FOMA
STUDENT/INTERN/RESIDENT
RESEARCH POSTER COMPETITION

CASE and EXPERIMENTAL
RESEARCH PRESENTATIONS

February 5-9, 2020
115th Annual FOMA Convention
Bonaventure Resort & Spa
Weston, Florida

Sponsored by the Osteopathic Foundation of East Orlando and the Advocates to the Florida Osteopathic Medical Association

Table of Contents

Rab8a Role in αSynucleinopathy Disorders 8
Kaitlyn Alessi, OMS-1, Nikolaus R. McFarland, M.D., Ph.D., Mayur S. Parmar, Ph.D.

Preventing the Development of Resistance to Radiation and Chemotherapy in Androgen- Independent DU-145 Prostate Cancer Cells *in vitro* 9
Rida Altaf, OMS-1, James Kumi-Diaka, Ph.D.

Patients with Sarcopenia Undergoing Primary Total Knee Arthroplasty at Increased Risk of 90-day Medical Complications and 2-year Implant-Related Complications 10
Andrew Ardeljan, OMS-1, Joseph Palmer, D.O., Rushabh M. Vakharia, M.D., Martin W. Roche, M.D.

Perception of Weight Status and BMI Based on Self-Reported Weight and Height among Undergraduate Students 11
Nada Belal, OMS-1, Deepesh Khanna, M.D., Ph.D.

Does Increased Environmental Temperature Affect Skin Tissue Dielectric Constant? 12
Garry Berdichevskiy OMS-1, Cindy Lorenzo-Valido, OMS-1, Marcos Clavijo–Fernandez, OMS-2, Harvey N. Mayrovitz, Ph.D.

An Investigation into the Antibacterial Properties of Honey and Its Constituent Macromolecules 13
Seth Boyd, OMS-2, Steve Sartore, OMS-2, Daniel Slabaugh, OMS-2, Nikhil Jain, OMS-2, Zimrisha Alla, PS-3, Maya Mwanza PS-2, Walters Cheso, PS-2, Blake Piepenbrink, OMS-2, Thomas Arnold, Ph.D.

A Cost-Benefit Analysis of Choosing Non-Instrumental Bedside Screenings in Patients with Low Risk Factors for PED not Meeting the CMS Criteria of PMV (Prolonged Mechanical Ventilation) 14
Giselle Falconi, M.D., Kyle Barjon, D.O., Jestin Kattalan, M.D., Bharat Upadhyay, M.D.

Exploring De Novo Gene Mutations in the Pathogenesis of Hirschsprung Disease 15
Jackleen Glodener, OMS-3, Iain Shepherd, Ph.D.

Leg-to-Arm Tissue Dielectric Constant Ratios to Aid Assessment of Leg Lymphedema 16
Ram Hirpara, OMS-1, Issac Ichoa, OMS-1, Ted Frederic, OMS-1, Harvey N. Mayrovitz, Ph.D.

Characterization of Herbal Supplement Use among an Underserved Diabetic Population in South Florida 17
Carmen Jaramillo, D.O., Jheannel White, M.D., Janey Oviedo Garcia, D.O., Elizabeth Philippe, M.D.

The Efficacy of Medication Assisted Therapy to Increase Hospitalization Compliance for People with Opioid Use Disorder who Require Long Term Inpatient IV Antibiotic Course 18
Young Jo, M.D., Jordan Calabrese, D.O., Rebecca Nosal, OMS-4, Samuel Neuhut, M.D.

PHQ-2 Scores in Broward County's Homeless: Prevalence, Barriers, and Proposed Solutions to Mental Health Disparities 19
Jeena Kar, OMS-4, Ariba Hashmi, Reeja Raj, Sandra Hossain, Joshua Berko, OMS-2, Patrick C. Hardigan, Ph.D., Joseph DeGaetano, D.O.

Understanding Medical Students' Knowledge of Opioid Use Disorder: A Preliminary Study 20
Ariel Kidron, OMS-1, Sweta Tewary, Ph.D., Naushira Pandya, M.D., C.M.D., Jim Howell, M.D., Rebecca Cherner, D.O., Marie Florent-Caree, D.O., Annisah Ishmael, Ed. D., Hiep Nguyen, B.A., Tianyu, B.S.

Oxidative Burst and Programmed Cell Death in Macrophages Infected with Carbapenem- Resistant *Klebsiella Pneumoniae* 21
Michael Kling, OMS-1, Danielle Ahn, M.D., Alice Prince, M.D.

Butterfly Ultrasound as a Reliable Method of Treatment and Quantitative Evaluation of Somatic Dysfunction in the Thoracic Spine 22
Christine Ma, OMS-2, Tyler O'Connor OMS-2, Luke Pettet OMS-2, Steven Ma, D.O., Bryan Lin D.O.

Cardiopulmonary Changes Related to Cancers of the Lungs, Breast, and Stomach 23
Anna Martin, OMS-2, Hunter Belanger, OMS-2, Minji Bae, OMS-2, Taylor Hyde, Kelly Tran, Alexa Constantakos, OMS-2, Aleksandr Sinelnikov, M.D., Ph.D.

Get It Right the First Time, Measure Twice, or Third Time's a Charm? Single vs. Multiple Tissue Dielectric Constant (TDC) Measurements 24
Alexander Mikulka, OMS-2, Don Woody, OMS-2, Harvey N. Mayrovitz, Ph.D.

Can a Static Magnetic Field of a Concentric Multipole Magnet Reduce Menstrual Pain? 25
Brittany Milo, OMS-2, Brooke Alexander, OMS-2, Yashaswani Moparthi, OMS-2, Marisa Mastropasqua, OMS-2, Harvey N. Mayrovitz, Ph.D.

The Enhancement of Osteopathic Rib Principles and Manipulation Treatments through 3D Printing 26
Kevin Moriles, OMS-3, Amanda Ramnot, OMS-3, Michael Lai, OMS-3, Yasmin Qureshi, D.P.T., Ed.D.

Implementing Target BP Program in the Patient Centered Medical Home Model 27
Kelly Mudon, D.O., Ludonir Sebastiany, M.D., Ifeoluwa

Balogun, M.D., Divy Mehra OMS-3; Nicole Cook, Ph.D., Elizbeth Philippe, M.D., Abiona Redwood, M.D.

The Repeatability of Visual Changes Measured With Tests of Visual Acuity and Contrast Sensitivity 28

Manonmani Murugappan, OMS-3, Andrea M. Janoff, O.D., Luis Lesmes, Emma Flor, Maryn JaNet Barnes, Ava K. Bittner

Perception of Overall Health, Weight Status, and Gaining Weight in Relationship with BMI among High School Students 29

Cody M. Mutter, OMS-1, Deepesh Khanna, M.D., Ph.D.

Is Hand Dominance a Factor in Inter-arm Systolic Blood Pressure (IASBP) Differences? 30

Ovshay S. Ovshayev, OMS-2, Aneil Tawakalzada, OMS-1, Harvey N. Mayrovitz, Ph.D.

The Extraction of Proteins and Lipids from Honey to Analyze Their Antimicrobial Properties 31

Blake Piepenbrink, OMS-2, Stephanie Blount, OMS-2, Seth Boyd, OMS-2, Daniel Slabaugh, OMS-2, Steve Sartore, OMS-2, Hunter Belanger, OMS-2, Marina Salah Shoukry, PS-2, Walters Cheso, PS-2, Zimrisha Alla, PS-3, Thomas Arnold, Ph.D.

Scrna-Seq of Hesc Retinal Organoids Identifies Different Retinal Progenitor Cells and Characterizes Cell-Cell Interactions 32

Sergio Poli, M.D., Shaojun Wang, Ph.D.

Targeting PRMT5 to Circumvent Acquired Ibrutinib Resistance in Mantle Cell Lymphoma 33

Alexander Prouty OMS-1, Shelby Sloan B.S., Robert A. Baiocchi, M.D., Ph.D., Lapo Alinari, M.D., Ph.D.

Continuous 24-hour Contact Lens Sensor as a Commercial Device for IOP Related Changes: Patient Tolerability and Clinical Experience 34

Oshin Rai, OMS-2, Ariel Chaves, M.D., Renata Prota Hussein, M.D., Syril Dorairaj, M.D.

Anti-Bacterial Effects Of Juglone, a Natural Product Derived From Walnut Trees 35

Robert J. Rowland, OMS-2, Mitchel Daugherty, OMS-2, Madison French, OMS-1, Sheng-Yi David Lim, OMS-2

Implementation of the Bipolar Disorder Screening Tool, MDQ: A Quality improvement Strategy to Prevent Delayed Diagnosis 36

Julio Scardini, D.O., Nicole Cook, Ph.D., Shivanie Ramdin, OMS-2

Early Clinical Results Following Repair of Gluteal Tendon Tears 37

Trevor Smith, OMS-1, Brad Ellison, M.D., Michael Matthews, B.S., Susan Odum, Ph.D.

Tissue Dielectric Constant of Breast Tissue in Women Undergoing Breast Tumor Biopsy 38

Paige Spagna, OMS-4, Carmen Somarriba P.A., Daniel Weingrad M.D., Harvey N. Mayrovitz Ph.D.

Does Emergency Department Sign-out Matter for Patient Safety and Patient Care Efficiency? A Survey of the Perception of Emergency Medicine Residents and Attending Physicians on the Effect of Sign-out 39
Tran Trung, M.D., Manuel Obando, M.D., Emerson Franke, M.D., Frederick Chu, M.D., Erin Marra, M.D., Todd Slesinger, M.D., Mark Mitchell, D.O.

Dietary Views and Habits of Health Professional vs. Non-Health Professional Students 40
Oleg Tsvyetayev, OMS-2, Nicholas Lampasona, OMS-2, Michael Downing, OMS-2, Mark Vinicky, OMS-3, Michael Bazzi, OMS-3, Harvey N. Mayrovitz Ph.D.

Does Body Fat Importantly Influence Skin Tissue Dielectric Constant Values 41
Adithi Vemuri, OMS-2, Jessica Forbes, OMS-3, Katelyn Krolick, OMS-2, Samantha Rubin, OMS-2, Harvey N. Mayrovitz, Ph.D.

Vascular Endothelial Growth Factor (VEGF) – Induced Endothelial Differentiation of Human Periodontal Ligament Derived Mesenchymal Stem Cells (PDLSCs) 42
Susan Zhang, OMS-2, Shreya Patel, Sondos Alghamdi, B.D.S., Umadevi Kandalam, D.M.D.

Subclavian Steal Syndrome 43
Zahava Alishaev, OMS-4, Divya Pandya, OMS-4, Tariq Jaber, M.D., Christina Savu, D.O.

Saving the Critically Ill Patient with Acute Pulmonary-Renal Syndrome with Combined Therapy of Plasmapheresis and Rituximab 44
Mehak Bhatia, OMS-4, Jusong Choi, M.D., Farid Isaac, M.D., Parham Eftekhari, D.O.

***E. coli* O157:H7 Sepsis following FMT in an IgA Deficient IBD Patient** 45
Landen Shane Burstiner, OMS-2, Anna Owings, D.O., Sarah Glover, D.O.

A Rare Presentation of Lupus Encephalitis Presenting as Bacterial Meningitis 46
Amanda Costa, M.D., Estefania Niewualkousk, D.O., Megan Arielle McGill, OMS-1

A Potentially Rare Case of Diffuse Large B-Cell Lymphoma of the Pelvis 47
Keresa V. Edwards, D.O., Ian D. Singer, D.O., J.D., Natan Bastoky, D.O., Ashley Shanblatt, D.O., Rajiv Chokshi, M.D., Tricia A. Kalwar, M.D.

Acute Generalized Cutaneous Lupus Erythematosus repeatedly mistaken for Cellulitis 48
Nicole Fischer, OMS-3, Mary Spring, OMS-3, Joseph Geffen, D.O.

Treatment of a Patient with Anterior Head Carriage and Low 49

Back Pain
Alyssa Goldenhart, OMS-2

A Hypercoagulable State Leading to the Detection of Occult Lung Malignancy 50
Adam Jacobs, OMS-4, Anita Singh, D.O., Israel Ugalde, D.O.

Thrombectomy: Clearing the way to the Top 51
Romeena Lee, D.O., Gabriela Perez, D.O., Ariol Lobrada, M.D.

Too Little, Too Much: Severe Thrombocytopenia and Erythrocytosis in a Patient with Polycythemia Vera and Dengue Virus 52
Andrea Linares, D.O., Carlos Barbur, D.O., Cesar Bertolotti, M.D.

Cardiac Arrest Secondary to Massive PE: Survival by VA-ECMO 53
Robin Mata, OMS-3, Gabrielle McDermott, OMS-3, Joaquin Mejias-Crespo, M.D.

Bronchiolitis Obliterans Organizing Pneumonia with Temozolomide 54
Emmanuel McDonald, D.O., Zaid Rana, D.O., Humberto Rios, M.D., Nora B. Khoury, M.D., Vamsidhar Vennamaneni, M.D., Patrick Dreyer, D.O., Yang Millet, D.O., George Mitchel, B.S., Linda S. Rios, B.S., George Michel, M.D., Odalys Frontela, M.D., Jaime F. Avecillas, M.D., Osmany DeAngelo, D.O., Hector Vazquez-Saad, M.D., Felix Hernandez, M.D., Gustavo Ferrer, M.D., Robert Hernandez, M.D., Carlos Dominguez, M.D., Luis Mendez-Mulet, M.D.

Difficulty in the Removal of a Subcutaneous Port-a-Cath after Eleven Years of Implantation, Fixed at the Catheter Tip in the Superior Vena Cava 55
Divy Mehra, OMS-3, Dieter Brummund, M.D., Benjamin Sinyor, M.D., Seza Gulec, M.D.

Emergent Bedside Ultrasound for the Confirmation of Left Atrial Myxoma 56
Mark Mitchell, D.O., Erin Marra, M.D., Nicolas Ulloa, M.D., Ricardo Rodriguez, M.D.

Post-traumatic Occupational Osteomyelitis Involving the Finger of a Healthy Adult 57
Adills Moosa, D.O., David Shenessa, M.D.

The Battle for the Placenta: A Unique Presentation of Twin-Twin Transfusion Syndrome 58
Mihir Nakrani, OMS-3, Rajeev Herekar, OMS-3, Ram Hirpara, OMS-1, Sandra Black-Boxill, M.D.

A Case of Primary Thrombocytosis Associated Focal Segmental Glomerulonephritis 59
Christopher Naranjo, D.O., Jusong Choi, M.D.,

Parham Eftekhari, D.O.
Cryoglobulinemia in an HIV+/HCV- Patient: A Case Report 60
Scott M. Nettboy, D.O., Farid Isaac, M.D., Parham Eftekhari, D.O., Veronica Perez, OMS-3
Esophageal Stricture Due to Caustic Ingestion: A Case of Failed Esophageal Reconstruction with Near Total Esophagectomy and Gastric Sleeve Pull Up Requiring Long Term PEG Tube Nutrition 61
Juan De La Ossa, D.O., Talar Kachechian, D.O., Michael Girard, M.D., Karthik Mohan, D.O.
Tachycardia Induced Cardiomyopathy and Thyrotoxicosis 62
Sigmund Paczkowski, D.O., Alex Morizio, M.D.
Survive the Dive: Acute Ischemic Stroke due to Decompression Sickness in a Recreational Scuba Diver 63
Stephanie Prater, M.D., Anjeza Chukus, M.D.
An Unsuspected Axillary Mass in a 2-Week-Old Male 64
Ashley Van Putten, D.O., Alexis Dietz, D.O., Angelica Garzon, M.D., Ron Persaud, OMS-4, Johnny Tryzmel, M.D.
Can You See the Carcinoid Tumor? A Case of Autoimmune Metaplastic Atrophic Gastritis (AMAG) and Carcinoid Tumor 65
Zaid Rana, D.O., Emmanuel McDonald, D.O., Humberto Rios, M.D., Nora B. Khoury, M.D., George Michel, B.S., Linda Samanta Rios, B.S., Linoj Panicker, D.O., Jamie Skrove, D.O., George Michel, D.O., Karthik Mohan, D.O., Juan Sarol, M.D., Javier Sobrado, M.D.
Hypersensitivity Reaction to PCSK9 Monoclonal Antibodies 66
Dustin Tran, OMS-3, Hady Masri, D.O., Donald Shalhub, M.D.
Dance, Dance, Dissection: A Case Study of a Spontaneous Vertebral Artery Dissection 67
Reed Yaras, D.O., Vu Huy Tran, M.D., Rebecca Saunders, OMS-4

Acknowledgements
Head Judge 68
Abstract Reviewers 68
Poser Judges 69

Title: **Rab8a Role in αSynucleinopathy Disorders**

Authors: Kaitlyn Alessi, OMS-1, Nikolaus R. McFarland, M.D., Ph.D. and Mayur S. Parmar, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Tampa Bay Campus, FL; University of Florida, Gainesville, FL

Background: Alpha-Synucleinopathies are a group of disorders characterized by the accumulation of αSynuclein (αSyn) inclusion in various brain cell types in different brain structures. Parkinson's disease (PD), Lewy body dementia (LBD), and multiple system atrophy (MSA) are three major αSynucleinopathies. In PD, the pathological features are the progressive degeneration of dopaminergic neurons and axonal projections in the Substantia Nigra due to misfolding and accumulation of αSyn aggregates, called Lewy bodies. While in MSA, the underlying αSyn pathology occurs in oligodendroglia. These patients have some overlapping symptoms but different clinical manifestations, which are the basis for differential diagnosis. Little is known about the role of Rab GTPases in human Synucleinopathies. This study focused on elucidating the role of specific Rab GTPases, called Rab8a, in human αSynucleinopathies.

Objective: To elucidate the role of Rab8a GTPase protein in αSynucleinopathy disorders.

Methods: We examined the Rab8a protein expression levels in postmortem human brain samples from multiple αSynucleinopathy disorders (PD, LBD, MSA), and healthy matched controls. Tissues from select brain regions including frontal and temporal cortex, striatum, cerebellum,and white matter were analyzed. Frozen brain samples were homogenized in the high salt buffer and analyzed by Western blot with specific Rab8a antibody. To understand Rab8a's effects on αsyn expression and aggregation, a follow up *in vitro* experiment were conducted. Human neuroglioma H4 cells were cultured and co-transfected with wildtype (WT) αsyn and Rab8a plasmid (and other Rab8a mutants). After 36 hours, the cell lysate was collected, and western blot analysis was performed to study the effect of Rab8a on αSyn. To study the effect of Rab8a on αSyn aggregation, immunocytochemistry (ICC) was performed on stable αSyn H4 which are prone to form αSyn aggregates when seeded with pre-formed αSyn fibrils (PFF). These cells were transfected with either control EGFP or Rab8a. After 36 hours of seeding, the cells were fixed, stained for aggregates and fluorescence microscopy was performed.

Results: Analysis of the data reveals a statistically significant decrease in Rab8a protein expression in MSA postmortem tissue compared to healthy control. No changes in Rab8a expression were observed in PD or LBD. In H4 cells, the WT and constitutively active form (Q67L) of Rab8a had a significant effect on αSyn expression and aggregation. The nonfunctional mutants (T22N) did not show any effect on αsyn expression and aggregation.

Conclusions: These data provide the first evidence that Rab8a may play an important role in human αSynucleinopathy disorders. The findings from these studies provide preliminary data for larger studies examining the role of Rab GTPases in αSyn pathology and their potential for therapeutic modulation.

Title: **Preventing the Development of Resistance to Radiation and Chemotherapy in Androgen- Independent DU-145 Prostate Cancer Cells *in vitro***

Authors: Rida Altaf, OMS-1 and James Kumi-Diaka, Ph.D.
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Florida Atlantic University, Charles E. Schmidt College of Science, Boca Raton, FL

Background: Prostate cancer (PCa) is still the most common non-skin cancer among men in the United States. The American Cancer Society has estimated 174,650 new cases and 31,620 deaths from prostate cancer for 2019. The standard treatment modalities (surgery, radio- chemotherapy, hormonal therapy) have been effective in improving the lifestyle of patients. Although the locally confined disease is treatable, treatment of the metastasized prostate cancer is still incurable with mostly guarded prognosis. The development of resistance to both radiation and chemotherapy has limited the efficacy of current therapeutic interventions for PCa. This has necessitated the search for novel and safer alternative therapeutic regimens.

Objective: Our hypothesis was that the use of very low dose radiation (VLDR) in combination with genistein isoflavone (Gn) will inhibit treatment-induced resistance and induce apoptotic cell death in DU-145 PCa cells at a faster rate and with significantly lower cytotoxicity.

Methods: We utilized DU-145 prostate cancers and exposed them to VLDR for 20 minutes before treatment with various doses of (Gn). MTT assay, inverted microscopy and fluorescence microscopy were used to assess the efficacy of mono vs. combination treatment.

Results: Our data revealed that exposing DU-145 cells to VLDR for 20 minutes before treatment with (Gn), significantly increased the therapeutic efficiency of genistein (Gn); the combination treatment (VLDR-Gn) caused significantly more apoptotic cell death in DU-145 cells. Results were statistically significant with $p<0.05$.

Conclusions: Our study demonstrated that hormone-independent DU-145 cells became more sensitive to genistein when primed with VLDR for 20 min prior to treatment in a dose-dependent manner than when treated with (Gn) alone. Preliminary data from limited studies in our lab revealed that (VLDR-Gn) combination inhibited treatment-induced resistance to apoptosis in the prostate cancer cells. If this observation can be demonstrated in in vivo studies, the outcome will be clinically significant.

