Third Annual

Karen Zier PhD Medical Student Research Day

Poster Book – 2020

Icahn School of Medicine at Mount Sinai

TABLE OF CONTENT

INTRODUCTION

The 3rd Annual Karen Zier Medical Student Research Day, scheduled for March 19, 2020, was canceled to keep everyone safe due to the COVID-19 Pandemic. To recognize students' hard work, the abstract book has been published and is available on the MSRO website. As a supplement, this poster book displays student volunteered posters that were submitted for the event. Please peruse to see the breath of research our medical students have accomplished with their mentors.

POSTER NUMBER	TITLE AND AUTHORS

1. **EVALUATION OF A REMOTE EARLY WARNING SYSTEM FOR MATERNAL HYPERTENSION IN RURAL KENYA.**
   Unwana Abasi[1], Emily Spiera[1], Molly Guy[2], Debora Rogo[3], Mary Anne Nyamogo[4], Khama Rogo[4], Tanya Rogo[5].
   [1]Medical Education, [2]Metronic Labs, [3]African Institute for Health Transformation, [4]Obstetrics, Gynecology, and Reproductive Science, [5]Pediatrics. [1] Icahn School of Medicine at Mount Sinai, New York, New York, [2]Medtronic Labs, Chanhassen, MN, US, [3,4]Sagam Community Hospital, Luanda, Kenya. [5]BronxCare Health System, Bronx, NY.
   Mentor: Tanya Rogo, MD, MPH.

5. **THE EFFECT OF NECK SHAFT ANGLE ON MUSCLE AND JOINT CONTACT FORCES FOLLOWING REVERSE SHOULDER ARTHROPLASTY.**
   Emily Bachner[1], Lawrence Gulotta[2], David Dines[2], Samuel Taylor[2], Andreas Kontaxis[3].
   [1]Medical Education, [2]Orthopaedics, [3]Motion Analysis Laboratory. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2,3]Hospital for Special Surgery, NY, NY.
   Mentor: Andreas Kontaxis, PhD.

6. **DOES GENDER MAKE A DIFFERENCE IN PROCEDURE SELECTION AND OUTCOME IN BARIATRIC URGERY?**
   Japjot Bal[1], Nicole Ilonzo[2], Michael Leitman[1].
   [1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
   Mentor: Michael Leitman, MD.

7. **PROBING THE ROLE OF THE DREAM COMPLEX IN HUMAN β-CELL QUIESCENCE.**
   Metodi Balev[1], Peng Wang[2], Courtney Ackeifi[2], Andrew Stewart[2].
   [1]Medical Education, [2]Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY.
   Mentor: Andrew Stewart, MD.

10. **COMPLICATIONS AFTER DIRECT TO IMPLANT BREAST RECONSTRUCTION: A PROPENSITY SCORE ANALYSIS.**
    Christopher Bellaire[1], Farah Sayegh[2], Pierce Janssen[2], Charles Salzberg[2].
    [1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
    Mentor: Charles Salzberg, MD.

13. **PROPHYLACTIC ANTIBIOTIC RESCRIPTION PRACTICES IN THE POSTOPERATIVE MANAGEMENT OF GYNECOMASTIA.**
    Jason Brody[1], Akio Kozato[1], Ilana Margulies[2], Peter Taub[2].
    [1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
    Mentor: Peter Taub, MD.

POSTER NUMBER **TITLE AND AUTHORS**

14. **TRENDS IN IUD AND IMPLANTABLE CONTRACEPTION PROVISION ACROSS THE INSTITUTE FOR FAMILY HEALTH, 2014-2019.**
Mariela Cabrera[1], Susan Rubin[2].
[1]Medical Education, [2]Family Medicine and Community Health. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Susan Rubin, MD.

15. **UTILIZATION OF A MODIFIED SENDAI VIRUS TO ATTENUATE IMMUNE CHECKPOINT EXPRESSION IN A UROTHELIAL CARCINOMA CELL LINE.**
Andrew J. Charap, BS[1,2] and John Heard, MS[1,3], Matthew Lin, BS[1], John Sfakianos, MD[2] and Amir Horowitz, PhD[1]
[1]Precision Immunology Institute, Icahn School of Medicine at Mount Sinai; [2]. Department of Urology, Icahn School of Medicine at Mount Sinai; [3]. SUNY Downstate College of Medicine
Mentor: Amir Horowitz, PhD

17. **HYPERGLYCEMIA AND ADVERSE PREGNANCY OUTCOMES IN TWINS: DO THE HAPO FINDINGS APPLY TO TWIN PREGNANICES?**
Kevin Cheung[1], Nathan Fox[2].
[1]Medical Education, [2]Maternal Fetal Medicine Associates, PLLC, Obstetrics, Gynecology, and Reproductive Science. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Nathan Fox, MD.

19. **THE MITOCHONDRIAL UPR AND MELANOMAGENESIS.**
Mimi Chung[1], Camila Rubio-Patiño[2], Umair Khan[2], Jerry Chipuk[2].
[1]Medical Education, [2]Oncological Sciences. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Jerry Chipuk, PhD.

29. **IDENTIFYING SOCIAL DETERMINANTS OF HEALTH AMONG MOUNT SINAI ADULT EMERGENCY DEPARTMENT PATIENTS.**
Axel Epie[1], Charles Sanky[2], Lauren Gordon[2], Lynne Richardson[2].
[1]Medical Education, [2]Emergency Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Lynne Richardson, MD.

POSTER NUMBER **TITLE AND AUTHORS**

32. **CYTOMEGALOVIRUS (CMV) IMMUNOPOSITIVITY DOES NOT CORRELATE WITH ABNORMAL SPERM PARAMETERS WITHIN A LARGE SPERM DONOR POPULATION.**
Ariella Farzan Nikou[1], Joanne Won[2], Stephanie Pan[3], Joseph Lee[2], Chris Antonelli[4], Jaime Shamonki[4], Alan Copperman[2].
[1]Medical Education, [2]Obstetrics, Gynecology, and Reproductive Science, [3]Population Health Science and Policy, [4]Other. [1, 3]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Reproductive Medicine Associates of New York, NY, NY, [4]California Cryobank, Los Angeles, CA.
Mentor: Alan Copperman, MD.

33. **ACCURACY OF ABC/2 FOR MEASURING INTRACRANIAL HEMORRHAGE VOLUME AFTER MINIMALLY INVASIVE ENDOSCOPIC INTRACEREBRAL HEMORRHAGE EVACUATION**
Thomas Fetherston[1], Dominic Nistal[1], Theodore Hannah[1], Christopher Kellner[2].
[1]Medical Education, [2]Neurosurgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY.
Mentor: Christopher Kellner, MD.

35. **SUCCESSFUL IMPLEMENTATION OF SIMULATION PROGRAM AND SKILLS CENTER IN THE DOMINICAN REPUBLIC IMPROVES SURGICAL RESIDENTS' LAPAROSCOPIC SKILLS.**
Rebecca Fisher[1], Ogechukwu Onuh[1], Linda Zhang[3].
[1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Linda Zhang, MD.

36. **PREDICTORS OF EARLY CATHETER REMOVAL IN PEDIATRIC PATIENTS UNDERGOING TUNNELED CATHETER PLACEMENT.**
Gabriela Frid[1], Megan Paul[1], Brian Coakley[2].
[1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Brian Coakley, MD.

38. **CLINICAL IMPACT OF VARIANTS WITH MODERATE-PENETRANCE RISK FOR BREAST CANCER.**
Daniel Fulop[1], Emily R. Soper, MS[2],, Gillian M. Belbin, PhD[2,3,4], Eimear E. Kenny, PhD[2,3,4], Noura Abul-Husn[2].
[1]Medical Education, [2]Genetics and Genomic Sciences. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Noura Abul-Husn, MD, PhD.

POSTER NUMBER **TITLE AND AUTHORS**

41. **THE USE OF ROTATIONAL THROMBOELASTOMETRY FOR MONITORING THE EFFECT OF HEPARIN IN PREGNANT PATIENTS: AN IN VITRO STUDY.**
Chloe Getrajdman[1], Matthew Sison[2], Hung-Mo Lin[3], Daniel Katz[2].
[1]Medical Education, [2]Anesthesiology, [3]Population Health Science and Policy. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Daniel Katz, MD.

43. **MOLECULAR MECHANISM(S) OF RESISTANCE TO VANDETANIB IN MEDULLARY THYROID CARCINOMA.**
Brittany Glassberg[1], Sophia Khan[2], Alex Pemov[2], Brigitte Widemann[2], Javed Khan[3], John Glod[2].
[1]Medical Education, [2]Pediatrics, [3]Genomics. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2,3]National Institutes of Health.
Mentor: John Glod, MD, PhD.

44. **INEFFICIENCY OF THE PRE-INCISION PERIOD OF MICROVASCULAR FREE FLAP RECONSTRUCTIVE SURGERY.**
Brandon Gold[1], Rohini Bahethi[2], Solomon Seckler[2], Eliezer Kinberg[2], Brett Miles[2].
[1]Medical Education, [2]Otolaryngology. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY
Mentor: Brett Miles, MD.

45. **A COMPREHENSIVE ANALYSIS OF IMMUNE BIOMARKERS IN BLOOD OF ATOPIC DERMATITIS PATIENTS FROM INFANCY TO ADULTHOOD.**
Joseph Han[1], Tali Czarnowicki[2], Helen He[2], Emma Guttman-Yassky[2].
[1]Medical Education, [2]Dermatology. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY
Mentor: Emma Guttman-Yassky, MD, PhD.

47. **EFFECTS OF INHIBITING EARLY INFLAMMATION IN KIDNEY TRANSPLANT PATIENTS.**
Daniel Henick[1], Peter Heeger[2].
[1]Medical Education, [2]Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Peter Heeger, MD.

POSTER NUMBER **TITLE AND AUTHORS**

50. **HISTORY OF UV-RELATED KERATINOCYTIC CARCINOMAS IS INCREASED IN PATIENTS WITH EXFOLIATION SYNDROME.**
Jeff Huang[1], Erica Jacobs[2], Emily Seo[3], Harriet Lloyd[4], Kateki Vinod[4], Tania Tai[2], Nisha Chadha[2], Sumayya Ahmad[2], Douglas Buxton[4], Robert Ritch[5], Louis Pasquale[2].
[1]Medical Education, [2,3,4,5]Ophthalmology. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY, [3,4,5]New York Eye and Ear Infirmary of Mount Sinai, New York, NY.
Mentor: Louis Pasquale, MD.

51. **IMPROVEMENT IN PRACTICE OPERATIONS AT AN AMBULATORY SITE IN ACCRA GHANA.**
Chioma Iwelumo[1], Adwoa Adjei[2], Stella Safo[3].
[1]Medical Education, [2]Medicine, [3]Population Health Science and Policy. [1,3]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Korle Bu Teaching Hospital. **Mentors: Adwoa Adjei, MD, Stella Safo, MD, MPH**.

52. **THE USE OF MACHINE LEARNING TO PREDICT RENAL REPLACEMENT THERAPY-FREE SURVIVAL IN PATIENTS WHO REQUIRE CONTINOUS RENAL REPLACEMENT THEERAPY.**
Suraj Jaladanki[1], Pattharawin Pattharanitima[2], Ishan Paranjpe[2], Ross O'Hagan[2], Kumardeep Chaudhary[2], Tielman Vleck[2], Aine duffy[2], Steven Coca[2], Lili Chan[2], Girish Nadkarni[2].
[1]Medical Education, [2]Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Girish Nadkarni, MD, MPH.

53. **INVESTIGATION OF THE ORAL METABOLOME AND CYTOKINE MILIEU IN PEDIATRIC FOOD ALLERGY.**
Stephanie Jeong[1], Hsi-En Ho[2], Supinda Bunyavanich[2].
[1]Medical Education, [2]Genetics and Genomic Sciences. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Supinda Bunyavanich, MD, MPH.

