonstrated significant expression change across three cell lines. Of the 14 downregulated genes, 13 genes had literature supporting oncogenic function. Each upregulated gene had literature supporting oncogenic function.

Conclusions-Implications: As FANCD2 is considered to promote cell proliferation, downregulation of oncogenic genes expression was expected with FANCD2 knockdown. However, the literature suggested that the 3 upregulated genes with FANCD2 knockdown also have oncogenic function. These genes may have other functioning beyond the scope of carcinogenesis which may explain
Introduction and Objectives: Olfaction allows perception of our chemosensory environment. All odorant receptors and signal transduction molecules are compartmentalized in the cilia of olfactory sensory neurons (OSNs). Shortening or loss of olfactory cilia as the result of disease impairs odor detection illustrating their critical role in olfactory function. Although our understanding of olfactory cilia has grown, it remains unclear whether cilary morphology changes under varying conditions. Utilizing adenoviral ectopic expression and live confocal imaging, we thereby examined length and number in olfactory epithelia under various conditions. Overall expanding our knowledge of the structural features of olfactory cilia will provide us with a reference to understand structure-function relationship between cilia morphology and odorant detection.

Methods: In Face. Mice were anesthetized, decapitated, and split along the cranial midline. The olfactory epithelium was isolated and placed on a bath of 1x PBS in the imaging chamber. Samples were imaged on a Nikon TE-2000-U confocal microscope. Cilium Measurements. The turbinates were identified through the presence of the (10-22) u under epifluorescence. Individual OSNs without intact cilia were identified based on AV-mediated dye uptake. Confocal z stack images of OSNs were collected at 60x. Cilium length and counting measurements were performed on ImageJ.

Results: Mean cilia length and number per OSN showed no significant difference across all regions (F(7,137)=2.111, p=0.0463); (F(7,137)=2.57, p=0.031). Data of mean OSN cilium lengths and number in 24 hour 4% PFA drop fixed OEs compared to en face visualization (p=0.0001). Mean cilium length per OSN, showed no significant difference across the different age groups (F(3),488=0.736, p=0.531). Data of the mean cilia number per OSN, showed a significant difference between the 3-5 week-old mice and other ages (F(3),467=22.70, p<0.0001). Data of the mean cilia length and number per OSN showed no significant difference between male and female mice (t(136)=1.389, p=0.170). The mean cilia length and number per OSN showed a significant difference among the various strains (F(3),505=26.45, p<0.0001); (F(3),504=46.46, p<0.0001).

Conclusions-Implications: Ectopic expression of lipoid-anchored fluorescent probes allowed us to examine the endogenous structure of OSN cilia allowing us to determine that OSN cilia lengths and numbers are consistent across the olfactory and trigeminal regions of the OE. OSN cilia lengths and numbers were also consistent across ages and gender but differed across the various strains of mice. In addition, parameborahlyte fixation can disrupt endogenous cilia structure. By accurately classifying OSN cilia morphology, we hope to gain insight regarding the processing of olfactory input and cilia regulation as their presence in the OE is crucial for odor detection.

# P4 Determining differential effects of Interleukin-2 (IL-2) on immune cells in lymphoid organs and the gastrointestinal tract

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Keywords: IL-2, Crohns Disease, GI Tract, Immune Cells

Introduction and Objectives: Interleukin-2 (IL-2) is a pleiotropic cytokine that can be used to treat several different conditions. However, clinical use of IL-2 can be associated with severe side effects including gastrointestinal toxicity (GIT). Similar GIT symptoms are observed in inflammatory disease states such as Crohn’s disease (CD). Interestingly, mounting evidence indicates a role for IL-2 in CD, but the underlying mechanisms are unknown. Indeed, studies concentrating on the in-vivo activities of IL-2 have mostly focused on secondary lymphoid organs and immune cells associated with them. Very few studies have addressed how IL-2 signals impact populations of immune cells in the gut. Here, we aim to identify and compare the effects of systemic IL-2 administration on six nodes, Peyrāte Patches in gut-associated lymphoid tissues versus the secondary lymphoid organs.

Methods: Complaining recurrent IL-2 protein with certain neutralizing monoclonal antibodies increases the bioavailability of IL-2 and can be used to selectively target IL-2 to different cell populations. We therefore compared the impact of IL-2 on six different populations in the gut, including immune cells lining the gut lumen, gut-associated lymphoid tissues (GALT) and various stromal cells. The results show a decline in B cells, most notably in Peyer’s patches, in the gut and gut- associated lymphoid tissues (GALT) versus other secondary lymphoid organs (SLOs). We propose that the decrease in B cells in the gut is a result of disease impairment of IL-2 and can be used to selectively target IL-2 to different cell populations. Further, the decrease in B cells in the gut may be due to disease-related immunosuppression or drug treatment. Our data demonstrate that IL-2 administration can be used to target specific immune cell populations in secondary lymphoid organs, including gut-associated lymphoid tissues (GALT) and various stromal cells. The results show a decline in B cells, most notably in Peyer’s patches, in the gut and gut- associated lymphoid tissues (GALT) versus other secondary lymphoid organs (SLOs). We propose that the decrease in B cells in the gut is a result of disease impairment of IL-2 and can be used to selectively target IL-2 to different cell populations. Further, the decrease in B cells in the gut may be due to disease-related immunosuppression or drug treatment. Our data demonstrate that IL-2 administration can be used to target specific immune cell populations in secondary lymphoid organs, including gut-associated lymphoid tissues (GALT) and various stromal cells. The results show a decline in B cells, most notably in Peyer’s patches, in the gut and gut- associated lymphoid tissues (GALT) versus other secondary lymphoid organs (SLOs). We propose that the decrease in B cells in the gut is a result of disease impairment of IL-2 and can be used to selectively target IL-2 to different cell populations. Further, the decrease in B cells in the gut may be due to disease-related immunosuppression or drug treatment. Our data demonstrate that IL-2 administration can be used to target specific immune cell populations in secondary lymphoid organs, including gut-associated lymphoid tissues (GALT) and various stromal cells.
POSTER ABSTRACTS

P7
A long noncoding RNA of lung epithelial cells in cigarette smoke-associated COPD
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Keywords: COPD, Non-Coding RNA, Airway Epithelial Cells, Mucosa, Cigarette Smoke

Introduction and Objectives: Airway epithelial cells (AECS) are crucial for lung innate immunity and any dysregulation in AECS can lead to hyperreactive mucous response that is often observed in chronic obstructive pulmonary disease (COPD). Therefore, studies were conducted to help understand the molecular mechanisms responsible for the cigarette smoke (CS)-associated lung pathologies of the COPD patients.

Methods: RNA-seq analyses of AECS were conducted to identify mucosa-associated long non-coding RNA (lncRNA) species. The RNA-seq data was validated by qRT-PCR analysis of air-layer interface cultured AECS that were exposed to CS extract (CSE). The lncRNA expression was compared to the changes in cellular proliferation assays: MTT, CyQyant, Sphere forming assay, and cell cycle analysis by propidium iodide incorporation. Finally, in-vivo animal studies were performed to assess airway distribution of the lncRNA in COPD subjects.

Results: The newly identified putative IncRNA AC05 was more than 6-fold upregulated in human AECS showing increased mucous levels compared to the non-treated controls. The in-silico sequencing and annotation analysis revealed that this IncRNA is 32.4 kb long with 3 exons and 2 introns and has several splicing sites. This IncRNA had the highest expression profile in COPD tissue with a P value 0.008 and a fold change of -0.25. It was located in the airway epithelial cells of the GOLD stage-3 COPD patients.

Conclusions-Implications: Here, we report that a novel AECS-specific IncRNA could be responsible for the CS-associated mucous hypersecretivity in COPD patients. Studies are underway to investigate whether the lncRNA AC05 derived exosomal nRNA can be isolated from AECS in the airway epithelium of the GOLD stage-3 COPD patients.

POSTER ABSTRACTS

P8
Isolation and characterization of slow-cycling tumor initiation cells in mouse model of glioblastoma
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Keywords: Immunotherapy, Glioblastoma, Cancer-Stem Cell, KR158

Introduction and Objectives: Glioblastoma (GBM) is an aggressive primary central nervous system neoplasm. GBMs are the most common primary brain tumor that carries a fatal prognosis in almost all cases. Despite the poor one and five-year survival rates (36.5% and 5% respectively) what is most alarming is the stately nature of GBMs, in spite of associated with its poor clinical outcome. Many GBM pathologies are the result of uncontrolled cell proliferation. Here, we report that a novel AEC-specific IncRNA in GBM cells. Further, we determined these slow cycling cells are more resistant to therapy and successful isolation and removal of these cells may provide a new means of treatment. With these findings, we can continue using this cell line for testing various immunotherapeutic targeting modalities in immunocompetent animal models for evaluation of GBM therapies.

P9
Neurocognitive status of aviremic HIV+ subjects is associated with proteomic content of plasma /CSF-derived exosomal extracellular vesicles
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Keywords: Exosomes, Human Immunodeficiency Virus (HIV), Neurocognitive Status

Introduction and Objectives: Despite successful suppression of HIV viral load by anti-retroviral therapy (ART) to undetectable levels, many aviremic HIV-infected individuals still develop neurocognitive deficits. The mechanism of HIV-associated neurocognitive deficits (HAND) is poorly understood and associated with multiple factors, including the oxidative stress and inflammation, within the brain. Thus, understanding the proteomic content of extracellular vesicles (eXVs) released in the peripheral blood and/or cerebrospinal fluid (CSF) of HIV+ individuals may help to develop new therapies that directly address the cause of HAND in these individuals.

Methods: To investigate whether the proteomic content of plasma- or CSF-derived xEVs is associated with neurocognitive status in aviremic HIV+ subjects, we performed a cross-sectional study comparing the proteomic content of plasma- or CSF-derived xEVs cargo from aviremic HIV+ non-drug users at different neurocognitive stages. Matched cryopreserved plasma or serum samples from HIV+ non-drug users at different neurocognitive stages were analyzed via mass spectrometry (MALDI-TOF MS), resulting in an average of 626 proteins identified across different conditions. These findings support the potential of plasma- and/or CSF-derived xEVs as a non-invasive and convenient method for monitoring HAND progression, as well as an indication of the underlying pathologies of the COPD patients.

Conclusions-Implications: Overall, the proteomic content of CSF- and serum-derived xEVs did not differ significantly between normal, HAND and ANI groups. However, the amount of proteins such as transferrin (TRF), apolipoprotein A1 (APOA1), α-2-macroglobulin (A2MG), and the HIV Neo protein did significantly increase in CSF- and serum-derived xEVs from HAND/ANI compared to subjects without deficits.