Title: **Patients with Sarcopenia Undergoing Primary Total Knee Arthroplasty at Increased Risk of 90-day Medical Complications and 2-year Implant-Related Complications**

Authors: Andrew Ardeljan, OMS-1, Joseph Palmer, D.O., Rushabh M. Vakharia, M.D. and Martin W. Roche, M.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Broward Health Medical Center, Orthopedic Surgery, Fort Lauderdale, FL; Holy Cross Orthopedic Institute, Fort Lauderdale, FL

Background: Sarcopenia is a musculoskeletal condition characterized by age related muscle tissue loss. The implications of sarcopenia on patients undergoing general surgical procedures is well documented, yet there is paucity in the current literature regarding the impact of sarcopenia on orthopedic outcomes. Considering the nature of orthopedic surgery, and importance of muscle strength in surgical outcomes, these implications could likely be magnified in orthopedic patients.

Objective: The objective of this study is to determine if patients with sarcopenia undergoing primary total knee arthroplasty are at greater odds of: (1) 90-day medical complications; and (2) 2-year implant related complications.

Methods: Patients who underwent primary TKA were identified using International Classification of Disease, ninth revision (ICD-9) procedural code 81.54. The database was then queried for patients with a diagnosis of sarcopenia using ICD-9 diagnosis code 728.2. The inclusion criteria for the study group consisted of patients undergoing primary TKA with a 90- day history of sarcopenia prior to the index procedure. Patients who underwent primary TKA without a history of sarcopenia served as controls. Study group patients were randomly matched to controls in a 1:5 ratio by age, BMI (body mass index), chronic obstructive pulmonary disease (COPD), diabetes mellitus, hyperlipidemia, hypertension, and tobacco use. Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (95%CI). A p-value of less than 0.05 was considered statistically significant.

Results: The query yielded 15,073 patients with sarcopenia, and 75,365 patients without sarcopenia, all of which had undergone primary TKA. Patients with sarcopenia were at a greater risk of 90-day medical complications (OR:3.67; 95%CI:3.18 – 4.23, *p*-value:<0.0001) and greater risk of 2-year implant-related complications (OR:1.80; 95%CI: 1.64 – 1.97, *p*- value:<0.0001).

Conclusions: Our findings suggest that sarcopenia may be a risk factor for medical and implant related complications in patients undergoing primary TKA. Further, prospective research should be performed to better assess risks and help determine whether these risks change with varying degrees of sarcopenic muscle loss. Additionally, patients and surgeons alike should be aware of these possible risks, in order to develop protocols to improve surgical outcomes.

Title: **Perception of Weight Status and BMI Based on Self-Reported Weight and Height among Undergraduate Students**

Authors: Nada Belal, OMS-1 and Deepesh Khanna, M.D., Ph.D.
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: University students, especially women, perceive themselves as being overweight. This is of major concern because inappropriate weight perceptions can lead to inappropriate dietary behaviors or a sedentary lifestyle. Perception of being overweight at a normal or underweight range of BMI can lead to conditions like anorexia nervosa or bulimia.

Objective: The objective of this study is to evaluate the presence of inappropriate weight perception in undergraduate students.

Methods: The cross-sectional study was conducted among undergraduate students at a university in Arkansas during August-December 2018. Face-to-face interviews using validated questionnaires were employed to collect the data. BMI was calculated based on the self-reported height and weight. Perceptions regarding weight were elicited using two questions: "Do you consider yourself to be underweight, overweight, or about right"? And, "if overweight, do you consider yourself to be obese or not?" The association between self-reported BMI and weight perception was assessed with Chi-Square tests for males and females. Level of significance was set at 0.05.

Results: Data is presented as mean±SD. A total of 126 undergraduate students participated in the study: 86 males and 36 females. Descriptive statistics showed a BMI of 27.07±5.61 kg/m^2 in males and 25.69±4.52kg/m^2in females. Most students reported a BMI range of normal weight which is 18.5-24.9 kg/m^2 (88.9% of males, 72.2% of females). Out of the total males who self-reported normal BMI, 3.7% considered themselves underweight and 7.4% considered overweight (χ^2=33.6, p=0.000). On the other hand, out of the females who reported normal BMI, 16.7% considered themselves underweight and 11.1% considered themselves overweight (χ^2=13.250, p=0.01). Among males who considered themselves overweight, 74.1% did not perceive themselves as obese (χ^2=51.7, p=0.000). Among females who considered themselves overweight, 78.6% did not perceive themselves as obese (χ^2=5.7, p=0.677).

Conclusions: Results show that the average BMI is higher for males as compared to females. Weight standards are rather uniform between males and females, with female students more likely to perceive themselves as overweight and underweight at a normal BMI range. Furthermore, among males and females who perceived themselves as overweight, most of them do not consider themselves to be obese. The results of this study reaffirm that there is a possibility of such pathologies as anorexia nervosa and/or bulimia manifesting in individuals who are of normal BMI due to inappropriate weight perceptions.

Title: **Does Increased Environmental Temperature Affect Skin Tissue Dielectric Constant?**

Authors: Garry Berdichevskiy OMS-1, Cindy Lorenzo-Valido, OMS-1, Marcos Clavijo-Fernandez, OMS-2 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Introduction: Localized edema or lymphedema are encountered in practice and successful management is aided by rapid quantitative ways to assess and track patient progress. Tissue dielectric constant (TDC) values are useful in detecting, assessing, and characterizing these conditions since TDC values are highly dependent on local tissue fluid content. Although TDC measurements can be done simply by touching the skin with a probe for less than 10 seconds, the effect of patient prior exposure to elevated environmental temperatures, such as in Florida, is unclear. This is especially true in patients with lymphedema who may arrive with the affected limb bandaged or otherwise covered which then needs to be removed to make evaluations or measurements. It was hypothesized that via heat-activation of eccrine sweat glands, TDC values would rise with increases in temperature because of increased fluid within the glands and possible surface sweating. Knowledge of the amount of such changes and the recovery time would be important to determine measurement procedure and to interpret TDC values.

Objective: To determine the effect of elevated environmental temperature on TDC values.

Methods: A volunteer group of 24 young adults participated in this research study after signing an informed consent. TDC values were measured on the thenar-eminence and anterior forearm in triplicate prior to heating, during a 20-minute whole-body heating interval and post heating. During heating, the environmental temperature was increased gradually to a maximum of 42^{O}C.

Results: Increasing environmental temperature from (mean ± SD) 23.3 ± 1.6^{O}C to 41.5 ± 1.3^{O}C increased forearm and thenar-eminence skin temperatures to 37.8 ± 0.5^{O}C and 37.9 ± 0.4^{O}C respectively. Corresponding forearm changes in TDC values were at the forearm from 30.7 ± 4.6 to 36.3 ± 5.7 (18.2%) and at the thenar-eminence from 34.7 ± 4.9 to 45.1 ± 5.5 (30%). Post heating measurements allowed the calculation of the time to recovery to baseline TDC values.

Conclusions: The present results support the hypothesis of increased TDC values associated with increase environmental temperature that impacts skin temperatures. The amount of increase is shown to depend on the amount of temperature increase. Based on calculated TDC recovery rates, it is concluded that temperature-related TDC variability in patient measurements can be minimized using a wait time of at least 15 minutes after their arrival in the office and in those patients wearing limb coverings (bandages or compression sleeves) that TDC measurements be made no sooner than 15 minutes after covering removal.

Title: **An Investigation into the Antibacterial Properties of Honey and Its Constituent Macromolecules**

Authors: Seth Boyd, OMS-2, Steve Sartore, OMS-2, Daniel Slabaugh, OMS-2, Nikhil Jain, OMS-2, Zimrisha Alla, PS-3, Maya Mwanza PS-2, Walters Cheso, PS-2, Blake Piepenbrink, OMS-2 and Thomas Arnold, Ph.D.

Program: Lake Erie College of Osteopathic Medicine, Bradenton, FL

Background: With the advent of antibiotic-resistant bacteria, the need for alternative antimicrobials has outpaced the actual development of novel, broad-spectrum antibiotics. Research has shown efficacy in natural antimicrobials, such as those found in honey. More research is still needed, especially quantitative evaluation of the antimicrobial strength of honey.

Objectives: The goal of this investigation was to examine the antimicrobial properties of honey and its components, and to isolate any viable antimicrobial agents.

Methods: For maximal representation, 22 honey samples were obtained from a variety of geographic sources. To assess potency, a series of Kirby-Bauer disk diffusion assays was performed on Mueller-Hinton agar using different types of raw honey with *Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, Escherichia coli,* and *Bacillus subtilis*. This process was then repeated using peptide and lipid extracts from the honeys.

Results: The Staphylococci were found to be more susceptible to honey samples I, II, and III than the other bacteria species studied. When the separated components of lipids and proteins were applied using the disc-diffusion method, the proteins of honey sample IV showed mild inhibition of the staphylococci while the lipid components failed to stall the growth of any of the organisms tested.

Conclusions: The greatest amount of inhibition was seen when the honey was tested as a whole instead of its constituent parts. Instead of an individual component acting as the key to honey's action against bacteria, it appears there is a synergistic relationship amongst the sugars, proteins, and lipids that make each honey unique. With the resulting inhibition of several high- prevalence bacteria strains, there is a hope to translate this in vitro success into an in vivo application.

Title: **A Cost-Benefit Analysis of Choosing Non-Instrumental Bedside Screenings in Patients with Low Risk Factors for PED not Meeting the CMS Criteria of PMV (Prolonged Mechanical Ventilation)**

Authors: Giselle Falconi, M.D., Kyle Barjon, D.O., Jestin Kattalan, M.D. and Bharat Upadhyay, M.D.

Program: Aventura Hospital & Medical Center, Aventura, FL; St. Lucie Medical Center, Port St. Lucie, FL

Introduction: Swallow studies are performed on all patients postextubation to screen for postextubation dysphagia (PED) [1]. Studies have shown that risk factors associated with the development of PED include: Stroke, neuromuscular disease, low GCS, advanced age, prolonged mechanical ventilation, preexisting CHF, forced supine position, presence of tracheostomy, NG tube placement, history of head and neck cancer, and recent TEE [2]. As a result, clinicians are more inclined to request more expensive instrumental assessments before allowing patients to eat if they required mechanical intubation longer than one week regardless if they have any risk factors or not. This often leads to delays in patients receiving adequate nutrition and added costs for most parties involved. Most of the literature search reveals that very little is known about the benefits of doing more advanced evaluations in low risk patients.

Background: Assessment of patients suspected of having swallowing disorders is accomplished by both clinical bedside swallowing assessments by speech-language pathologist (SLP), modified barium swallow test (MBS), videofluoroscopy (VFS), and fiberoptic endoscopic evaluation of swallowing (FEES) [3]. Clinical and bedside evaluations typically precede the physiologic examinations and in various hospitals it is protocol to wait 24 hours before swallow study assessment. This will be a cost-benefit analysis of instrumental examinations in low risk patients not meeting the CMS criteria for PMV. CMS defines PMV as greater than 21 days of mechanical ventilation for ≥6 hours per day [4]. The goal of our research is to determine if there is a benefit to using non- instrumental screenings for PED in low risk patients. This will be identified through first-time swallow study pass rate in the included populations. Having the ability to choose non- instrumental screenings in low-risk patients could decrease the lag time in receiving adequate nutrition, while lowering patient and hospital resource costs.

Methods: This will be a secondary analysis of existing data (de-identified). The HCA corporate database will be queried on demographics (age, gender, race, tobacco use), discharge diagnosis, procedures, treatments, labs, vitals, encounters, Glasgow coma scale, duration of intubation, lag time between extubation and swallow study, type of swallow assessment performed, and swallow assessment results.

Conclusions: (Data Analysis in progress). We plan to run a logistic regression analysis to determine if there is a correlation between duration of intubation and first-time swallow study pass rate. With the variables collected we will also be able to determine if there are any that may be contributing to failures of swallow evaluation. From this information we will be able to assess the benefits of more advanced swallow evaluations in our low risk patient population.

Title: **Exploring De Novo Gene Mutations in the Pathogenesis of Hirschsprung Disease**

Authors: Jackleen Glodener, OMS-3 and Iain Shepherd, Ph.D.
Program: Emory University, Department of Biology, Atlanta, GA

Background: Hirschsprung disease is a congenital motor disorder of the gut, most often affecting the rectosigmoid colon. HD occurs in 1 in 5000 live births, with a male predominance. The disease is suspected in neonates who fail to pass meconium within 48 hours of life. Babies and children with HD may suffer from failure to thrive, bowel complications, surgeries, and the feared Hirschsprung-associated enterocolitis.
Hirschsprung disease develops due to an error in neuronal migration and proliferation during weeks 4-7 in embryogenesis. Neural crest-derived cells fail to complete their craniocaudal migration, leaving the distal colon nonfunctional.
Genes currently linked to Hirschsprung only explain approximately 25% of the genetic inheritance. In 2017, a study was released that identified de novo mutations present in Hirschsprung disease patients. The whole exome gene sequencing uncovered 28 novel mutations in genes deemed indispensable for ENS development in zebrafish. These identified genes are also expressed in human DNA. With exploration of this new data using CRISPR methodologies, our goal is to uncover the remaining 75% of unexplained genetic mutations implicated in Hirschsprung disease pathogenesis.

Objective: The purpose of this study is to investigate newly identified genetic mutations involved in the development of Hirschprung's Disease, and to elucidate the pathology behind this inherited and potentially life-threatening pediatric disease.

Methods: Fluorescent zebrafish genetic lines were bred to produce embryos with fluorescent ENS neurons in order to track neuronal migration. Zebrafish embryos at the one-cell stage were injected with a CRISPR reagent, composed of Cas9 mRNA and NCL1 gRNA. Injected zebrafish were raised, and photographs were taken at each of 24, 48, 72, 96, and 120 hours post- fertilization under white and fluorescent light. DNA was extracted from intestinal dissections, and CRISPR knockouts were confirmed by restriction endonuclease.

Results: Compared to controls, zebrafish embryos injected with the Cas9/NCL1 reagent showed phenotypic evidence of shortened colons. The same specimens examined under fluorescence contained a sparser distribution of enteric neurons throughout the gut and fewer neurons in the distal colon.

Conclusions: This study demonstrates that knockout of the NCL1 gene reduced the number of enteric neurons in the distal zebrafish intestine and warrants further exploration into the genetic pathogenesis of Hirschsprung disease.

Title: **Leg-to-Arm Tissue Dielectric Constant Ratios to Aid Assessment of Leg Lymphedema**

Authors: Ram Hirpara, OMS-1, Issac Ichoa, OMS-1, Ted Frederic, OMS-1 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Quantitative assessment of leg edema or lymphedema is useful to determine effectiveness of treatment and early detect and track lymphedema in patients who have undergone gynecological and other surgeries. Clinical assessment of lower extremity edema or lymphedema is largely visual and tactile. A puffy and swollen limb in which the architecture of the skin is smoothed with the visual absence of surface veins provides some descriptive evidence. The tactile detection part relies on skin pressing usually with non-standard pressures for usually non-standard times and observing either indentation depth or how long skin indentation remains after release of the pressure. Based on a combination of visual and tactile assessments it is usual to characterize the level of the edema present as 1^+, 2^+, 3^+ or 4^+ with the numerical assignment mainly subjective and largely dependent on the evaluator's skill and experience. There is thus a need for less subjective measures that can be easily implemented.

Objective: There were two objectives; 1) to introduce a new measurement procedure that would be less subjective and 2) to provide a normal reference range of parameter values.

Methods: Because of the sensitivity of skin tissue dielectric constant (TDC) values to tissue water its measurement was the primary assessment tool. TDC was measured at the foot, calf and forearm and foot/arm and calf/arm ratios calculated. The logic of using these ratios was that for most lower extremity edematous conditions there is little or no effect on arm water. Thus, the ratios provide self-contained assessment parameters independent of possible variations in absolute TDC values among patients. These ratios were measured in 44 young and 64 mature persons equally divided by gender to test for age-related differences.

Results: Foot/arm ratios of mature vs. young (mean ± SD) were 0.997 ± 0.112 and 1.041 ± 0.184 and did not statistically differ ($p = 0.157$). Calf/Arm ratios were 1.050 ± 0.168 vs. 1.085 ± 0.197 and did not significantly differ ($p = 0.320$). Including both age groups ($n = 108$) to get combined ratios yielded 1.015 ± 0.146 for foot/arm and 1.013 ± 0.160 for calf/arm. Potential lymphedema threshold ratios, calculated as the mean ratio plus 2SD, were for foot/forearm and calf/forearm 1.307 and 1.333 respectively.

Conclusions: Based on the present findings it is proposed that a conservative estimate of lower extremity lymphedema presence could be based on a foot/arm or calf/arm TDC ratio exceeding 1.35. Changes in these ratios should be useable to track temporal changes and therapy related improvements. The test of these conclusions requires future research in which these intra-side TDC ratios and thresholds are evaluated in patients with lower extremity lymphedema and/or venous-related edema.

Title: **Characterization of Herbal Supplement Use among an Underserved Diabetic Population in South Florida**

Authors: Carmen Jaramillo, D.O., Jheannel White, M.D., Janey Oviedo Garcia, D.O. and Elizabeth Philippe, M.D.

Program: Community Health of South Florida Inc., Family Medicine Department, Miami, FL

Background: Type 2 Diabetes is linked to higher mortality rates, health care costs, and reduced quality of life. Disparity in adverse outcomes from Diabetes is even greater among disadvantaged populations, including those who have low English and health literacy, the underinsured, those who are low-income, and those who are immigrants from third-world nations. Literature reviews have suggested that the use of complementary and alternative medicine (CAM) is common, particularly among people from South America and the Caribbean. Overall, CAMs may be used by more than 72% of people with diabetes, with the most common CAM being herbal medications and supplements.

Objectives: The objective of this study was to characterize the utilization of herbal medicine/supplement use among a diverse group of patients with diabetes who receive care at a large Community Health Center (CHC) in South Florida.

Methods: Using a literature review and input from members of the target population, the team developed a survey in English, Haitian-Creole, and Spanish which assessed herbal medicines/remedies commonly used to treat chronic diseases, particularly in Caribbean and Hispanic populations. After obtaining patient consent, the survey was verbally administered to patients in a family resident clinic. Data was collected in REDCap survey software and descriptive and chi-square statistics were analyzed in JMP.

Results: A total of 52 patients completed the survey; 54% of responders were female. Among participants, 30.77% (n=16) completed the survey in Spanish, 2% (n=1) completed the survey in Haitian-Creole, and the remaining 67.31% (n=35) were completed in English. Garlic was reported as the most prevalent among all supplements (n=18), followed by cinnamon (n=15) and cranberry (n=15). Incidentally, these three supplements were also the most commonly used to help treat diabetes. Regarding gender, it was determined that females were statistically more likely to use garlic than men, $p<.05$.

Conclusions: In order to more effectively care for their patients, health care providers should understand how CAM could be affecting treatment of chronic illness, including type 2 Diabetes. With a lack of reliable evidence regarding the safety and efficacy of many supplements, healthcare providers have a unique opportunity to partner with their patients to determine their best treatment plan.

Next steps: Data analysis is ongoing and will be shared with healthcare providers at the CHC to support improved understanding of the type and extent of herbal supplements used by patients in order to improve patient-centered care among Diabetic patients.

Title: **The Efficacy of Medication Assisted Therapy to Increase Hospitalization Compliance for People with Opioid Use Disorder who Require Long Term Inpatient IV Antibiotic Course**

Authors: Young Jo, M.D., Jordan Calabrese, D.O., Rebecca Nosal, OMS-4 and Samuel Neuhut, M.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Aventura Hospital & Medical Center, Aventura, FL

Background: Opioid use disorder (OUD) has led to the current opioid epidemic in the United States. A few of the significant complications from the epidemic include infective endocarditis (IE) and infective osteomyelitis (IO) secondary to injection drug use (IDU). The treatment course for IE and IO is generally inpatient antibiotic treatment lasting several weeks. The hospital course for these cases becomes complicated as they often do not receive proper care for their substance use and end up leaving against medical advice (AMA) and returning for readmissions within 30 days.

Objective: We investigated whether medication assisted therapy (MAT) for OUD had positive outcomes on decreasing the likelihood of patients leaving AMA, having fewer 30-day readmissions, and increasing the length of stay (LOS).

Methods: The retrospective study reviews all encounters made within HCA enterprise hospitals across the country from 2015 to 2018. All patients admitted with the ICD 10 diagnosis code for opioid use disorder (ICD code F11) and concurrent IE (ICD code I33) or IO (ICD code M86) were selected for analysis. After descriptive analytics were conducted, logistic regression was computed to measure the effect of MAT on patients leaving AMA, 30-day readmission, and LOS. MAT was considered to be either buprenorphine or methadone at any dosage started during hospitalization.

Results: 1546 admitted patients met criteria for both OUD and either IE or IO. Of those, 309 patients received MAT during their hospitalization. Controlled variables included age, gender, and race. Those who received MAT were 32% less likely to leave AMA compared to those who did not receive MAT ($p<0.05$). MAT did not impact 30-day readmission rates. Patients who received MAT on average had 4.7 additional days of hospital stay compared to those who did not receive MAT.

Conclusion: Recent literature states that leaving AMA is the greatest risk factor for 30-day readmission for IE. Our study shows a significant correlation between MAT and reduced likelihood of patients leaving AMA as well as increased LOS. Increased LOS can provide clinicians time to arrange better continued care for patients. By treating the comorbid OUD, there is potentially a positive impact on patient care to decrease not only mortality and morbidity, but also healthcare costs related to infectious sequelae of OUD.

Title: **PHQ-2 Scores in Broward County's Homeless: Prevalence, Barriers, and Proposed Solutions to Mental Health Disparities**

Authors: Jeena Kar, OMS-4, Ariba Hashmi, Reeja Raj, Sandra Hossain, Joshua Berko, OMS-2, Patrick C. Hardigan, Ph.D. and Joseph DeGaetano, D.O.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine; Department of Statistics, Fort Lauderdale, FL

Introduction: This research study surveyed members of the homeless population in Broward County to investigate the utilization of healthcare and mental health resources and the accessibility of the target population to adequate care. The study was conducted to address mental health disparities in the homeless population by quantifyingtheir need for evaluation and care and by further uncovering the barriers they face in accessing this care. A statistical analysis of the data collected including demographics concerning homelessness such as age and gender, as well as prevalence of mental illness, history of substance abuse and emergency department utilization allowed for further insight in offering appropriate solutions for the healthcare disparities observed. Florida ranks 9th in states with highest prevalence of mental illness among homeless individuals.