54. **PROPHYLACTIC VERSUS REACTIVE FEEDING TUBE PLACEMENT FOR HEAD AND NECK QUAMOUS CELL CARCINOMA.**
Derek Kao[1], Rocco Ferrandino[2], Susan Bates[3], Yeun-Hee Park[4], Joshua Bauml[5], Keith Sigel[6].
[1]Medical Education, [2]Otolaryngology, [3,4,5,6]Medicine. [1,2,6]Icahn School of Medicine at Mount Sinai, New York, New York, [3]College of Physicians and Surgeons at Columbia University, New York, NY, [4]James J. Peters Veterans Affairs Medical Center, Bronx, NY, [5]Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA.
Mentor: Keith Sigel, MD, PhD.

POSTER NUMBER **TITLE AND AUTHORS**

56. **A NOVEL RESPONSE BIOMARKER FOR ACUTE GVHD TREATMENT.**
Alexander Karol[1], Hrishikesh Srinagesh[1], Kaitlyn Ben-David[1], George Morales[2], Steven Kowalyk[2], Stephanie Gergoudis[1], Rachel Young[2], Gilbert Eng[2], John Levine[2], James Ferrara[2].
[1]Medical Education, [2]Oncological Sciences. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: James Ferrara, MD.

57. **THE ROLE OF THE HUMAN RIGHTS CLINIC: IMPACT ON MEDICAL EDUCATION AND PROFESSIONAL IDENTITY, AND CAREER DEVELOPMENT.**
Sophia Karwoska Kligler[1], Madison Edens[1], Stephanie Schonholz[1], Axel Epie[1], Kim Baranowski[1], Elizabeth Singer[1].
[1]Medical Education. [1]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Elizabeth Singer, MD.

58. **PROVIDER PERSPECTIVES ON A TRAINING PROTOCOL FOR NOVEL ANESTHESIA ADMINISTRATION WHEN NO ANESTHETIST IS AVAILABLE.**
Sara Kiani[1], Javan Imbamba[2], Wenslaus Adenya[2], Mary Anne Nyamogo[3], Debora Rogo[2], Khama Rogo[3], Thomas F Burke[4], Tanya Rogo[5].
[1]Medical Education, [2]Other, [3]Obstetrics, Gynecology, and Reproductive Science, [4]Emergency Medicine, [5]Pediatrics. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2,3]Sagam Community Hospital, [4]Massachusetts General Hospital, [5]BronxCare Health System.
Mentor: Tanya Rogo, MD, MPH.

59. **IS THE DORSAL FIBER-SPLITTING APPROACH TO THE WRIST SAFE? A KINEMATIC ANALYSIS AND INTRODUCTION OF THE WINDOW APPROACH.**
Jinseong Kim[1], Francois Loisel[2], Kyle Morse[3], Kathleen Meyers[3], Lauren Wessel[3], Scott Wolfe[3].
[1]Medical Education, [2,3]Orthopaedics. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Besancon Teaching Hospital, Besancon, France, [3]The Hospital for Special Surgery, New York, NY.
Mentor: Scott Wolfe, MD.

61. **THE EFFICACY OF PERIOPERATIVE ANTIBIOTICS IN THE SURGICAL MANAGEMENT OF GYNECOMASTIA.**
Akio Kozato[1], Jason Brody[1], Ilana Margulies[2], Peter Taub[2].
[1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Peter Taub, MD.

POSTER NUMBER **TITLE AND AUTHORS**

66. **EVALUATING RESILIENCE FACTORS AMONG MEDICAL STUDENT SURVIORS OF THE GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI IN FUKUSHIMA.**
Mukanga Marcia Lange[1], Anna Stacy[1], Satoshi Waguri[2], Kanako Taku[3], Craig Katz[4], Robert Yanagisawa[5].
[1]Medical Education, [2]Department of Anatomy and Histology, [3]Psychology, [4]Psychiatry, [5]Medicine. [1,4,5]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Fukushima Medical University, Fukushima, Japan, [3]Oakland University, Rochester, Michigan. **Mentors: Craig Katz, MD, Robert Yanagisawa, MD**.

70. **MICROENCAPSULATION OF ANNULUS FIBROSUS CELLS IN OXIDIZED ALGINATE MICROBEADS FOR INTERVERTEBRAL DISC CELL DELIVERY.**
Tiffany Lim[1], Chris Panebianco[2], Michael Weir[1], James Iatridis[2].
[1]Medical Education, [2]Orthopaedics. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: James Iatridis, PhD.

71. **EFFECT OF MEDIAN LOBE ENLARGEMENT ON EARLY PROSTATIC ARTERY EMBOLIZATION OUTCOMES.**
Samuel Maron[1], Alex Sher[1], Jeremy Kim[2], Art Rastinehad[3], Aaron Fischman[2].
[1]Medical Education, [2]Radiology, [3]Urology. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Aaron Fischman, MD.

74. **INSULIN RESISTANCE AND VIMENTIN EXPRESSION IN BREAST CANCER.**
Anandita Mathur[1], Irini Antoniou[2], Derek LeRoith[2], Nina Bickell[2], Emily Gallagher[2].
[1]Medical Education, [2]Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Emily Gallagher, MD.

75. **DOWNSIZING A BAERVELDT GLAUCOMA IMPLANT FOR THE MANAGEMENT OF PERSISTENT POSTOPERATIVE HYPOTONY.**
Maria Mavrommatis[1], Sonal Dangda[2], Paul Sidoti[2], Joseph Panarelli[3].
[1]Medical Education, [2,3]Ophthalmology. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York, [3]Langone School of Medicine (NYU), New York, NY.
Mentor: Joseph Panarelli, MD.

POSTER NUMBER **TITLE AND AUTHORS**

77. **IN SITU CODE SIMULATION INITIATIVE AT NYC H+H/ELMHURST: A SYSTEM FOR NOVEL TEAMWORK ASSESSMENT, EDUCATIONAL NEEDS ASSESSMENT, AND IDENTIFICATION OF LATENT SAFETY THREATS.**
Alexander Meshel[1], Lorraine Boehm[2], Barbara Dilos[3], Mamie McIndoe[4], Rachel Carroll-Bennett[5], Suzanne Bentley[6].
[1]Medical Education, [2]Nursing, [3]Anesthesiology, [4]Other, [5]Obstetrics, Gynecology, and Reproductive Science, [6]Emergency Medicine.
[1,3,5,6]Icahn School of Medicine at Mount Sinai, New York, New York, [2,4]NYC H+H/ Elmhurst, NY.
Mentor: Suzanne Bentley, MD, MPH.

78. **ESTIMATING HEALTH UTILITY SCORES AND EXPENDITURES FOR CARDIOVASCULAR DISEASE FROM THE MEDICAL EXPENDITURE PANEL SURVEY.**
Jacob Morey[1], Bart Ferket[2].
[1]Medical Education, [2]Population Health Science and Policy. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Bart Ferket, MD, PhD.

81. **SURGEON VOLUMES AND OUTCOMES FOR RHINOLOGICAL PROCEDURES WITH RESPECT TO INDUSTRIAL FUNDING.**
Roshan Nayak[1], Enrique Gorbea[2], Christopher Pool[2], Jay Agarwal[2], Alfred-Marc Iloreta[2].
[1]Medical Education, [2]Otolaryngology. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY.
Mentor: Alfred-Marc Iloreta, MD.

86. **USE OF NATURAL LANGUAGE PROCESSING AND DEEP LEARNING TO IDENTIFY RECOMMENDED FOLLOW-UPS IN DIAGNOSTIC IMAGING REPORTS.**
Ross O'Hagan[1], Ronilda Lacson[2].
[1]Medical Education, [2]Radiology. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Brigham's woman's Hospital, Boston, MA.
Mentor: Ronilda Lacson, MD, PhD.

POSTER NUMBER **TITLE AND AUTHORS**

87. **GENERAL SURGERY RESIDENT PERCEPTION OF LAPAROSCOPIC SURGERY AND TRAINING IN THE DOMINICAN REPUBLIC.**
Ogechukwu Onuh[1], Tahsin Khan[2], Rebecca Fisher[2], Pedro Trejo[3], Prerna Khetan[2], Linda Zhang[2].
[1]Medical Education, [2,3]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York, [3]Hospital Jose Maria Cabral y Baez (Cabral) Santiago, DR.
Mentor: Linda Zhang, MD.

89. **HEALTH RELATED QUALITY OF LIFE AFTER SMALL BOWEL NEUROENDOCRINE TUMOR RESECTION.**
Femi Oyewole[1], Prerna Khetan[2], Celia Divino[2].
[1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Celia Divino, MD.

95. **INSIGHTS ON PHYSICIAN INSTRUCTIONS TO INJECT EPINEPHRINE WITH MILD OR NO SYMPTOMS ON FOOD ALLERGY EMERGENCY PLANS.**
Samantha Platt[1], Scott Sicherer[2].
[1]Medical Education, [2]Pediatrics. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Scott Sicherer, MD.

98. **PROGRESSION TO CHRONIC KIDNEY DISEASE IN CHILDREN WITH A HISTORY OF PREMATURE BIRTH AND NEONATAL ACUTE KIDNEY INJURY.**
Cassandra Pruitt[1], Andrea Weintraub[2].
[1]Medical Education, [2]Pediatrics. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Andrea Weintraub, MD.

103. **URINE COLLECTION FOR ENVIRONMENTAL CHEMICAL EXPOSURE ASSESSMENT IN THE NICU.**
Jacqueline Roig[1], Emily Spear[2], Srinivasan Narasimhan[3], Syam Andra[3], Annemarie Stroustrup[2].
[1]Medical Education, [2]Pediatrics, [3]Environmental Medicine & Public Health. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, NY.
Mentor: Annemarie Stroustrup, MD, MPH.

106. **ASSESSING TREATMENT OUTCOMES AMONG DEPRESSED PATIENTS IN A STUDENT-RUN OUTPATIENT PSYCHIATRY CLINIC.**
Alexandra Saali[1], Samuel Powell[2], Craig Katz[3].
[1]Medical Education, [2]Neuroscience, [3]Psychiatry. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Craig Katz, MD.

POSTER NUMBER **TITLE AND AUTHORS**

107. **AUTOMATED MEASUREMENT OF SPINOPELVIC PARAMETERS ON LATERAL LUMBAR RADIOGRAPHS USING MACHINE LEARNING.**
John Schwartz[1], Peter Tang[2], Javin Schefflein[2], Brian Cho[1], Jun Kim[3], Samuel Cho[3].
[1]Medical Education, [2]Radiology, [3]Orthopaedics. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Samuel Cho, MD.

112. **AN ANALYSIS OF THE EXPERIENCES AND NEEDS OF LGBTQ TORTURE SURVIVORS AT THE LIBERTAS CENTER FOR HUMAN RIGHTS AT ELMHURST HOSPITAL, QUEENS.**
Nausheen Singh[1], Benjamin McVane[2], Sara Wagner[3], Dinali Fernando[2].
[1]Medical Education, [2]Emergency Medicine, [3]Other. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York, [3]Libertas Center for Human Rights, New York City, NY.
Mentor: Dinali Fernando, MD, MPH.

115. **FACTORS IMPACTING KNOWLEDGE AND PERCEPTIONS OF HEALTH IN PREGNANCY AMONG WOMEN IN RURAL KENYA.**
Emily Spiera[1], Unwana Abasi[1], Molly Guy[2], Debora Rogo[3], Mary Anne Nyamogo[4], Khama Rogo[4], Tanya Rogo[5].
[1]Medical Education, [2,]Other, [3]African Institute for Health Transformation, [4]Obstetrics, Gynecology, and Reproductive Science, [5]Pediatrics. [1]Icahn School of Medicine at Mount Sinai, New York, New York, [2]Medtronic Labs, Chanhassen, MN, US, [3,4]Sagam Community Hospital, Luanda, Kenya. [5]BronxCare Health System, Bronx, New York.
Mentor: Tanya Rogo, MD, MPH.

116. **THE MAGIC ALGORITHM PROBABILITY: A NOVEL RESPONSE BIOMARKER FOR ACUTE GRAFT-VERSUS-HOST TREATMENT.**
Hrishi Srinagesh[1], Umut Ozbek[2], Urvi Kapoor[2], Mina Aziz[2], Kaitlyn Ben-David[1], Aaron Etra[2], Matthew Hartwell[2], Alexander Karol[1], Stelios Kasikis[2], Steven Kowalyk[2], Jung-Yi Lin[2], Hannah Major-Monfried[2], George Morales[2], Keith Sigel[2], Rachel Young[2], John Levine[2], James Ferrara[2].
[1]Medical Education, [2]Medicine. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: James Ferrara, MD.