P10
Sugar-sweetened beverage consumption effect on cholesterol levels among U.S. adults
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Keywords: Sugar-Sweetened Beverages, Cholesterol, Hyperlipidemia, Metabolic Syndrome, Diabetes

Introduction and Objectives: Sugar-sweetened beverages (SSB) are the leading source of added sugar in the American diet, and a major contributor to adult and childhood obesity. The intake of SSB has been associated with increased BMI, waist circumference, HDLc, and insulin resistance. In addition, recently, there has been an increased interest in understanding the targeting of SSB intake to reduce risk factors, including hypercholesterolemia. The purpose of this study was to determine whether there is an association between the consumption of sugar-sweetened beverages and increased hypercholesterolemia in U.S. adults.

Methods: We conducted a cross-sectional study based on secondary analysis of the 2017 data from the Behavioral Risk Factor Surveillance System (BRFSS) in ten U.S. states. The exposure variable was defined as reporting daily soda and sugary drinks consumption in the last 30 days. The outcome variable was reporting hypercholesterolemia. We initially performed an analysis of the distribution of selected demographics and comorbidities according to the main exposure and outcome variables. We then performed a multivariate analysis utilizing a binary logistic regression approach to adjust for potential confounders.

Results: Our sample included 46,853 adults. The unadjusted association of SSB intake with cardiovascular risk factors, including hypercholesterolemia. The purpose of this study was to determine whether there is an association between the consumption of sugar-sweetened beverages and increased hypercholesterolemia in U.S. adults.
lower odds for those consuming 5+ SSIB (OR=0.59, 95% CI=0.42-0.83). However, the adjusted analysis showed no association between the frequency of SSIB and survival (OR=0.91, 95% CI=0.90-1.1; and OR=0.84; 95% CI=0.57-1.25, respectively). Secondary findings indicated that being in the 65+ year-old age group increased by 5 times the odds of death (OR=5.03, 95% CI=2.43-9.58) compared to those in the 18-34 year-old age group. There was also a 9% (OR=1.09, 95% CI=1.0-1.19) increase in odds of hypercholesterolemia compared to females, and a 21% decrease in odds among blacks (OR=0.79, 95% CI=0.68-0.92) compared to whites. Being overweight or obese increased odds of hypercholesterolemia by 60% (OR=1.60, 95% CI=1.44-1.78) and 72% (OR=1.72, 95% CI=1.55-1.92), respectively.

Conclusions-Implications: Our findings suggest that there is no statistically significant association between SSIB intake and reporting hypercholesterolemia. Incidentally, we found that increased age, male sex, blacks, and overweight/obesity were significantly associated with reporting hypercholesterolemia. Further research should include a prospective study design to clarify the impact of SSIB intake and hypercholesterolemia.

P11 Gender differences in hospital mortality based on anatomical location of acute myocardial infarction in the Puerto Rican population

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Keywords: Myocardial Infarction, In-Hospital Mortality, Hispanic, Sex Differences

Introduction and Objectives: Myocardial infarction is a prominent diagnosis worldwide. Published scientific literature has associated acute myocardial infarction (AMI) at the anterior location with increased in-hospital mortality. Our study targets a rapidly growing, underrepresented minority of Hispanic men and women for which there is limited information regarding cardiac health. Our objective is to examine the association of anatomical location of AMI and in-hospital mortality between men and women in a Puerto Rican population.

Methods: Patients from the Puerto Rican Cardiovascular Surveillance System hospitalized in 2007, 2009 and 2011 with a newly diagnosed AMI at 21 medical centers in Puerto Rico were included for analysis. Anterior location of AMI based on ECG was compared to all other locations, including posterior, inferior, lateral, septal and non-anterior. We used multivariable logistic regression analysis to identify the association between anatomical location of AMI and in-hospital mortality while controlling for age, smoking status, gender, obesity, hyperlipidemia, diabetes, hypertension, congestive heart failure, and type of AMI (STEMI/NSTEMI).

Results: Our study included 2,965 patients (45% women) with the largest proportion (26.4%) of patients between the ages of 65 and 74 years. The adjusted odds ratio in patients with anterior AMI was 35% higher for in-hospital mortality compared to all other locations (OR=1.3, 95% CI 0.8-2.2), while men had 20% lower odds (OR=0.80, 95% CI 0.6-1.0) in comparison to women. Interestingly, anterior location of AMI based on ECG was significantly associated with effective weight management, with a 5 mg/kg improvement, lowering associated risk for diabetes and cardiometabolic complications. This improvement in FBG levels suggests that despite the difficulty of effective weight management in these patients, proper glucose values may still be achieved with nutrition counseling and education, thus lowering risk for diabetes and associated complications.

P12 Lowered fasting blood glucose (FBG) in a prediabetic individual with HIV despite struggle with weight control management

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Keywords: HIV, Diabetes, Nutrition, Intervention, Waist Circumference

Introduction and Objectives: HIV infection has previously been associated with malnutrition and wasting; however, with the initiation of antiretroviral therapy (ART), a growing number of people living with HIV (PLWH) are becoming centrally obese, with disproportionate weight accumulation around the abdominal area and fat loss in the rest of their body (periphery, arms and legs), indicative of lipodystrophy. As a result, some PLWH may struggle simultaneously with central fat accumulation and peripheral losses, trying to balance these two opposite effects.

Case Presentation: PB is a 62-year-old, African-American male infected with HIV for 12 years, receiving an ART regimen. Participating in the Miami Adult Studies in HIV (MASH) Cohort, PB was diagnosed with diabetes and hypertension. He presented to lose weight, PB gained ~12 lbs a month after initiation. When questioned about the weight gain, PB revealed that he had started taking an appetite stimulant (Megace) to address the wasting on his periphery, claiming that he looked “sickly”. PB stopped taking Megace after he gained ~20lbs (12.3% Wt%) in 4 months. BMI at this time was 26.3 kg/m2 and WC was 45.5 inches, reflecting a substantially increased risk for metabolic complications. With WC increasing 9 inches and hip circumference increasing only 2 inches, it is evident that a considerable amount of the weight accumulation occurred around the waist. As can be seen, he among others in his situation, are struggling with conflicting goals by simultaneously trying to reduce central obesity and prevent peripheral losses and wasting, something that may be unique to PLWH.

Conclusions-Implications: Despite the participant’s difficulties in weight management, his fasting blood glucose (FBG) improved from 126mg/dL to 102mg/dL, with a 21% decrease in HbA1c (3.9mg/dL improvement, lowering associated risk for diabetes and cardiometabolic complications. This improvement in FBG levels suggests that despite the difficulty of effective weight management in these patients, proper glucose values may still be achieved with nutrition counseling and education, thus lowering risk for diabetes and associated complications.

P13 Effectiveness of a 6-month nutrition intervention in lowering diabetes risk in prediabetic people living with HIV (PLWH) in MASH cohort

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Keywords: HIV, Diabetes, Nutrition, Intervention, Fasting Blood Glucose

Introduction and Objectives: People living with HIV (PLWH) have a higher risk of developing diabetes than the general non-HIV population, primarily due to HIV infection as well as the chronic use of antiretroviral therapy (ART). The objective of this study is to assess the effectiveness of a 6-month nutrition intervention to improve glycermic parameters and inflammation in prediabetic PLWH on stable ART with undetectable HIV viral load.

Methods: A 6-month randomized, controlled nutrition intervention was conducted in prediabetic PLWH. The study participants for the intervention were recruited from the Miami Adult Studies for HIV (MASH) cohort at the FIU-Borinquen Research Clinic. Upon their consent, the participants were randomized into the intervention group or the control group. Participants randomized in the intervention group met once a month for approximately 1 hour for 6 consecutive months at baseline and at 6-month to measure fasting blood glucose (FBG) and high sensitivity C-reactive protein (hs-CRP).

The results from this intervention support the notion that a nutrition intervention is effective in lowering fasting blood glucose and may be implemented into larger scale interventions; however, no significant changes was seen in hs-CRP values between the 2 groups.

P14 Racial disparity in survival for women with ovarian cancer

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Keywords: Race, Ethnicity, Disparity, Survival, Ovarian Cancer

Introduction and Objectives: Ovarian cancer is the fifth-leading cause of cancer-related mortality in United States women. Previous studies have documented disparities in survival between non-Hispanic black (NHB) and non-Hispanic whites (NHW) women. This study aimed to assess if insurance status and extent of disease were effect modifiers of the survival difference between NHW and NHB women diagnosed with ovarian cancer from 2007 to 2015.

Methods: A secondary data analysis of the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) program from 2007-2015 was performed. Participants were selected based on postmenopausal status (age over 51 years), NHW and NHB race/ethnicity, epithelial histology, stage of disease at diagnosis. The exposure was race/ethnicity (NHB and NHW). Outcome was time from diagnosis to cause-specific death up to five years. Extended Cox proportional hazards model was fitted, which included two first-order interaction terms: race by extent of disease and race by insurance status. For each statistically significant interaction, stratified Cox regression models were fitted for the identified effect modifier.

Results: A total of 6,880 women were included. Interaction test for insurance status was non-significant but was significant for extent of disease (regional vs. distant). Stratified multivariate Cox regression model showed that NHB experienced worse prognosis compared to NHW with regional disease (adjusted HR = 1.63; 95% CI:0.97-2.48), but this difference was not evident for distant disease (adjusted HR=1.05; 95% CI 0.93-1.18).

Conclusions-Implications: We found evidence for greater cause- specific mortality among NHB women only in patients with regional disease. The reasons for such a difference need further research but could be related to disparities in access to quality cancer treatment or biological factors affecting response to treatment.
Introduction and Objectives: It is estimated that in 2019 there will be 81,190 new cases of bladder cancer with an estimated number of deaths projected to be 17,240, making it the fifth most common cancer in the U.S. Current evidence shows a racial disparity in survival, though studies assessing whether the association differs according to insurance status are scant. The objective of our study was to determine if there is an association between race and bladder cancer 5-year survival differs according to health insurance.

Methods: A retrospective cohort study was conducted using the 2015 SEER database. The inclusion criteria for study participants was ≥18 years, who presented with primary malignancy of the urinary bladder (n=39,587). The independent variable was the patient’s reported racial status (White, Black and Asian Pacific Islanders). For statistical analysis of the outcome, 5-year cancer-specific survival was used. The covariates included in the analysis were age, gender, marital status, stage, grade, recurrence, and surgery. Unadjusted and adjusted Cox regression analysis were used to calculate the hazard ratios (HR) and 95% confidence intervals (CI).