Methods: The Community Based Participatory Research model was employed while working with local volunteer organizations such as Project Downtown and Jubilee Center of South Broward. The participants completed an 18-question survey and standardized depression screening tool at three separate feeding sites in Broward County, on three independent dates, totaling 136 participants who met the inclusion criteria. Patient participation was encouraged with food and hygiene items.

Results: 100% of participants surveyed had an income below $12,488, thereby falling in the Affordable Care Act (ACA) coverage gap. 66% stated "none" as insurance plan, 67% of this population screened positive for depression with the PHQ-2 questionnaire, while 57% acknowledged suffering from mental illness. Only 19% of individuals acknowledged going to the ER during mental health emergencies such as thoughts of suicide but 80% of this population had at least 1 ER visit within the year. Individuals who reported no to the question, In the past year, was there ever a time when you were prescribed a drug but were unable to get it, scored 1.23 points lower (95% CI: -0.33,-2.12) on the PHQ-2 than individuals who were able to get their medications. Individuals who admitted to history of binge drinking, use of illicit drugs and thoughts of suicide scored 1.21 points higher (95% CI: -0.14,-2.28) on the PHQ 2 than individuals who responded no.

Discussion: The results of the PHQ-2 data collection screening tool suggests a majority of homeless individuals need further medical assessment concerning for depression. Based on the utilization of the ER, health care resource awareness is inadequately approached. Of the programs available, they are underutilized due to lack of awareness, accessibility and outreach. The analysis of data collected aims to encourage redistribution of funding and further advocate for resources available to this population.

Title: **Understanding Medical Students' Knowledge of Opioid Use Disorder: A Preliminary Study**

Authors: Ariel Kidron, OMS-1, Sweta Tewary, Ph.D., Naushira Pandya, M.D., C.M.D., Jim Howell, M.D., Rebecca Cherner, D.O., Marie Florent-Caree, D.O. and Annisah Ishmael, Ed. D., Hiep Nguyen, B.A., Tianyu, B.S.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: The rise of the opioid epidemic over the last two decades has increased the mortality rate, healthcare cost, and drug overdose deaths across the country. Practicing physicians are lacking in education regarding non-opioid alternatives to pain management, prevention, diagnosis, and treatment of opioid use disorder (OUD). Existing literature suggest a link between knowledge discrepancy and opioid use among clinicians resulting in patient's abuse of opioids. Therefore, it is important to educate medical students at the start of their career. This preliminary study assesses the current knowledge and perceived skills of medical students regarding (OUD)/opioid misuse and related content in order to identify gaps and provide necessary education.

Objective: To evaluate medical students' knowledge and perceived skills regarding OUD/opioid misuse.

Methods: The study used a pre-post survey method to understand the demographics, medical, and clinical knowledge about opioid use, abuse, and clinical knowledge regarding patient opioid overdose. The self-administered survey was administered to all students 18 years or older, M1- M4 enrolled in NSU-KPCOM. All participants were asked to complete the survey at the start of the school year. The survey was administered via student list serve to each student using REDCap, a web application for surveys and databases. A total of 1164 students met these criteria. However, only 137 students participated in the pre-survey collected from August 2019 to September 2019. Data was analyzed using frequencies and percentages.

Results: Approximately 12% of the eligible students participated in the pre-survey. Results of the pre-survey suggest a progressive increase in opioid knowledge from M1 to M4 years. For the first- year students, the knowledge and clinical skills were the lowest. Results for the M4 students showed the most knowledge and clinical skills. Knowledge increased from the first year to the second year, from the second year to the third year, and from the third year to the fourth year.

Conclusions: The results of the study suggest that students who are further along in their medical education are more knowledgeable about opioid usage, and specifically there is a larger gap in knowledge between the first and second year as well as between third and fourth year. However, there is only a modest difference in knowledge between second and third year which suggests that medical students' knowledge about opioid usage reaches a plateau in the time after pre-clinical years and before clinical rotations. Results of the study suggest investigating a relationship between medical education and knowledge of opioid usage, with a specific lens aimed at assessing the efficacy of opioid education during second and third years of medical school.

Title: **Oxidative Burst and Programmed Cell Death in Macrophages Infected with Carbapenem- Resistant *Klebsiella Pneumoniae***

Authors: Michael Kling, OMS-1, Danielle Ahn, M.D. and Alice Prince, M.D.
Program: Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine; Department of Pediatrics, Fort Lauderdale, FL; Columbia University, Vagelos College of Physicians & Surgeons, New York City, NY

Background: Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) sequence type 258 (ST258) are a multidrug-resistant Gram-negative bacteria species responsible for numerous health care- and community- associated infections. In the critically ill, such infections and their complications are often lethal. CRKP exhibit high genetic flexibility and the predominant species of ST258 isolates have evolved mechanisms that make them resistant to phagocytic killing by the innate immune system. Here we consider KP35, a representative clinical isolate of ST258 from our institution. Previous studies demonstrated that neutrophils failed to clear KP35 after 2 hours, while *K. pneumoniae* ATCC 43816 (KPPR1), a well-studied reference strain, was cleared by neutrophils within 30 minutes.

Objective: Clarify how KP35 evades innate immune clearance, specifically looking at whether KP35 inhibits the oxidative burst and how KP35 induces AM death.

Methods: Macrophage-induced THP-1 cells were infected with either KP35, KPPR1, or USA 300 (*S. Aureus*; the control). qRT-PCR analyses were performed for relative expression of NOX2/gp91^{phox} – the catalytic core of phagolysosomal membrane associated NADPH oxidase. Flow cytometry analyses for both mitochondrial and intracellular reactive oxygen species (mROS and iROS respectively) were performed. Immunoblots for phosphorylated MLKL (p- MLKL) were performed to investigate the induction of necroptosis.

Results: qRT-PCR analyses for relative expression of NOX2/gp91^{phox} indicated that KP35 did not affect the oxidative burst on the level of transcription. Flow cytometry analyses for both mROS and iROS were inconclusive regarding the oxidative burst as they were confounded by the induction of significant cell death. Interestingly, two populations of dead cells emerged during flow cytometry: the first, positive for mROS; the second, negative for mROS. Immunoblots were negative for p-MLKL suggesting necroptosis did not occur.

Conclusion: It remains unclear how KP35 affects oxidative burst; however, it is still hypothesized to affect it**.** Regarding induction of cell death, flow cytometry suggested KP35 induces two forms of cell death: apoptosis and a non-ROS dependent form of cell death, such as necroptosis or pyroptosis. Although necroptosis was ruled out via immunoblot, earlier studies confirmed the occurrence of necroptosis by blocking the phosphorylation of MLKL and observing the consequences. It is unclear why these results are contradictory. What is clear: KP35 does not induce necroptosis in the way expected. More investigation into these bacteria is required.

Title: **Butterfly Ultrasound as a Reliable Method of Treatment and Quantitative Evaluation of Somatic Dysfunction in the Thoracic Spine**

Authors: Christine Ma, OMS-2, Tyler O'Connor OMS-2, Luke Pettet OMS-2, Steven Ma, D.O. and Bryan Lin D.O.

Program: Lake Erie College of Osteopathic Medicine, Bradenton, FL

Background: High Velocity Low Amplitude (HVLA) osteopathic manipulation has repeatedly been shown to be an effective treatment for somatic dysfunctions throughout the body. Diagnosis of somatic dysfunctions has been traditionally measured by palpation without substantial quantitative methods. Recent studies have shown that ultrasound imaging is useful in assessing and reassessing HVLA treatment of the lumbar spine. The use of ultrasound to provide a more accurate quantitative means of evaluating the effectiveness of HVLA has not been established.

Objectives: The objective of this study was to evaluate ultrasound as a reliable method for assessing the effectiveness of HVLA treatment on thoracic spinal somatic dysfunctions at the levels of T3-T7.

Methods: This study was organized as a cohort study of LECOM first- and second-year medical students. All the HVLA treatments and ultrasound imaging were performed in the LECOM OMM lab. To be eligible as a participant of the study the student must have a somatic dysfunction of the thoracic spine involving rotation. Ten individuals met the criteria for the study. The study was divided into three parts starting with a palpatory exam of the thoracic vertebrae by a board-certified osteopathic physician. Once a somatic dysfunction involving rotation was found this was marked and ultrasound imaging was performed on that vertebral level. The depth of both the left and right transverse processes were recorded to determine extent of rotation. At this point HVLA treatment was applied to the thoracic segment and ultrasound imaging was performed post treatment as a diagnostic tool to assess the HVLA treatment.

Results: All our results are in the preliminary stages as we're currently adding more subjects are being recruited to the study. US showed that there was a change in the differences between left and right transverse process depth between pre-treatment measurements and post-treatment measurements (N=10, 6 males and 4 females, p=.01). Additionally, 90% of individuals showed an improvement of their rotational somatic dysfunction.

Conclusion: Using US for verifying thoracic HVLA technique is a reliable method for diagnosing somatic dysfunctions. The initial data shows that there is a general improvement of rotation of the thoracic spine with HVLA, though the HVLA treatment does not completely correct the rotation. When reassessing the rotation after treatment, US and palpation confirmed the effectiveness of the treatment. Based upon our findings, it can be said that using US in conjunction with OMT can be beneficial. In future studies, group curves should be taken into consideration. The effectiveness of different treatment modalities compared to one another might be taken into consideration. Additionally, the length of time that an individual goes without needing treatment (how long the result of a treatment session lasts) should also be evaluated.

Title: **Cardiopulmonary Changes Related to Cancers of the Lungs, Breast, and Stomach**

Authors: Anna Martin, OMS-2, Hunter Belanger, OMS-2, Minji Bae, OMS-2, Taylor Hyde, Kelly Tran, Alexa Constantakos, OMS-2 and Dr. Aleksandr Sinelnikov, M.D., Ph.D.

Program: Lake Erie College of Osteopathic Medicine, Bradenton, FL

Background: It has been established that there is an increased incidence of cardiopulmonary disease among cancer patients. While cardiotoxicity as a result of chemotherapy is a well- accepted concept, the effects of the cancer itself on the cardiopulmonary system has not been well-established. Thus, cardiopulmonary effects of cancer should be further investigated, similar to neurologic, dermatologic, and endocrine symptoms commonly seen in paraneoplastic syndromes.

Objective: The objective of this study is to compare the cardiopulmonary changes associated with lung, breast, and stomach cancers to determine possible commonalities.

Methods: This study is a retrospective analysis of histological data from cadavers (post-embalming) with various malignancies. Of the nine cadavers studied, 2 had lung cancer, 3 had breast cancer, and 4 had stomach cancer. Post-mortem stroma, vessels, and parenchyma of the lungs were examined using hematoxylin and eosin, Alcian blue, reticulin, and trichrome stains. No information regarding cadavers' pre-mortem treatment or primary conditions such as hypertension, coronary artery disease was available.

Results: Lung changes observed in specimens included alveolar collapse and signs of nonspecific pulmonary hypertension. Hypertension was noted by arterial wall thickening, intimal desquamation, and tunica media hyperplasia. Cardiac findings were consistent with unspecified cardiomyopathy, foci of hypertrophy and atrophy, cardiofibrosis, and possible neoangiogenesis. Similar changes in both lungs and heart were seen in all three malignancies, independent of cancer localization.

Conclusion: This study suggests that various cancers could lead to systemic cardiopulmonary effects, much like a paraneoplastic syndrome. Cadavers with breast, lung, and stomach cancers all exhibited similar, nonspecific changes in the lungs as well as the heart, regardless of the malignancy cancer localization. This study highlights the need for future research to explore the direct relationship between the cardiopulmonary system and cancer and whether these changes meet the criteria for a new form of paraneoplastic syndrome.

Title: **Get It Right the First Time, Measure Twice, or Third Time's a Charm? Single vs. Multiple Tissue Dielectric Constant (TDC) Measurements**

Authors: Alexander Mikulka, OMS-2, Don Woody, OMS-2 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Tissue dielectric constant (TDC) measurements use an electromagnetic wave that passes through a probe that acts as an open-ended transmission line. When in contact with the skin a major portion of the wave is absorbed by the tissue and its water content with the remaining fraction transmitted back into the line. TDC values are strongly dependent on the skin tissue water and are used to estimate skin water content changes due to conditions such as breast cancer treatment-related lymphedema and lower extremity edema. Most prior studies have used triplicate TDC averages because the suitability of single measurements was unknown.

Objective: The purpose of this study was to determine the differences in absolute and relative TDC values based on one measurement per anatomical site versus averaging duplicate or triplicate values.

Methods: This study was approved by the NSU institutional review board and all participating subjects signed an approved consent form. Measurements were done in a dedicated research room on the HPD campus. An equal number of female (n=25) and male (n=25) subjects with no history of upper or lower extremity edema or lymphedema were recruited for participation. The studied group's average age (mean ± SD, N=50) was 30.6 ± 13.4 with a range of 18 to 70 years. Triplicate TDC measurements were made bilaterally at five anatomical sites representative of lymphedema development areas; anterior forearm, hand palm, lateral calf, medial calf and foot dorsum. TDC values obtained with single measurements were compared to duplicate and triplicate averages at each site (N=100). TDC dominant-to-nondominant side ratios (N =50) were also compared.

Results: The triplicate average TDC values for forearm, hand, lateral calf, medial calf and foot measurements were, respectively, 31.1 ± 4.4, 42.7 ± 8.2, 40.1 ± 6.7, 34.4 ± 5.3 and 31.6 ± 5.3. The average percentage difference between these triplicate values and those obtained with a single measurement was less than 0.75% at all sites with a maximum SD of 4.7% at the medial calf and a minimum of 2.2% at the forearm. Dominant-to-nondominant side TDC ratios using triplicate values were respectively 1.013 ± 0.090, 1.019 ± 0.112, 1.019 ± 0.163, 1.052 ± 0.134 and 1.029 ± 0.108. Ratios using single values differed by, at most, 1.5%.

Conclusion: The results of this study suggest that single TDC measurements or dominant-to- nondominant side ratios based on single TDC measurements can be utilized if a deviation from triplicate averages of ±5% or ±1.5% is acceptable, respectively. Thus, unless small changes are needing to be tracked, much clinical time can be saved by using single measurements.

Title: **Can a Static Magnetic Field of a Concentric Multipole Magnet Reduce Menstrual Pain?**

Authors: Brittany Milo, OMS-2, Brooke Alexander, OMS-2, Yashaswani Moparthi, OMS-2, Marisa Mastropasqua, OMS-2 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Magnetic therapy has been used to reduce or eliminate pain based on the effect of static magnetic fields (SMF) from magnets of an array of designs, materials and intensities. The use of concentric multipole magnets has been suggested to provide an efficacious design but systematic application of such an approach to the rapid amelioration of dysmenorrhea pain has not been systematically studied.

Objective: Our objective was to evaluate the effectiveness of a concentric multipole magnet regarding its impact on dysmenorrhea pain (Menstrual or Period Pain).

Methods: Women with period pain self-rated as ≥6 on the Numeric Pain Rating Scale (NPRS) participated. The NPRS is a pain scale that is a numeric version of the visual analog scale. In the NPRS, subjects select an integer from 0 to 10 for their pain intensity; 0 is no pain and 10 the worst possible pain. After rating their entry pain, a magnet or sham was secured to an abdominal site close to the largest source of pain for 40 minutes. The magnet is of a concentric design with a surface field at its center of 500mT and an intensity of 60 mT at 4.5 mm. The magnet (25.4 mm wide, 3.5 mm thick and 14.5 g) is visually indistinguishable from the sham. After placement, subjects were free to go about their business. Upon returning, pain was again rated. Subject and experimenter were "blind" to whether a magnet or sham was used. Outcomes were determined by chi square analysis of the number of subjects in whom pain was or was not reduced. Subjects with NPRS ratings reduced by ≥ 35% were scored as having reduced pain; reductions < 35% were scored as no change.

Results: As of this writing 24 females have been evaluated, 14 with a magnet and 10 with a sham. Of the 14 with magnet, 10 had pain reduction and 4 did not. Of the 10 with sham, 2 had pain reduction and 8 did not. The difference between magnet and sham treatment was statistically significant $p < 0.05$. Entry pain levels (mean ± SD) for the groups were similar, with magnet and sham groups being respectively 6.93 ± 0.76 vs. 6.60 ± 1.07 and post- treatment scores of 3.96 ± 1.99 vs. 5.00 ± 1.49. Pain reduction was 42.1% ± 30.9% for magnet treated vs. 24.6% ± 18.3%, $P<0.05$ for sham treated. All subjects reported no negative effects associated with wearing the magnet.

Conclusions: The fact that, as of now, 71.4% of subjects who wore the magnet had a meaningful pain reduction whereas only 20% of subjects who wore the sham received a pain reduction, suggests a potentially favorable effect of the active magnet. If this finding maintains with increased number of subjects (planned for 30 in each group), the SMF from this magnet type may be considered a possible alternative to traditional pain management such as pharmaceutical medication. The magnet could be especially useful in women who are unable or unwilling to take medication or as a non-side effect substitute,

Title: **The Enhancement of Osteopathic Rib Principles and Manipulation Treatments through 3D Printing**

Authors: Kevin Moriles, OMS-3, Amanda Ramnot, OMS-3, Michael Lai, OMS-3 and Dr. Yasmin Qureshi, D.P.T., Ed.D.

Program: Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: With the advent of accessible 3D-printing, the ability to rapidly prototype precision models have greatly improved. In osteopathic medicine, the diagnosing and treating of somatic rib dysfunctions can be enhanced with a tangible visualization of rib movement. A novel rib model designed specifically to display osteopathic techniques can thus enrich learning. Currently there are no osteopathic models that can display these concepts to students.

Objective: The purpose of this experiment is to assess the effectivenessof 3D printing models in enhancing the understanding of rib osteopathic principles. 7

Methods: Six 3D printed plastic ribcage models will be designed and prototyped for the purpose of the study. The design will incorporate a novel hinge at each rib to allow for free movement. Each completed unit was created through the Makerbot and Lulzbot 3D printers using 145.3 grams of PLA filament per rib model. 1st year osteopathic medical students would be divided into a comparison group that would receive a lecture with a traditional rib model and an experimental group that would receive the same lecture with the prototyped 3D rib model. Each student would have an opportunity to see various rib dysfunctions being taught through the model as a group and individually. Prior to the lecture a survey will be given to each student participant, inquiring about their present knowledge of rib somatic dysfunction. After the lecture, an exit survey will be given with follow up questions regarding rib knowledge and to also evaluate the viability of rib models in osteopathic education. Statistical analysis will then be used to determine any relationships regarding the use of rib models.

Results: Students instructed with 3-D models reported higher scores (M = 9.55, SD = .978) on whether or not the model accurately depicted the material presented than did those who were instructed with the standard teaching model (M = 9.06, SD = 1.33), $t(235) = 3.253$, $p < .01$.

Students instructed with the 3-D rib model chose the correct answer to one knowledge question of three statistically significantly more than the students in the comparison group with the standard rib model (while both groups scored similarly on this item during the pre-test), X^2 (1, N = 257) = 5.97, $p < .05$ (52.9% vs 47.1%). 98.4% of students in the comparison group and 100% of the students in the experimental group found that using models in general enhanced their understanding of rib anatomy, dysfunction, and treatment.

Conclusions: Our study shows that 3D printed osteopathic rib model can enhance the understanding of rib somatic dysfunction, improve student learning satisfaction in learning the rib concepts, and provide a cost-effective alternative to traditional models.

Title: **Implementing Target BP Program in the Patient Centered Medical Home Model**

Authors: Kelly Mudon, D.O., Ludonir Sebastiany, M.D., Ifeoluwa Balogun, M.D., Divy Mehra OMS-3; Nicole Cook, Ph.D., Elizbeth Philippe, M.D. and Abiona Redwood, M.D.

Program: Community Health of South Florida, Inc., Family Medicine Department, Miami, FL; Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: In the United States, upwards of 75 million adults are diagnosed with hypertension (HTN). Due to blood pressure (BP) fluctuations, white-coat HTN, and improper BPmeasurement techniques, HTN is misdiagnosed or undiagnosed in millions f Americans: about 48.2% of U.S. adults have insufficiently controlled HTN.

Objective: Target: BP™ was implemented at Community Health of South Florida, Inc. (CHI) to empower underserved persons to manage their HTN and improve health outcomes through regular BP monitoring. This pilot study sought to evaluate the efficacy of a loaner self-monitoring blood pressure program on systolic and diastolic blood pressures in an underserved patient population.

Methods: Evaluation of Target: BP™ was performed with a quasi-experimental, single-arm pretest-posttest design. A total of 155 patients from a large, diverse community health center in Miami-Dade County, Florida were enrolled since Target: BP™ program initiation in January 2018. Eligibility criteria for enrollment included new or established adults above the age of 18 who were diagnosed with uncontrolled hypertension (defined as at least 160 mmHg systolic and/or 100 mmHg diastolic) and who had an arm size appropriate for available loaner BPcuffs. Thirty-seven patients with completed logs met the eligibility criteria as of October 2019. Baseline and follow-up BPs were analyzed using a paired sample T-test and 95% confidence interval determination of mean systolic and diastolic pressures.