117. **DO SOCIOECONOMIC DISPARITIES EXIST IN POSTOPERATIVE OPIOID PRESCRIPTION & CONSUMPTION?**
Maya Srinivasan[1], Shruti Zaveri[2], Tamar Nobel[2], Celia Divino[2].
[1]Medical Education, [2]Surgery. [1,2]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentor: Celia Divino, MD.

POSTER NUMBER **TITLE AND AUTHORS**

118. **"I'D LIKE TO LET PEOPLE KNOW WHAT WE DID:" VALUES OF FUKUSHIMA MEDICAL STUDENTS FOLLOWING THE GREAT EAST JAPAN EARTHQUAKE.**
Anna Stacy[1], Mukanga Marcia Lange[1], Robert Yanagisawa[2], Craig Katz[3].
[1]Medical Education, [2]Medicine, [3]Psychiatry. [1,2,3]Icahn School of Medicine at Mount Sinai, New York, New York.
Mentors: Robert Yanagisawa, MD, Craig Katz, MD, MPH.

119. **EVALUATING EFFECTS OF STATE REPORTING POLICIES ON THE IMPACTS OF INTIMATE PARTNER VIOLENCE.**
Mary Sun[1], Jacob Appel[2].
[1]Medical Education, [2]Psychiatry. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY.
Mentor: Jacob Appel, MD, MPH.

120. **MATERNAL TRAIT ANGER EXPRESSION AND LIFETIME TRAUMATIC STRESS ARE ASSOCIATED WITH PRETERM BIRTH.**
Lilly Taing[1], Whitney Cowell[2], Michelle Bosquet Enlow[3], Michele Hacker[4], Rosalind Wright[5].
[1]Medical Education, [2]Environmental Medicine and Public Health, [3]Psychiatry, [4]Obstetrics, Gynecology, and Reproductive Science, [5]Pediatrics. [1,2,5]Icahn School of Medicine at Mount Sinai, New York, New York, [3]Harvard Medical School, Boston Children's Hospital, Boston, MA, [4]Beth Israel Deaconess Medical Center, Harvard Medical School, Harvard T.H. Chan School of Public Health, Boston, MA.
Mentor: Rosalind Wright, MD, MPH.

127. **HIGH RATES OF LOCOREGIONAL AND IN-FIELD FAILURES OF SQUAMOUS CELL CARCINOMA OF THE ORAL TONGUE AMONG NON-SMOKING AND NON-DRINKING PATIENTS: A SINGLE INSTITUTIONAL STUDY.**
Dillan Villavisanis[1], Daniel Dickstein[2], Kunal Sindhu[2], John Rutland[3], Krzysztof Misiukiewicz[4], Marshal Posner[4], Jerry Liu[2], Vishal Gupta[2], Sonam Sharma[2], Marita Teng[5], Eric Genden[5], Brett Miles[5], Richard Bakst[2].
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129. **ANALYSIS OF PARKINSON'S DISEASE SUBTYPES VIA CLUSTER ANALYSIS.**
Kristen Watkins[1], Giulietta Riboldi[2], Towfique Raj[3].
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POSTER NUMBER **TITLE AND AUTHORS**

130. **INVESTIGATING RACIAL DISPARITIES IN ADVANCED STAGE PANCREATIC CANCER PATIENTS TREATED AT MOUNT SINAI HOSPITAL.**
Matthew Williams[1], Umut Ozbek[2], Celina Ang[3].
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Mentor: Celina Ang, MD.

132. **PREDICTING THE RELATIONSHIP BETWEEN O-LINK ANALYTES AND DIFFERENT PHENOTYPES AFTER ENDOSCOPY IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE.**
Dean Wiseman[1], Judy Cho[2].
[1]Medical Education, [2]Genetics and Genomic Sciences. [1,2]Icahn School of Medicine at Mount Sinai, New York, NY.
Mentor: Judy Cho, MD.

135. **SPATIAL MAPPING OF COLLAGEN CONTENT AND STRUCTURE IN HUMAN INTERVERTEBRAL DISC DEGENERATION.**
Lawrence Zeldin[1], Grace Mosley[2], Damien Laudier[2], Zachary Gallate[2], Robert Hoy[2], James Iatridis[2].
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Mentor: James Iatridis, PhD.

Evaluation of a remote Early Warning System (EWS) for Maternal Hypertension in rural Kenya

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INTRODUCTION

- In Sub-Saharan Africa, hypertensive disorders during pregnancy (HDP) affect one in ten pregnancies.
- The "Maisha Mapya Hypertension in Pregnancy Feasibility Pilot" (MM Pilot) uses an early warning system (EWS) to reduce HDP-related morbidity in rural Kenya by remotely monitoring hypertension and sending alerts via mobile phone.

OBJECTIVES

To assess (1) the MM Pilot EWS's ability to identify high-risk patients for HDP and (2) associations between EWS and patient knowledge of HDP.

METHODS

- English-speaking MM Pilot participants were invited to complete a 55-item survey to assess knowledge and perceptions of maternal health, pregnancy, and HDP.
- Demographics and medical history were obtained for each participant. 4/41 surveyed patients were excluded from analysis due to incomplete medical records.
- Associations between an EWS alert and survey responses, and risk factors for HDP were tested using chi-squared test and t-tests.

RESULTS

- EWS alerts were not associated with hypertensive diagnosis, nulliparity, ANC attendance, or overall HDP risk (p=0.19) (**Table 1**).
- Women with EWS alerts were able to name fewer medications recommended for pregnancy compared to women without alerts (p=0.03) (**Figure 1**).
- Women with alerts correctly identified fewer signs and symptoms of HDP (p<0.001) (**Figure 2**).

Table 1: Associations between EWS, HDP Risk and Maternal Health Knowledge

	EWS Alert Present (n=4)	EWS Alert Absent (n=33)	p-value
Risk: # HTN Diagnosis	0	3	1
Risk: # Nulliparous	0	11	0.42
Risk: # ≤8 ANC Appointments	1	24	0.17
Mean Overall HDP Risk	1	1.39	0.19
Mean Identified Pre-Natal Medications	0.25	1.06	0.03
Mean Identified HDP Signs/Symptoms	1.25	3.06	<0.001

Figure 1. Correctly Identified Pre-Natal Medications

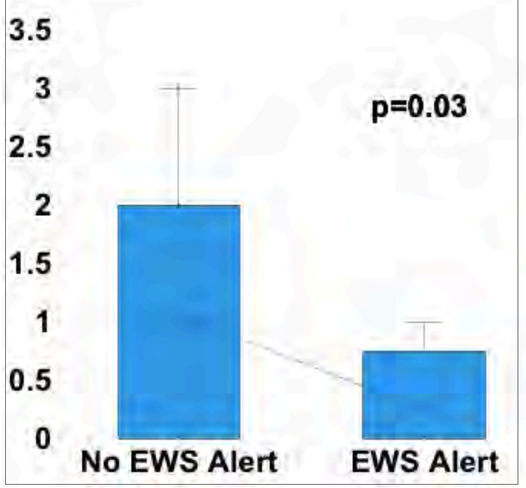
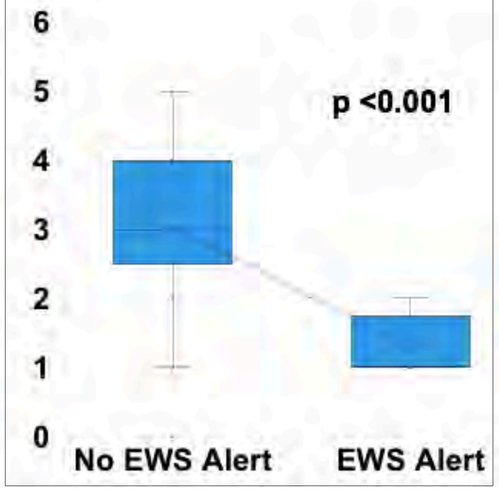


Figure 2. Correctly Identified Signs and Symptoms of HDP



CONCLUSIONS

- EWS alerts did not identify patients at high risk for HDP based on HDP risk factors.
- Women alerted through the EWS had less knowledge of medications recommended for pregnancy and of signs and symptoms of HDP.
- Potential future steps include (1) interviewing more participants to elucidate relationships between EWS alerts and other risk factors for HDP such as increased age and BMI and (2) examining the relationship between alerts and pregnancy-related health outcomes in this patient population.

LIMITATIONS

- Few high-risk participants enrolled in the MM Pilot, so few patients had alerts through the EWS.
- Could not survey all 143 enrolled MM Pilot participants due to time constraints and excluding non-English speaking participants.
- All women in the MM pilot were receiving some ANC education as a part of the pilot.

FUNDING & ACKNOWLEDGEMENTS

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The Effect of Neck Shaft Angle on Muscle and Joint Contact Forces Following Reverse Shoulder Arthroplasty

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5

INTRODUCTION

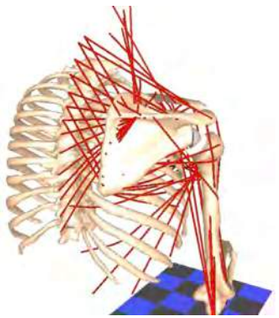
- Scapular notching is a significant complication in reverse shoulder arthroplasty (RSA).[1]
- Several studies have attributed this complication to the non-anatomically elevated humeral neck-shaft angle (NSA) of 155° in early RSA implants.
- In response, numerous commercial RSA designs have modified the NSA, but it is unclear how this affects joint stability.
- Existing studies looking at the effects of NSA compare commercially available prostheses; as such, their conclusions are limited by the confounding variables of these implants.[2]

OBJECTIVE To analyze the effect of neck-shaft angle in RSA prosthetics on joint stability and impingement

METHODS

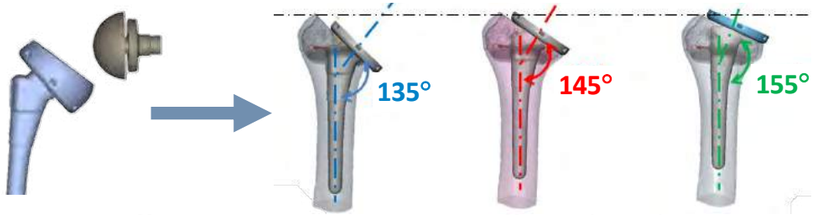
1. RSA Biomechanical Shoulder Model

- 31 muscles divided into 90 lines of action
- Scapula and clavicle kinematics
- Computes muscle and joint contact forces, stability, and impingement for any given motion (via inverse dynamics)



2. Model Configurations

- An onlay commercial RSA design (Biomet® Comprehensive) was adapted to represent NSAs ranging from 155° to 135°:



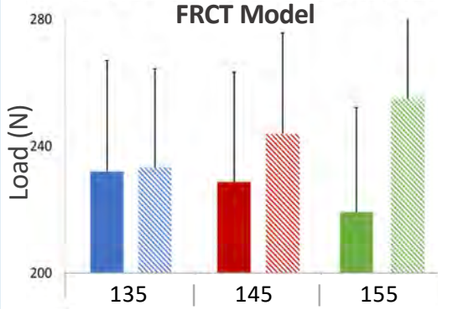
- Two rotator cuff conditions: Full Rotator Cuff Tear (**FCRT**), Subscapularis Repaired (**SRCT**)

3. Applying Kinematics

- Input kinematics: abduction, forward flexion, scapular plane elevation, 10 ADLs
- Outcome measures: muscle forces, joint contact loads, impingement-free ROM

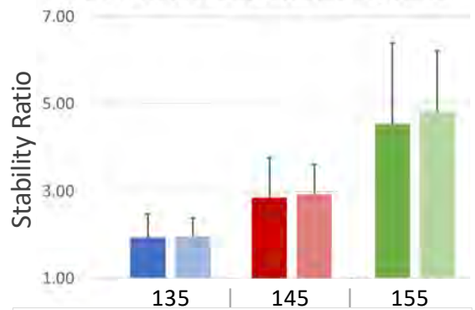
RESULTS

Average Peak Glenoid Loading for FRCT Model



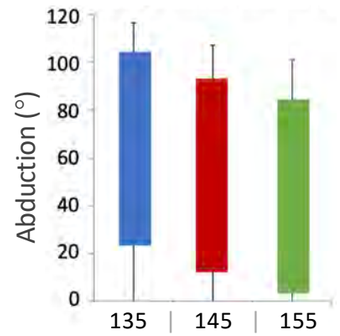
** Solid: Compressive, Striped: Shear*

The Effect of NSA on Stability Ratio



** Bold: FRCT model, Pastel: SRCT model*

Impingement-Free ROM



Muscle and Joint Contact Forces:

- Increasing the NSA resulted in increased shear and decreased compressive glenoid forces on both FRCT and SRCT models
- However, the maximum joint contact force was observed for the 135° NSA design
- Subscapularis repair reduced deltoid and teres minor loads

Loading on the Humeral Cup:

- Increasing NSA resulted in increased compressive and decreased shear forces
- Decreasing NSA resulted in a 57% decrease in the ratio of compressive/shear force on the cup, indicating decreased stability
- Subscapularis repair did not affect the joint stability

Impingement:

- The NSA did not affect impingement-free ROM, but it did change the impingement type
- Increasing NSA led to increased intra-articular impingement (notching) and decreased extra-articular impingement

CONCLUSIONS

- Increased NSA can affect muscle loads and result in increased joint contact forces.
- Increased NSA can increase joint stability.
- Subscapularis repair can reduce glenoid loads but may not affect joint stability.
- Increased NSA can increase intra-articular impingement (notching), but it can decrease the extra-articular impingement.