Results: The adjusted hazard ratios for 5-year overall survival stratified by insurance status indicated that Blacks with any Medicaid (HR = 1.45, 95% CI 1.32-1.60) were 41% more likely to die of bladder cancer compared to Whites. The corresponding hazard of Medicaid were 1.44 times more likely to die of bladder cancer (95% CI 1.28-1.62) compared with Whites. The main outcome variable was advanced stage at diagnosis. Age, sex, tumor grade, type of bone cancer, decade and geographic location were added as co-variates to the statistical models. Unadjusted and adjusted logistic regression analysis were conducted. Odds ratios (OR) and their corresponding 95% confidence intervals were calculated.

Results: Race/ethnicity was not statistically significantly associated with late stage disease. Adjusted OR for NH-B was 0.94 (95% CI 0.78-1.13) as compared with Whites. The corresponding hazard of death in uninsured Blacks was 1.30 (95% CI 1.10-1.59). However, there was statistically significant difference between race and survival between insured Black and insured White patients (HR 1.10; 95% CI 1.05-1.15). The median 5-year survival compared with Whites were the same and any Medicaid categories. However, the uninsured API group had increased survival (HR 0.71 95% CI 0.51-1.00) compared with uninsured White patients.

Conclusions-Implications: While race is accepted as a poor prognostic factor in the mortality from bladder cancer, insurance status can help to explain some of the observed differences across races. We suggest empowering clinicians to identify high-risk patients and connect them with additional services to improve access to quality care. Future research should be conducted to explore the variation in access to quality of care for patients of varying insurance status to minimize disparities in mortality between races for patients with bladder cancer.

The association between race/ethnicity and cancer stage at diagnosis of bone malignancies

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Keywords: Bone Malignancy, Cancer Stage, Disparity, Ethnicity.

Introduction and Objectives: Evidence has shown disparities and delays in diagnosis of both breast and colorectal cancers in both Black and Hispanic populations when compared to White populations. Limberg et al. compared disparities in diagnosis in regards to primary bone neoplasms (PBN). The objective of our study was to determine if there is an association between race/ethnicity and advanced stage of diagnosis of PBN.

Methods: This population-based retrospective cohort study included patient demographic and health information extracted from the NCI Surveillance, Epidemiology, and End Results Program (SEER). Our patient population includes patients less than 95 years of age with a diagnosis of PBN (osteo Sarcoma, Ewing sarcoma, chondrosarcoma, and giant cell tumor) from 1973-2014. The main exposure variable was race/ethnicities categorized as Non-Hispanic White (NH-W), Non-Hispanic Black (NH-B), Non-Hispanic Asian Pacific Islander (NH-API), and Hispanic (Hispanic- API). The main outcome variable was advanced stage at diagnosis. Age, sex, tumor grade, type of bone cancer, decade and geographic location were added as co-variates to the statistical models. Unadjusted and adjusted logistic regression analysis were conducted. Odds ratios (OR) and their corresponding 95% confidence intervals were calculated.

Results: This study included 242,819 participants. Black males were more likely to be diagnosed with late stage prostate cancer (OR = 1.31; 95% CI 1.27-1.35). Being uninsured (OR = 2.28; 95% CI 2.13-2.43) and for Hispanic API (OR = 1.84, 95% CI 1.70-1.98) was associated with a diagnosis of late stage cancer. The (interaction term black and Hispanic API was statistically significant. Stratified analysis for health insurance revealed that blacks had an increased risk for late stage cancer if uninsured (OR = 1.29; 95% CI 1.04-1.57) and if having Medicare (OR = 1.39; 95% CI 1.31-1.49).

Conclusions-Implications: Insurance status may affect the effects of race on late stage prostate cancer in Black patients. Racial disparities and the effects of insurance status has on stage of prostate cancer at diagnosis were elucidated. These findings along with the observed regional differences call for public health initiatives and intervention programs that target vulnerable communities with the greatest disparities, allowing for proper expansion of care and adequate acquisition of services.

Insurance status as a modifier of the association between race and stage of prostate cancer diagnosis in Florida during 1995 and 2013

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Keywords: Prostate, Cancer, Insurance, Race, Medicare

Introduction and Objectives: Cancer stage at diagnosis is a critical prognostic factor regarding a patient’s health outcomes. Historically, it has been identified that black males are at increased risk for presentation at advanced stage prostate cancer when compared with whites. This study aimed to investigate whether insurance status was a modifier of the association between race and stage of prostate cancer at the time of diagnosis in Florida between 1995 and 2013.

Methods: This secondary data analysis of a cross-sectional survey used information from the Florida Cancer Data System. Study participants included black and white males diagnosed with prostate cancer in Florida between 1995 and 2013. Those with missing data regarding race, stage of cancer at diagnosis, and/or insurance status were excluded. The main outcome variable was stage of prostate cancer at diagnosis. The main independent variable was race (Black vs White). The possible effect modifier variable was insurance status (Insured, Uninsured, Medicaid, and Medicare). Unadjusted and adjusted logistic regression models were used to explore the association between race, insurance status and stage at diagnosis. The association of selected characteristics regarding race, stage of cancer at diagnosis, and/or insurance status were excluded. The main outcome variable was stage of prostate cancer at diagnosis. The main independent variable was race (Black vs White). The possible effect modifier variable was insurance status (Insured, Uninsured, Medicaid, and Medicare). Unadjusted and adjusted logistic regression models were used to explore the association between race, insurance status and stage at diagnosis. The association of selected characteristics regarding race, stage of cancer at diagnosis, and/or insurance status were excluded.

Results: Our sample included 31,338 patient records. After adjusting for age, sex, ethnicity, marital status, and geographic location, the odds of being diagnosed with a late stage 1.03 (95% CI 1.00-1.06) in Black males compared to White males. The odds of late stage diagnosis was 1.3 times greater in non-Spanish-Hispanic-Latino patients (OR = 1.50, 95% CI 1.22-1.82, p<0.001) than in non-Spanish-Hispanic-Latino patients; 1.3 times greater in Single/Unpartnered patients (OR = 1.33, 95% CI 1.22-1.45, p<0.001) than in married/Partnersed patients, and 1.2 times greater in patients living in non-metropolitan areas (OR = 1.23, 95% CI 1.10-1.38, p<0.001) than those living in Metropolitan areas.

Conclusions-Implications: Our findings suggest that uninsured patients had significantly higher odds of presenting with later stages of cutaneous melanoma. Other risk factors for later stage presentation include being Spanish-Hispanic-Latino, being Single/Unpartnered, and living in non-metropolitan areas. Future research is needed to elucidate if lower SES is associated with later melanoma stage diagnosis at presentation in other minority groups, single/unmarried patients living in rural areas.

The association between health insurance status and stage of primary cutaneous melanoma at presentation

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Keywords: Insurance Status, Melanoma, Socioeconomic Status, Stage of Presentation

Introduction and Objectives: Annually, melanoma only accounts for 5% of all skin cancers; however, it has a 63% and above mortality rate if diagnosed in later stages. Recently published population based studies have found a correlation between lower socioeconomic status (SES) and increased incidence of melanoma diagnoses at advanced stages. A similar association has been found between Medicaid users and melanoma at diagnosis advanced stages. The objective of our study is to determine the association between health insurance status, as a proxy for SES, and stage of melanoma at diagnosis.

Methods: This is a retrospective cohort study that utilized the Surveillance, Epidemiology, and End Results (SEER) data from years 2007 to 2018. We included patients 18-64 years old with first diagnosis of cutaneous melanoma, excluding patients with prior diagnosis of skin cancer, unknown insurance status, or unknown or un-staged cancer. The association of selected characteristics (age, sex, ethnicity, stage, and/or insurance status) was assessed using Chi-squared and Student’s t-test. Binary logistic regression was conducted to obtain unadjusted and adjusted odds ratios and 95% confidence intervals to assess the effect of health insurance status (Uninsured/Insured) on cutaneous melanoma stage at presentation (Early v. Late).
The association between household income and childhood depression in American children aged 5–18 years old

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Keywords: Depression, Household Income Level, Poverty Levels, Childhood, Prevalence

Introduction and Objectives: Childhood depression is an under-recognized illness that can have long-term detrimental effects. Risk factors should be studied in order to identify children who could benefit from early interventions. Our research question is testing the association between a family’s income level and childhood depression.

Methods: This is a cross-sectional study using data collected in the 2011 National Survey of Children’s Health, a telephone survey conducted to households in the United States. We stratified household income into eight categories in relation to poverty level and tested the association between the presence of childhood depression, and other potential confounders. Childhood depression was determined using the question “has a doctor or other healthcare provider ever told you that [child] had depression.” We adjusted for the potential confounders, we used multivariable regression analysis.

Results: 62,950 of the 95,677 responses were included. The survey conducted to households in the United States. We stratified household income into eight categories in relation to poverty level and tested the association between the presence of childhood depression, and other potential confounders. Childhood depression was determined using the question “has a doctor or other healthcare provider ever told you that [child] had depression.” We adjusted for the potential confounders, we used multivariable regression analysis.

Conclusions-Implications: In the literature review, the variables mother’s mental health, child mental health, socioeconomic status, and health care utilization patterns. Independent associations were assessed through multivariable logistic regression and reported as odds ratios and corresponding 95% confidence intervals.

Health characteristics associated with Affordable Care Act Marketplace enrollment in 2017

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Keywords: Patient Protection and Affordable Care Act, Health Insurance Exchanges, Insurance Coverage, Health Reform, Health Economics

Introduction and Objectives: The affordability and sustainability of the health insurance marketplaces established by the Patient Protection and Affordable Care Act are of concern particularly due to a lack of diversity of Marketplace enrollees as a risk-pool. This study aims to assess whether selected health characteristics of Marketplace enrollees differ from those of individuals with employer-sponsored insurance (ESI).

Methods: Exploratory, secondary analysis of data from the 2017 National Health Interview Survey (NHIS). Adults (18-64 years old) with family incomes that qualify for Marketplace tax subsidies were included. Those with Marketplace enrollment were compared to adults with ESI based on demographic characteristics, health-related behaviors, presence of chronic medical conditions (including hypertension and diabetes), and health care utilization patterns. Independent associations were assessed through multivariable logistic regression and reported as odds ratios and corresponding 95% confidence intervals.