Results: Among the 37 individuals with baseline and post-intervention BPs, systolic BPs decreased by a mean of 22% (p-value <0.01) with a 95% CI of (29.1, 44.4), while diastolic BPs decreased by a mean of 12% (p-value <0.01) with a 95% CI of (5.2, 16.5). Mean baseline and final systolic BP were 167.30 and 130.54 mmHg, respectively. Mean baseline and final diastolic BP were 90.14 and 79.32 mmHg, respectively.

Conclusions: Uncontrolled HTN is a critical risk factor in the development of cardiovascular/ cerebrovascular events and kidney disease; however, it is the second most preventable cause of death in the United States. Methods to improve rates of control have shown success: hypertension treatment algorithms and patient follow-up, including non-clinician visits for patients with uncontrolled hypertension. Although the number of patients with pre and post BP readings was small (n=37), the percentage change of both systolic and diastolic BPs from baseline to post-intervention was statistically significant at 22% and 12%, respectively. Limitations related to the study population include the prevalence of low health literacy, which in the state of Florida is as high as 20% among people age sixteen years or older and the data quality of patients' self-report on BP logs. A possible future solution could employ Bluetooth BP tracking.

Title: **The Repeatability of Visual Changes Measured With Tests of Visual Acuity and Contrast Sensitivity**

Authors: Manonmani Murugappan, OMS-3, Andrea M. Janoff, O.D., Luis Lesmes, Emma Flor, Maryn JaNet Barnes and Ava K. Bittner

Program: Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine; College of Optometry, Fort Lauderdale, FL; Adaptive Sensory Technology, San Diego, CA

Introduction: The recent applications of active learning algorithms to testing visual acuity (VA) and contrast sensitivity function (CSF) – quantitative VA (qVA) and quantitative CSF (qCSF) – reflect an attempt to develop tools with higher stimulus resolution, better test precision, and improved detection of vision changes related to intervention or ocular disease progression. We compared the test-retest repeatability of the qVA and qCSF tests to the standard ETDRS VA and Pelli-Robson CS charts.

Methods: At two visits about one week apart, the same test battery was repeated, involving two measures of distance VA (ETDRS trans-illuminated chart and qVA) and two tests of distance CS (Pelli-Robson and qCSF) in a total of 50 eyes in 25 normally-sighted, pre-presbyopic adults without ocular disease. Subjects performed all tests with daily disposable Acuvue or Alcon contact lenses with distance-only and multifocal correction to introduce some visual degradation. Between-visit repeatability was determined with 95% coefficients of repeatability (CR).

Results: For the two visual conditions, 95% CRs for distance-only and multifocal correction were 0.18 and 0.18 log units for ETDRS VA, 0.12 and 0.16 log units for qVA, 0.20 and 0.21 logCS for Pelli-Robson, and 0.23-0.25 and 0.24-0.29 logCS for qCSF area under the log curve (AUC) or at 1.5, 3 and 6 cpd, respectively. The magnitude of vision loss with the multifocal lens was not significantly different between the two visits for each of the four tests (all $p>0.05$). Cohen's *d* effect size reflects both the magnitude of visual change and test repeatability, which was 1.16 and 1.61 for ETDRS VA and qVA, respectively, 0.77 for Pelli-Robson CS, 1.20 for qCSF AUC, and 0.31, 0.75, and 1.11 for qCSF at 1.5, 3 and 6 cpd, respectively.

Conclusions: As part of central visual function test validation and selection, it is important to determine and consider both the test repeatability and magnitude of visual changes of interest that are documented with each test. Improving Cohen's *d* effect size for detected visual changes has the potential to reduce sample sizes in clinical trials.

Title: **Perception of Overall Health, Weight Status, and Gaining Weight in Relationship with BMI among High School Students**

Author: Cody M. Mutter, OMS-1 and Deepesh Khanna, M.D., Ph.D.
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Correct perception of weight status and gaining weight are important motivational factors for physical activity among overweight and obese children. However, misperception is common.

Objective: The objective of this study is to assess perceptions of overall health, weight status, and weight gain in relation to BMI among high school students.

Methods: A face-to-face validated survey-based study was conducted among high school students. Body Mass Index (BMI) was calculated based on the self-reported height and weight to compare with perceived weight status based on a question: "Do you consider yourself to be underweight, overweight, about right or obese"? Participants were asked to rate their health and how much they worry about gaining weight. Descriptive and Chi-Square tests were used for analysis. Level of significance was 0.05.

Results: Males who reported normal BMI, 23.1% considered themselves underweight and 11.5% considered overweight (χ^2 = 20.305, P=0.016). Females who reported normal BMI, 6.9% considered themselves underweight and 17.2% considered overweight (χ^2 = 31.613, p=0.000). Males who considered themselves overweight, 40% think they are not obese and 35% think they are obese (χ^2 = 30.322, p=0.000). Females who considered themselves overweight, 55.6% think they are not obese and 29.6% think they are obese (χ^2 = 11.415, p=0.076). Only 6% of students in the overweight BMI range, reported their overall health is poor (χ^2 = 21.266, P=0.047). In the BMI range of overweight, 40% of females and 6.3% of males worry all the time of gaining weight (χ^2 = 13.470, p=0.336).

Conclusion: The results of this study show female students are more likely to perceive themselves overweight and worried about gaining weight compared to their male peers. The results also show that a low percentage of male and female students rate their overall health as poor with an overweight BMI. The results of this study provide framework for understanding the differences in how male and female high school students perceive their health, weight status, and weight gain in relation to BMI.

Title: **Is Hand Dominance a Factor in Inter-arm Systolic Blood Pressure (IASBP) Differences?**

Authors: Ovshay S. Ovshayev, OMS-2, Aneil Tawakalzada, OMS-1 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Previous report suggest that an IASBP difference of 5 mmHg may be an optimal threshold to predict future cardiovascular events. Data showed that in 11% of patients, left arm SBP exceeded right arm by at least 5 mmHg but in 16% of patients right arm SBP exceeded left arm by at least 5 mmHg. Others have indicated that an IASBP difference ≥ 10 mmHg is useful diagnostically. IASBP has been assessed in many cardiovascular conditions but has not been well studied in healthy populations systematically and separately considering the role of handedness. It may be that the imbalance in numbers of right and left handers in the general population have obscured a possible handedness-dependency with respect to IASBP.

Objective: To determine if hand dominance affects IASBP in young healthy adults.

Methods: This study used simultaneously determined bilateral SBP measurements done in triplicate in 90 subjects (45 females, 45 males). Average age (mean ± SD) was 29.4 ± 10.4 years with 38% (17/45) of each gender left-handed. Subjects were recruited mainly from medical students and faculty. All participants were non-smokers.

Results: Results show that the absolute IASBP difference in left-handers was 4.4 ± 3.8 mmHg and was 5.0 ± 4.2 mmHg for right-handers (P = 0.362). There was no statistically significant difference among 1st, 2nd and 3rd measured blood pressures during the simultaneous sequential triplicate measurements for either right or left-handers. Interestingly, nearly 15% of the total group demonstrated an IASBP difference ≥ 10 mmHg.

Conclusion: Results show no evidence of a higher systolic blood pressure in a participant's dominant hand whether that person was left or right-handed. This finding clarifies the hand- dominance issue as a factor not generally needing to be considered in clinical assessments. A potentially useful secondary outcome was the finding that 14.8% of this group had at least one measured IASBP DIFF ≥ 10 mmHg, a fact that may have future relevance and was an unexpected finding in the relatively young and self-declared healthy group herein studied.

Title: **The Extraction of Proteins and Lipids from Honey to Analyze Their Antimicrobial Properties**

Authors: Blake Piepenbrink, OMS-2, Stephanie Blount, OMS-2, Seth Boyd, OMS-2, Daniel Slabaugh, OMS-2, Steve Sartore, OMS-2, Hunter Belanger, OMS-2, Marina Salah Shoukry, PS-2, Walters Cheso, PS-2, Zimrisha Alla, PS-3 and Thomas Arnold, Ph.D.

Program: Lake Erie College of Osteopathic Medicine, Bradenton, FL

Background: Honey is known for exhibiting antibacterial properties indicating its use as part of traditional medicine since the early ages. It is a viscous solution that is mainly composed of the monosaccharides glucose and fructose, and the disaccharide, sucrose. Honey also contains a great variety of minor components including phenolic acids, flavonoids, glucose oxidase and catalase, amino acids, lipids, and proteins (apidacins), all of which play an important role in the function of the biological activities of honey. Much research has revolved around the sugar content of honey because its sweetness makes it an attractive food source. However, research assessing the protein and lipid components of honey is lagging that of its sugar counterpart.

Objective: This study aimed to extract sugars from honey to quantitatively analyze its proteins and lipids and examine their potential antimicrobial properties, specifically to bacteria endemic to the superficial microbiome.

Methods: Dialysis was utilized to effectively extract sugars leaving behind mainly proteins and lipids. Different samples of local and foreign sourced honeys prepared in 9 parts distilled water to one-part saline solution were dialyzed for 48 hours, with the solution being replaced after the first 24 hours. Proteins were analyzed using 2-dimensional gel electrophoresis (2D SDS-PAGE) with Coomassie blue and silver stain, while lipids were examined using thin layer chromatography (TLC).

Results: The data analysis on honey obtained from a variety of different local sources confirmed the presence of several proteins and lipid compounds in honey. SDS-PAGE trials revealed repetitive promising protein bands across several gels in the range of 50 to 75kD with both Coomassie blue and silver staining. The TLC analysis of varying raw honey samples consistently demonstrated the presence of long chain saturated fatty acids, specifically C16:0 and C18:0.

Conclusion: Our objective for this study was to determine a reliable method to extract and concentrate the proteins and lipids in honey so we can determine their efficacy as an antibiotic and as a vehicle for antibiotic topical formulations. We hope to use this information to further standardize protein and lipid extraction and send out those samples for DNA sequencing. Once we have this information, we hope to combine concentrated alternatives of the active ingredients with commonly used topical vehicles for investigation regarding clinical use.

Title: **Scrna-Seq of Hesc Retinal Organoids Identifies Different Retinal Progenitor Cells and Characterizes Cell-Cell Interactions**

Authors: Sergio Poli, M.D. and Shaojun Wang, Ph.D.

Program: Mount Sinai Medical Center, Division of Internal Medicine, Miami Beach, FL; Key Laboratory of Visual Cell Differentiation and Regulation, Basic Medical College, Zhengzhou University, Zhengzhou, Henan province, China

Background:
Human retina development involves multiple well-studied signaling pathway that promote the genesis of a wide arrange of different cell types in a complex architectural structure. Human embryonic stem cells (hESCs) derived retinal organoids could recapitulate the human retinal development. Here, we performed single cell RNAseq of retinal organoids derived from hESC in 5 different time points (D36, D66, D96, D126, D186) and identified 10 distinct populations of cells across our differentiation time course.

Methods: We analyzed the molecular character of each main populations and demonstrated the genesis and mature process by pseudo-time analysis and characterize the cell-cell interactions between different cell types. Interestingly, we identified Insulin Receptor (INSR) as a differentially expressed receptor involved in the genesis of photoreceptors, and Pleiothropin (PTN) – Protein Tyrosine Phosphatase Receptor Type Z1(PTPRZ1) as a previously unknown interaction between Muller and Retinal Progenitor cells.

Results/Conclusions: Together, these findings provide a rich transcriptome-based lineage map for studying human retinal development and modeling developmental disorders in retinal organoids.

Title: **Targeting PRMT5 to Circumvent Acquired Ibrutinib Resistance in Mantle Cell Lymphoma**

Authors: Alexander Prouty OMS-1, Shelby Sloan B.S., Robert A. Baiocchi, M.D., Ph.D. and Lapo Alinari, M.D., Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; The Ohio State University, Division of Hematology, Department of Internal Medicine, Columbus, OH

Background: Mantle cell lymphoma (MCL) is an incurable B-cell malignancy characterized by genetic dysregulation of cyclin D1. Ibrutinib is an FDA-approved irreversible inhibitor of Bruton's Tyrosine Kinase (BTK) with significant single-agent activity in patients with relapsed/refractory MCL. Unfortunately, the vast majority of MCL patients on ibrutinib eventually progress and develop an aggressive disease with short median overall survival (OS) (3-8 months). Our group has shown that protein arginine methyltransferase (PRMT5) is overexpressed in MCL and drives the expression of key pro-survival oncogenes while silencing expression of tumor suppressors. Strategies aimed at selectively targeting PRMT5 have shown anti-tumor activity in preclinical lymphoma models.

Objective: The objective of this study is to gain understanding of drug-resistance mechanisms and develop effective therapies for ibrutinib resistant (IR) MCL which are urgently needed.

Methods: These studies were conducted on an approved IRB and IACUC protocol. In this study a novel patient derived xenograft (PDX) of IR-MCL was developed and used to explore PRMT5 inhibition as an alternative therapeutic option to circumvent IR. After validation of circulating disease at day 25 engraftment, mice were treated with either a novel small molecule inhibitor of PRMT5 (PRT382, 10 mg/kg orally 4 days on 3 daysoff) or ibrutinib (75 mg/kg administered in drinking water, n=5 mice per treatment group).

Results: Treatment of this PDX model with PRT382 resulted in significantly decreased disease burden and improved median OS compared to control animals (48 to 83 days, respectively, p=0.0045), while no significant difference was detected for the ibrutinib treated animals compared to controls (p=0.6540).

Conclusion: This model serves as a useful tool to investigate mechanisms of drug resistance and provides a platform to explore novel pre-clinical therapeutic strategies to circumvent IR. Preliminary experiments performed using this IR-MCL PDX mouse model demonstrates the therapeutic activity of PRMT5 targeted therapy in the context of ibrutinib resistance. We are currently investigating the mechanisms responsible for circumventing IR-MCL following PRMT5 inhibition *in vitro* and *in vivo* by integrating genome-wide changes to chromatin accessibility and whole transcriptome analysis.

Title: **Continuous 24-hour Contact Lens Sensor as a Commercial Device for IOP Related Changes: Patient Tolerability and Clinical Experience**

Authors: Oshin Rai, OMS-2, Ariel Chaves, M.D., Renata Prota Hussein, M.D. and Syril Dorairaj, M.D.

Program: Mayo Clinic, Jacksonville, FL

Background: Elevated intraocular pressure is one of the leading risk factors for the glaucoma progression, in which the optic neuropathy leads to damaging and irreversible vision loss. The only modifiable risk factor with evidence-based treatment in preventing glaucoma progression resides in lowering the intraocular pressure (IOP), to prevent optic nerve damage. Even though diurnal and nocturnal variation in IOP is clinically recognized, glaucoma management decisions are made after considering IOP measurements in the office. The Contact Lens Sensor allows for continuous 24-hour monitoring but the safety and tolerability in patients' needs to be accessed before establishing its role in glaucoma management.

Objective: To examine patient compliance, wear, tolerability and symptoms for Telemetri Contact Lens Sensor (CLS) wear over a 24-hour measuring period.

Methods: 51 patients from Mayo Clinic Jacksonville were considered candidates for the device, with two patients excluded. The CLS was clinically used for glaucoma patients upon discussion with the physician, therefore there was no exclusion criteria if the device was suited for the patient. The study group was observed from February to November of 2018. The device is worn as a contact lens, sitting directly on the cornea with a Bluetooth recording device designed to indirectly measure intraocular pressure (IOP). Over the 24 hours it collects about 300 data points, for 30-seconds during a 5-minute interval that is sent to the Bluetooth sensor and recorded in mV equivalents. The 24-hour CLS required a fitting and removal appointment. Patients were provided a daily journal to log their activities, symptoms and medications used.

Results: The average age was 62.56 ± 11.44 years and 33 participants were female (67.3%). Out of 49 patients, 2% exclusively experienced pain, restless sleep, facial redness, woke up with eyes glued shut, tearing, headache, or light sensitivity. Redness was experienced by 4.1%. Only 8.2% of patients experienced itchiness. Most commonly, 55.1% of patients used artificial tears, an average of 3.45 times, and a median of 3 times. Additionally, 4.1% of patients experienced more than one symptom, however 75.5% of patients did not experience any symptoms. There were no reports of blurred vision, and no corneal abrasions were noticed upon slit lamp examination under fluorescein stain

Conclusion: This CLS proves to be a device that is well tolerated by patients and hosts minimal side effects or discomforts. The CLS can provide more data on daily IOP patterns and progression unavailable before. Although the CLS serves to be a promising device, more prospective research needs to be conducted to assess how the 24-hour IOP data collected by this safe device can influence and benefit both the clinician and patient in the management of glaucoma care.

Title: **Anti-Bacterial Effects Of Juglone, a Natural Product Derived From Walnut Trees**

Authors: Robert J. Rowland, OMS-2, Mitchel Daugherty, OMS-2, Madison French, OMS-1 and Sheng-Yi David Lim, OMS-2

Program: Lake Erie College of Osteopathic Medicine, Bradenton, FL

Background: Juglone (5-hydroxy-1,4-naphtoquinone) is an allelopathic biochemical found in members of the *Juglandaceae* family, such as walnut trees. Juglone is found in the nut husks, roots, leaves, and bark of these trees. One activity of juglone is to stunt the growth of nearby plants that may be competing for resources. Juglone has been used as an herbicide and insecticide, and evidence suggests that juglone inhibits microbial growth through peroxidation of their intracellular environment, as well as by suppression of DNA replication via direct DNA binding. In addition, although it does not have significant toxicity to humans, juglone is actively investigated for potential anti-neoplastic activities.

Objectives: A goal of our research is to determine whether natural products, such as juglone, exhibit significant anti-microbial activity and may be developed into an effective therapeutic agent.

Methods: We tested the effects of juglone exposure on the proliferation and viability of several human pathogens, including *Listeria monocytogenes*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Streptococcus agalactiae*, and *Enterococcus faecalis*. Bacteria were grown in liquid culture in 96-well plates in the presence of serially diluted concentrations of juglone, with 6 replicates per drug concentration. Bacterial proliferation levels were determined by measuring light absorbance on a multi-well plate reader. Bacterial viability was determined by plating on juglone-free agar plates and colony counting.

Results: We found that although *E. faecalis* was insensitive to the effects of juglone, the other tested organisms exhibited a concentration-dependent inhibition of proliferation and viability.

Conclusions: The results of these studies indicate that juglone has anti-bacterial activity on several human pathogens. Although only Gram-positive organisms were tested in these studies, future studies will evaluate juglone's anti-bacterial activities in Gram-negative bacteria and in fungi. Future studies will also address the basis for sensitivity or resistance to juglone exposure, as well as molecular targets of the drug. The results from this study suggest that juglone or its derivatives may be developed as agents that will improve patient outcomes as an adjuvant to standard anti-bacterial therapy in the era of increasing prevalence of drug resistance.

Title: **Implementation of the Bipolar Disorder Screening Tool, MDQ: A Quality improvement Strategy to Prevent Delayed Diagnosis**

Authors: Julio Scardini, D.O., Nicole Cook, Ph.D. and Shivanie Ramdin, OMS-2

Program: Community Health of South Florida, Inc., Miami, FL; Nova Southeastern University, Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Background: Some studies report misdiagnosis rates for Bipolar Disorder to be as high as 70% and taking up to 10 years for a diagnosis to be confirmed (Shen et al., 2018). Misdiagnoses can have severe consequences for patients, such as polypharmacy, poorer health outcomes, and worsening health conditions. The Mood Disorder Questionnaire (MDQ) is comprised of 17 questions divided into 5 sections and commonly used by mental health care providers in a range of different settings. Patients who answer "yes" to at least seven items in question number one, answer "yes" to question number two, and answer "moderate problem" or "serious problem" to question number three are considered to screen positive for possible Bipolar Disorder (Hirschfeld, 2002) and should be comprehensively evaluated by a clinician for accurate diagnosis. In a large Community Health Center with an attached Community Mental Health Center, residents in psychiatry anecdotally identified several patients who had Bipolar Disorder but were initially diagnosed by a primary care physician (PCP) as having MDD. After non-response, these patients were referred to a resident psychiatrist who conducted additional evaluation and diagnosis. To assess methodologically and identify opportunities for improved diagnosis and treatment, a team of residents developed a Quality Improvement (QI) study to test the implementation of the MDQ as an additional screening tool to rule in or rule out Bipolar Disorder in all patients presenting with MDD.

Methods: The MDQ was implemented on all patients with a diagnosis of MDD who presented to the QI team (four residents in psychiatry) between January 2019 and June 2019. De-identified longitudinal data was collected on each patient at the MDQ administration date and at reassessment (typically at 4-8 weeks). Variables included patient age, diagnosis, number of visits, number of medications and patient stability at reassessment.

Results: Forty-three patients met the inclusion criteria and were screened with MDQ. Among those, 72.7% (n=32) were subsequently diagnosed with Bipolar Disorder. Of the 32 patients with Bipolar Disorder, 25 patients had a reassessment. At reassessment, 76% (n=19) of the 25 patients were stable. The average decrease in number of medications from assessment to reassessment among the 19 patients was 2.47 to 2.21 (not significant).

Conclusions: Implementation of a Bipolar Disorder screening instrument, such as the Mood Disorder Questionnaire (MDQ) should be considered in primary care settings because it may expose underlying Bipolar Disorder that would require further evaluation by a mental health care provider for timely diagnosis and adequate treatment.

Title: **Early Clinical Results Following Repair of Gluteal Tendon Tears**

Authors: Trevor Smith, OMS-1, Brad Ellison, M.D., Michael Matthews, B.S. and Susan Odum, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; OrthoCarolina, Orthopedic Surgery; Research Institute, Charlotte, NC; Davidson College, Pre-Medical Department, Davidson, NC

Background: Gluteal tendinopathy is a common source of pain and impairment in adults usually related to degenerative changes and disruption in the gluteus medius and minimus tendon complex. There is no official CPT treatment code available for surgical repair of the gluteal tendon complex.

Objective: To identify patients with chronic gluteal tendinopathy or trochanteric bursitis who had failed conservative treatment over 6 months and underwent surgical treatment to determine if operative management resulted in early clinical improvement.