Applying these findings will enable further optimization of RSA implant design

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Probing the Role of the DREAM Complex in Human β-cell Quiescence

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7

OBJECTIVES

- Delineate the repertoire of DREAM complex members in the human β-cell
- Identify key DREAM-MMB complex target genes involved in cell cycle regulation

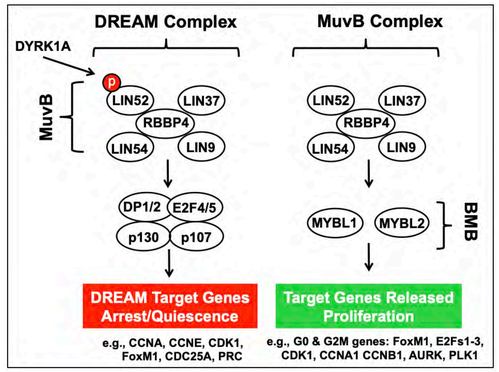
INTRODUCTION

Regeneration of endogenous β-cells is a potential avenue for diabetes treatment. Our lab has previously reported[1] that the harmine family of small molecules induces human β-cells to regenerate via DYRK1A inhibition and consequent modulation of NFaT activity. Preliminary data suggest that an additional mechanism by which DYRK1A inhibition may be inducing proliferation is by switching the balance between the repressive (quiescent) and proliferative forms of the DREAM complex – a cell cycle regulatory complex whose existence in the human β-cell has never been demonstrated.

METHODS

- Experiments were performed in cell culture with cadaver-derived human islets, HEK293, or HepG2 cells
- Adenovirus infections were performed at 150 MOI for 96 hours.
- Transfections were performed using the Lipofectamine 3000 protocol w/ zsGreenN1 plasmids containing DREAM components under the control of a CMV promoter

RESULTS



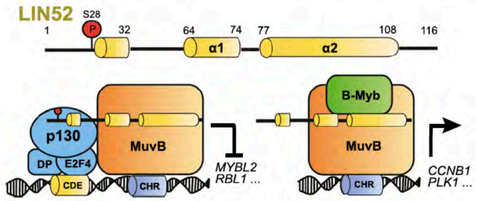


Figure 1. DREAM-MMB complex member interaction and function is dependent on the DYRK1A-mediated phosphorylation of Lin52 [2]

DREAM Members

Repressive

Gene	CPM DMSO	CPM Harmine
Lin9	479	459
Lin52	1081	855
Lin37	228	219
Lin54	2892	2983
RBBP4	10880	9876
E2F4	5283	4769
E2F5	607	644
RBL2	10794	10905
TFDP1	8688	8351

Proliferative

Gene	CPM DMSO	CPM Harmine
MYBL1	214	478
MYBL2	698	1028
MYB	11	49
E2F1	603	1886
E2F2	51	543
E2F3	1462	1229

Canonical DREAM Targets

Gene	CPM DMSO	CPM Harmine
3. DREAM Complex Targets		
CCNA1	142	310
CCNA2	1111	1596
CCNE1	192	213
CCNE2	136	403
CDK1	902	2316
MYBL1	214	478
MYBL2	698	1028
FOXM1	1303	2466
AURKA	897	1187
AURKB	356	783
PLK1	1251	1463
PLK2	22528	23965
CCNB1	1698	2277
CCNB2	451	758
CDC25A	310	577
CDC25C	92	143
MELK	701	1201
CENPA	122	278
CENPF	1529	3732
BUB1	921	2002
POLD1	1729	1926
SKP2	840	869
CDC6	871	1377
BIRC5	261	410
EZH2	521	1095
MCM5	2045	2823
ASF1B	352	1343

Canonical pRb Pathway Targets

Gene	CPM DMSO	CPM Harmine
CDK4	4319	4105
CDK6	10175	15473
CDK2	1158	1290
CCND1	11244	9372
CCND2	4061	5029
CCND3	8084	6220
CDKN1A	37735	22952
CDKN1B	6571	6026
CDKN1C	19665	9368
CDKN2A	759	479
CDKN2B	3521	1247
CDKN2C	1764	2873
CDKN2D	1275	1457
TP53	2376	2160
MDM2	6626	7813
RBBP5	3812	3613
RB	6620	6686

Figure 2. RNAseq analysis of 5 sets of FACS-sorted human β-cells treated with DMSO or harmine

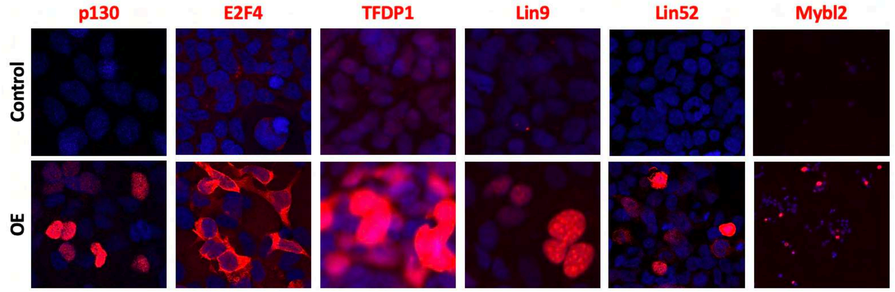


Figure 3. Confocal images of HEK293 cells transfected with plasmids containing DREAM component ORFs under the control of CMV promoters (3 days post transfection)

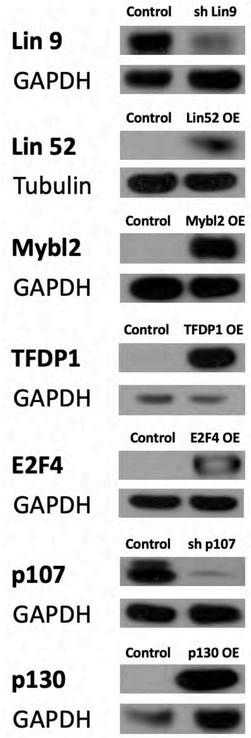


Figure 4. IBs of HEK293/HepG2 lysates transfected with pCMV-DREAM plasmids or infected with sh-DREAM adenoviruses

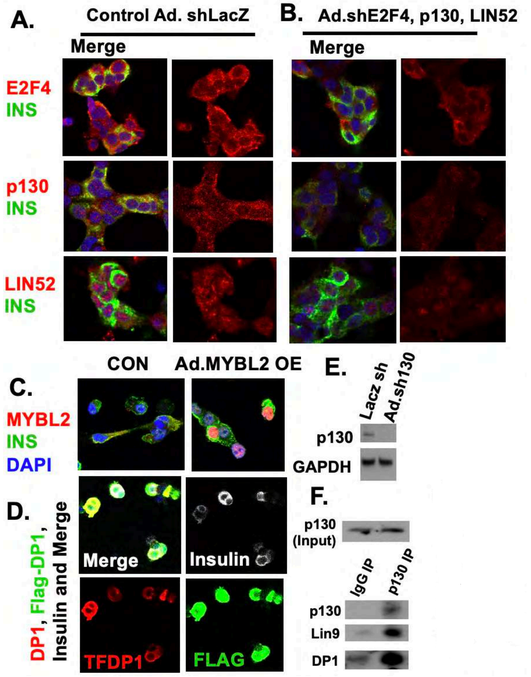


Figure 5. Representative ICC of dispersed human islets infected with corresponding adenoviruses at an MOI of 150 for 96 hours (**5A, 5B, 5C, 5D**). IB of dispersed islets infected with LacZ sh or p130 sh adenovirus at an MOI of 150 for 96 hours (**5E**). Co-IP of non-specific IgG or p130 with DP1, Lin9, and p130 (**5F, 5G**)

CONCLUSIONS

- Human β-cells abundantly express most repressive DREAM members, but not the proliferative MYBL1/2 members at both the RNA and protein level
- qPCR and RNAseq analyses of harmine-treated human β-cells show significant upregulation of canonical mitogenic DREAM targets and increased expression of MYBL1/2
- Preliminary Co-IP results showcase robust complexing between p130, Lin9, and DP1, suggesting that the repressive DREAM complex is assembled in dispersed human β-cells

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Does Gender Make a Differences in Procedure Selection and Outcome in Bariatric Surgery?

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6

Icahn School of Medicine at Mount Sinai

BACKGROUND

- Obesity rates still rising in the United States (1)
- Bariatric surgery has become an increasingly more common, well-established and effective treatment for morbid obesity and its comorbid conditions (1)
- Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (SG) are two of the more common types of bariatric procedures (1, 2)
- This study analyzes gender disparities and its role in differing outcomes, following LRYGB and SG

METHODS

- Using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database for years 2015-2017, demographics, postoperative complications, and readmission rates were assessed.
- Chi-square analysis, Student t-test, and propensity analyses were performed where appropriate.