Results: We studied 4,090 eligible respondents. About 9.2% had Marketplace insurance. The odds of having Marketplace insurance over ESI were higher for participants: 46-64 years old [compared to those 55-64 years old], female (OR=2.2, 95% CI 1.5-3.2), 18-200% poverty level. Below 186%, the prevalence of depression is greater than 5.2%, but above 186% the prevalence is less than 4.5%. After adjusting other variables that were cited as potential confounders in the literature review, the variables mother’s mental health, child mental health, socioeconomic status, and health care utilization patterns. Independent associations were assessed through multivariable logistic regression and reported as odds ratios and corresponding 95% confidence intervals.

Memory CD4 T cell recall responses against influenza A virus are retained during pregnancy

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Keywords: Immunological Memory, CD4 T Cells, Influenza A Virus, Pregnancy

Introduction and Objectives: Despite widespread annual vaccination, Influenza A-virus (IAV) remains a global health concern. Serious illness can occur in susceptible individuals including children, the elderly and pregnant women. The physiological changes associated with pregnancy are well known to cause alterations in immune responses. Afluenza is affordable towards the generation of humoral or antibody responses at the cost of cell mediated immunity. The latter is essential for anti-viral immune responses. While much is known about alterations to the generation of primary immune responses, how memory or secondary immune responses, such as those induced by vaccination, are impacted during pregnancy is unclear. We examine here, the responsive capacity of memory CD4 T cells specific for influenza virus A in gravid and non-gravid hosts during recall infection.

Methods: Timed-pregnant female BALB/c mice and non-gravid controls were adoptive transfer recipients of in vitro generated IAV-specific memory CD4 T cells that were challenged with sub-lethal doses of A/PuertoRico/8/1934 (PR8) virus. Briefly, naïve HNT CD4 T cell receptor transgenic cells, which are specific for a peptide of the hemagglutinin of PR8, were isolated and polarized in vitro to generate the Th1+ CD4+ effectors that were subsequently restimulated to generate a memory CD4 T cell population. On day 7 post infection, the number of donor memory cells, surface expression of CD127 (IL-7 receptor), and production of the cellmediated response associated cytokines IFN-γ, TNF-α, and IL-2 in the spleen, draining lymph nodes, and lung was determined in recipient hosts by flow cytometry. The fetal outcomes in similarly treated animals and unmanipulated controls were also monitored.

Results: The recovery of donor memory CD4 T cells in all organs was found to be similar between gravid and non-gravid female mice on day 7 post sublethal IAV infection. Likewise, the functional capacity of memory CD4 T cells in terms of multi-cytokine IFN-γ, TNF-α, and IL-2 production, which is associated with protective cell mediated immunity, was unaltered by the pregnancy environment. However, in vivo memory CD4 T cells were able to efficiently generate the donor in vitro memory cells (rested effectors). On day 1 post infection, the number of and multi-cytokine producing potential of the transferred donor CD4+ T cells in spleens, draining lymph nodes (DLN), and lungs were enumerated by flow cytometry.

Conclusions-Implications: Cryopreserved and thawed in vitro-generated CD4+ memory T cells, both unthawed and cultured for 24 h with cytokines IL-7 or IL-7 and IL-2, mediate protection against lethal doses of IAV. Enhanced recovery as early as day 5 post infection is seen with thawed cells cultured overnight with IL-7 as well as the combination of IL-7 and IL-2. At day 2 post-infection, donor memory CD4 T cells derived from thawed cells cultured overnight with cytokines were found to produce significantly more IFN-γ, IL-2, and TNF in the spleen and draining lymph nodes (DLN) of infected mice.

Conclusions-Implications: Cryopreserved influenza A virus (IAV)-specific memory CD4+ T cells are efficient at mediating protection against lethal doses of virus.
POSTER ABSTRACTS

P23

Therapeutic plasma exchange in immune thrombocytopenia (ITP) related hospitalizations: Real world practices for a category III apseudo indication
Sarah Malhani, BA; Joseph Schwartz, MD, MPH; Aaron Tobian, MD, PhD; Saurav Chopra; Lijjana Vasovic, MD; Robert Andrew Desimone, MD; Patricia Shi, MD; Shira Kalkier, MD; Cassandra Josephson, MD; James Bussell, MD; Ruchika Goel, MD, MPH.

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Post-abstracts: Posters from 2010-2014. TPE was performed in patients with highest severity of underlying illness, more significant bleeding, and a high (50%) rate of comorbidities. No clear associations with improvement or worsening of mortality or bleeding outcomes was seen in TPE hospitalizations reporting but neither was there any evidence of increased bleeding or mortality with the procedure.

P24

Effect of short and long sleep duration in predicting obesity among various racial groups of a large multi ethnic organization
Sarah Malhani, BA; Joseph Schwartz, MD, MPH; Aaron Tobian, MD, PhD; Saurav Chopra; Lijjana Vasovic, MD; Robert Andrew Desimone, MD; Patricia Shi, MD; Shira Kalkier, MD; Cassandra Josephson, MD; James Bussell, MD; Ruchika Goel, MD, MPH.

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Methods: Hospitalizations with ITP as the primary admission diagnosis were identified from the 2010-2014 National Inpatient Sample (NIS). NIS is the largest all-payer inpatient database for United States hospitalizations. Univariate and multivariable logistic regression models were used to determine factors of TPE and clinical outcomes in ITP patients undergoing TPE.

Results: From 2010-2014, analyzing hospitalizations with ITP listed as ‘one of all diagnoses’ during hospital course, there were total of 282,285 admissions (42% white, 40% black, 2% Hispanic, 10% other) (0.6% reported TPE). Of the 60,940 primary ITP admissions, 1,044 admissions (n=35) reported TPE during the hospital course. Most subjects getting TPE were the highest severity class. Major (50.4%) and Extreme severity (48.5%). There were approximately 50% co-morbidities among ITP admissions undergoing TPE: acute kidney failure (10.6%), heart failure (7.4%), HIV/AIDS (4.8%), human immunodeficiency virus (2.4%), and hepatitis C (2.4%). Among all ITP admissions, 12.3% reported at least one bleeding complication (gastrointestinal, 6.2%, genitourinary, 5.3%, and intracerebral hemorrhage, 0.5%). Among ITP hospitalizations with TPE, 28.8% cases reported at least one bleeding complication (p<0.05). After multivariable analysis, underlying severity of illness remained the most significant predictor of undergoing TPE (p<0.001). Admissions categorized as major (adjOR=3.53, 95%CI=2.01-6.18, p=0.001) and extreme severity of illness (adjOR=33.07, 95%CI=19.22-56.90, p<0.01) had substantially higher odds of undergoing TPE than less severe hospitalizations. Admissions with TPE also had significantly longer mean length of stay (p<0.001). All-cause mortality was 1.4% among all ITP hospitalizations and 7.8% in ITP hospitalizations with TPE. However, patients with TPE showed neither an improvement nor a worsening in the adjusted odds of all-cause mortality (p-value=0.142) bleeding status (p-value=0.755).

Conclusions-Implications: TPE was reported in about 1% of hospitalizations with ITP as the primary diagnosis in this nationally representative sample between 2010-2014. TPE was performed in patients with highest severity of underlying illness, more significant bleeding, and a high (50%) rate of comorbidities. No clear associations with improvement or worsening of mortality or bleeding outcomes was seen in TPE hospitalizations reporting but neither was there any evidence of increased bleeding or mortality with the procedure.

P25

Weapon carrying and mental health concerns among victims of cyber-bullying
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Methods: The data for this cross-sectional study was extracted from the Youth Risk Behavior Survey (YRBS) database. The questionnaire was administered to statistically representative samples of high school students across the United States. The association between experiencing cyberbullying and carrying a weapon in school was evaluated through multivariate (logistic) regression analysis while controlling for several confounders (age, gender, race, sexual orientation, BMI, mental health issues, academic performance, experiencing traditional physical bullying, and drug and alcohol abuse).

Results: Among 11,637 students included, 14.2% and 14.6% reported being victims of cyberbullying and carrying a weapon to school in the past 30 days, respectively. No significant association was found among weapons for victims of cyberbullying when compared to students not cyberbullied (adjusted OR 0.9, 95% CI 0.7-1.2, p=0.47). This study confirmed the association between bullying weapons in school and male gender (aOR 5.3, 95% CI 4.3-6.5, p<0.0001), victim of traditional physical bullying (aOR 1.4, 95% CI 1.1-1.7, p=0.002), poor academic performance (aOR 1.3, 95% CI 1.1-1.6, p=0.002), previous suicidal attempt (aOR 1.6, 95% CI 1.2-2.2, p=0.003), alcohol lifetime use (aOR 2.5, 95% CI 1.9-3.2, p<0.0001), and illicit drug use (aOR 2.9, 95% CI 1.7-4.2, p<0.0001).

Conclusions-Implications: Cyberbullying was not significantly associated with increased risk of weapon carrying in campus or school; however, it was significantly associated with multiple interacting factors including male gender, traditional bullying, poor academic performance, and behavioral health issues. Decreasing rates of weapon carrying would be a viable strategy in order to decrease severity of violence in schools. Implications of this study for prevention indicate a need for comprehensive multidisciplinary services in high schools that include mental health counseling aimed at behavior change, as well as programs directed at decreasing adolescent substance abuse.

P26

3D conformal radiotherapy versus intensity-modulated radiotherapy for patients with frontal lobe cancer
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Keywords: 3D Conformal Radiotherapy, Intensity Modulated Radiotherapy, Frontal Lobe Tumor

Introduction and Objectives: Frontal is the largest lobe of the brain and is vital to executive and motor functions. Tumors in this area require targeted treatment. Both intensity-modulated radiation therapy (IMRT) and 3D-conformal radiation therapy (3D-CRT) are external beam radiotherapies. IMRT is a more advanced version of 3D-CRT. This study assessed whether surgery and IMRT conferred better survival rates than surgery and 3D-CRT to patients with frontal lobe cancers.

Methods: This is a retrospective cohort study using 2014 Florida Cancer Data System (FCDS) data which contained aggregated data from all cancer patients in Florida from 1981 to 2014. All patients who had frontal lobe cancer and surgery with either IMRT or 3D-CRT were included in the analysis. The Kaplan-Meier method was used to compare survival curves and the Wilcoxon test to compare median time of survival. A Cox proportional hazards model was used to generate hazard ratios for age at diagnosis, extent of surgical excision and tumor staging.