Methods: This study was designed as a retrospective cohort study. IRB approval was obtained. We reviewed the OrthoCarolina database to identify patients with gluteal tendinopathy and/or trochanteric bursitis who underwent surgical repair of the gluteus medius tendon. A total of forty-eight patients, seventeen with complete tears and thirty-one with partial tears, were then contacted with minimum follow-up of 6 months after surgery with several clinical and functional reported outcome measures. Plain radiographs and MRI imaging was reviewed for each patient. Demographic data was reviewed in combination with use of clinical outcome scoring systems, such as Hip Outcome Score (HOS), Veterans Rand 12-item health survey (VR-12) and a specific patient survey.

Results: Overall, 79.5% of patients were satisfied with surgery and noted 95.5% improvement in pre-operative symptoms. Patients with partial tears demonstrated 90.0% improvement, while patients with complete tears noted 85.0% improvement ($p=0.983$). The median percent improvement for satisfied patients was 95.0% and was significantly different from the improvement in non-satisfied patients ($p<0.0001$). Surgical repair resulted in higher HOS Activity of Daily Living score, HOS Sports score, but equivalent VR-12 score for partial tendon tears compared with complete tendon tears. Non-smokers demonstrated 97.0% improvement, whereas active smokers only demonstrated 37.5% improvement with surgery ($p=0.003$).

Conclusion: **Most** patients with partial or complete gluteal tendon tears were very satisfied with surgical treatment at 6 months follow-up. Hip Outcome Scores, using ADL and Sports sub-scores specifically, along with VR-12 and Patient's Perceived Improvement were helpful outcome measures to characterize clinical responses in this study. Active smokers demonstrated inferior results compared with non-smokers. The results suggest that operative management for gluteal tendon tears is a beneficial procedure for patients. Future studies are recommended for operative treatment to become the mainstay treatment of injury.

Title: **Tissue Dielectric Constant of Breast Tissue in Women Undergoing Breast Tumor Biopsy**

Authors: Paige Spagna, OMS-4, Carmen Somarriba P.A., Daniel Weingrad M.D. and Harvey N. Mayrovitz Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Aventura Hospital & Medical Center, Aventura, FL

Background: Tissue dielectric constant (TDC) measurements are often used to assess skin-to-fat tissue properties in women who have developed arm lymphedema as a complication secondary to treatment for breast cancer. Values obtained strongly depend on both free and bound tissue water. However, there is virtually no information regarding TDC values of breast tissue which is also impacted by breast cancer treatment resulting in breast edema or lymphedema. It is also unknown if the presence of breast tumors effect TDC values and whether any such effects are dependent on whether the tumor is malignant or benign.

Objective: Our goals were two-fold: 1) to characterize TDC values of female breasts and 2) determine if the presence of benign or malignant tumors impact these values.

Methods: As of now, the study group consists of 35 women who were scheduled for a biopsy of a tumor of one breast. Immediately prior to the biopsy, TDC was measured at a standard site on both breasts and measured over the tumor on the breast with the tumor and at an anatomically corresponding site on the healthy breast. The standard site was adjacent and superior to the areola. TDC measurements were done in triplicate using a 22 mm diameter probe that touched the breast surface for about 5 seconds per measurement. Parameters of interest were the extent of TDC differences between healthy and tumor laden breasts and differences between TDC values obtained for malignant and benign tumors. Paired tests were done with the non-parametric Wilcoxon test and group tests with the Mann-Whitney test. Asof now pathology reports have been obtained on 29 of the women with 10 having malignant tumors and 19 having benign tumors.

Results: TDC values at standard sites of biopsied vs. healthy breasts (mean ± SD) were not statistically different (30.4 ± 3.8 vs. 29.9 ± 4.7, p=0.308). Composite TDC values measured at standard sites of 70 breasts was 30.7 ± 4.5. TDC values at tumor-related sites were greater on tumor carrying breasts vs. healthy breasts (32.1 ± 6.7 vs. 30.5 ± 6.6, p = 0.017. On breasts with malignant tumors), TDC values at tumor sites were greater than at standard sites (32.9 ± 6.4 vs.
30.7 ± 3.8, p=0.018). On breasts that had benign tumors, there was no difference in TDC values between the tumor mirrored site and the standard site (31.0 ± 6.5 vs. 30.8 ± 6.0, p = 0.906).

Conclusion: The composite TDC findings for all breasts provides reference TDC values for standardized breast sites that are useful comparison values for future studies related to breast edema and other breast issues. The findings also show slightly greater TDC values at malignant tumor sites vs. the same breast's standard site. However, it not clear if this difference is sufficient to provide useful diagnostic sensitivity of tumor type.

Title: **Does Emergency Department Sign-out Matter for Patient Safety and Patient Care Efficiency? A Survey of the Perception of Emergency Medicine Residents and Attending Physicians on the Effect of Sign-out**

Authors: Tran Trung, M.D., Manuel Obando, M.D., Emerson Franke, M.D., Frederick Chu, M.D., Erin Marra, M.D., Todd Slesinger, M.D. and Mark Mitchell, D.O.

Program: Aventura Hospital & Medical Center, Emergency Medicine Program, Aventura, FL

Background: The Joint Commission recognized improper handoffs/sign-out as a major source of medical errors. Implementation of a standardized sign-out protocol in the emergency department was shown to lead to a decreased length of stay and increased frequency of bedside rounding in the emergency department. The question that has yet to be asked is: how does residency training affect one's perception of sign-out on safety and efficiency?

Objectives: Evaluate how the effect of sign-out on patient safety and patient care efficiency will differ among residents of different levels of training and attending physicians.

Methods: Investigators surveyed attending physicians and residents of five local emergency medicine programs via email and paper surveys. 85 survey samples were completed, with 31 PGY-1s, 16 PGY-2s, 19 PGY-3s, and 18 from attending physicians. Descriptive statistics and t-test for comparison of items on a Likert scale were obtained. The measured outcome is the participants' perception of the relative importance of sign-out as a contributor to patient safety and care efficiency.

Results: 30% of respondents never received any training on proper sign-out. 13% considered sign-out as having "little effect" or "no effect" on patient safety and care efficiency. 74% considered sign-out affect safety "a great deal" or "a lot", with 53% similar answers on care efficiency. PGY-1 residents' perception on the relative importance of sign-out on care efficiency is lower than that of attending physicians' ($p<0.05$), but this difference disappears between groups (ANOVA, $p>0.05$). There is no statistical difference between groups ($p>0.05$) in the perception of the relative importance of sign-out on patient safety.

Conclusion: The results of this survey suggest that training enhances a residents' perception of the effect of sign-out on patient care efficiency. Moreover, it suggests that greater efforts should be emphasized on sign-out education in the emergency department and the implementation a standardized sign-out protocol.

.

Title: **Dietary Views and Habits of Health Professional vs. Non-Health Professional Students**

Authors: Oleg Tsvyetayev, OMS-2, Nicholas Lampasona, OMS-2, Michael Downing, OMS-2, Mark Vinicky, OMS-3, Michael Bazzi, OMS-3 and Harvey N. Mayrovitz Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine; College of Medical Sciences, Fort Lauderdale, FL

Background: The National Research Council set a minimum of 25 classroom hours of nutrition education for preclinical medical school to adequately inform future physicians on healthy eating habits. Previous studies suggest some inadequacy in such programs and some knowledge gaps in student perceptions of nutritional issues.

Objective: To add to the informational database regarding student dietary habits and to test the hypothesis that students enrolled in health-related programs would practice healthier nutritional habits than students enrolled in non-health-related programs.

Methods: A 16 question survey was created and distributed to Nova Southeastern University students enrolled in the Health Professions Division (HPD) or non-health-related programs (NHPD). We strove to get feedback on student habits about their consumption of sweets, fast food, red meat, caffeine, protein sources besides red meat, water, fruit, and vegetables and their thoughts regarding healthy food choices. Each question had five options and was worth at most 10 points. Quantification and analysis were based on an assignment of 2 points for the "least nutritionally good" choice, 10 points for the "most nutritionally good" choice and in-between values in steps of 2 points. Scoring was done so that higher scores indicate a nutritionally better approach.

Results: 732 responses (569 HPD and 163 NHPD) have been received with most responses from females (73.1%). Analysis of responses was based on Mann-Whitney non-parametric tests since Normality of score distributions was rejected ($p<0.001$) using the Shapiro-Wilk test. Differences between HPD and NHPD response scores were considered statistically significant if $p < 0.01$. Results showed no significant difference (NSD) between HPD and NHPD in any tested parameter. This included their consumption of sweets, fast food, red meat, caffeine, water, fruit, vegetables, considerations of healthy food choices, and protein sources besides red meat. Expressed as mean ± SD, females scored higher (better) than males in red meat consumption (7.34 ± 1.9 vs. 5.96 ± 2.0, $p<0.001$) but lower (less nutritionally good) than males in consumption of sweets (6.19 ± 1.74 vs. 6.82 ± 1.66, $p<0.001$), water intake (6.23 ± 1.95 vs 6.85 ± 1.90, $p<0.001$), and protein intake (4.41 ± 1.03 vs 4.90 ± 1.20, $p<0.001$). Females also had a lower exercise score (5.62 ± 3.0 vs 6.36 ± 3.00, $p<0.01$).

Conclusion: The results of this study suggest that HPD program students and Non-HPD program students have similar nutritional concepts and eating habits that at this juncture do not appear to be statistically different. Further, the gender difference herein uncovered should be considered in any such process.

Title: **Does Body Fat Importantly Influence Skin Tissue Dielectric Constant Values?**

Authors: Adithi Vemuri, OMS-2, Jessica Forbes, OMS-3, Katelyn Krolick, OMS-2, Samantha Rubin, OMS-2 and Harvey N. Mayrovitz, Ph.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine; College of Medical Sciences, Fort Lauderdale, FL

Background: Measurements of the skin's tissue dielectric constant (TDC) at a frequency of 300 MHz is sensitive and largely dependent on the amount of free and bound water contained within the target measurement volume. We hypothesized that women with greater BMI values, especially those in the obese category would have reduced TDC values. The focus on the obese category is driven by the fact that statistically, these women have a greater risk of breast cancer and thus of developing lymphedema for which the TDC measurements have shown utility.

Objectives: To test the hypothesis regarding the potential impact of TBF% as determined in middle-to-mature age women having BMI values in the overweight and obese ranges.

Methods: A group of 32 women with age (mean ± SD) of 40.0 ± 11.6 years and BMI of 31.8 ± 6.7 Kg/m^2 (23.0 to 49.9 Kg/m^2) participated. They had the study explained and then signed an approved consent form. These volunteer participants were women who were enrolled in a local commercial weight loss program. Body composition parameters, including TBF, and intracellular (ICW) and extracellular water (ECW) percentages were determined using impedance measurements at 5, 50, 250 and 500 kHz (Inbody 570). TDC values were measured in triplicate bilaterally at forearm, biceps, neck and face. Measurement depths were 0.5 mm, 1.5 mm and
2.5 mm in order to sample different levels of skin tissue. These data were obtained by touching skin with a small probe (Delfin Technologies) for about 5 seconds during which a 300 MHz signal is used to determine the TDC value of the interrogated area. For analysis, subjects were divided into those with BMI<30Kg/m^2 (sub-group A, n=16) vs. ≥30Kg/m^2 (sub-group B, n=16). Tests for statistical differences between sub-groups were based on the non-parametric Mann-Whitney test with a p-value < 0.01 accepted as statistically significant.

Results: TDC at forearm and biceps decreased significantly ($p<0.001$) with increasing depth from 0.5 to 1.5 to 2.5 mm but TDC values and their inter-side ratios did not differ between sub- groups A and B at any measured site. Although correlations between TBW, ECW and ICW were significant ($p<0.001$), there was no dependence of TDC values on any of these parameters.

Conclusions: Previously unknown TDC values for obese persons are provided and based on sub- group analyses suggest that skin TDC values in overweight and obese persons are not confounded by variables such as TBW and TBF. Further, since inter-side ratios and their SD's yielded thresholds for forearm and biceps similar to those established for women with normal BMI, use of these clinical inter-arm TDC ratios now is extended to include a wider BMI range.

Title: **Vascular Endothelial Growth Factor (VEGF) – Induced Endothelial Differentiation of Human Periodontal Ligament Derived Mesenchymal Stem Cells (PDLSCs)**

Authors: Susan Zhang, OMS-2, Shreya Patel, Sondos Alghamdi, B.D.S. and Umadevi Kandalam, D.M.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine; Department of Pediatric Dentistry, Fort Lauderdale, FL; Halmos College of Natural Sciences and Oceanography, Dania Beach, FL

Abstract: Cleft lips and palates are among one of the most common congenital anomalies, affecting about one in 700 live births every year in the US. Patients with cleft palates present with a multitude of problems such as feeding difficulties, speech abnormalities and dentofacial anomalies. The current gold standard treatment is surgical repair with bone-autografts requiring multiple surgeries with risks of donor site morbidities. Alternatively, use of allografts may pose the concern of unknown virus infections. The advancements in stem cell-based tissue engineering in the craniofacial defects appear to be promising alternatives for the repair of cleft palate defects. Mesenchymal stem cells derived from the orofacial region such as periodontal ligament stem cells (PDLSCs) are highly proliferative and can be programmed to differentiate into osteogenic precursor cells that can be used for cranial bone regeneration. However, in bone tissue engineering vascularization is essential for regeneration of functional bone. The objective of this study was to investigate the effects of the potent angiogenic growth factor vascular endothelial growth factor (VEGF) on PDLSCs differentiation into endothelial cells. The result of PDLSCs treated with VEGF is enhanced gene expression of the endothelial marker genes VCAM-1, KDR, PCDH12, and FLT-1. The functional behavior of the differentiated cells also showed capillary like structures (matrigel assay). Our findings support that PDLSCs can differentiate into endothelial cells. Furthermore, PDLSCs as an autologous stem cell source provide new options for engineered vascularized tissue for the repair of craniofacial defects.

Title: **Subclavian Steal Syndrome**

Authors: Zahava Alishaev, OMS-4, Divya Pandya, OMS-4, Tariq Jaber, M.D. and Christina Savu, D.O.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Broward Health Medical Center, Internal Medicine, Fort Lauderdale, FL

Introduction: Subclavian Steal Syndrome (SSS) consists of vascular and neurological symptoms which may seem unrelated if not properly understood within their respective clinical context. It is a more of a phenomenon of an "appropriate" compensatory blood flow whereby an occlusion of the prevertebral subclavian artery leads to a retrograde blood flow of the vertebral artery. SSS often found incidentally and usually patients are asymptomatic. Here we describe a case of SSS which warranted an invasive intervention.

Case Presentation: A 61 year old male who presented with claudication, exercise intolerance, decreased left radial and ulnar pulse, and three episodes of near collapse and dizziness when he was painting his house. Examination revealed impalpable pulses on the left radial and ulnar arteries, normal pulses on right arm, normal pulses felt for both legs, and patient was Roo's test positive on the left arm. His ABPI was within normal limits on both lower extremities. His pressure for brachial index was significantly reduced in his left arm when compared to his right. CT angiogram revealed a focal occlusion of the medial left subclavian artery. It was treated with an endovascular repair rather than revascularization which lead to relief of symptoms upon follow-up.

Discussion: SSS can lead to arterial insufficiency in the brain or upper extremities which are supplied by the subclavian artery. However, the arm may be supplied by blood flowing in a retrograde direction down the vertebral artery at the expense of the vertebrobasilar circulation. Although a majority of patients will remain asymptomatic, physical findings of SSS are often incidentally found. That is why we recommend a careful history to identify the vascular and neurological deficits to correctly diagnose this phenomenon. Hence why it is described as a rare kind of syncope given its non-specific symptoms.

We recommend assessing brachial systolic pressures bilaterally, radio-radial pulse delays, and assessing the supraclavicular fossa for thrills, bruits, and pulse character. In addition, it is highly recommended to examine the extremities for changes regarding skin, hands, and nail beds of the affected extremity. Always perform a thoracic outlet maneuvers and palpate all major pulses to rule out Takayasu. Physical examination with positive signs should be followed by Doppler and angiography scans (CT/MRIs) for further assessment.

Asymptotic patients should be treated conservatively and with pharmacotherapy. Since the most significant risk for developing SSS is atherosclerosis we recommend targets that addresses the following clinical outcomes: hypertension, lipid control, proper glycemic control, antithrombotic therapy, lifestyle changes, and mitigating risks associated peripheral/cardiovascular disease. For symptomatic patients we recommend the surgical/endovascular approach. Revascularization is especially recommended for continuous steal symptoms in comparison to intermittent where stenting or angioplasty is more recommended.

Title: **Saving the Critically Ill Patient with Acute Pulmonary-Renal Syndrome with Combined Therapy of Plasmapheresis and Rituximab**

Authors: Mehak Bhatia, OMS-4, Jusong Choi, M.D., Farid Isaac, M.D. and Parham Eftekhari, D.O.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Broward Health Medical Center, Internal Medicine, Fort Lauderdale, FL

Introduction: Diffuse alveolar hemorrhage (DAH) is a life-threatening clinical syndrome that is characterized by bleeding into the alveolar space due to disruption of the alveolar-capillary basement. With concomitant renal failure in association with respiratory failure the presentation is also known as Pulmonary-renal syndrome. The underlying cause of this syndrome is mostly due to autoimmune mediated vasculitis where Antineutrophil cytoplasmic antibodies (ANCA) and Good-pasture's disease are the most common. DAH is a rare manifestation of Lupus vasculitis which can be accounted for 1-5% of Pulmonary-renal syndrome with 64-100% concomitant renal failure.

Case Presentation: We present the case of a 37-year-old Hispanic female with history of systemic lupus erythematosus (SLE). Patient had biopsy confirmed stable lupus nephritis controlled with Azathioprine and Prednisone. The patient initially presented with multiorgan failure involving liver and renal failure with creatinine level of 4.6 along with potassium level of 7.6. The patient underwent cardiopulmonary arrest upon presentation and was successfully resuscitated. Initial labs showed hypocomplementemia with C3 at 17mg/dL and C4 of <3mg/dL. With elevated dsDNA at 9 IU/mL, high dose pulse intravenous steroid with 1g of methylprednisolone was given daily for 3 days followed by a tapering dose. With clinical improvements, the patient was extubated and continuous renal replacement therapy was transitioned to intermittent hemodialysis with some renal recovery. The patient was clinically stable and mycophenolate mofetil treatment was initiated for lupus nephritis. Two days later the patient developed acute respiratory distress with hemoptysis. Chest x-ray showed new diffuse infiltrates and the bronchoscopy confirmed bronchial bleeding. Patient was initiated on plasmapheresis and IVIG along with Rituximab. She improved significantly after two weeks of therapy. Although she remained on the dialysis for renal replacement therapy, the patient was stable for discharge to a rehabilitation center with hydroxychloroquine and methylprednisolone tapering schedule.

Discussion: The acute deterioration of the patient's respiratory status and potential diffuse alveolar hemorrhage raised concerns for organ failure due to the progressive lupus. The decision to initiate the plasmapheresis and IVIg was made due to the patient's poor tolerance to CellCept in addition to her acute deterioration and severe respiratory distress. SLE patients with thrombocytopenia and low complement levels on admission may have a higher index of suspicion for impending DAH. These patients should be aggressively treated with immunosuppressive regimen. The initial management of acute DAH requires supportive care including ventilatory support and of pulse corticosteroid therapy with methylprednisolone. Fibrinolytic therapy with recombinant factor VIIa may be beneficial in refractory cases.

Title: ***E. coli*** **O157:H7 Sepsis following FMT in an IgA Deficient IBD Patient**

Authors: Landen Shane Burstiner, OMS-2, Anna Owings, D.O. and Sarah Glover, D.O.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; University of Mississippi Medical Center, Jackson, MS

Introduction: Fecal microbiota transplant (FMT) has been demonstrated to be an effective treatment option for recurrent C. *difficile* infections (RCDI) with minimal serious adverse reactions reported. Although the results of FMT for RCDI are promising, the screening process (for both donors and recipients) remains largely unregulated by the FDA.

Case Description: A 19 y.o. male with a history of primary IgA deficiency, growth hormone deficiency, asthma, and ulcerative colitis presented to his gastroenterologist with his 3rd C. difficile infection in a 4 month period. FMT was performed via colonoscopy using commercially sourced stool. 10 days later, the patient presented to the ER with explosive bloody diarrhea, up to 20 BMs per day. He was also positive for leukocytosis, tachycardia, intermittent subjective fevers, chills, night sweats, and abdominal cramping. Stool studies were positive for EPEC, ETEC, and Shiga toxin-producing *E. coli* O157:H7. Patient was admitted with sepsis and received only supportive care for nine days, followed by a five-day regimen of IC antibiotics. He was discharged in stable condition after a 17-day hospitalization. The patient made a full recovery and has not experienced another recurrence of CDI since the FMT seven months prior.

Disclaimer: The patient's history of mostly asymptomatic, Primary IgA Deficiency was diagnosed in the Czech Republic and was not reported by the patient to his Gastroenterologist in the United States. Laboratory tests ran in 2014 revealed IgA <1.0 mg/dL with normal IgG, IgM, IgE, and IgG subclass levels.

Discussion: After extensive review of literature publications our patient presents with the first reported instance of an individual with Primary IgA Deficiency undergoing FMT as well as the first documented instance of FMT-introduced *E. coli* O157:H7 infection. The patient's complete lack of IgA appears to be the main catalyst for his disastrous response to FMT. While barrier defects secondary to IBD and the concomitant use of immunosuppressive medications can increase susceptibility to infections, studies have shown FMT does not carry an increased risk of serious adverse effects in immunocompromised patients (including IBD patients on immunosuppressive therapy)
This patient was not screened for immunodeficiencies prior to receiving FMT. The FDA has issued guidelines but does not currently mandate which pathogens the donor stool must be screened for, nor any immunodeficiencies the recipient must be screened for. Given the understood importance of IgA in mucosal immunity against *E. coli*, and the outcome presented in this study, we suggest that rigorous screening of the recipient's medical history for immunodeficiency, and/or potentially running a basic Immunoglobulin panel, should be performed prior to performing FMT to avoid any future unfavorable outcomes or adverse events.