RESULTS

- Significantly more men than women underwent SG (68.5% vs 63.0%, P < 0.0001) and significantly more women than men underwent LRYGB (37.0% vs 31.5%, P < 0.0001)
- Men experience more severe complications after LRYGB such as cardiac arrest (0.2% vs 0.1%, P = 0.02) and prolonged intubation (0.4% vs 0.2%, P = 0.02)
- Men experience more symptoms after SG such as myocardial infarction (0.2% vs 0.1%, P = 0.006)
- Unplanned readmissions higher in women (3.5% vs 2.8%, P = 0.0012)

RESULTS

	Men (n=4961)	Women (n=4935)
SSI*	56 (1.13)	80 (1.62)
DSI*	3 (0.06)	10 (0.2)
Organ space infection	39 (0.79)	45 (0.91)
Wound dehiscence	10 (0.2)	11 (0.22)
Pneumonia	35 (0.71)	24 (0.49)
Prolonged intubation	15 (0.3)	10 (0.2)
Pulmonary embolism	16 (0.32)	13 (0.26)
Ventilation*	21 (0.42)	8 (0.16)
Acute renal failure*	10 (0.2)	3 (0.06)
Urinary tract infection*	15 (0.3)	50 (1.01)
Cerebrovascular accident	0	2 (0.04)
Cardiac arrest *	12 (0.24)	3 (0.06)
Blood loss requiring transfusion	71 (1.43)	64 (1.3)
Deep vein thrombosis	21 (0.42)	14 (0.28)
Sepsis	26 (0.52)	20 (0.41)
Reoperation	127 (2.56)	118 (2.39)
Unplanned readmission*	218 (4.39)	272 (5.51)
30-day mortality	12 (0.24)	5 (0.1)

Table 1 Postoperative 30-day outcomes after propensity analysis for laparoscopic Roux-en-Y gastric bypass

*P-value ≤ 0.05
SSI = superficial surgical site infection, DSI = deep incisional surgical site infection

	Men (n=10788)	Women (n=10814)
SSI	55 (0.51)	53 (0.49)
DSI	2 (0.02)	5 (0.02)
Organ space infection	34 (0.32)	35 (0.32)
Wound dehiscence	3 (0.03)	4 (0.04)
Pneumonia	21 (0.19)	24 (0.22)
Prolonged intubation	25 (0.23)	17 (0.16)
Pulmonary embolism	20 (0.19)	16 (0.15)
Acute renal failure	9 (0.08)	11 (0.1)
Urinary tract infection*	26 (0.24)	59 (0.55)
Cerebrovascular accident	2 (0.02)	2 (0.02)
Cardiac arrest	9 (0.08)	7 (0.06)
Blood loss requiring transfusion	79 (0.73)	65 (0.6)
Deep vein thrombosis	41 (0.38)	32 (0.3)
Sepsis	19 (0.18)	22 (0.2)
Reoperation	111 (1.03)	105 (.97)
Unplanned readmission	227 (1.05)	273 (2.52)
30-day mortality	16 (0.15)	5 (0.05)

Table 2 Postoperative 30-day outcomes after propensity analysis for laparoscopic sleeve gastrectomy

*P-value ≤ 0.05
SSI = superficial surgical site infection, DSI = deep incisional surgical site infection

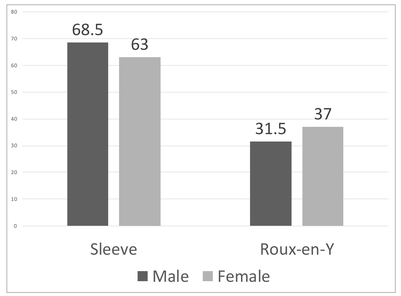

Figure 1 Patient percent undergoing Roux-en-Y bypass ($P < 0.0001$) and sleeve gastrectomy ($P < 0.0001$) based on gender

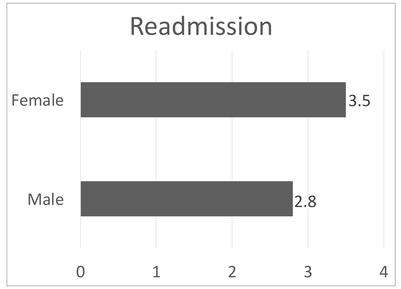

Figure 2 Percentage of patients with unplanned readmission related to initial procedure ($P = 0.0012$) based upon gender

SUMMARY & CONCLUSION

- Men more likely to undergo SG; aligns with current literature (3, 4)
- Men undergoing either SG or LRYGB presented with more comorbidities and higher BMI; experienced more complications
- LRYGB and female gender identified as risk factors for increased early hospital readmission (5)
- Women had higher rates of hospital readmission than men when controlled for comorbidities, complications, procedure type
- Need for additional discharge interventions, including outpatient monitoring protocol, to improve quality of care
- Identify barriers male patients face in follow-up care, despite presenting as higher risk population needing closer postoperative monitoring

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Complications After Direct to Implant Breast Reconstruction: A Propensity Score Analysis

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Division of Plastic and Reconstructive Surgery, Icahn School of Medicine at Mount Sinai

10

OBJECTIVES

- Examine implant shell texture and complication rates
- Utilize propensity score matching to simulate pseudo-randomization

INTRODUCTION

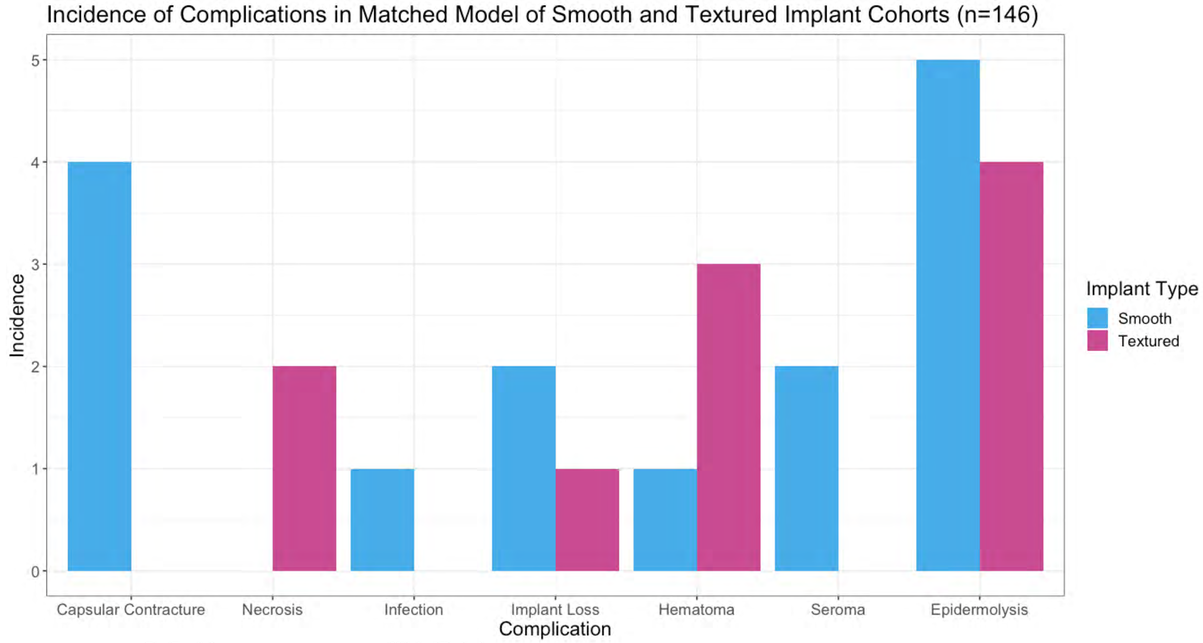
- Implant-based breast reconstruction is the most common reconstructive option for the management of postmastectomy absent breast deformity in the United States[1]
- Smooth vs. Textured Implant Types

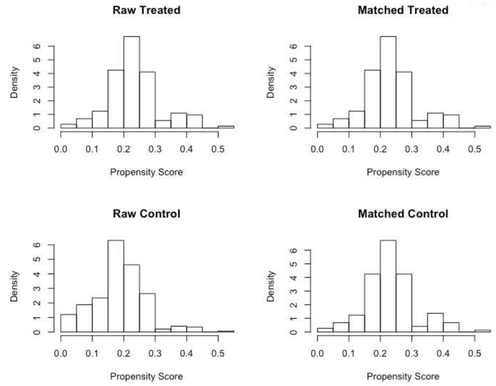
METHODS

- Retrospective review of 407 patients from 2011-2018 by a single surgeon
- Primary outcome: Incidence of postoperative complications (capsular contracture, skin flap necrosis, infection, hematoma, seroma and implant loss)
- Propensity score matching algorithm

RESULTS

- Major complication rates were similar for acellular dermal matrix (ADM)-assisted direct-to-implant breast reconstruction for textured and smooth implant types, with no statistically significant differences after propensity score matching.





Complications for Smooth vs. Textured Implant Type

	Smooth No. 146	Textured No. 146	P-value
Capsular Contracture	4 (2.7%)	0 (0.0%)	0.12
Necrosis	0 (0.0%)	2 (1.4%)	0.50
Infection	1 (0.7%)	0 (0.0%)	1.0
Implant Loss	2 (1.4%)	1 (0.7%)	1.0
Hematoma	1 (0.7%)	3 (2.1%)	0.62
Seroma	2 (1.4%)	0 (0.0%)	0.50
Epidermolysis	5 (3.4%)	4 (2.7%)	1.0
Total Complications			0.40
0 Complications	133 (91.1%)	138 (94.5%)	
1 Complication	11 (7.5%)	6 (4.1%)	
2 Complications	2 (1.4%)	2 (1.4%)	
3 Complications	0 (0.0%)	0 (0.0%)	
4 Complications	0 (0.0%)	0 (0.0%)	

CONCLUSIONS

- A propensity score matching algorithm was used to simulate a pseudo-randomized controlled trial in the context of a retrospective study, mitigating bias by matching similar populations for smooth and textured implants based on clinically relevant variables.
- The matching criteria were: Age, Diabetes, Smoking History, Hypertension, Obesity, Chemotherapy History, Pre- and Post-Operative Radiation History, Prepectoral Implant Placement.
- All reconstructions were performed by a single surgeon.
- Propensity score matching improved the clinical covariate distributions for textured and smooth implant cohorts.

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Prophylactic Antibiotic Prescription Practices in the Postoperative Management of Gynecomastia

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13

INTRODUCTION

- Elective gynecomastia procedures carry low baseline risk for surgical site infections
- No current prophylactic antibiotic recommendations exist for gynecomastia surgery in the literature or ASPS guidelines

OBJECTIVES

- Examine prophylactic antibiotic prescription practices among plastic surgeons performing gynecomastia operations and evaluate whether those practices are efficacious

METHODS

- Retrospective review 2011-2019
- Medical & surgical history, age, BMI, procedure type (liposuction, tissue excision, combination), intraoperative details (incision, drains), postoperative care (discharge antibiotics, compression use), and complications recorded
- Rates of antibiotic prescriptions calculated
- Fisher's exact test used for comparison

RESULTS

- 54 operative gynecomastia patients identified
- IV cefazolin administered to 50 patients (92.6%) prior to incision
- Prophylactic postop PO cephalexin prescribed to 38 patients (70.4%) at discharge
- Four patients (7.4%) received neither pre-incision nor postoperative prophylactic antibiotics
- Surgical site infections rates: patients prescribed postoperative antibiotics (2.6% SSI) vs. no postoperative antibiotics (6.3% SSI); p = 0.509; insufficient power (13%)

Patient Characteristic	Abx Prescribed n/N (%)	P-value
Age > 30 years old	19/21 (90.5)	p = 0.014
Age < 30 years old	19/33 (57.6)	
History of BMI > 30	26/31 (83.9)	p = 0.017
No history of BMI > 30	12/23 (52.2)	
BMI > 30	17/20 (85.0)	p = 0.122
BMI < 30	21/34 (61.8)	
Age > 30 & h/o obesity	15/16 (93.8)	p = 0.429
Age > 30 & no h/o obesity	4/5 (80.0)	
Smoker at operation	2/2 (100)	p = 1
Non-smoker at operation	36/52 (69.2)	
History of smoking	9/10 (90.0)	p = 0.250
No history of smoking	29/44 (65.9)	
Diabetes	3/3 (100)	p = 0.547
No diabetes	35/51 (68.6)	
Hypertension	6/6 (100)	p = 0.163
No hypertension	32/48 (66.7)	
Liposuction only operation	8/9 (88.9)	p = 0.253
Tissue excision +/- liposuction	30/45 (66.7)	
Inframammary incision	13/15 (86.7)	p = 0.042
Peri-areolar incision	14/27 (51.9)	

CONCLUSIONS

- Significant variation exists at MSH in postoperative antibiotic prescription rates after operative gynecomastia treatment
- Patient- and procedure-specific factors associated with significantly higher rates of antibiotic prescriptions:
  - age over 30
  - history of obesity (BMI > 30)
  - inframammary incisions
- Antibiotic prescription decisions should be evidence-based, especially for low-risk procedures, such as gynecomastia surgery
- Further studies needed to determine which factors, if any, carry risk that warrants postoperative antibiotic prophylaxis after gynecomastia surgery

FUNDING

- Icahn School of Medicine Summer Student Investigator Award

Trends in IUD and Implantable Contraception Provision at the Institute for Family Health, 2014-2019

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14

BACKGROUND

- IUDs and implantable contraception (aka long acting reversible contraception or LARC) are increasingly popular.
- The Institute for Family Health (Institute) is a large FQHC network in NYC and upstate NY staffed largely by family physicians with 3 family medicine residency programs.
- Recently Institute clinicians have perceived that the number of LARC procedures are decreasing; this would be unexpected given the rise in LARCs.