Results: The analysis included 505 and 60 patients who received IMRT and 3D-CRT respectively. More patients in IMRT group had local tumor excision (39.4% versus 25.4%) and were older at time of diagnosis than patients in 3D-CRT group (54.8 versus 50.6 years old). On the contrary, more patients in 3D-CRT group had total lobectomy (11.7% versus 40.7% versus 25.4%). Six, stage of cancer, insurance status, adjuvant chemotherapy or grade of cancer showed no statistically significant difference between radiation treatments. The median survival time was higher in patients who underwent 3D-CRT (25 months) compared to patients who underwent IMRT (18 months) (p=0.043). Cox regression adjusted for age at diagnosis, extent of surgical excision and tumor stage showed no statistically significant difference in survival between the two radiation treatments. In the multivariate analysis, extent of surgery at diagnosis, tumor extent of excision and adjuvant chemotherapy were associated with statistically significant differences in survival.

Conclusions-Implications: There is no difference in mortality of patients with frontal lobe cancer treated with surgery and either 3D-CRT or IMRT. A randomized controlled study is necessary to determine whether this conclusion holds true for different types of tumors despite the anatomical location.
P27

Demographic variation in the frequency of glioma in Florida


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Keywords: Glioma, Brain Cancer, Race, Florida, Demographics

Introduction and Objectives: Glial brain cancers affect nearly 20,000 individuals in the United States (U.S.) annually. Currently, SEER database data exploring the relationship between race and gliomas is available and has shown that cerebral gliomas have a higher frequency in Caucasian men. However, such analyses did not include demographic data specific to the state of Florida. This study assessed the association between race and glioma vs. non-glioma Central Nervous System (CNS) cancers in Florida, U.S.

Methods: This case-control study utilized the Florida Cancer Data Registry (FCDR) in which race was considered the exposure and development of glioma as the measured outcome. The sample was comprised of patients in Florida diagnosed with brain tumors from January 1, 2012 to December 31, 2012. Relative frequencies were compared between patients with glial brain tumors and those with other CNS tumors in Florida. Data was analyzed using logistic regression analysis in order to determine any associations between race and frequency of diagnosis adjusting for several confounders (age, sex, smoking status, year of diagnosis, and insurance status).

Results: Between 2018 and 2013 a total of 14,092 patients meeting the inclusion and exclusion criteria were diagnosed in Florida with a primary brain tumor. Being of non-white race was associated with a 65% decreased odds of glioma diagnosis compared to the reference white population (adjusted OR 0.35, 95% CI 0.34-0.37). Secondary findings include associations between increasing age and male sex with increased odds of glioma diagnosis. Decreased adjusted odds of glioma diagnosis were found with former smoking status (reference non-smokers), diagnosis between 2001 and 2010 (reference 1981-1990), and Medicaid or Medicare insurance (reference private insurance). Hispanic ethnicity, current smoking status, no insurance/self-pay, and geographic location (urban vs. rural) all had no association with glioma diagnosis.

Conclusions-Implications: These findings are consistent with and help refine on previously utilizing national databases (SEER) which also showed increased odds of glioma diagnosis in older white males. Various potential explanations for these findings include genetic predisposition, lifestyle and behavioral factors, and socioeconomic status, including access to healthcare. Future research aims at identifying potential etiologies.

P28

Stroke outcomes in Florida pediatric and adult sickle cell patients: A retrospective, secondary analysis of the Florida hospital discharge database for stroke, 2008-2012

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Keywords: Sickle Cell, Stroke, Risk Factors

Introduction and Objectives: Due to the high incidence of stroke in patients with sickle cell disease coupled with the severe, costly, and long-lasting effects, it is crucial to investigate this population. Since the creation of the Florida hospital discharge database in 2008, there is minimally published data on stroke outcomes in pediatric and adult patients with sickle cell disease. The purpose of this study is to provide a modern look at the association between age and stroke outcome in a population of sickle cell disease patients.

Methods: A retrospective secondary analysis of the Florida Hospital Discharge Database for Stroke was conducted which included all patients (N=333,367) admitted to Florida hospitals with a primary diagnosis of stroke between January 1, 2008 and December 31, 2012. The exposure variable was age at admission which was dichotomized into two comparison groups: pediatric and adult. The dependent variable was stroke outcome. Variables of interest were mechanism of stroke, comorbidities and patient demographics.

Results: 210 hospitalizations for stroke in patients with sickle cell disease were identified. While the overall prevalence of adverse outcome was 50%, the odds was significantly higher in the adult subgroup (OR=3.20, 95% CI [1.57, 6.76]) compared to the pediatric subgroup. Additionally, the rate of adverse outcomes in pediatric and adult patients with sickle cell disease patients.

Conclusions-Implications: In a statewide patient population which was dichotomized into two comparison groups: pediatric and adult subgroup. Additionally, the rate of adverse outcomes in pediatric and adult patients with sickle cell disease patients.

P29

MMP-13 as a therapeutic target in paclitaxel-induced neuropathy

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Introduction and Objectives: Paclitaxel is a chemotherapeutic agent that binds to cell membrane keratinocytes and causes a significant number of peripheral neuropathy (PNP) cases, which is characterized by pain, temperature sensitivity, tingling, and numbness in the hands and feet due to sensory axon degeneration. Why patients develop this side effect is unknown and remains unclear. One theory is that unregulated gene transcription stemming from mitochondrial dysfunction and damage, which has been observed to precede pain and sensory axon degeneration. However, a mechanism linking mitochondrial damage as a source of PNP has not yet been established.

Methods/Results: We developed a zebrafish in vivo model of paclitaxel neurotoxicity and identified that hydrogen peroxide (H2O2) formation in the epidermis of the skin plays a critical role in paclitaxel-induced sensory axon degeneration. We show that H2O2 formation upregulates MMP-13 expression specifically in keratinocytes, whereas MMP-13 inhibition prevents axon degeneration. To determine the source of H2O2 we performed transient transgenesis to target the H2O2 sensor HyPer to the mitochondria in epidermal keratinocytes and sensory axons. This revealed increased mitochondrial H2O2 upon paclitaxel treatment, consistent with previous literature, suggesting mitochondrial dysfunction plays a role. To further confirm this, we analyzed mitochondria structure with confocal imaging and transmission electron microscopy, which indicates that paclitaxel causes distinct mitochondrial defects in keratinocytes and in sensory axons. Keratinocyte-specific mitochondria show acute toxicity evident by shrinkage and subsequent long-term effects by which these organelles swell. Sensory axons also display acute damage in mitochondria that contain vacuoles. However, these vacuoles do not appear to be vacuoles in keratinocytes and in sensory axons. Keratinocyte-specific mitochondria show acute toxicity evident by shrinkage and subsequent long-term effects by which these organelles swell. Sensory axons also display acute damage in mitochondria that contain vacuoles. However, these vacuoles do not appear to be vacuoles in keratinocytes and in sensory axons. Keratinocyte-specific mitochondria show acute toxicity evident by shrinkage and subsequent long-term effects by which these organelles swell. Sensory axons also display acute damage in mitochondria that contain vacuoles. However, these vacuoles do not appear to be vacuoles in keratinocytes and in sensory axons.

Conclusions-Implications: These findings demonstrate that mitochondria in sensory axons and epidermal keratinocytes are distinctly affected by paclitaxel treatment, but that acute keratinocyte stress is playing a critical role in axon degeneration. We show that H2O2 formation in the epidermis of the skin plays a critical role in paclitaxel-induced sensory axon degeneration.
Methods: A cross-sectional study was designed in which carriers and non-carriers of the BRCA1 mutation were recruited from the community. The study was approved by the Research Ethics Board of a large health system. Our Risk of Cancer Empowered (FORCE) conference or through email. Participants qualified for the study if they were over the age of thirty, had intact fallopian tubes, ovaries, and uterus, were comfortable using a tampon and had no history of significant radiation or chemotherapy. They placed a vaginal tampon for 6 hours at home and returned the tampons to the laboratory through overnight mail. The tampons were de-identified, cells were isolated, and DNA was extracted. The DNA was interrogated for the presence of TP53 mutations using the MiSeq NextSeq sequencer. Archer Analysis 6.0 pipeline was used for data analysis using three ovarian cancer cell lines with known mutations as positive controls and sensitivity controls.

Results: Sixty-six participants were enrolled. Thirty-two BRCA1 and thirty-four control participants were included for analysis, with an average age of 37.7 and 37.0, respectively. TP53 mutations were not identified in any of the sixty-six samples.

Conclusions-Implications: There were no TP53 mutations detected in either population of clinically-well women. Despite the limitations of our study, the use of tampons for sample collection was an effective and well accepted strategy for DNA collection in our population. Therefore future studies should continue to investigate vaginal tampons as a possible tool for the screening of gynecologic malignancies.

P34 Vaginal microbial profile and socio-demographic characteristics of young African American women with asymptomatic bacterial vaginosis in the United States

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Introduction and Objectives: Bacterial vaginosis is an important sexually transmitted disease, which affects 13-21% of women in the USA. Many of these women are asymptomatic which presents a barrier to diagnosis and treatment. The objective of this study is to examine socio-demographic and microbial characteristics of young African American women with asymptomatic bacterial vaginosis (BV) in the United States.

Methods: Participants were recruited via email. Participants qualified for the study if they were over the age of 18, self-identified as African American, and able to provide a vaginal swab. A total of 120 participants were recruited and divided into an asymptomatic BV who were also at high risk for sexually transmitted diseases (HIV, hepatitis B and C) and asymptomatic BV without risk factors (NV). BV status was defined based on 4-gene bacterial vaginosis test (Gardnerella vaginalis and Atopobium vaginae). Novel co-occurrence patterns of which includes the species from the genus Anaplasa and Actinomyces. Maximum variance was observed among Gardinerella vaginals, however, this was not significant.

Conclusions-Implications: The use of whole genome sequencing to analyze the vaginal microbiome can aid in identifying potential biomarkers that may be associated with increased risk for HIV and increased viral shedding.

P35 The effect of race on survival in pulmonary squamous cell carcinoma in adults

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Keywords: Lung Cancer, Race, Squamous Cell Carcinoma

Introduction and Objectives: Lung cancer is the leading cause of cancer death in men and women. Non-small cell lung cancer (NSCLC) accounts for 80% of lung cancers and squamous cell carcinoma comprises 25% of lung cancers. The objective of this study is to evaluate the association between race and survival in adults with pulmonary squamous cell carcinoma.

Methods: This is a secondary analysis based on the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) program on cancer statistics. The sample were adults older than 18 years old who were diagnosed with squamous carcinoma from 2007 onward. Survival over time was compared between Non-Hispanic Caucasian (NHCA), Non-Hispanic Black (NHB), and Non-Hispanic (NH) Adjusting for confounders. Kaplan-Meier curves were estimated for each study group and the log-rank test was used to compare survival distributions. Cox proportional hazard models were used to determine the independent effect race played in survival by estimating adjusted hazard ratios (HR) with 95% confidence intervals (95% CI).