Title: **A Rare Presentation of Lupus Encephalitis Presenting as Bacterial Meningitis**

Authors: Amanda Costa, M.D., Estefania Niewualkousk, D.O. and Megan Arielle McGill, OMS-1

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Broward Health Medical Center, Pediatrics, Fort Lauderdale, FL

Introduction: We report a case of an 18-year-old female admitted for bacterial meningitis management, and later diagnosed with SLE encephalitis.

Case Description: An 18-year-old female with a history of systemic lupus erythematosus with lupus nephritis stage 2, hypertension, decreased IQ, and anxiety presented to the emergency room with headaches, altered mental status, neck pain, and eye deviation. In the emergency room, the patient was found to be limp, and had an episode of seizure-like activity. Vitals in the emergency of 101.2 degrees Fahrenheit, pulse of 101 beats per minute, respirations 23 breaths per minute, blood pressure 97/51 mmHg, and was saturating 99% on room air. On physical exam the patient was somewhat arousable, pupils were equal, round, and reactive to light, malar rash on the face, extremities warm and well perfused, and positive Brudzinski's and Kernig's sign. CT of the brain demonstrated a patchy hypodensity within the right temporoparietal lobe. The patient was then admitted for management and treatment of bacterial meningitis. The patient was started on acyclovir, fluconazole, vancomycin, meropenem, and dexamethasone empirically. An ultrasound-guided lumbar puncture was obtained after empiric treatment was initiated. CSF demonstrated white blood cell count 5916/cumm, red blood count of 31/cumm, polymorphonucleocytes of 89%, lymphocytes of 2%, glucose of 26 mg/dL, and CSF protein of 384. Blood, CSF fungal, CSF acid-fast bacilli, CSF gram stain, and urine cultures were all found to be negative. Furthermore, PCR HSV 1 and 2 and PCR enterovirus were also negative. Per infectious disease, patient was removed from fluconazole and acyclovir, however continued on vancomycin and meropenem for a completion of IV antibiotics of 10 days as the patient's CSF cultures were obtained after empiric antibiotics. Due to high suspicion that the patient's central nervous involvement was lupus-related, neurology was consulted. Per neurology, an MRI, MRA, and MRV ordered. MRI demonstrated the absence of leptomeningeal enhancement, as well as, deep involvement of the brain making bacterial infection unlikely, and T1 hyperintensity in the basal ganglia. Patient was given two doses of high-dose methylprednisolone. After the patient finished her 10-day course of antibiotics, she was cleared for discharge, and was to follow-up with rheumatology, and neurology for a repeat MRI.

Discussion: Systemic lupus erythematosus is an autoimmune disease that can manifest itself in a variety of forms. Commonly, neuropsychiatric symptoms may arise with symptoms ranging from anxiety and depression to demyelination of the nervous system. Our patient presented with symptoms and laboratory evidence suggesting bacterial meningitis. However, imaging studies demonstrated involvement of deep structures of the brain with no leptomeningeal involvement, suggesting lupus encephalitis as the etiology of the patient's presentation.

Title: **A Potentially Rare Case of Diffuse Large B-Cell Lymphoma of the Pelvis**

Authors: Keresa V. Edwards, D.O., Ian D. Singer, D.O., J.D., Natan Bastoky, D.O., Ashley Shanblatt, D.O., Rajiv Chokshi, M.D. and Tricia A. Kalwar, M.D.

Program: Broward Health Medical Center, Family Medicine Residency Program, Fort Lauderdale, FL

Introduction: Diffuse Large B-Cell Lymphoma (hereafter "DLBCL") is one of most common Non-Hodgkin Lymphoma subtypes worldwide. Patients diagnosed with DLBCL typically present with symptomatic nodal enlargement in the neck, mediastinum, or abdomen. Close to one-third of patients will exhibit B-symptoms such as fever, weight loss, and night sweats and more than one-half of patients will have an elevated serum lactate dehydrogenase. DLBCL is also an AIDS-defining malignancy. Primary lymphomas of the bone, however, are rare; they represent less than 2% of lymphomas in adults worldwide. Those with disease involving the bone have a median age of 56 years and present with a palpable mass, non-remitting bone pain, and the aforementioned B-symptoms.

Case Presentation: We present a 48-year-old Jamaican male with no significant past medical history, who was admitted to our hospital with a left pelvic tumor and possible surrounding organ infiltration. The patient presented with severe left hip pain with radiation to the back for one year. He lost the ability to ambulate independently and developed groin and rectal numbness with concurrent constipation and urinary incontinence. He denied fever but endorsed intermittent night sweats and unintentional weight loss of 15 pounds. The patient underwent radiograph of the hip and pelvis, which revealed a large mixed lytic sclerotic lesion of the left hemipelvis [Figure 1]. Follow up magnetic resonance imaging confirmed a left pelvic mass measuring 16.4 cm x 6.7 cm x 23 cm with invasion of the rectum, bladder, prostate, corpus cavernosum base, and sacrum. Subsequent computed tomography showed lytic destructive infiltration suspicious for sarcoma. HIV testing was negative. Pain Management had been consulted for palliative and end-of-life care discussions with the patient. However, a pelvic mass biopsy unexpectedly came back as suspicious for DLBCL. This was a surprising yet highly encouraging finding for our family medicine resident team, internal medicine attending, and managing oncologist. It should be noted, however, that this diagnosis could not be confirmed due to the small number of cells observed. A port was nonetheless placed in anticipation of aggressive outpatient chemotherapy therapy for DLBCL. The patient is scheduled to undergo a second biopsy for official diagnosis.

Discussion: This case illustrates a potentially rare finding of DLBCL that originated not only in the bone, but also in the appendicular skeleton. It therefore reinforces the overarching theme of conducting a thorough work-up even when statistical evidence points to other diagnoses. Doing so can drastically change patient management and considerably, improve prognosis. As this relates to our patient, a diagnosis of DLBCL can yield a five-year survival rate of greater than 70% with multi-agent chemotherapy. In summary, but for the above-discussed comprehensive work-up by our comprehensive care team, this vibrant patient with a young family to care for would have likely been dismissed as an untreatable patient.

Title: **Acute Generalized Cutaneous Lupus Erythematosus repeatedly mistaken for Cellulitis**

Authors: Nicole Fischer, OMS-3, Mary Spring, OMS-3 and Joseph Geffen, D.O., M.P.H.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Lake America Family Physicians, Internal Medicine, Clermont, FL

Introduction: Although acute cutaneous lupus erythematosus (ACLE) is most commonly thought of as the "butterfly [malar] rash," it should be noted that this subtype of cutaneous lupus may also affect sun-exposed areas on the lateral or extensor aspects of the arms, elbows, shoulders, knees, and trunk. ACLE may present in various manners, including an erythematosus maculopapular rash, plaque-like lesions, a widespread area of congestive erythema, crusting, scaling lesions, or erosions.

Case Presentation: We present a case of a 52-year-old female with ESRD (due to unknown cause), HTN, Chronic Antiphospholipid Syndrome (on warfarin), and Anemia of Chronic Disease who sustained a minor injury to her right forearm, which developed into a small abrasion. The abrasion then developed into a plaque with bullous margins prompting her to make an urgent appointment with her PCP. She was prescribed TMP/SMX, which had no impact, and subsequently developed increasing pain. She was therefore admitted to the hospital for IV antibiotics for presumed cellulitis and was taken to the OR for wound debridement. Notably, the patient was leukopenic and afebrile, and her wound cultures were sterile throughout her admission. At her initial visit at the wound care clinic (1 week after the date of injury; Fig 1), the patient reported pain and serosanguinous drainage associated with the wound. She also reported having a similar wound on her left forearm years prior. On examination, the lesion was 19.7 cm by 13 cm with indurated borders, a blood-filled bulla and a shallow crater within the wound with no periwound erythema. She was readmitted for an urgent hematological evaluation to exclude the possibility of warfarin toxicity and was again started on IV antibiotics for suspected cellulitis. Warfarin-induced skin necrosis was excluded due to the timing of the wound's development and its location. A week later the patient returned to the wound care clinic for follow-up demonstrating a persistently swollen and tender wound. Labs from the hospital were reviewed at this time and revealed the presence of Lupus Anticoagulant, Antinuclear Antibodies at a titration > 1:640 (mixed pattern), Phosphatidylserine/Prothrombin Antibodies, Cardiolipin Antibodies, and Beta-2 Glycoprotein Antibodies. A diagnosis of Acute Generalized Cutaneous Lupus Erythematous was made and the patient was started on oral steroids with dramatic improvement in the wound (Fig 2). Three weeks after the initiation of treatment, the only evidence that remained of the wound was dyspigmentation. She followed up with a rheumatologist who started her on hydroxychloroquine. Due to the discovery of systemic lupus erythematosus (SLE), she became eligible for kidney transplantation and is currently being evaluated for it.

Discussion: This case not only illustrates an atypical presentation of ACLE, but also demonstrates the efficacy of systemic corticosteroids as an initial treatment with rapid onset for ACLE. Antimalarials have been the gold standard for treatment of CLE for decades. However, antimalarials can take 2 to 3 months to reach maximum efficacy, thus it may be necessary to use a bridging therapy, such as systemic corticosteroids, as was the case in this patient.

Title: **Treatment of a Patient with Anterior Head Carriage and Low Back Pain**

Authors: Alyssa Goldenhart, OMS-2
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL

Introduction: A metanalysis in 2017 found a correlation between the degree of neck flexion and length of time one spent using handheld devices. This could indicate that as the use of handheld electronics increases, anterior head carriage will become more prominent in the general population. The biomechanical forces of increased head carriage can place up to 10 times more load on the cervical vertebrae. Looking beyond the cervical region, anterior posture can also cause increase in disk load and stress on the T9 vertebrae and all levels below. Because of increased load placed on vertebrae from faulty biomechanics, back pain can arise.

Case Presentation: An 86-year-old man presents complaining of lower back pain and bad posture. Pain has minimally improved with cyclobenzaprine, ketoprofen, and gabapentin. After previous osteopathic manipulative treatments patient feels relief from his back pain which he contributes to his ability to stand up straighter. Patient has a history of mild to moderate cervical spinal stenosis, moderate to severe cervical neural foraminal stenosis, a history of osteomyelitis, and an L1-L2 fusion.
Clinical examination reveals a man with severe anterior carriage of the head. When standing against a wall the back of his head measured 13.4 cm away from the wall. Further evaluation revealed L4-L5 rotated right side bent left. T12-L1 rotated right side bent left. T1-4 rotated left side bent left. The patient had ropiness of paravertebral cervical muscles, anterior and posterior scalene, platysma, trapezius, and the sternocleidomastoid muscle. AA was rotated left. OA was side bent left rotated right. There was bilateral scapular myofascial restriction, as well as a scar just medial to the left scapula further restricting the scapula. Decreased shoulder flexion was also noted.
OMT was performed. In the cervical region, OA release was used on the paravertebral cervical muscles. Muscle energy and Still Technique was preformed to the cervical spine. Muscle energy was preformed to the scalene, platysma, and paravertebral cervical muscles. Facia distortion model was used on the trapezius, sternocleidomastoid, and anterior scalene. The thoracic spine received Still Technique and muscle energy. The thoracic region received muscle energy to the pectoralis minor. Reciprocal inhibition was used on the pictorials minor and anterior deltoid. The shoulders received two stages of Spencer's technique with muscle energy, myofascial release to the scapula, including the scar on the left medial scapula. Post-treatment the patient was able to stand with his head 6.5 cm away from the wall compared to the 13.4 cm distance found before treatment. He also noted decreased pain in his lower back immediately after treatment.

Discussion: This case demonstrates of how the biomechanics of bad posture can contribute to an increase of lower back pain. Post treatment outcomes showed how the use of osteopathic manipulative medicine to better align posture can reduce pain.

Title: **A Hypercoagulable State Leading to the Detection of Occult Lung Malignancy**

Authors: Adam Jacobs, OMS-4, Anita Singh, D.O. and Israel Ugalde, D.O.
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Mount Sinai Medical Center, Internal Medicine, Miami Beach, FL

Introduction: Patients with malignancy may present with significant thromboembolic complications including deep vein thrombosis (DVT), pulmonary embolism, arterial thrombosis, nonbacterial thrombotic endocarditis, and stroke due to abnormal coagulation cascades. Although these events are typically recognized later in the disease process, complications of a hypercoagulable state can rarely present as the first manifestation of an occult malignancy. We report a case of a young male who was ultimately found to have an aggressive form of lung adenocarcinoma after the initial presentation of multiple thromboembolic events.

Case Description: A 36-year-old male truck driver with a history of tobacco abuse initially presented to the emergency department with right lower leg swelling and pain. He was diagnosed with a right lower extremity DVT and was discharged home with rivaroxaban. He returned to the hospital one day later complaining of facial droop, slurred speech, and right upper extremity weakness. Imaging revealed multiple infarctions in the bilateral hemispheres with perfusion defect most significant in the left middle cerebral artery. Transesophageal echocardiogram was negative for patent foramen ovale and no arrhythmias were noted. He was discharged home on anticoagulation for the DVT. Two weeks later, he presented with a sudden episode of headache, chest pain, and confusion. CT brain revealed a small subarachnoid hemorrhage in right posterior parietal and left frontal lobe. Emergent cerebral angiography revealed a total occlusion of the M2 branch of the right middle cerebral artery (MCA). Repeat echocardiogram revealed a mitral valve mass, suspicious for a thrombus. The hospital course was further complicated by multiple thromboembolic strokes in the left MCA and bilateral posterior cerebellar arteries. CT angiogram of the chest revealed a pulmonary embolism, multilevel supraclavicular, mediastinal, hilar lymphadenopathy, and a bilobed pulmonary nodule opacity at the posterior segment of the left lower lung. Biopsy confirmed PDL1 and ROS positive lung adenocarcinoma. Given his aggressive hypercoagulable state, he was restarted on rivaroxaban. Treatment with crizotonib was initiated as he was a poor candidate for platinum-based chemotherapy. Repeat CT of chest showed improvement in the size of the pulmonary nodule and lymphadenopathy six weeks later. However, the patient remains ventilator dependent with a poor overall functional and neurological status and is currently undergoing aggressive rehabilitation.

Discussion: DVT and stroke as an initial presentation of an active lung adenocarcinoma in a young patient is extremely rare as patients presenting in a hypercoagulable state usually are older. However, genetic influences are thought to play a strong role in young patients presenting with lung cancer. Though testing for a hypercoagulable state is not recommended for the first unprovoked DVT, clinicians should be prompted to screen for malignancy in the setting of cryptogenic strokes, especially in younger patients with no prior risk factors.

Title: **Thrombectomy: Clearing the way to the Top**

Authors: Romeena Lee, D.O., Gabriela Perez, D.O., and Ariol Lobrada, M.D.
Program: Community Health of South Florida Inc., Family Medicine Residency, Miami, FL; Palmetto General Hospital, Neurology Residency, Hialeah, FL

Introduction: Strokes are the most common disability in the United States; the annual incidence of new or recurrent strokes is 795,000. Prior to 2015, individuals who suffered from a stroke had limited treatment options with initial management consisting of intravenous thrombolytics for patients who met treatment criteria.

Case Presentation: We present a case of an 84-year-old Hispanic male with a past medical history of hypertension, previous myocardial infarction with stent placement and pacemaker placement, congestive heart failure, atrial fibrillation and hypothyroidism who was rushed by ambulance to the hospital with left upper and lower extremity weakness, left facial droop, slurred speech, and ataxia. Prior to the symptoms, the patient's family reports that the patient was able to ambulate independently and was able to perform activities of daily living. Patient's baseline Modified Rankin score (mRS) was 0. The Modified Rankin Score is used to measure a patient's disability or dependence on activities of daily living in stroke patients. On primary survey, the patient was alert, awake, and uncooperative. He was oriented only to self, had a left sided facial droop with generalized left sided weakness. His National Institutes of Health Stroke Scale score (NIHSS) was 7. He was immediately taken for CT head without contrast, which showed a focal hyperdensity of the proximal right middle cerebral artery (Figure 1). While in the CT room, the patient received intravenous tissue plasminogen activator (tPA) after it was determined that he was within the therapeutic window and there were no contraindications. The patient was then taken to the Interventional Radiology suite for a suctioned Mechanical Thrombectomy. In the Interventional Radiology suite, the patient was found to have a clot in the right middle cerebral artery (Figure 2), which was successfully removed (Figure 3). The patient was admitted to the Neurology Intensive Care Unit for close monitoring and evaluation due to the high risk of neurological deterioration and hemorrhagic transformation. Within 24 hours of onset the patient gained full function of his left lower and upper extremity, and his left sided facial droop improved by day two of onset of symptoms. His National Institutes of Health Stroke Scale score (NIHSS) was 1. The patient's baseline modified rank score (mRS) was 1 at discharge.

Discussion: Middle cerebral artery occlusion is one of the most debilitating strokes that can result in permanent disability without intervention. This case serves as an example to highlight the importance of prompt diagnosis by emergency and primary care physicians as well as the critical importance of management of ischemic stroke with intravenous tissue plasminogen activator and thrombectomy. Rapid management of strokes with cutting edge technology leads to optimal patient outcomes and avoidance of significant patient mortality and morbidity as well as negative economic outcomes. The patient was discharged to home with his family and was able to avoid common adverse outcomes including physical impairment, increased caregiver burden, risk of depression and subsequent hospitalizations.

Title: **Too Little, Too Much: Severe Thrombocytopenia and Erythrocytosis in a Patient with Polycythemia Vera and Dengue Virus**

Authors: Andrea Linares, D.O., Carlos Barbur, D.O. and Cesar Bertolotti, M.D.
Program: Palmetto General Hospital, Internal Medicine, Hialeah, FL

Introduction: Polycythemia Vera (PV) is a rare condition characterized by an increased number of red blood cells in the bloodstream, termed erythrocytosis. Patients with this condition may also have accompanying excess of white blood cells (leukocytosis) and platelets (thrombocytosis). Altogether, these conditions of excess make up what are known as myeloproliferative neoplasms. Extra cells in the body make blood thicker than normal, which may increase the risk of developing blood clots in arteries and veins. It can also decrease blood flow to organs including the spleen, causing splenomegaly.

Case Presentation: A 52-year-old male, with past medical history of PV diagnosed as a teen, presented to the emergency department with symptoms of malaise, fevers and chills. Patient was visiting family in Cuba when he began feeling these symptoms and decided to return home and seek medical treatment. The patient denied any nausea, vomiting, diarrhea, shortness of breath, cough, or any other upper respiratory tract infection symptoms. He denied any sick contacts, changes in diet, recent hospitalizations, or recent antibiotic therapy for any other infection. The patient stated he usually treated his PV with occasional phlebotomy every couple of months.

When the patient was evaluated, he was found to be febrile and tachycardic. He had an elevated hemoglobin of 20.5 g/dL, and a hematocrit of 61.2 %. However, when evaluating the rest of his cell lines, instead of finding elevations in platelet count, the patient was severely thrombocytopenic with a platelet count of 7x $10^{3/mm3}$. The patient was questioned further and examined to look for any signs of bleeding, ecchymosis, clotting, disseminated intravascular coagulation, which were all negative. Concern for bone marrow suppression, due to poor treatment compliance arose.

The patient was immediately admitted to Intensive Care Unit. Due to the patient's history of recent travel to Cuba, fever and malaise, tests for possible viral diseases were obtained. Once the results were in, the patient's uncommon hematological findings made more sense. The patient had positive IgM an IgG antibodies to Dengue Virus. Dengue Virus (DENV) is a Flavivirus, single stranded positive RNA mostly found in tropical and subtropical areas, transmitted by the Aedes species mosquito. The mechanism for the dengue virus mediated thrombocytopenia is multifactorial and poorly understood. Increased concern for Dengue hemorrhagic fever or dengue Shock appeared imminent as the patient had previous exposure to the virus with a +IgG and acute infection with +IgM which can lead to a phenomenon called antibody-dependent immune enhancement, which makes a person have a more severe form of disease after the first infection. This patient was given supportive therapy as well as immediate platelet transfusion.

Discussion: Patients with hematological conditions may present with different elevations or deficiencies of different cell lines. However, it is important to not blame the known histories of chronic diseases and evaluate all possibilities. In this patient's case, travel history was one of the most important factors in obtaining the right laboratory test, which led to the correct diagnosis and appropriate treatment.

Title: **Cardiac Arrest Secondary to Massive PE: Survival by VA-ECMO**

Authors: Robin Mata, OMS-3, Gabrielle McDermott, OMS-3 and Joaquin Mejias-Crespo, M.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Memorial Regional Hospital, Hollywood, FL

Introduction: Pulmonary Embolism (PE) is a relatively common diagnosis with an associated mortality of 14.7%. Though less than 5 % of patients with PE progress to cardiac arrest, the associated 90-day mortality rate can range from 65-95%. VenoArterial Extracorporeal Membrane Oxygenation (VA-ECMO) is a unique form of cardiopulmonary bypass used in life-threatening cardiopulmonary failure that has only become more widespread in the past decade as a bridge to medical therapy. The FDA-recommended treatment for Acute PE is continuous infusion of 100 mg of alteplase (tPA) over 2 hours. However, in cases of hemodynamic instability, bleeding risk and refractory clots there are no set guidelines and alternative treatments must be explored.