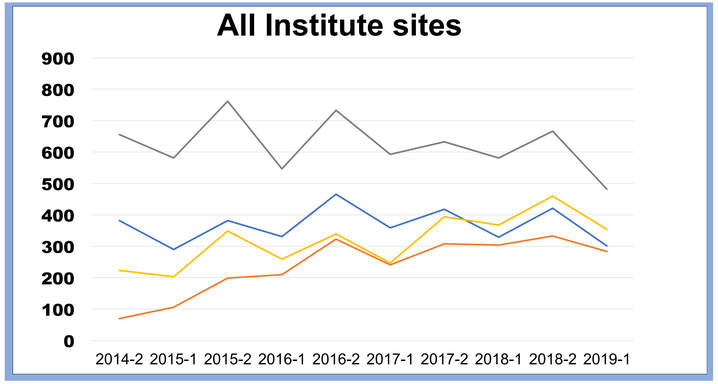
RESEARCH QUESTION

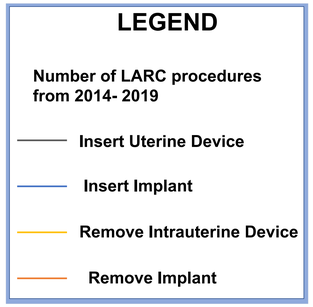
- What is the trend in LARC insertion and removals across the Institute?
- How does procedure volume differ by site?

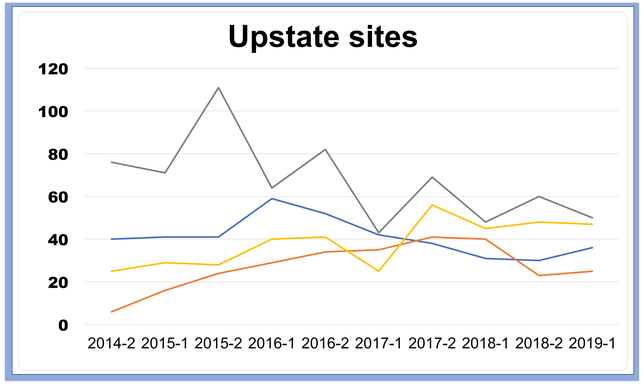
METHODS

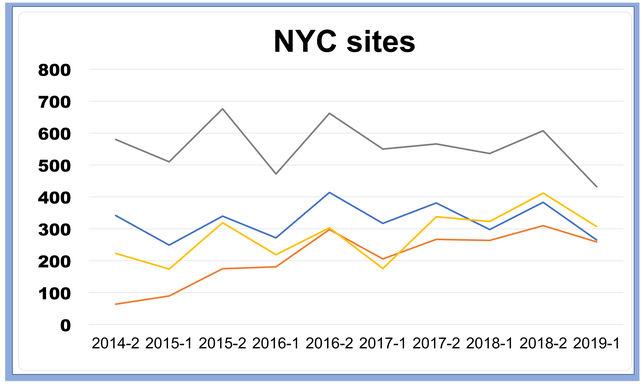
- Using billing data, we identified LARC insertion and removal procedures at Institute sites from May 2014- May 2019.
- We examined number and trends in procedures for all sites together, and compared upstate to NYC sites, and NYC residency to NYC non residency sites.

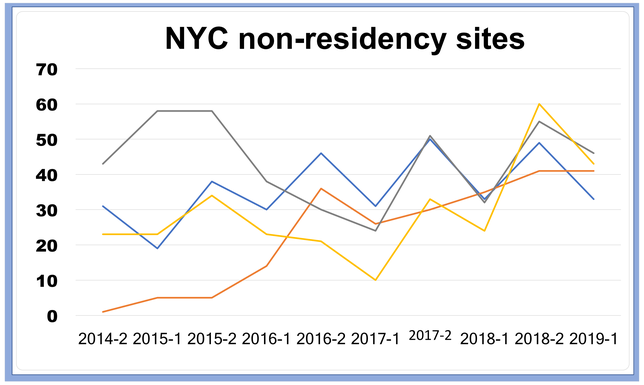
RESULTS (N=15,488 procedures)

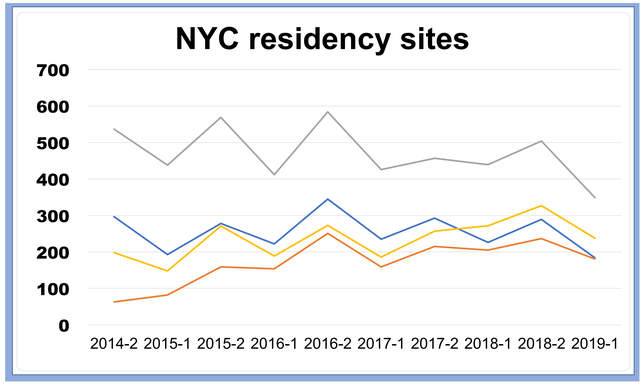












CONCLUSIONS

- From 2014-2019 trends in overall IUD and implant *insertions* are decreasing while IUD and implant *removals* are increasing
- All procedures have a slower rate of change in the past two years.
- The vast majority of the procedures were done at NYC, not upstate sites.
- In NYC, approximately 90% of the procedures were done at one of the two residency sites.

IMPLICATIONS

- Institute patients have LARC access at upstate and NYC sites
- We theorize that since the Institute was an early leader in LARC provision, that the plateau in procedure volume may represent saturation of the patient population.
- Institute residents, especially at the NYC sites still have LARC training opportunities
- Upstate residents appear to have fewer opportunities for LARC procedure learning

FUNDING & ACKNOWLEDGEMENTS

- Center for Multicultural Affairs

Utilization of a modified Sendai virus to attenuate immune checkpoint expression in a urothelial carcinoma cell line

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15

OBJECTIVES

- Develop a Sendai virus capable of attenuating tumor cell immune checkpoint expression using micro-RNA (miRNA).
- Understand the natural relationship between Sendai infection and NK cell activating and inhibitory ligand expression.

INTRODUCTION

- Immune checkpoint inhibitors (ICIs) such as atezolizumab are approved as second-line agents in recurrent or metastatic bladder cancer for patients who have failed platinum-based chemotherapy.
- Due to their systemic administration route of ICIs, they are associated with considerable toxicity.[1]
- Sendai virus (SeV) is a murine paramyxovirus with no innate virulence in humans but with documented oncolytic activity and tumor cell specificity.
- HLA-E is an immune checkpoint expressed on tumor cells that inhibits CD8+ T cells and NK cells

METHODS

- We assembled a SeV genome modified to express an artificial miRNA targeting HLA-E as well as a GFP reporter gene
- We infected 639V urothelial carcinoma cells and A549 lung adenocarcinoma cells and assessed surface HLA-E expression, in addition to other activating/inhibitory ligands

RESULTS

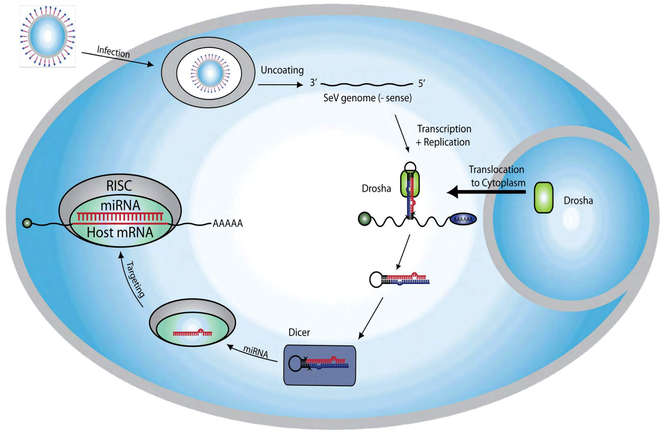

Figure 1: A schematic representation of RNA interference using the modified SeV**.** Dicer cleaves hairpin pre-miRNA molecules produced by Drosha into miRNA, which are subsequently able to hybridize with and degrade target transcripts via the RNA-induced silencing complex (RISC).

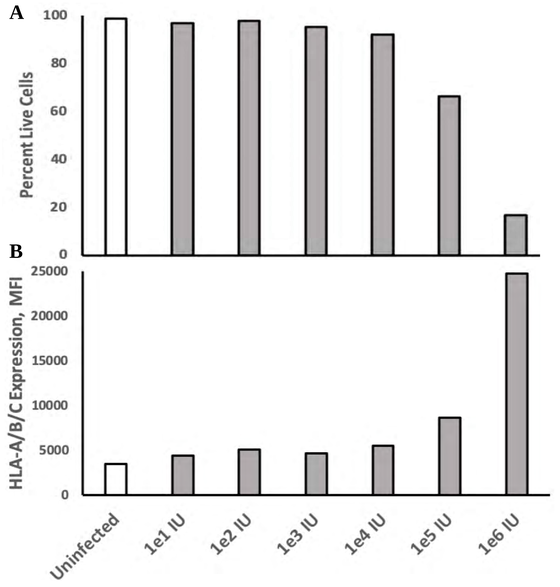

Figure 2: A) Percentage of live cells after three days of infection of A549 cells with wild-type SeV. **B)** Median fluorescence intensity (MFI) of A549 cells tagged with anti-HLA-A/B/C antibody, gated on live cells. Class I HLA contributes structurally necessary leader peptides to HLA-E.

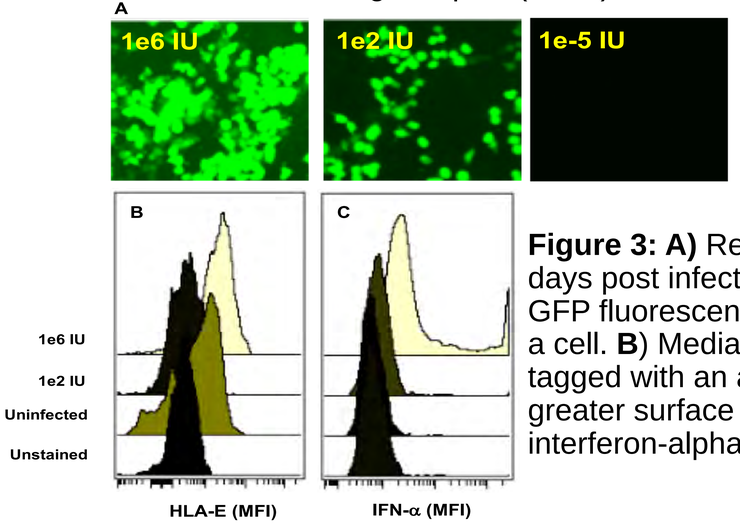

Figure 3: A) Representative fluorescence of 639V cells 3 days post infection with SeV-GFP-miRNA virus. Positive GFP fluorescence was interpreted as successful infection of a cell. **B**) Median fluorescence intensity (MFI) of 639V cells tagged with an anti-HLA-E antibody. Higher MFI indicates greater surface expression of HLA-E. **C)** MFI of intracellular interferon-alpha, a marker of active antiviral response.

CONCLUSIONS

- In this experiment, we successfully inhibited the expression of HLA-E using a modified Sendai virus carrying an artificial anti-HLA-E miRNA at an intermediate viral titer.
- We hypothesize that the counterintuitive upregulation of HLA-E at the highest viral titer is caused by the activation of the cellular anti-viral response, indicating a nonlinear dose-response relationship between viral load and HLA-E knockdown.
- Next, we plan to test the efficacy of these modified Sendai viruses with primary tumor cells in co-culture with tumor-infiltrating lymphocytes.

ACKNOWLEDGEMENTS

We thank the tenOever lab for their ongoing guidance in designing and testing the modified SeV.

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Hyperglycemia and adverse pregnancy outcomes in twins: do the HAPO findings apply to twin pregnancies?

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17

BACKGROUND

- In 2008, the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study found that in singleton pregnancies, maternal hyperglycemia less severe than in GDM was associated with adverse pregnancy outcomes, including macrosomia, cesarean delivery, neonatal hypoglycemia, and preeclampsia.
- The objective of this study was to determine if the maternal glucose level in twin pregnancies without GDM is associated with an increased risk of adverse pregnancy outcomes.