Results: Our total sample was 18,112 adults. The adjusted multivariate analysis showed that race other than NHC did not significantly affect survival outcome (NBH: HR 0.94, 95% CI 0.88-1.02; NHT: HR 1.01, 95% CI 0.96-1.07; MHC: HR 1.08, 95% CI 1.03-1.14). The adjusted survival rate differed mostly between males and females (male: 0.94, 95% CI 0.89-1.00; female: 0.95, 95% CI 0.90-1.01).

Conclusion: This study found no evidence that race other than NHC significantly affected survival rates in adults with squamous cell carcinoma.
Our study did not find a significant association between race and survival in adult pulmonary squamous cell carcinoma patients from 2007-2015. We did find significant secondary outcomes that future studies could explore. By understanding the factors that play a role in pulmonary squamous cell carcinoma, we hope to improve survival outcomes.

**P36**

**Pancratic intraepithelial neoplasia (PanIN) as a morphologic marker ofampullary type of carcinoma**

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Keywords: PanIN, Ampullary Adenocarcinoma, Intestinal Subtype, Pancreatobiliary Subtype

**Introduction and Objectives:** In 1994, Kimura reported two main hallmarks of pancreatic intraepithelial neoplasia (PanIN), the intestinal and the pancreatobiliary [PB]. This classification was later found to be important in predicting the prognosis as well as determining the therapeutic strategy. Isolated histological analysis is hindered by inherent subjectivity and considerable interobserver variability. Additionally, undifferentiated or poorly differentiated tumors cannot be classified based on histology alone. PanIN is a well recognised precursor to pancreatic adenocarcinoma. Three studies have shown concurrent PanIN in patients with ampullary carcinoma, but their stenosis with the two subtypes has not yet been reported. Reports of similar molecular alterations in pancreatic adenocarcinoma and PanIN type of adenocarcinoma hint at a common carcinogenic pathway. The purpose of this study was to evaluate the association of PanIN with the two major ampullary adenocarcinoma subtypes.

**Methods:** Fourteen cases of segmental resection for ampullary adenocarcinoma were retrieved from the archives. The cases were classified into two groups based on the presence of concomitant PanIN. All the cases were stained for CK7, CK20 and CDX2 and were classified as intestinal or PB type based on the staining pattern.

**Results:** All the 10 cases with PanIN stained negative for CDX2 and were classified as PB type (p=0.01). Of the cases without PanIN, 3 were classified as intestinal subtype based on CDX2 positivity and 1 was classified as PB type. Concomitant PanIN was present in 91% of PB type of ampullary adenocarcinoma. The grade of PanIN did not influence the grade or stage of the adenocarcinoma (p>0.05). CK 7 was positive in 13 cases and CK 20 was positive in 12 cases (p=0.05).

**Conclusions-Implications:** The histologic subtyping of ampullary adenocarcinoma appears to have significant prognostic and therapeutic implications. But due to the considerable variability in isolated morphology based subtyping, high frequency of poorly differentiated cancers and low incidence of disease, the histomorphologic classification of ampullary adenocarcinomas remains one of the grey zones in surgical pathology. In this scenario, ordered logistic regression for treatment response was carried out using those variables which were significantly different between subject groups in univariate analyses. Differences were considered significant at p<0.05. The statistical analysis was performed using Stata 11.1.

**Results:** Of the 115 subjects with follow-up, 19.1% reported no clinical response while 53.0% had a complete response and those with fibromyalgia or chronic spine pain were strongly associated with a poor outcome (OR = 5.7, p<0.001).

**Conclusion-Implications:** The data in our study supports LHB tendon sheath injection as a reasonable alternative in the nonsurgical treatment of LHB tendon pathology, even in patients with chronic rotator cuff or labral pathology, as well as articular changes. Simultaneous SA/SD bursa injection should be considered in patients who undergo USGI if there is clinical and/or sono graphic suspicion of concomitant bursitis or clinical evidence of subacromial impingement. We propose a treatment algorithm beginning with USGI of the LHB tendon sheath injection in all patients without “pain syndrome” presenting with acute LHB tendinopathy before proceeding to surgery. Not only did most patients have good relief or partial relief outcomes, but USGI is less invasive, has fewer associated risks and results in less overall cost compared to surgery. Ultrasound guided intraarticular injection is an effective method of non-surgical management for biceps tendinopathy.

**P38**

**An unusual case of lung mass. Neoplasm? Pulmonary sequestration!**

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Keywords: Ultrasound, Corticosteroid, Injection, Tendinopathy, Biceps

**Introduction and Objectives:** Identify factors predictive of therapeutic success following ultrasound guided biceps tendon sheath corticosteroid injection.

**Methods:** Among various conditions affecting tendons, rotator cuff tendinopathy is one of the most common, with high prevalence and high frequency of treatment failure. It has been reported that isolated histological analysis is hindered by inherent subjectivity and considerable interobserver variability. Additionally, undifferentiated or poorly differentiated tumors cannot be classified based on histology alone. PanIN is a well recognised precursor to pancreatic adenocarcinoma. Three studies have shown concurrent PanIN in patients with ampullary carcinoma, but their stenosis with the two subtypes has not yet been reported. Reports of similar molecular alterations in pancreatic adenocarcinoma and PanIN type of adenocarcinoma hint at a common carcinogenic pathway. The purpose of this study was to evaluate the association of PanIN with the two major ampullary adenocarcinoma subtypes.

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**Results:** All the 10 cases with PanIN stained negative for CDX2 and were classified as PB type (p=0.01). Of the cases without PanIN, 3 were classified as intestinal subtype based on CDX2 positivity and 1 was classified as PB type. Concomitant PanIN was present in 91% of PB type of ampullary adenocarcinoma. The grade of PanIN did not influence the grade or stage of the adenocarcinoma (p>0.05). CK 7 was positive in 13 cases and CK 20 was positive in 12 cases (p=0.05).

**Conclusions-Implications:** The histologic subtyping of ampullary adenocarcinoma appears to have significant prognostic and therapeutic implications. But due to the considerable variability in isolated morphology based subtyping, high frequency of poorly differentiated cancers and low incidence of disease, the histomorphologic classification of ampullary adenocarcinomas remains one of the grey zones in surgical pathology. In this scenario, ordered logistic regression for treatment response was carried out using those variables which were significantly different between subject groups in univariate analyses. Differences were considered significant at p<0.05. The statistical analysis was performed using Stata 11.1.

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**Conclusion-Implications:** The data in our study supports LHB tendon sheath injection as a reasonable alternative in the nonsurgical treatment of LHB tendon pathology, even in patients with chronic rotator cuff or labral pathology, as well as articular changes. Simultaneous SA/SD bursa injection should be considered in patients who undergo USGI if there is clinical and/or sono graphic suspicion of concomitant bursitis or clinical evidence of subacromial impingement. We propose a treatment algorithm beginning with USGI of the LHB tendon sheath injection in all patients without “pain syndrome” presenting with acute LHB tendinopathy before proceeding to surgery. Not only did most patients have good relief or partial relief outcomes, but USGI is less invasive, has fewer associated risks and results in less overall cost compared to surgery. Ultrasound guided intraarticular injection is an effective method of non-surgical management for biceps tendinopathy.

**P39**

**Massive lipomatosis of the small intestine causing intussusception**

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Keywords: Lipomatosis, Intussusception, Lipoma

**Introduction and Objectives:** Intestinal lipomatosis is a disease of unknown etiology which may present with complications such as intussusception. It is exceedingly rare, and the presentation as intussusception is rarer still. We report a case of a symptomatic intestinal lipomatosis of the small bowel.

**Case Presentation:** The patient is a 40 year old man with a history GERD and a family history of colon cancer. He presented with severe abdominal pain and episodes of diarrhea. He had lost 20 lbs in the one month prior to presentation as well as the onset of prandially, and fecal urgency. An abdominal CT and colonoscopy showed a severely lipomatous, bulbus and protuberant ileocecal valve, with an obliteration of the lumen into the cecum. Exploratory laparotomy revealed marked enlargement of the bowel, with severe abdominal pain due to massive fat deposition, and adhesions between the ascending colon and the right lateral lower abdominal wall.

**Conclusions-Implications:** This is an unusual case of lipomatosis of the small intestine presenting as an intussusception of a submucosal mass into the ileocecal valve. The etiology of lipomatosis is unknown. Theories include embryonic displacement of adipose tissue, post-chemotherapeutic fat deposition, chronic irritation such as chronic inflammatory bowel disease, low-grade infection and hamartomatous syndromes. Only 14 documented cases of diffuse intestinal lipomatosis exist and only 2 documented cases predicting the diagnosis was made by lipomatosis. Most patients in reported cases of intestinal lipomatosis were asymptomatic, however some presented with sub-acute intermittent obstruction, colonic perforation, and intussusception, the rest of complications. Early diagnosis of adult intussusception is difficult because most
cases present with non-specific signs and symptoms and may present in an acute, sub-acute or chronic manner. The classic triad of intermediate or abdominal pain, a palpable tender mass seen in children is rarely present in adults. However, in adults, nausea, vomiting, gastrointestinal bleeding, changes in bowel habits and abdominal distention are more common.

P40 Distribution and density of FOXP3-positive cells in thymus with and without follicular hyperplasia: A clinico-pathological correlation with autoimmune

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Keywords: FOXP3, Thymus, Autoimmune

Introduction and Objectives: The thymus is the anatomical organ for T-cell maturation and differentiation. Regulatory T cells (Tregs) play an important role in immune tolerance. Generalized differentiated squamous cell carcinoma along with respiratory failure and atrial fibrillation. Computed tomography of the chest revealed a mass consistent with adenocarcinoma and was brought to the emergency room after resuscitation. He was in severe metabolic acidosis at the time of presentation and had a hemoglobin of 2

P41 Trapped in the NET- A report of two autopsy cases of NETosis

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Keywords: Neutrophil Extracellular Traps, Autopsy, Carcinomatosis, Sepsis

Introduction and Objectives: Recent studies reveal that neutrophil extracellular traps (NETs) play a significant role in pathologic thrombosis through platelet entrapment and consequent activation of the coagulation cascade. NETosis is a type of cell death, distinct from necrosis and apoptosis. NETs are composed of chromatin, chromatin-bound proteins, neutrophil granules and enmeshed neutrophils. Bacteria, fungi, activated platelets and numerous inflammatory stimuli can induce dramatic changes in the morphology of the neutrophils inducing NETosis. The chromatin and proteases released by the neutrophils during NET formation regulate procoagulant and prothrombotic factors and participate in intravascular clot formation. The granulocyte collagen-stimulating factor produced by many tumors is another chemical stimulus that has been found to trigger NET formation.