Case Description: A 42-year-old male presented with progressive shortness of breath after a syncopal event. He was a full-time taxi driver and had no medical history, recent trauma or injuries. Work up evidenced elevated d-dimer, right ventricle (RV) strain with filling defects indicating RV clot-in-transit on transesophageal echocardiogram (TEE), and bilateral pulmonary emboli on Chest CT. The patient was started on a heparin drip and transferred to the main hospital where the PE response team (PERT) began tPA infusion. Within one hour of treatment, he developed a headache, raising concern for intracranial hemorrhage. While in route to CT, he decompensated and went into cardiac arrest. Despite several attempts, return of spontaneous circulation was unable to be achieved leading the team to initiate VA-ECMO. Once stable, multiple therapy options were considered: systemic and catheter directed thrombolysis, percutaneous thrombectomy and surgical embolectomy. Percutaneous approach with aspiration thrombectomy was felt to be the safest treatment option for this hemodynamically unstable patient who previously failed systemic thrombolytic therapy. The patient incurred complications secondary to his condition including pericardial effusion, infarct CVA and acute kidney injury but ultimately recovered and was discharged.

Discussion: VA-ECMO has the potential to unload the RV and provide oxygenation to allow for RV recovery giving PERTs additional time to choose the best interventional treatment. Anticoagulation has limited therapeutic success in the setting of RV compromise and extensive clot burden. Systemic thrombolysis was attempted but precipitated cardiac arrest. Catheter guided thrombolysis and percutaneous aspiration thrombectomy raise the risk of mobilizing the suspected clot-in-transit and new or worsening PE. Surgical embolectomy potentiates hemorrhagic stroke and raises mortality risk in an already critical patient. In patients with massive PE complicated by clot-in-transit and failure to respond to tPA, percutaneous aspiration thrombectomy may be the more appropriate therapeutic approach to maximize clot removal and balance risk of CVA and hemorrhage. The diversification of VA-ECMO comes with a need for large scale randomized trials to evaluate outcomes of VA-ECMO as well as interventional treatments in patients with high risk PE to further stratify the risks and benefits of each therapy.

Title: **Bronchiolitis Obliterans Organizing Pneumonia with Temozolomide**

Authors: Emmanuel McDonald, D.O., Zaid Rana, D.O., Humberto Rios, M.D., Nora B. Khoury, M.D., Vamsidhar Vennamaneni, M.D., Patrick Dreyer, D.O., Yang Millet, D.O., George Mitchel, B.S., Linda S. Rios, B.S., George Michel, M.D., Odalys Frontela, M.D., Jaime F. Avecillas, M.D., Osmany DeAngelo, D.O., Hector Vazquez-Saad, M.D., Felix Hernandez, M.D., Gustavo Ferrer, M.D., Robert Hernandez, M.D., Carlos Dominguez, M.D., and Luis Mendez-Mulet, M.D.

Program: Larkin Community Hospital, Palm Springs Campus, Internal Medicine, Hialeah, FL; University of Miami, Coral Gables, FL; Florida International University, Miami, FL

Introduction: Bronchiolitis Obliterans Organizing Pneumonia (BOOP) associated with Temozolomide has been observed in very few patients and documented even less. Many a times, patients with BOOP present with flu-like illness with no underlying source of infection. Patient's imaging will show pneumonia but show no improvement on antibiotics. BOOP is a reversible inflammatory reaction in the lung often resolved by cessation of the offending agent, and steroid therapy.

Case Presentation: Patient is a 67-year-old male brought into the hospital due to altered mental status. Patient's daughter provides insight that the patients symptoms started couple months ago when she noticed personality changes, confusion, and aphasia. Patient had an MRI which showed a left frontal lobe mass requiring stereotactic guided craniotomy with partial resection of the tumor, then underwent Gamma Knife Radiosurgery. He was started on Temozolomide shortly thereafter per Oncology recommendation. Two days after starting therapy he developed acute shortness of breath warranting a stat CXR, ABG, and supplemental oxygen to maintain saturation >90%. On Physical Exam, patient vitals showed normal temperature with respiratory rate 25, BP 128/71, and pulse of 106. His saturation improved on Ventimask, and patient's lungs were clear to auscultation. Initial ABG showed: pH 7.49, CO2 32, PO2 50, SO2 87 HCO3 28 with A-a gradient of 48.7. The radiology team read the initial Chest XR as suggestive of pulmonary edema. An ABG the following morning showed improvement of PaO2 of 63 with SO2 93.2% while on ventimask at 40%. A CT scan was performed which showed diffuse patchy consolidation predominantly subpleural and peribronchial in distribution, and bronchial wall thickening. Given the findings there was less suspicion of infectious etiology since patient was afebrile, and without leukocytosis, but Zosyn was started empirically. Patient was continued on Temozolomide, but his shortness of breath worsened, thus was discontinued per discussion with Oncology, and BOOP was strongly suspected, thus patient was initiated on Methylprednisolone 1mg/kg/day. The ABG performed the following morning showed a pH of 7.45, PCO2 34, PO2 72, HCO3 23, SO2 94% on ventimask at 40%. With use of methylprednisolone the patient's respiratory status improved significantly and his respiratory distress resolved. All cultures collected at time of acute shortness of breath were negative, thus the diagnosis of Temozolomide associated BOOP was made.

Conclusion: BOOP has been reported in very few patients taking Temozolomide. After extensive workup and ruling out of other differentials, the diagnosis of BOOP secondary to Temozolomide was made. The mechanism of action of the induced insult is still unknown, but the ability to reverse the damage is well documented if caught in earlier stages.

Title: **Difficulty in the Removal of a Subcutaneous Port-a-Cath after Eleven Years of Implantation, Fixed at the Catheter Tip in the Superior Vena Cava**

Authors: Divy Mehra, OMS-3, Dieter Brummund, M.D., Benjamin Sinyor, M.D. and Seza Gulec, M.D.,

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Aventura Hospital & Medical Center, Department of Graduate Medical Education, Aventura, FL; Florida International University, Herbert Wertheim College of Medicine, Department of Oncological Surgery, Miami, FL

Introduction: A port-a-cath (implanted venous access device) is a type of central venous catheter (CVC) consisting of a surgically placed subcutaneous port attached to a catheter inserted into a major vessel, commonly terminating at the junction of the lower superior vena cava and right atrium. While difficulty removing port catheters is uncommon, a long port dwell time (>20 months) has been associated with difficulty in catheter removal even with a strong traction force by adherence to the vessel wall. Few such cases have been documented in the literature, totally less than 1% of all permanent central venous catheter removal procedures, and adherence of the terminal catheter tip is an even more rare occurrence. This case details vascular adhesion at the superior vena cava of the distal catheter tip of a port-a-cath left in place for eleven years, preventing complete removal.

Case Presentation: A 65-year-old woman with a medical history significant for anal cancer presented for port-a-cath removal. The port was placed 11 years prior for chemotherapeutic treatment of anal cancer, which subsequently cleared with complete clinical response following treatment with Nigro protocol. The patient was referred from her primary care physician for port removal, which was proceeded with as requested. The port-a-cath had been inserted into the left internal jugular vein with the catheter tip in the superior vena cava, and the port was secured in the subcutaneous tissue of the left chest wall along the left upper breast border. The port and catheter were identified covered with chronic capsule. Subcapsular dissection allowed for complete freeing of the port, but significant resistance was felt upon pulling the catheter. The explanted metallic port (measuring 2.5 x 2.5 x 1.3cm) and transected proximal catheter (3.5cm) were removed. A guidewire was inserted followed by no change in resistance of the catheter tip, and there was a confirmed absence of backflow from the catheter. Fluoroscopic imaging indicated the catheter tip was fixed to the sidewall of the superior vena cava. This fixation made the complete removal of the catheter by traction unsafe. We concluded that further attempt to retrieve the stuck catheter may result in vascular injury and opted instead to shorten the distal catheter end while leaving the adherent tip in place. Three large surgical clips were placed, and the distal catheter was transected (transected piece measuring 11.5cm length).

Discussion: As exemplified in this case, vascular catheter adhesion is a potential long-term complication of utilizing an implanted venous access device. As a result, we suggest timely removal of port-a-cath following completion of intended chemotherapeutic regimen. In cases of indwelling catheters for extended periods (>20 months), appropriate preparation should be made in anticipating this complication with removal.

Title: **Emergent Bedside Ultrasound for the Confirmation of Left Atrial Myxoma**

Authors: Mark Mitchell, D.O., Erin Marra, M.D., Nicolas Ulloa, M.D., and Ricardo Rodriguez, M.D.

Program: Aventura Hospital & Medical Center, Emergency Medicine Residency Program, Aventura, FL

Introduction: Left atrial myxomas have been known to have the potential to simulate mitral valve disease and produce heart failure and/or secondary pulmonary hypertension. The most serious complications known include interference with the circulation. As tumor fragments or thrombi in the systemic circulation become a real danger, the risks of embolization and neurologic damage increases serving to highlight the importance of timely emergency care. This case illustrates an uncommon medical condition, left atrial myxoma. The context of the case also illustrates a cost-effective approach to the interval diagnosis and management of the condition with emergency medicine point of care bedside ultrasound.

Case Presentation: This case presents a 61-year-old female with a past medical history of hypertension, dermatomyositis on mycophenolate and methotrexate as per patient who presented to the emergency room with about 5 months of worsening exertion and non-exertional dyspnea beginning at rest. On cardiovascular and pulmonary exam patient with regular rate and rhythm and clear bilateral breath sounds to auscultation. No clinical signs of heart failure were noted. Recent outpatient cardiac echo showed a left atrial myxoma without any interval change as per ultrasound promptly done at bedside on patient arrival. Pt admitted without any hemodynamic instability, obstructive CAD ruled out as per LHC and patient successfully managed with surgical extraction of round shaped left atrial myxoma which was 3.5x 3.9cm attached to inter-atrial septum and excursioning across the anterior leaflet of the mitral valve causing dynamic obstruction through mitral valve and LVOT. Medical condition management was optimized and patient given timely continued cardiothoracic surgery follow up.

Discussion: This interesting case presents unique pathology which illustrates the value of prompt utilization of bedside emergency ultrasound for the initial evaluation, reassessment and continued monitoring of patients at risk of hemodynamic instability and systemic deterioration. Utilizing bedside ultrasound for the prompt and accurate confirmation of this patient's uncommon pathology optimized their hospital outcome. While prior studies indicate sensitivities and specificities greater than 94 and 100 percent, respectively (using TEE imaging), additional research is necessary to confirm the apparent utility and decreased expenditure of resources and time associated with emergent bedside ultrasonography for initial evaluation of this condition.

Title: **Post-traumatic Occupational Osteomyelitis Involving the Finger of a Healthy Adult**

Authors: Adills Moosa, D.O., and David Shenessa, M.D.
Program: Larkin Community Hospital, Sports Medicine Fellowship, Miami, FL

Introduction: Osteomyelitis (OM) is an infection of the bone that can lead to progressive inflammatory destruction and necrosis of the bone. While the incidence of occupational OM is not known, rates of OM in the general community among healthy adult females (ages 18-50) are relatively low. Furthermore, involvement of the hands/fingers is rare and comprise less than 8% of all cases. MRI is the imaging modality of choice as plain radiographs may not demonstrate abnormalities in the setting of acute OM. Treatment of OM consists of culture-guided antibiotics, irrigation, and debridement, and in some cases amputation. Prompt recognition and treatment decreases the risk of disease progression and complications.

Case Presentation: We present a case of a 40-year-old right-hand dominant Caucasian female with pain and swelling of left 3rd digit for the past five weeks. She was a second-year dental resident on a rotation and suffered a small laceration of the distal portion of left 3rd finger while making dental molds. At an urgent care clinic, the wound was cleaned and closed with derma-bond. Seven days post-injury, she reported pain, redness, and swelling of left 3rd digit, x-rays were unremarkable, and was prescribed Augmentin. After fourteen days post-injury, she underwent incision and drainage and was prescribed Bactrim. Twenty days post-injury, she presented to the emergency department and underwent a repeat incision and drainage, but X-rays were not performed. Twenty-six days post-injury, she was evaluated by an orthopedic provider, undergoes a superficial wound culture and told that the wound was healing. Thirty-five days post-injury, a physical exam of the left hand was significant for erythema, edema, crepitus, and tenderness to palpation along the distal phalanx of the 3rd digit. X-rays revealed an osteolytic lesion along the distal phalanx. A stat MRI revealed a diffuse decreased T1 signal, diffuse increased T2 signal of the bone marrow, and a focus of artifact along the radial aspect of 3rd distal phalanx which may represent gas formation. These findings were concerning for post-traumatic OM and she was informed that she would require irrigation and debridement with bone biopsy, initiation of IV/oral antibiotics, and possibly an amputation. She was tentatively scheduled to have the procedure but as this was a work-related injury, she was also instructed to contact her Human Resources representative and get approval for the procedure. She does not report to her date of procedure and was subsequently lost to follow-up.

Discussion: Despite its rare occurrence in immunocompetent adults, OM of the hand must be considered in the setting of a recent traumatic injury that remains symptomatic despite the initiation of treatment. Common radiographic findings, such as "periosteal thickening, lytic lesions, endosteal scalloping, osteopenia, loss of trabecular architecture, and new bone apposition" may take up to 14 days to be visualized. MRI is considered the most sensitive and specific imaging modality. Though traumatic occupational OM is rarely reported in the medical literature, it has been documented among males over the age of 50 in the agricultural, manufacturing, and construction sectors. This case illustrates the importance of making a prompt and accurate diagnosis in halting the disease progression, preventing future complications, and reducing morbidity associated with OM.

Title: **The Battle for the Placenta: A Unique Presentation of Twin-Twin Transfusion Syndrome**

Authors: Mihir Nakrani, OMS-3, Rajeev Herekar, OMS-3, Ram Hirpara, OMS-1, Sandra Black-Boxill, M.D.

Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Broward Health Medical Center, Department of Obstetrics and Gynecology, Fort Lauderdale, FL

Introduction: Twin-twin transfusion syndrome (TTTS) is a serious pathology that is exclusive to monochorionic diamniotic pregnancy which results in unbalanced transfusion between the twins. Several treatment options for TTTS include fetoscopic laser surgery, amnioreduction, septostomy, and expected management, and termination of pregnancy. Currently, the main treatments offered are fetoscopic laser surgery and amnioreduction. We report a case of a 26-year-old female was diagnosed with TTTS at 22 weeks gestation, after an ultrasound was done showing fetal demise of twin B.

Case Presentation: A 26-year-old G2P0010 female, with a history of fibroids and migraines who presented to Broward Health Medical Center with a known twin gestation with monochorionic diamniotic membranes at 27 weeks and 6 days gestation. Her ultrasound showed intrauterine fetal demise of twin B, and twin A with polyhydramnios, pericardial effusion with thickened pericardium, and ventriculomegaly. Biophysical profile is 8/8 with a normal umbilical artery doppler. 5 weeks prior to admission, the patient was found to have twin to twin transfusion syndrome and had fetoscopic laser ablation of the placenta and cervical cerclage performed. The patient was administered steroids at that time. She has no history of alcohol, tobacco, or substance abuse and no significant family history. Review of systems was negative. Vitals were stable and within normal limits. Physical exam was negative with deferral of the cervical exam. Patient was admitted for daily fetal testing. Patient was started on Celestone and 24 hours of Magnesium sulfate for neural protection. At 28 weeks and 2 days with twin gestation, the patient underwent a primary low transverse cesarean section. Post-operative diagnosis was delivery of Twin A with new onset of ventriculomegaly and twin B fetal demise. Twin A is a viable male infant in cephalic presentation with Apgars of 7 and 8 at 1 and 5 minutes, respectively. Twin B was a demise confined to the sack, and there was 1 placenta. Pt had normal fallopian tubes bilaterally, mildly polycystic ovaries bilaterally. Patient was taken to the recovery room in stable condition.

Discussion: In this case, there was the demise of twin B, while twin A had a pericardial effusion with thickened pericardium, and ventriculomegaly. Previous studies have shown that TTTS can cause cardiovascular dysfunction. In a previous study which included 136 pregnancies, a total of 47 pregnancies had TTTS. Researchers found a presence of atrioventricular valve regurgitation and ventricular dysfunction at a gestation age of 24 weeks due to the increased fluid volume in the recipient twin, which caused an increase in afterload. If amniotic reduction (AR) is performed over FLS then there is a 2.7 times increased risk of death due to fetal heart failure. In a previous study done with 89 survivors of severe TTTS, ventricular function normalized after 15 months. Possibly due to the plasticity of a pediatric cardiac tissue and enhanced recovery after the stressor has been removed. However, the majority of cases have shown that patients with TTTS are at risk for long-term cardiac disease.

Title: **A Case of Primary Thrombocytosis Associated Focal Segmental Glomerulonephritis**

Authors: Christopher Naranjo, D.O., Jusong Choi, M.D. and Parham Eftekhari, D.O.

Program: Broward Health Medical Center, Internal Medicine Residency Program, Fort Lauderdale, FL

Introduction: Here we present an interesting case of primary thrombocytosis in a patient with no previous renal disease. Myeloproliferative neoplasms (MPN) are not commonly recognized risk factors for development of renal parenchymal disease. However, according to a 2011 study by Said et al. published in the Journal for International Society of Nephrology, glomerulopathy may be a late complication of such neoplasms. The study found that all 11 patients with evidence of renal insufficiency and nephrotic range proteinuria had evidence of mesangial sclerosis and hypercellularity. In this study cohort, proteinuria had been present for about 24 months prior to biopsy and mean time from diagnosis of MPN to biopsy was 7.2 years. Focal segmental glomerulosclerosis (FSGS) is a glomerular disorder with a prevalence of 4% in the United States. FSGS has been recognized as a pathologically diverse disease depending on the type of glomerular lesion that is observed on biopsy. Regardless of the histological variant and clinical syndrome, podocyte damage and effacement is pathognomonic for FSGS. While most cases are primary with no identifiable cause, 20% of cases are secondary to either genetic, virus-associated, drug-induced, or adaptive changes to physiologic stressors.

Case Presentation: The patient is a 54-year-old female with past medical history of hypertension who was referred to the emergency department after being noted to have hyperkalemia of 5.9 mEq/L and acute kidney injury with a creatinine of 3.9mg/dL. on routine outpatient metabolic panel. A complete blood count demonstrated leukocytosis and thrombocytosis. Vital signs were within normal range. Admission lab panel revealed leukocytosis of $14.9x10^3$/L and significant thrombocytosis at $1,157x10^3$/μL. A spot urine protein-creatinine ratio was done which revealed 2,567.4mg/g of proteinuria. HIV and Hepatitis panel were non-reactive, and C3/C4 complement levels were within normal range. SPEP and UPEP did not reveal monoclonal gammopathy. Sodium zirconium cyclosilicate was given for the acute hyperkalemia which led to resolution. The patient had been started on aspirin for thrombosis prophylaxis, intravenous fluids for treatment of the acute kidney injury which led to improvement in renal function and creatinine clearance, and hydroxyurea for cytoreduction. A bone marrow biopsy of the iliac crest revealed JAK2 positive myeloproliferative neoplasm. A biopsy of the left kidney revealed diffuse global and focal segmental glomerulosclerosis with chronic thrombotic and microangiopathic changes.

Discussion: In conclusion, physicians should keep in mind the association of myeloproliferative neoplasms such as primary thrombocytosis and glomerular diseases. This case represents a unique presentation that involved simultaneous detection of a myeloproliferative neoplasm and focal segmental glomerulosclerosis. The detection of these two entities has previously been established, however, the typical time to biopsy is delayed due to the late presentation of glomerulopathy. This case will help propagate more awareness of the intricacies of primary thrombocytosis.

Title: **Cryoglobulinemia in an HIV+/HCV- Patient: A Case Report**
Authors: Scott M. Nettboy, D.O., Farid Isaac, M.D., Parham Eftekhari, D.O. and Veronica Perez, OMS-3
Program: Broward Health Medical Center, Internal Medicine Program, Fort Lauderdale, FL; St. George's University, West Indies, Grenada

Introduction: Cryoglobulinemia syndrome, a vasculitis involving the deposition of circulating cryoglobulins, is by and large associated with chronic HCV infection. HIV has a known association with cryoglobulinemia syndrome; however this has traditionally been in the setting of HCV co-infection. The incidence of cryoglobulinemia syndrome in HIV-monoinfected patients is incredibly low and some studies have suggested that HIV infection is not the causal agent. A case of HIV+/HCV- cryoglobulinemia is quite rare.

Case Description: A 49-year-old Haitian male with longstanding history of HIV presenting with dyspnea was found to have a Creatinine of 3.5mg/dL, eGFR 24 mL/min/1.73m2, microscopic hematuria and proteinuria. Based on these findings and his HIV status, a full glomerular disease workup was performed. A sub-nephrotic range 24-hr urine protein, low C4 and polyclonal gammopathy were discovered with negative UPEP, ANA, RF, dsDNA, ANCA, ASO, RPR, Smith, Hepatitis panel Anti-GBM and urine eosinophils. A renal biopsy was performed with very surprising results: membranoproliferative glomerulonephritis with associated cryoglobulinemia and severe thrombotic microangiopathy. The patient was found to be cryoglobulin positive by blood work 3 days post biopsy. He subsequently received pulse dose IV methylprednisolone, 1gm daily for 3 days and then continued on prednisone 60mg daily as well as plasma exchange for 2 weeks. His Creatinine improved to 1.9mg/dL and he was discharged on plasma exchange three times a week with a slow prednisone taper. Approximately 1 month after initial diagnosis and initiation of treatment, he was hospitalized for a CHF exacerbation and tested negative for cryoglobulins; plasma exchange was discontinued and he continued the prednisone taper.