METHODS

- Retrospective cohort study of twin pregnancies in a single MFM practice between 2005 and 2019 who underwent two-step GDM screening at 24-28 weeks, excluding women with pregestational or gestational diabetes (based on Carpenter and Coustan cutoffs).
- We examined the association between maternal glycemia and adverse pregnancy outcomes.
- Glycemia was defined as the 1-hour GCT value in all women and each of the additional four values of the 3-hour OGTT in women who failed the GCT and underwent OGTT testing.
- Primary outcomes were preeclampsia, cesarean delivery, and neonatal hypoglycemia in either twin.
- Statistical tests used included Pearson correlation, Student's t-test, chi-square for trend, and logistic regression.

Table 1 – Pearson correlation between glucose measurements and primary outcomes

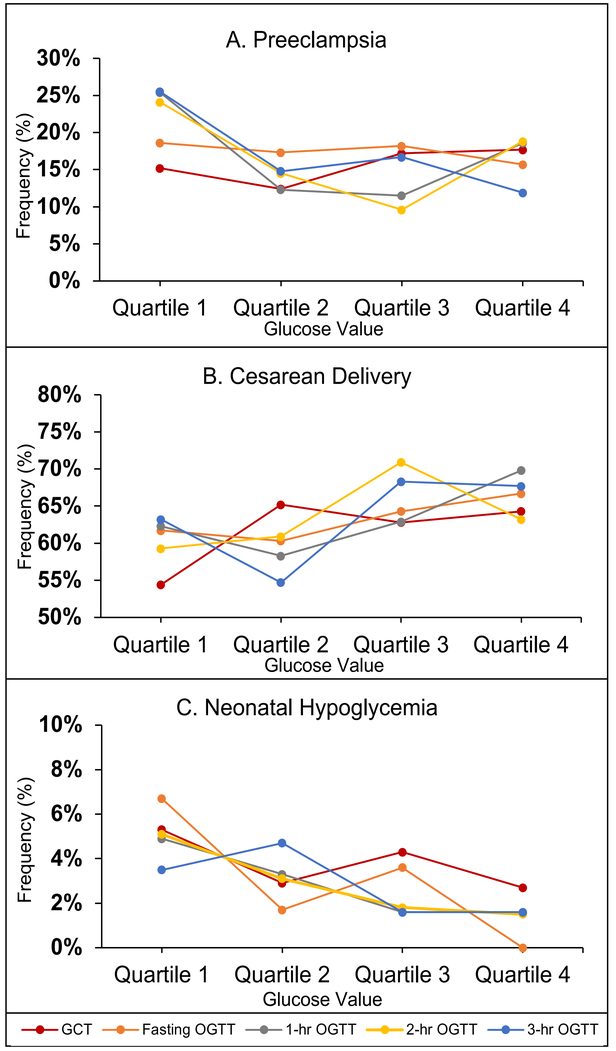
	GCT	Fasting OGTT	1-hour OGTT	2-hour OGTT	3-hour OGTT
Cesarean	0.058 (p=0.09)	0.051 (p=0.42)	0.027 (p=0.68)	0.049 (p=0.44)	0.084 (p=0.19)
Preeclampsia	0.012 (p=0.74)	-0.039 (p=0.55)	-0.116 (p=0.07)	-0.039 (p=0.55)	-0.090 (p=0.17)
Neonatal hypoglycemia	-0.049 (p=0.15)	-0.141 (p=0.03)	-0.055 (p=0.39)	-0.039 (p=0.55)	-0.054 (p=0.40)

Table 2 – Comparison of glucose values in women with twin pregnancies with and without adverse outcomes

	Preeclampsia N=132	No preeclampsia N=715	p-value
GCT	119 +/- 23	118 +/- 24	0.73
Fasting OGTT	77 +/- 8	78 +/- 7	0.57
1-hour OGTT	145 +/- 31	152 +/- 21	0.17
2-hour OGTT	125 +/- 27	128 +/- 22	0.61
3-hour OGTT	96 +/- 29	102 +/- 25	0.21
	Hypoglycemia in either twin N=32	**No hypoglycemia in either twin N=832**	**p-value**
GCT	112 +/- 25	119 +/- 24	0.17
Fasting OGTT	72 +/- 6	78 +/- 7	0.03
1-hour OGTT	144 +/- 18	152 +/- 23	0.31
2-hour OGTT	123 +/- 26	128 +/- 23	0.62
3-hour OGTT	94 +/- 22	102 +/- 26	0.36
	Cesarean delivery N=535	**Vaginal delivery N=329**	**p-value**
GCT	120 +/- 24	117 +/- 24	0.09
Fasting OGTT	78 +/- 7	77 +/- 7	0.42
1-hour OGTT	152 +/- 23	151 +/- 22	0.68
2-hour OGTT	129 +/- 23	126 +/- 23	0.44
3-hour OGTT	103 +/- 26	99 +/- 26	0.19

Glucose values (mg/dL)

Figure 1 – Frequency of outcomes by glucose quartiles



RESULTS

- 847 women underwent a GCT and 246 women underwent a GTT.
- On Pearson correlation, none of the glucose values were associated with an increased risk of adverse outcomes.
- Interestingly, there was a negative association between fasting OGTT values and neonatal hypoglycemia (r=-0.141, p=0.027), with increasing maternal glucose levels associated with a decreased risk of neonatal hypoglycemia.
- This association was no longer statistically significant after controlling for gestational age at delivery and maternal body mass (adjusted beta coefficient -0.129, p=0.052).
- Women with adverse outcomes did not have higher mean GCT or GTT values than women without these outcomes.
- increasing glucose quartiles were not associated with increased frequency of adverse outcomes.
- In contrast, increasing fasting OGTT quartiles was negatively associated with neonatal hypoglycemia, suggesting a decreased risk.

CONCLUSIONS

- **Elevated maternal glucose levels in non-diabetic twin pregnancies are not associated with adverse outcomes.**
- **Current approaches to screening for GDM during pregnancy might not adequately account for the unique physiology of hyperglycemia in twin gestations.**

THE MITOCHONDRIAL UPR AND MELANOMAGENESIS

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19

OBJECTIVES

Determine the relationship between the unfolded protein response (UPR) and melanomagenesis.

INTRODUCTION

- Over 60% of melanomas have a $BRAF^{V600E}$ mutation, which confers constitutive activation of the MAPK pathway leading to cellular transformation.[1]
- Oncological signaling induces changes in mitochondrial shape[2], but little is known on its effect on stress response pathways like the mtUPR during melanomagenesis.

METHODS

Immunofluorescence (IF) staining

- Activation of mtUPR in SK-MEL-28 melanoma cell line by incubation in G-TPP 5μM for 5hrs
- shRNA silenced the mtUPR proteins (ATF4, ATF5, and CHOP)
- Stained with Ab against mtUPR proteins, each with HSP60 or TOM20 for mitochondria

Immunohistochemistry (IHC) classification

- IHC stains against ATF4, ATF5, and CHOP on 33 human biopsies (normal skin, benign & dysplastic nevi, and melanoma) using LeicaBond RX instrument
- Samples scored as negative, weakly, positive, and strongly positive
- Chi-squared t-test for comparison

RESULTS

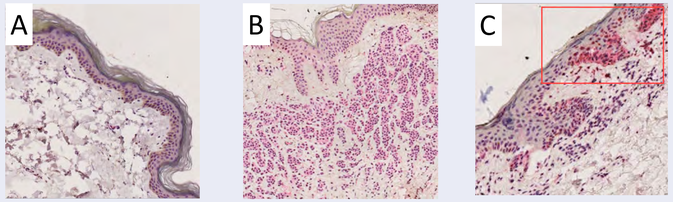

Figure 1. Representative staining of Negative (a), Weakly Positive (b), and Strongly Positive (c, in box).

Table 1. Immunohistochemistry staining classifications.

Staining Classification						
		Negative	Weakly Positive	Strongly Positive	Total	p-value
ATF4	Normal Skin	3	1	0	4	0.135
	Benign Nevi	0	2	0	2	
	Dysplastic Nevi	0	1	1	2	
	Melanoma	0	3	1	4	
ATF5	Normal Skin	0	0	2	2	N/A
	Benign Nevi	0	0	3	3	
	Dysplastic Nevi	0	0	1	1	
	Melanoma	0	0	4	4	
CHOP	Normal Skin	2	0	0	2	0.013
	Benign Nevi	0	1	1	2	
	Dysplastic Nevi	0	0	2	2	
	Melanoma	0	2	3	5	

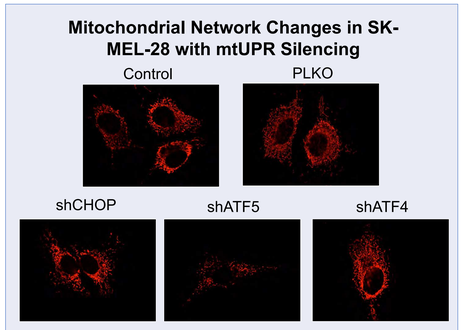

Figure 2. IF staining of SK-MEL-28 cells with HSP60, with an empty vector (PLKO), silenced CHOP (shCHOP), silenced ATF4 (shATF4), and silenced ATF5 (shATF5).

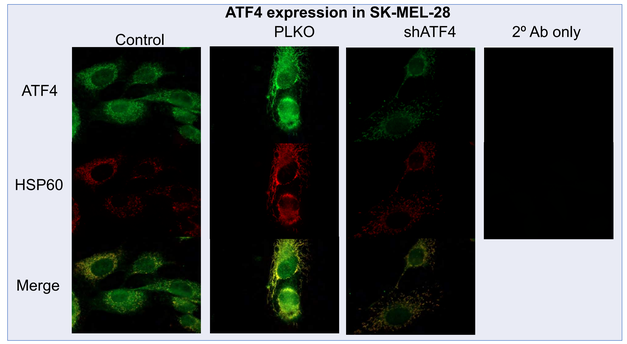

Figure 3. IF staining of SK-MEL-28 cells with ATF4, with an empty vector (PLKO), and silenced (shATF4).

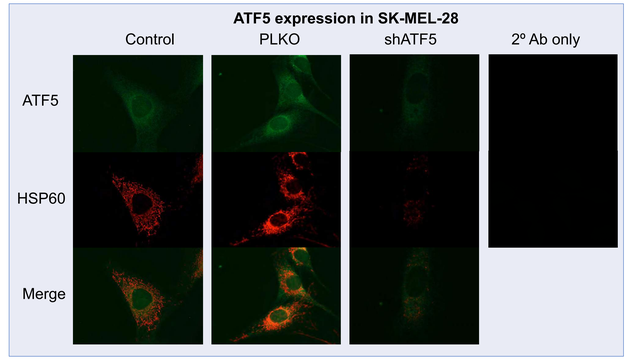

Figure 4. IF staining of SK-MEL-28 cells with ATF5, with an empty vector (PLKO), and silenced (shATF5).

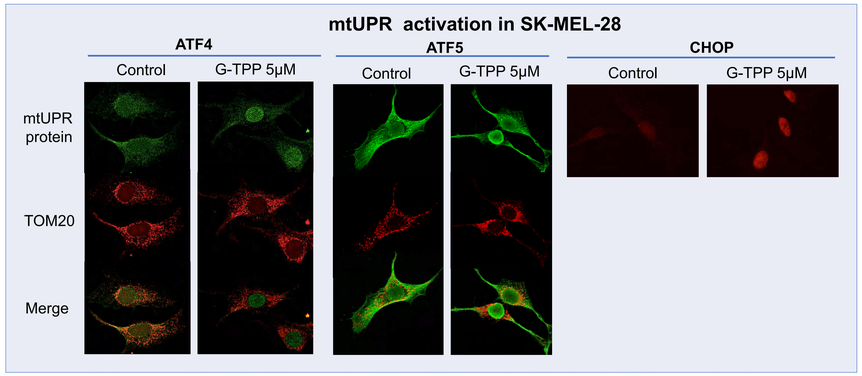

Figure 5. IF staining of SK-MEL-28 cells with ATF4, ATF5 and CHOP after G-TPP incubation for 5 hours

CONCLUSIONS

- SK-MEL-28 cells showed localization of ATF4 and CHOP to nucleus after stimulation of the mtUPR with G-TPP. ATF5 was localized to the nucleus but still appeared in the mitochondrial network.
- Silencing of mtUPR proteins slowed cell proliferation (not shown)
- Mitochondrial network showed increased fragmentation with silencing of each mtUPR proteins. Silencing of ATF5 appeared to have the most significant effect
- Preliminary results of IHC stains show no statistically significant difference in ATF4 or ATF5 between different skin samples; however, more samples may yield significant data for ATF4
- CHOP stained more positive in more dysplastic tissue ($p < 0.013$)

FUNDING & ACKNOWLEDGMENTS

This project was funded by the Sharon D. Cosloy Summer Research Program.