Case Presentation: Herein we present two autopsy cases. The first case is a 76 year old man, with metastatic squamous cell carcinoma of the lung, admitted for acutely worsening respiratory failure and atrial fibrillation. Computed tomography of the chest revealed a mass consistent with adenocarcinoma and was brought to the emergency room after resuscitation. He was in severe metabolic acidosis at the time of presentation and had a hemoglobin of 2

P42 Correlates of non-supine infant sleep position in the US: Results from the PRAMS 2012-2015

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Keywords: SIDS, Infant Sleep Position, Risk Factors

Introduction and Objectives: Sudden Infant Death Syndrome (SIDS) is the leading cause of death of infants between one month and 1 year of age. A key recommendation for preventing SIDS is to place infants in the supine position for sleep, yet up to 33.8% of parents still place their infants in non-supine positions. The objective of this study is to explore whether selected infant and maternal factors are associated with the use of non-supine infant sleep position.

Methods: We analyzed data from 11,853 mother-infant pairs who participated in the 2012-2015 Pregnancy Risk Assessment Monitoring System (PRAMS) in the states of Minnesota, New Jersey, Pennsylvania, West Virginia, and Wisconsin, for which maternal and infant sleep position on infant sleep habits was collected. Multivariable logistic regression models were used to explore factors independently associated with adherence to the infant supine sleep position. Maternal age, race, education, smoking and alcohol use during pregnancy, and history of specific stressors, as well as infant's sex, gestational age at birth, and history of postnatal ICU stay were also included in the analysis accounted for the complex survey design using Stata software.

Results: Of the 11,310 participants with information on infant sleep practices, about 20% placed their infants in the non-supine sleep position. Of these, 85% of the mothers reported counseling on sleep position. Some characteristics were independently associated with use of non-supine infant sleep position. Black race was more common in this group (adjusted odds ratio = 2.0; 95% confidence interval [CI] 1.8-2.2, p < 0.001). Younger maternal age (OR = 1.23; 95% CI 1.02-1.47, p = 0.028), lower maternal education level (OR = 1.51; 95% CI 1.05-2.16, p = 0.03), and mothers who reported relational stressors (OR = 1.51; 95% CI 1.05-2.16, p = 0.034) were independently associated with lower adherence to the recommended supine infant sleep position. Lastly, compared to non-drinker mothers, mothers who reduced or stopped drinking alcohol during pregnancy were 29% less likely to use the non-supine sleep position (OR=0.71; 95% CI 0.90-0.85, p<0.01).

Conclusions-Implications: Our study has built on previous studies as well as identified novel risk factors associated with SIDS, such as lower education, black mothers, women with lower levels of education, and women with relational stressors. Preventative efforts could be focused on development of interventions targeted towards at risk populations.

P43 Treatment modality and social functioning in children with attention deficit hyperactivity disorder


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Keywords: Attention Deficit Hyperactivity Disorder (ADHD), Treatment Modality, Social Functioning, Pharmacotherapy, Cognitive Behavioral Therapy (CBT)

Introduction and Objectives: Attention deficit/hyperactivity disorder (ADHD) is the most common neurobehavioral pediatric disorder, affecting 3-7% of school age children. In addition, ADHD in the developmental period of age 7 to 17 years is associated with poor psychosocial outcomes and decreased quality and number of dyadic relationships. This study is the first to statistically test the differences between patients who use pharmacotherapy, cognitive behavior therapy (CBT), or a combination of both, is associated with improved social function in children with ADHD compared to control subjects receiving neither pharmacotherapy nor CBT.

Methods: This is a secondary analysis using information from the 2009-2010 National Survey of Children with Special Healthcare Needs (NSCH). Children whose parent reported clinical diagnosis and treatment of ADHD or hyperactivity were included in the analysis. The independent variable is treatment modality - pharmacotherapy only, CBT only, and combination of both. The dependent variable is social functioning, defined as making/maintaining friendship, aggression/acting-out, participation in activities, and participation in play. The associations between treatment modality and social functioning were explored through bivariate analysis. Adjusted odds ratios with 95% confidence intervals while controlling for confounders were obtained using logistic regression.

Results: 7,775 children were included in this study, with 54.2% receiving pharmacotherapy only as treatment for ADHD, 9.5% receiving only behavioral therapy, and 71% receiving no therapy. Only gender and parental education level were associated with treatment modality at baseline. Using unadjusted analyses there was no difference in social functioning between children with medication-only compared with no therapy (OR 0.8, 95% CI 0.6-1.1, p=0.157), whereas the CBT alone (OR 2.0, 95% CI 1.3-3.0, p=0.003) and combination therapy (OR 2.2, 95% CI 1.4-3.5, p=0.002) were associated with improved social functioning. However, after adjusting for confounding variables the association between inadequacy of social function and medication only (OR 0.7, 95% CI 0.5-1.1, p=0.134), CBT alone (OR 1.4, 95% CI 0.8-2.3, p=0.201), and combination therapy (OR 1.2, 95% CI 0.8-1.8, p=0.342) disappeared.

Conclusions-Implications: No significant differences in social functioning were found between patients in the four treatment modalities. Identifying and treating inadequate social functioning can have far-reaching implications in future relationships. This study explored the differences between medication-only and combination treatment modalities in the severity of ADHD are suggested.
Epilepsy in the pediatric population

Introduction and Objectives: Epilepsy in the pediatric population has a noticeable impact on the quality of life of the afflicted. Physical activity positively benefits epilepsy patients; however, epileptic children are less likely to participate in physical activity due to concerns about potential, further decreasing the quality of life of these children. Objective: To assess whether the level of parental education is associated with participation in physical activity of epileptic children living in the US.

Methods: We performed secondary analysis of data collected by the National Survey of Children’s Health, year 2016. Children aged 6-17 years with a previous diagnosis of epilepsy were studied. The independent variable was the highest level of parental education (categorized as “up to high school” and “above high school”). The dependent variable was adequate physical activity, defined present if the child participated in exercise, played sport, or performed any physical activity for 60 minutes for at least 4 days a week. Any level of activity done less than 4 days a week was considered not adequate. Independent associations were assessed using multivariate logistic regression models. P-values <0.05 were considered statistically significant (two sided test).

Results: We studied 310 epileptic children. Of those, only 43% exercised adequately. About 20% of the parents had an educational level up to high school. The level of parental education was not associated with adequate physical activity in the pediatric epileptic population.

Conclusions-Implications: The CDC-reported an increase in STI prevalence and, coincidentally, a concurrent decrease in condom use during sexual intercourse in adolescents. By understanding the determinants that are associated with reduced condom use in high school students, a more directed approach to community funding and interventions can be pursued.

Keywords: Adolescents, Condom-Use, Risk Factors

An observational study: Environmental and other risk factors for pediatric depression

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Keywords: Depression, Neighborhood, Environment, Pediatric

Introduction and Objectives: Poor environmental characteristics have been associated with poor mental health, but research directed at pediatric mental illness in disadvantaged social conditions remains an area of further exploration. With suicide climbing as the second leading cause of death among children, it is imperative that we better understand the causes of pediatric depression. The goal of this study is to understand the association between environmental conditions on depression in pediatric populations. Specifically we aim to assess the association between unfavorable environmental physical characteristics and depression in pediatric populations in the US.

Methods: We used a nationally representative sample (N= 82,197) from the National Survey of Children’s Health from 2011/2012 focusing on children ages of 2-17 years to assess the association between neighborhood amenities and depression. We controlled descriptive analysis of sociodemographic characteristics and neighborhood characteristics, as well as unadjusted and adjusted multivariate logistic regression analysis.

Results: Decreased amenities had higher odds of childhood depression in the unadjusted analysis; after controlling for confounders there was no longer a statistical significant association. Secondary factors that were statistically significant for higher odds of childhood depression in our adjusted analysis included: children 8-17 years (vs <0-4) children’s overall health reported as less than excellent had a greater odds of depression (odds ratio [OR]: 1.02, 95% CI 0.99-1.05); parent’s mental health had a greater odds of childhood depression (OR: 0.91; 95% CI 0.79-1.04); and household income levels (100-199%, 200-399%, and >+400%) compared to the highest poverty level (OR 0.65; 95% CI 0.50-0.84 respectively). In the final multivariate model, the adjusted results demonstrated a 35% decrease in odds of depression in the US.

Conclusions-Implications: The adjusted results demonstrated a 35% decrease in odds of ADHD among children in the lowest poverty level of <100% compared to the highest poverty level of >400%. The adjusted odds ratios for the child’s education levels (100-199% and 200-399%) and ADHD were not statistically significant (OR 1.02, 95% CI 0.99-1.05). The adjusted odds ratio for the child’s education level was significant (OR 0.91; 95% CI 0.83-1.00) when compared with the highest poverty level.

Keywords: Mental Health, Socioeconomic Status, Children, ADHD, Poverty

Introduction and Objectives: Attention-deficit/ hyperactivity disorder (ADHD) is one of the most common neurodevelopmental disorders of childhood and with symptoms and/or impairment often continuing into adulthood. Research has shown that parent-reported ADHD by household annual income during 2016, which is valuable given the increasing prevalence of ADHD in the United States. The objective is to assess the association between the poverty level experienced in the household and the prevalence in 2016 of reported ADHD diagnoses among children in the United States aged 4-17.

Methods: This cross-sectional study uses data from the National Survey of Children’s Health, which collects data from parents and caregivers on children assessed by the Pediatrician. The goal of this study was to examine trends in parent-reported ADHD by household annual income during 2016, which is valuable given the increasing prevalence of ADHD in the United States. Specifically we aim to assess the association between household’s poverty level and reported ADHD diagnosis. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Results: The total number of participants in this study was 40,422. The adjusted results demonstrated a 35% decrease in odds of ADHD among children in the lowest poverty level of <100% compared to the highest poverty level of >400%. The adjusted odds ratios for the child’s education levels (100-199% and 200-399%) and ADHD were not statistically significant (OR 0.91; 95% CI 0.83-1.00). The adjusted odds ratio for the child’s education level was significant (OR 0.91; 95% CI 0.83-1.00) when compared with the highest poverty level.