Discussion: HIV-associated cryoglobulinemia syndrome without HCV coinfection is very rare, occurring in as low as 6% of HIV patients. It is unclear whether HIV itself can lead to cryoglobulinemia, or if etiologies such as HCV or chronic liver disease are the true causes, in which cases HIV coinfection is relatively common. Studies have shown that HIV-positive patients often demonstrate elevated cryoglobulin levels, but without clinical manifestations. However, we present a case demonstrating Cryoglobulinemic MPGN with thrombotic microangiopathy in an HIV-positive, HCV-negative patient. This case raises suspicion that HIV may independently lead to Type 2 Cryoglobulinemia due to HIV-induced immune complex formation. Our patient presented with a HIV viral load of 57761 copy/mL . Decreased complement levels, elevated polyclonal Gamma Globulins and renal biopsy showing Cryoglobulinemic Glomerulonephritis confirmed the diagnosis. Given the limited available data for this condition, our case offers insight regarding a possible treatment regimen involving plasma exchange with pulse IV steroids, in addition to as needed renal replacement therapy and HAART therapy. Our patient responded exceptionally well to this approach, with GFR returning to normal after decreasing to as low as 20mL/min/1.73m^2. Further research is required to fully understand this rare disease process.

Title: **Esophageal Stricture Due to Caustic Ingestion: A Case of Failed Esophageal Reconstruction with Near Total Esophagectomy and Gastric Sleeve Pull Up Requiring Long Term PEG Tube Nutrition**

Authors: Juan De La Ossa, D.O., Talar Kachechian, D.O., Michael Girard, M.D. and Karthik Mohan, D.O.

Program: Palmetto General Hospital, Internal Medicine Residency Program, Hialeah, FL

Introduction: Caustic ingestion can cause life-threatening injuries to the esophagus and the stomach. Acidic agents are known to cause more damage to the stomach whereas alkaline ingestions cause more damage to the esophagus; both can induce laryngeal and tracheobronchial injury. Alkaline ingestion, such as Drano in our case, results in liquefactive necrosis which rapidly extends transmurally and may result in esophageal perforation, mediastinitis, or even death. The severity of injury is dependent on the corrosive properties of the ingested material, concentration and amount ingested, physical form of agent, and the duration of contact of the ingested solution. The most common complication is esophageal strictures that occur in about 2/3 of patients and typically present in about 2 months after the incident. To manage esophageal strictures, most physicians will wait 3-6 weeks after the injury before attempting esophageal dilation to minimize the risk of perforation. Patient with multiple failed attempts at endoscopic dilations should be evaluated for reconstructive surgery that involves esophageal resection with esophagogastric anastomosis, colonic interpositioning, or gastric transpositioning.

Case Presentation: We present a case of a 58-year-old female who presented to our hospital for generalized weakness and malnutrition. Four years ago, our patient attempted suicide by consuming Drano and subsequently developed an esophageal stricture. This was treated multiple times with prior dilations. Failure of these therapies led to placement of a PEG tube and the inability for the patient to take anything PO for that last 4 years. Our interdisciplinary team discussed the options of esophageal stenting, esophageal resection, extra mediastinal colonic interpositioning, and lastly, jejunal flap reconstruction. She was taken to the OR for an attempted endoscopy to reassess the level of esophageal obstruction to plan for restorative surgery. She was found to have a near total esophagectomy and failed gastric pull up. Our surgeon concluded that there was lack of viable cervical esophagus and would put the patient at risk of immediate and most likely fatal aspiration. We have agreed to plan for a possible jejunal graft however in order for this patient to tolerate the procedure, she will need to achieve 10-15% of her ideal weight. She weighs about 31kg with evidence of severe muscle wasting and severe subcutaneous fat loss.

Discussion: This case reveals the complexity and challenges of the management of esophageal strictures to optimize patient prognosis. We hope our findings will assist in outlining alternative approaches and giving consideration of the risks involved. Literature states that jejunal flap is considered the standard technique for reconstructing the cervical esophagus because the jejunum is best for allowing swallowing function and can be used to reconstruct 20 cm in length due to its segmental blood supply. Overall, successful swallowing can be achieved in 88-100% in patients.

Title: **Tachycardia Induced Cardiomyopathy and Thyrotoxicosis**

Authors: Sigmund Paczkowski, D.O. and Alex Morizio, M.D.

Program: Palmetto General Hospital, Critical Care Medicine Fellowship, Hialeah, FL

Introduction: Tachycardia induced cardiomyopathy is a condition defined by reversible, dilated cardiac dysfunction directly caused by persistent tachycardia states. While the actual prevalence is not known, it has been found in 10-37% of patients with atrial tachycardia. Prior studies show that cardiomyopathy can be seen as early as 3 days after the onset of tachycardia and have an average ejection fraction of 32%. With cessation of the tachycardia, the ejection fraction can recover to normal values in as little as 48 hours. Thyrotoxicosis is associated with persistent tachycardia. Additionally, multiple case reports discuss cardiovascular collapse with the initiation of beta-blockade.

Case Presentation: This is the case of a 55 year old female with no prior medical history who presented to the hospital for 3 to 4 days of shortness of breath. She reported a non-productive cough, but denied any recent travel, sick contacts, fevers, chills, chest pain, abdominal pain, N/V/D/C. She additionally reported that she had a single episode of leg swelling one year prior that resolved without intervention. The only significant exam finding in the emergency department was sinus tachycardia of approximately 150 BPM. Radiology and laboratory workup was positive for a d-dimer of 3020. This prompted a CTA of the chest that showed patchy bilateral lower lobe, right middle lobe, and lingular infiltrates, however no pulmonary embolism. She was subsequently admitted to the step-down unit where the heart rate was attempted to be controlled with 2 doses of metoprolol 5 mg IV. At this time additional workup revealed an undetectable TSH and a free T-4 of 4.31. A critical care consultation was requested for the uncontrolled, persistent tachycardia with thyrotoxicosis. A point of care ultrasound was performed showed a reduced ejection fraction of 20-25% via visual estimation and fractional shortening. In order to control the tachycardia, the patient was transferred to the ICU and started on an esmolol infusion. For the thyrotoxicosis, she was started on methimazole and potassium iodine. Over the next 24 hours, her heart rate decreased to approximately 110. She was subsequently transitioned to propranolol. Formal echocardiogram on hospital day 2 showed a severely dilated left atrium, moderately dilated right atrium, mild apical hypokinesis, and an ejection fraction of 50%. US of the thyroid was consistent with thyroiditis. The patient's condition improved quickly, and she was discharged on levaquin, methimaloze and carvedilol.

Discussion: Beta-blockade is a mainstay therapy for thyrotoxicosis induced tachycardia. However, tachycardia induced cardiomyopathy may also be present and prior case reports have also reported cardiovascular collapse with initiation of beta-blockade. Point of care ultrasound should be considered prior to starting therapy, and if cardiomyopathy is found consideration should be given towards shorter acting beta-blocker therapy compared to longer acting medications. Since a patient's ejection fraction can recover quickly, the incidence of tachycardia induced cardiomyopathy may be underreported.

Title: **Survive the Dive: Acute Ischemic Stroke due to Decompression Sickness in a Recreational Scuba Diver**

Authors: Stephanie Prater, M.D., and Anjeza Chukus, M.D.
Program: Aventura Hospital & Medical Center, Department of Radiology, Aventura, FL

Introduction: Air contains approximately 78% nitrogen, 21% oxygen and a negligible percentage of various other gases. Henry's law states that the solubility of a gas is directly proportional to the pressure exerted on it. Underwater scuba diving exerts pressure on the body, leading to an increased volume of nitrogen dissolved in the blood and tissues. A rapid ascent can cause nitrogen gas to expand as pressure decreases, leading to the formation of tiny bubbles. These bubbles can arise in muscles and joint, causing local symptoms of pain and swelling. Alternatively, they can travel to distant organs in the form of arterial gas embolism, occluding vessels, damaging endothelium and activating clotting or inflammatory cascades. The clinical signs and symptoms of this phenomenon are called decompression sickness, also known as "the bends" or Caisson disease.

Case Presentation: A 55 year old man vacationing in the Caribbean experienced a grand mal seizure following a recreational scuba diving trip during which he sustained multiple jellyfish stings at a reported depth of approximately 250ft feet, causing him to rapidly ascend to the surface. He arrived at the local hospital combative, confused and not following commands. He was subsequently intubated, sedated and airlifted to the Unites States for further evaluation. On arrival, he was hypertensive at 180/100 mmHg with a purple petechial rash over his chest, bilateral upper and lower extremities. Blood work revealed lactic acidosis with a lactate level of 3.10 mmol/L (Normal 0.4 – 2.0 mmol/L) and rhabdomyolysis with a CK level of 6467 U/L (Normal 39-308 U/L). A confluent area of decreased attenuation in the left frontoparietal region seen on the initial CT scan of the brain prompted further evaluation with MRI which showed corresponding acute ischemic infarction and cytotoxic edema. Upon extubation, he demonstrated dense right hemiparesis. He was diagnosed with decompression sickness and started on antihypertensives, IV fluid resuscitation and 100% oxygen. Hyperbaric recompression therapy was also initiated in an effort to promote efflux of the nitrogen bubbles back in to the bloodstream where they could be appropriately off-gassed via respiration. His motor function gradually improved with only residual ataxia and right foot drop remaining at the end of multiple recompression sessions. Eventually, he was transferred to a rehabilitation facility for outpatient physical therapy in an effort to improve these residual functional deficits.

Discussion: Because nitrogen dissolves readily in fat, tissues with a high lipid content like the central nervous system are particularly susceptible to decompression sickness. Nitrogen bubble formation following an accelerated scuba dive ascent can result in profound neurological deficits due to acute ischemic infarction in the brain and spinal cord. Severe cases can be fatal. Diagnosis of decompression sickness is typically clinical but radiological imaging in the form of MRI can be helpful for determining the severity and extent of injury. Definitive treatment is recompression via hyperbaric therapy which promotes the dissolution of nitrogen bubbles thus alleviating inflammation and vascular occlusion.

Title: **An Unsuspected Axillary Mass in a 2-Week-Old Male**

Authors: Ashley Van Putten, D.O., Alexis Dietz, D.O., Angelica Garzon, M.D., Ron Persaud, OMS-4, and Johnny Tryzmel, M.D.

Program: Broward Health Medical Center, Salah Foundation Children's Hospital, Fort Lauderdale, FL

Introduction: Langerhans cell histiocytosis (LCH) is a clonal neoplasm derived from immature dendritic cells that typically peaks between ages 1 to 4. It is a rare disease with localized to disseminated features. Clinical manifestations depend on site of lesions, number of areas involved, and compromised function of organs. LCH presenting in the neonatal period is very rare and, in most cases, present with skin lesions, which can be self-limiting. Rarely is it multifocal, and more aggressive. We report an unusual case of neonatal LCH presenting with a large congenital axillary mass without skin lesions.

Case Description: We present a 2-week-old male, born full term to a 21-year-old G1P0A0 with no complications who presented to the ED with a right axillary mass that had been rapidly enlarging for the past week. Mother brought infant into the ED due to inconsolable crying. Ultrasound revealed a 3.7 x 1.9 x 3.5 cm mass in the right axilla with increased doppler flow suggesting mild to moderate hypervascularity, a pathologic nodule mass was suspected. Complete blood count, erythrocyte sedimentation rate, complete metabolic panel, liver function tests, uric acid and LDH were normal.

Patient was admitted to the neonatal intensive care unit for further evaluation and management. MRI of chest was performed and showed predominantly solid components but also a small cystic area which potentially represented internal cystic necrosis with no evidence of invasion of the chest wall. Pediatric surgery removed the mass. Pathology H&E showed an enlarged lymph node with distorted architecture, areas of necrosis and multiple areas of abnormal cellular infiltrate. Composed of intermediate sized histiocyte cells with irregular nuclei, open vesicular chromatin and ample amounts of pink granular cytoplasm associated with numerous eosinophils. Staining showed histiocyte cells diffusely positive for langerin, CD1a, S100. ICH stains showed histiocytic proliferation with necrosis, eosinophilic abscess admixed with neutrophils. ICH stains positive for CD45, CD163, negative for CD20 and CD3. Cyclin D1 was positive on Langerhans cells, BRAF stain was negative. The final diagnosis was Langerhans cell histiocytosis. Further work up to look for visceral organ involvement including MRI and skeletal survey was negative. Patient is being followed closely, and as this is unifocal single system disease, no chemotherapy was initiated.

Discussion: Langerhans cell histiocytosis in neonates is rarely observed, the incidence of LCH in infants is 25 per 1 million infants and <5% of these cases are neonates. Many cases of LCH in neonates present with rash, diffuse hemorrhagic nodules. Lymphadenopathy however is a common presentation in older children, representing about 20% of LCH pediatric patients. Very few cases have been published in neonates with a solitary nodule being the first presentation of LCH.

Title: **Can You See the Carcinoid Tumor? A Case of Autoimmune Metaplastic Atrophic Gastritis (AMAG) and Carcinoid Tumor**

Authors: Zaid Rana, D.O., Emmanuel McDonald, D.O., Humberto Rios, M.D., Nora B. Khoury, M.D., George Michel, B.S., Linda Samanta Rios, B.S., Linoj Panicker, D.O., Jamie Skrove, D.O., George Michel, D.O., Karthik Mohan, D.O., Juan Sarol, M.D. and Javier Sobrado, M.D.

Program: Larkin Community Hospital, Palm Springs Campus, Internal Medicine, Hialeah, FL; University of Miami, Coral Gables, FL; Florida International University, Miami, FL

Introduction: Atrophic gastritis is a known risk factor for the development of carcinoid tumor and gastric adenocarcinoma. In AMAG, there is destruction of parietal cells which leads to G-cell hyperplasia and elevated gastrin levels resulting in the proliferation of enterochrommaffin-like cells. These cells serve as precursors to carcinoid tumors, thus can be neoplastic in nature. A majority of carcinoid tumors appear on upper endoscopy (EGD) as polypoid lesions in the gastric body or fundus. We would like to present a unique case of carcinoid tumor in the context of AMAG, with grossly normal EGD.

Case Presentation: Our patient is a 25-year-old female without significant past medical history with sole complaint of chronic dyspepsia and upper abdominal pain. She presented to clinic for a second opinion after a recent diagnosis of a neuroendocrine malignancy on EGD one month prior. The patient underwent repeat EGD with biopsies taken from the antrum, body, and fundus. An area of hypopigmented mucosa was identified in the antrum, prompting biopsies. The remainder of the stomach, duodenum, and esophagus were grossly normal. Pathology from the antrum and fundus all revealed chronic gastritis with mild enterochromaffin-like cell hyperplasia and severe reactive changes. The fundic biopsy showed chronic atrophic gastritis with antralized mucosa, suggestive of AMAG. The biopsies from the body of the stomach demonstrated well-differentiated neuroendocrine tumor (NET) grade 1, arising in the background of chronic atrophic gastritis. KI67 demonstrates proliferation index less than 2%. No lymphovascular invasion was seen. Her prior EGD showed well differentiated NET on antral biopsy. Patient underwent EGD/EUS with biopsies at a tertiary center, which was unremarkable, and biopsy showed atrophic gastritis. She was advised to repeat EGD every 6-12 months.

Discussion: This case raises concern for therapy modalities as minimal literature exists in regard to treatment of NET in the setting of AMAG with normal EGD. Given the lack of gross focality to the carcinoid lesion, it is questioned whether to resect or surveil. Although gastric carcinoid in the setting of atrophic gastritis is rarely malignant, it is important to consider the malignancy potential given that we were unable to pinpoint the lesion despite multiple EGD's. Further cases must be studied to adequately manage such patients and better understand disease progression.

Title: **Hypersensitivity Reaction to PCSK9 Monoclonal Antibodies**

Authors: Dustin Tran, OMS-3, Hady Masri, D.O. and Donald Shalhub, M.D.
Program: Nova Southeastern University, Dr. Kiran C. Patel College of Osteopathic Medicine, Fort Lauderdale, FL; Palmetto General Hospital, Department of Dermatology, Hialeah, FL

Introduction: Evolocumab, a monoclonal antibody (mAb), is a proprotein convertase subtilisin/kexin type 9 inhibitor. Monoclonal antibodies are biologics that have increasing pharmacological therapy implications in many disease processes. Hypersensitivity reactions (HSR) are uncommon complications of biologic usage and may be interpreted as disease recurrence or otherwise worse. Because of the increase in mAb usage given their efficacy for immunomodulation, we must characterize adverse effects so we can prevent misdiagnosis and adequately treat the patient to the best of our ability.

Case Description: We present a case of a 70-year-old Caucasian male with a history of hyperlipidemia. Our patient was started on high-intensity rosuvastatin indicated for hyperlipidemia but developed severe myopathy. Due to the severity of his myopathy, rosuvastatin was discontinued and he was subsequently placed on intramuscular injectable evolocumab once every two weeks as an alternative pharmacological therapy for hyperlipidemia. The patient reported no adverse reactions apart from mild erythema at the injection site on initial administration.

Six-months into mAb therapy, our patient developed pruritic maculopapular rashes, lupus erythematosus-like rashes, eczema-like lesions, granuloma annulare-like lesions that formed on his chest, back, and arms. The HSR did not subside despite prompt discontinuation of Evolocumab. Our patient received injectable triamcinolone and oral prednisone which provided mild relief. High dose clobetasol cream and topical crisaborole 2% ointment were applied to lesions also with mild relief.

As this reaction progressed into a chronic phase, new pruritic lesions and pressure urticaria developed with contact and irritation that has made activities of daily livings difficult to perform. One-year after evolocumab discontinuation, the patient remains highly atopic with treatment resistant contact dermatitis-like symptoms to the hands, neck, antecubital, and popliteal areas.

Discussion: As immunotherapy becomes more popular and incorporated into standard care, their adverse reactions must be characterized to prevent and treat complications that may arise such as in our patient. Immunotherapy drugs administered to patients can be described as small or large molecules, with large molecules commonly referred to as biologics. Drugs that are characterized as biologics include mAb, cytokines, enzymes, peptides, and growth factors. Biologics may sometimes be recognized as foreign to the host immune system.

Immune responses to biologics vary in severity, phenotypes and manifest as neutralization of the endogenous molecule, and/or type 1 or type 3 HSR, immediate and immune-complex, respectively. Formation of antibodies against evolocumab are uncommon, but they do occur. However, HSR to evolocumab have not been adequately explored, characterized nor profiled even though this mAb has become the standard alternative to those intolerable to statin therapy.

Title: **Dance, Dance, Dissection: A Case Study of a Spontaneous Vertebral Artery Dissection**

Authors: Reed Yaras, D.O., Vu Huy Tran, M.D. and Rebecca Saunders, OMS-4
Program: Aventura Hospital & Medical Center, Emergency Medicine Residency Program, Hialeah, FL

Introduction: A spontaneous vertebral artery dissection (SVAD) is a tear in the vertebral artery, a major cervicocerebral artery, occurring in approximately 1-1.5 out of every 100,000 people. Although rare, these are one of the leading causes of ischemic strokes in young and middle-aged patients. SVAD's occur when layers of the wall of the vertebral artery tears off and causes blood to accumulate between these layers. As a result, stenosis of the lumen or an aneurysmal dilation can occur resulting in either ischemia or hemorrhage in the posterior circulation. The vast majority of cases occur from spontaneous movements of the neck, especially hyperextension, due to the rapid stretching of the artery.

Case Description: We present a case of a 40-year-old right-handed female with no known past medical history, who was brought in by EMS for 3 days of worsening vertigo, nausea, vomiting and right-sided neck pain.
Symptoms began 3 days prior as sharp, sudden onset neck pain after instructing a Zumba class. Associated right sided weakness, vomiting, and voice hoarseness began 1 hour after. EMS was called shortly after onset, but emergency transport was declined due to suspicion for viral gastroenteritis. EMS was later recalled on day of admission due to worsening symptoms and persistent vomiting.
The patient was hypertensive 147/88, with otherwise stable vital signs. Her physical exam revealed ocular bobbing, severe nystagmus with rotatory, horizontal, and vertical nystagmus. No facial droop was present. The patient exhibited a low, hypophonic speech, and decreased sensation to right upper extremity and face. Initial NIH stroke score: 5.
An emergent CT angiogram of the head and neck illustrated diffuse narrowing of the right vertebral artery throughout its course (most prominent involving the V1-V3 segment with crescent sign and loss of flow within the V4 segment). Brain MRI confirmed small foci of high signal on diffusion weighted imaging in the right cerebellar hemisphere and right posterior pons are most compatible with subacute infarcts. Due to the delayed time until presentation the patient suffered irreversible ischemia. The patient was started on aspirin and admitted to ICU for further workup.

Discussion: This report illustrates a rare case of spontaneous vertebral artery dissection after performing rigorous dancing. Clinicians should maintain a high degree of suspicion for this condition in the proper clinical context to avoid delays in diagnosis and for optimization of treatment.

HEAD JUDGE

Robin J. Jacobs, Pd.D., M.S.W., M.S., M.P.H.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

POSTER JUDGES

Marie Florent-Carre, D.O., M.P.H.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Patrick Hardigan, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Allopathic Medicine

Arkene Levy, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Huong Nguyen, M.D., Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Samiksha Prasad, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Allopathic Medicine

Sweta Tewary, Ph.D., M.S.W.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Algevis Wrench, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Allopathic Medicine

ABSTRACT REVIEWERS

Joshua Costin, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Marie Florent-Carre, D.O., M.P.H.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Roody Joseph, P.T., D.P.T., O.C.S.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Deepesh Khanna, Ph.D., M.P.H., M.S.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Harvey Mayrovitz, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Huong Nguyen, M.D., Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Samiksha Prasad, Ph.D.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine

Zaid Rana, D.O., M.P.H., PGY-2
Larkin Community Hospital
Internal Medicine Residency Program

Daniel Shaw, Ph.D., Ed.S., M.Ed.
Nova Southeastern University
Dr. Kiran C. Patel College of Osteopathic Medicine