Conclusions-Implications: Although most studies showed an increased likelihood of ADHD among lower socioeconomic demographics, we observed a decreased likelihood among children living in a household with an annual income of >100% below the federal poverty level. Future studies may consider methodology to better elucidate underlying mechanisms and the directional of the named associations.
The relationship between social support and psychological distress in Latina mothers living in Miami-Dade County

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Keywords: Social Support, Psychological Stress, Acculturation, Latina, Mental Health

Introduction and Objectives: Previous studies have demonstrated a link between social support and mental health. However, few studies have explored this relationship among adult Latina women. This study aimed to examine the association between social support and psychological distress in Latina women living in Miami-Dade County. In addition, acculturation was examined as a potentially modifying factor.

Methods: The study included baseline data of 155 Latina mothers in Miami-Dade County collected as part of a longitudinal study of Latina mother and daughter dyads in the year 2005. Social support was measured using the Interpersonal Support Evaluation List (ISEL)—score ranging from 0 to 80, and categorized into tertiles: low (<26), medium (26-72), high (>73). Psychological distress was measured using the Beck Depression Inventory and the Beck Anxiety Inventory. The study was designed to assess whether social support and acculturation interacted in predicting psychological distress. The study had two primary findings.

Results: Data were collected from 405 students from November 3-12, 2018. More than half of respondents (58%) had indicators of PIU. Of those, 30% scored positive for depression, 33% for moderate and severe psychological distress, and 29% for moderate and severe insomnia. Bivariate correlations were significant between PIU and all of those variables (p<0.01). PIU was highly associated with insomnia severity and selecting “dating” and “reading” news as top reasons for internet use. Most students (78%) knew about wellness and health services on campus but only 51% never used them.

Conclusions-Implications: College students are at risk for PIU. PIU is associated with negative sleep and mental health outcomes. Counselors are aware of services on campus that may provide support, but they do not take advantage of them. College administrators should investigate ways to publicize services and provide support, but do not take advantage of them. College administrators should investigate ways to publicize services and provide support, but do not offer these services on campus. Colleges can offer counseling in a tech-free environment. Students may be more likely to be sexually active in college. However, sexual minorities were more likely than non-minorities to report using a condom and having higher odds of reporting psychological distress. The prevalence of abstinence declined by grade level across the data, but more so among those who identified as heterosexual. Interestingly, boys were significantly more likely than girls or lesbian women to identify as bisexual. Finally, sexual minorities were more likely than non-minorities to have ever had an HIV test.

Sexual minorities were significantly more likely than non- 

Introduction and Objectives: Pathological internet use, also known as problematic internet use (PIU) is excessive internet use that interferes with one’s daily life. PIU has been linked to insomnia, psychological health issues, and negative academic performance. This pilot study aimed to measure the degree to which such an association existed among a student population at a large Hispanic-serving research university in Miami, FL. The purpose of this research was to investigate the phenomenon of increased internet usage and its impacts on college students’ sleep habits, mental health, and overall academic performance.

Methods: A cross-sectional study design employing venue-based sampling was used to recruit students from seven high traffic locations on campus. To be eligible students had to be at least 18 years of age and currently enrolled in at least one credit hour course. Students completed a self-administered questionnaire assessing PIU, insomnia severity, psychological distress, student health center services use, academic performance, and top reasons for internet use. Cross tabulations and bivariate correlations were run to find significant associations among variables and a multiple linear regression was run to identify explanatory variables of PIU.

Results: Results of multivariable logistic regression models showed that compared to women with low level of social support, women with low social support had higher odds of reporting psychological distress (Odds Ratio = 7.89 [95% Confidence Interval = 2.74–22.14]). Level of acculturation, however, did not modify the association between social support and psychological distress (P = 0.74).

Conclusions-Implications: The study had two primary findings. First, social support was strongly associated with psychological distress among Latina women. Second, acculturation did not moderate the relationship between social support and mental health. This lack of interaction may be due to the small sample size. Although the study’s findings are preliminary, the results have clinical implications for the development of future social support scales and for Latina women’s well-being, especially in the context of mental health prevention.

Generation net: Exploring internet usage and its association with academic performance, mental health, and sleep habits amongst college students

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Keywords: College Students, Internet Use, Social Media, Insomnia, Mental Health

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West Kendall Baptist Hospital

Keywords: Colorectal Screening, Appendicitis, Colorectal Cancer, Complications, Abdominal Pain

Introduction and Objectives: Colorectal cancer is a gold standard method for colorectal cancer screening in asymptomatic adults ages of 50 to 75 by 2024. Some of the complications following colonoscopy examination are well documented and include cardiopulmonary complications related to use of sedatives, bleeding which is usually associated with polypectomy, perforation of bowel, and infection. However, other complications like acute appendicitis following colonoscopy have been less studied and are rarely reported.

Case Presentation: First patient: 53 year old white male presented to ED in the evening with complaint of gradual onset, moderate to severe, right lower quadrant abdominal pain and associated with nausea, non-bloody vomiting, and diziness. Patient underwent a screening colonoscopy that same morning without any obvious complications and started having abdominal symptoms after he started eating later that day. Abdomen CT showed multiple appendiculitis present within lumen of 1.1 cm dilated appendix and 7mm mesenteric lymphadenopathy. Patient underwent a laparoscopic appendectomy under general anesthesia without complications. Second patient: 55 year old Hispanic male with less than one week history of screening colonoscopy, presented ED with one day history of acute severe abdominal pain, located in periumbilical and right lower quadrant, sharp, moderate to severe in intensity. Patient was noted to have anemia, without fever, and nausea without vomiting. Patient reported having a screening colonoscopy within a week prior to any complications with normal findings. Abdomen CT showed appendicitis measuring about 12 mm in caliber with a distended lumen and perianal appendicolitis. Patient underwent a laparoscopic appendectomy under general anesthesia without complications.

Conclusions-Implications: Colorectal cancer is a relatively new threat to all individuals in the United States, but can be greatly decreased if one undergoes the screening that is offered. The National Cancer Institute is recommended that all individuals ages 50 to 75 get a fecal occult blood test or a flexible sigmoidoscopy. The screening is recommended to be done every 10 years in order to decrease the mortality of colorectal cancer.

Two cases of post colonoscopy appendicitis: Case study

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Keywords: Colonoscopy, Appendicitis, Colorectal Cancer, Complications, Abdominal Pain

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Evaluation of race as an effect modifier of the association between diabetes and surgical site infection


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Keywords: Hysterectomy, Infection, Diabetes, Race

Introduction and Objectives: Diabetes is a chronic condition that currently affects almost 10% of the adult population in the US. They are at increased risk of surgical site infection (SSI) compared to those without diabetes. Few studies evaluate the role of race in the association between diabetes and SSI. Our objective was to investigate race as an effect modifier of the association between diabetes and SSI in patients undergoing total abdominal hysterectomy (TAH).

Methods: We nested a historical cohort into the 2016 American College of Surgeons National Surgical Quality Improvement Program database (NSQIP). Exploratory analyses included description of baseline characteristics and bivariate analyses to identify potential confounders. To adjust for confounders and test for interaction, multivariable logistic regression models were fitted: a general model including the interaction between race and diabetes, and separate models for each race.

Results: Of the 16,043 included women, 63% were Caucasian and 29% African Americans. Eleven percent were diagnosed with diabetes and the incidence of surgical site infection was 3.8%. After adjusting for age, race, functional status, dyspnea, COPD, hypertension, disseminated cancer, bleeding disorder, and operation time, the odds ratio (OR) of SSI between diabetics and non-diabetics was 1.62 (95%CI:1.29-2.02), and the interaction between race and diabetes was not statistically significant (p=0.540). After stratification, the adjusted ORs of infection between diabetics and non-diabetics were very similar between whites and blacks (1.55; 95%CI:1.18-2.05 and 1.62; 95%CI:1.07-2.45, respectively).

Conclusions-Implications: Our data supports that diabetes increases the risk for SSI after TAH. Obesity, hypertension, dyspnea, and operation time (>2 hours) independently increase the odds of developing SSI. Lastly, we didn’t find evidence supporting the role of race as an effect modifier of the association between diabetes and SSI in those undergoing TAH.

Moving away from mannitol infusion for partial nephrectomy: has there been any effect on renal function?

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Keywords: Urology, Partial Nephrectomy, Mannitol, Renal Function, GFR

Introduction and Objectives: Currently, partial nephrectomy is the recommended treatment for localized renal cancer, according to the AUA guidelines. However, one of the major concerns in the setting of partial nephrectomies is the effect of ischemia on the remaining kidney parenchyma. It is understood that ischemia is a significant modifiable factor influencing nephron damage and renal failure due to the effect of organ-induced ischemia and subsequent ischemia reperfusion injury. In response, diuretics such as mannitol have been used in the hopes of mitigating these phenomena. Although mannitol has been used for many years for its purported protective effects, recently multiple studies of mannitol use specifically in the setting of partial nephrectomy have emerged challenging this assertion. This study considers whether mannitol administration has shown any benefit to patients in the contemporary era.

Methods: We retrospectively reviewed a multi-institution database for an association between mannitol administration and subsequent renal function during follow-up. These patients were assessed for de novo chronic kidney disease, stage III (CKD III) and followed with estimated glomerular filtration rate (eGFR). Statistical analysis included Mann-Whitney-U and chi-squared tests for comparing baseline and perioperative variables, and postoperative outcomes. eGFR changes were evaluated with a mixed-effects linear regression model.

Results: Between 2014 and 2017, 915 patients were identified whose operative reports or surgeons’ treatment algorithms explicitly described mannitol administration. 667 (73%) of patients did not receive mannitol. They did not differ significantly at baseline in terms of demographics, age, Charlson comorbidity index, nephrometry score, tumor size, grading, or baseline eGFR from those who received mannitol. On follow-up, patients were tracked for a median of 5 months (IQR 0.4-18 months), during which mannitol use was associated with an increase in de novo CKD III (14% v. 9%, p < 0.001), and minimally worsened median eGFR on final follow-up (73 v. 76, p < 0.05) (table). On multivariate analysis, mannitol was not associated with changes in renal function, which appeared to be most strongly related to ischemia time and length of follow-up. Interestingly, ischemia time and operative time appeared slightly longer with mannitol use.

Conclusions-Implications: Mannitol administration, long believed to prevent ischemic damage during partial nephrectomy, has recently been phased out. Our analysis of partial nephrectomy patients during this shift in practice patterns indicates that mannitol administration likely confers no short- or long-term renal benefit. Mannitol may be used at the surgeon’s discretion, but if it prolongs surgery time or ischemia time, it may actually be detrimental to outcome.