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Identifying Social Determinants of Health Among Mount Sinai Adult Emergency Department Patients

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[1]Icahn School of Medicine at Mount Sinai; [2]Department of Emergency Medicine, Icahn School of Medicine at Mount Sinai

OBJECTIVE

To assess the social determinants of health afflicting adult Emergency Department patients at the Mount Sinai Hospital.

BACKGROUND

- Social determinants of health (SDoH) are socioeconomic and environmental factors that affect health.
- Despite their wide recognition in the medical community, little is known about the SDoH needs and the required resources needed to address them among vulnerable populations in the emergency department setting.
- Addressing SDoH risk factors could improve health outcomes and eliminate health disparities.

METHODS

- Prospective study of randomly selected, medically stable, English speaking adults in the Mount Sinai Emergency Department.
- Participants underwent a structured interview of 27 previously validated questions assessing SDoH, including economic stability, education level, physical activity, and demographics.
- Those with a household income <138% of the NY State federal poverty level were defined as living below the poverty line.

RESULTS

Table 1. Demographics (n = 250); *Some identified with more than one race/ethnicity

Gender	n	%
Male	88	35%
Female	162	65%
Race/Ethnicity		
Black/African American	122	49%
Non-Hispanic White	34	14%
Hispanic/Latino	103	41%
Asian	9	4%
American Indian/Alaskan/Pacific Islander	3	1%

- 250 participants from July to November 2019 self-reported as: 65% female, 35% male, 49% Black/African American, 14% Non-Hispanic White, 41% Hispanic/Latino **(Table 1).**

Table 2. SDoH Risks

Education Level	n	%
High school diploma or less	111	44%
Some college or trade school	59	24%
College	65	26%
Masters or doctoral degree	15	6%
Insurance status		
Medicaid	123	49%
Uninsured	13	5%
Household income		
Below poverty line	95	38%
Financial Strain		
Very hard and somewhat hard	120	48%

- 48% reported financial strain, 49% reported having Medicaid, 38% reported living below the poverty line and 44% reported having a high school (HS) diploma or less **(Table 2).**

Table 3. Risk, Demographic Associations

	Below poverty line		≤ HS Diploma		Medicaid	
	OR	P-value	OR	P-value	OR	P-value
Race/Ethnicity/Education						
Non-Whites	**2.01**	**0.049**	**1.91**	**0.018**	-	-
Whites	-	-	0.14	<0.05	-	-
Hispanic/Latino	2.73	0.003	2.17	0.003	**1.74**	**0.032**
HS Diploma or less	**2.76**	**0.003**	-	-	-	-

	Financial Strain	
	OR	P-value
Gender/SES		
Male	0.44	0.002
Female	**2.30**	**0.002**
Below poverty line	**1.97**	**0.046**

- Non-whites more likely to live below the poverty line and to have a HS diploma or less.
- Hispanic/Latino ethnicity associated with having Medicaid and living below the poverty line.
- Having a HS diploma or less associated with living below the poverty line.
- Those who reported living below the poverty line tended to face financial strain **(Table 3).**

CONCLUSIONS

- Mount Sinai Emergency Department patients reported significant social determinants of health risks:
  - living below the poverty line
  - low education level (high school diploma or less)
  - Medicaid insurance
- These risks appear conducive to greater financial strain.
- Poverty and lower education level disproportionately impact non-white populations in the Mount Sinai Emergency Department.
- Future assessments of social determinants of health could inform future patient-specific health interventions.

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- The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Cytomegalovirus (CMV) Immunopositivity Does Not Correlate with Abnormal Sperm Parameters Within A Large Sperm Donor Population

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32

INTRODUCTION

- CMV detected in semen and sperm
- CMV+ human testes cultures have decreased number of precursor sperm cells
- Conflicting evidence regarding the association between CMV infection and sperm quality and/or reproductive potential.

OBJECTIVE

Investigate the association between CMV immunopositivity and sperm quality within a robust cohort of sperm donors.

METHODS

- **1310 males** who electively donated a sperm sample between Nov. 2007 and Dec. 2017
- **CMV IgG+ donors** (n=394) that tested positive within a month of their first donation
- **CMV IgG- donors** (n=916) that tested negative for the whole duration of their donation period.
- IgM+ or IgG seroconversion during donation period were excluded.
- Sperm parameters for every donation and BMI and age at first visit were collected.
- Association between IgG status and sperm quality was evaluated using **general estimate equation (GEE) model** to account for each donor's repeated donations.
- P-values are computed comparing IgG status using Student's t-tests or Wilcoxon rank-sum tests.

RESULTS

Table 1: Donor Parameters at Initial Visit [Median (IQR)]

Donor Parameters	CMV IgG+ (n=394)	CMV IgG- (n=916)	P-value
Age	26.0 (24.0, 30.0)	25.0 (23.0, 29.0)	**0.002**
Body Mass Index (kg/m^2)	24.3 (22.4,26.4)	24.3 (22.5, 26.0)	0.35
Total Sperm Count (M)	232.6 (156.0, 335.8)	250.4 (177.4, 346.8)	**0.02**
Total Motile Sperm (M)	173.2 (112.9, 247.5)	186.5 (129.0, 259.9)	**0.02**
Average Motility (%)	76.0 (69.0, 81.0)	75.0 (69.0, 82.0)	0.92
Average Concentration (M/mL)	77.0 (61.0, 99.0)	80.0 (62.5, 104.0)	0.18

Table 2: Association between IgG status and Sperm Parameters using GEE model (adjusted for age and BMI)

Sperm Parameters	Estimate (95% CI) [CMV IgG+ vs IgG-]	P-value
Total Motile Sperm (M)	-6.44 (-16.41, 3.53)	0.21
Total Sperm Count (M)	-10.02 (-22.56, 2.53)	0.12
Average Motility (%)	0.55 (-0.46, 1.55)	0.28
Average Concentration (M/mL)	2.92 (-1.08, 6.92)	0.15

CONCLUSIONS

This large-scale study of healthy male sperm donors demonstrated that immunological evidence of prior CMV infection does not significantly correlate with sub-optimal sperm parameters.

ACKLOWLEDGMENTS

- Financial Support: Icahn School of Medicine at Mount Sinai and Brown University
- California Cryobank

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Accuracy of ABC/2 for Measuring Intracranial Hemorrhage Volume After Minimally Invasive Endoscopic Intracerebral Hemorrhage Evacuation

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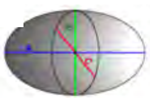
33

INTRODUCTION

Intracerebral hemorrhage (ICH) is the most severe form of stroke and a rapid determination of the volume can help determine the appropriate intervention.**1,2** Evidence from the MISTIE II and III trials suggests that minimally invasive ICH evacuation may decrease post-operative volumes directly related to the hematoma percentage evacuated, serving as a surrogate measure of efficacy for this procedure.**3-4** In this study, we tested the accuracy of the ABC/2 method against semiautomated threshold-guided segmentation software in the measurement of pre- and post-operative ICH.

METHODS

The pre- and post-operative CT scans of 77 patients who underwent minimally invasive endoscopic ICH evacuation were retrospectively analyze using ABC/2 and AnalyzePro™ SATGR software.

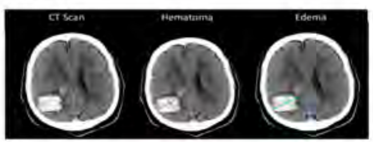


$$Volume = \frac{4}{3}\pi\left(\frac{A}{2}\right)\left(\frac{B}{2}\right)\left(\frac{C}{2}\right) \approx \frac{ABC}{2}$$

A = Maximum Diameter
B = Maximum Diameter Perpendicular to A
C = Height (Slice Thickness x Number of Slices)

Analyze Pro Software Method

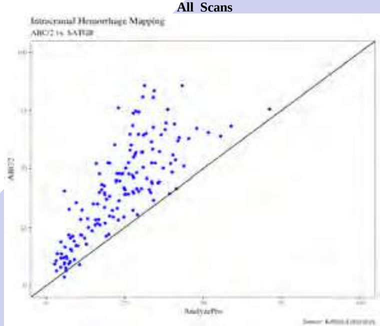
ABC/2 Method



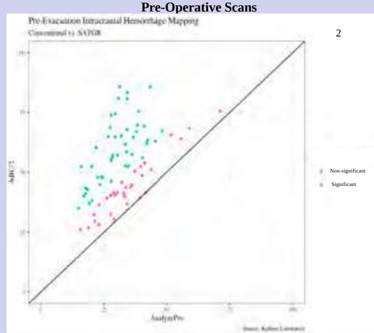
RESULTS

ABC/2 evaluation of pre-evacuation hematoma volumes was found to significantly overestimate the volume established by automated imaging software by an average of 21.1cc ($p<0.00001$) while post-evacuation was overestimated by 14.3cc ($p<0.00001$). Volumes in the ABC/2 group were dichotomized into two cohorts: ABC/2 volumes =15cc and >15cc different from the AnalyzePro™ volume. The volumes at which the ABC/2 model accurately determined hematoma volume was determined to be = 52.45cc (AUC= 0.8117) with a sensitivity and specificity of 83.7% and 78.8% respectively (95% CI: 0.77 – 0.88, 0.66 – 0.85). Preoperative hematoma volumes of = 52.45cc using ABC/2 were not significantly different from paired AnalyzePro™ volumes (p=0.19), however, hematoma volumes >54.25cc were significantly different ($p<0.00001$).

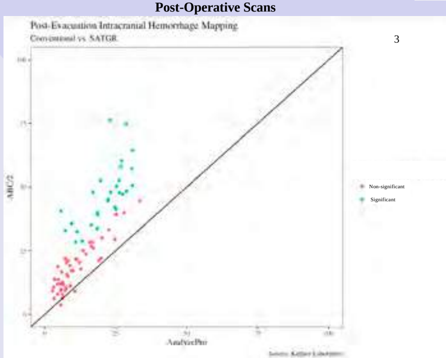
All Scans



Pre-Operative Scans



Post-Operative Scans



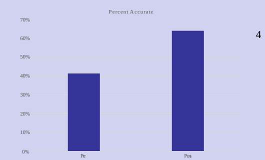


Figure 1 Scatter plot of ICH volumes using AnalyzePro™ and ABC/2 for all 77 scans. Black line indicates 100% accuracy.

Figure 2 Pre-operative ICH volumes coded based on clinically significant cut-offs of 15cc. Black line indicates 100% accuracy

Figure 3 Post-operative ICH volumes coded based on clinically significant cut-offs of 15cc. Black line indicates 100% accuracy

Figure 4 Post Comparison of accuracy with 42% of Pre-operative ABC/2 measurements being clinically accurate and 64% of Post-operative scans.

RESULTS

Pre-Operative Scans

Figure 7

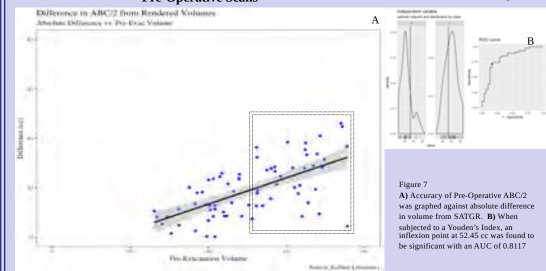


Figure 7
A) Accuracy of Pre-Operative ABC/2 was graphed against absolute difference in volume from SATGR. **B)** When subjected to a Youden's Index, an inflexion point at 52.45 cc was found to be significant with an AUC of 0.8117

Post-Operative Scans

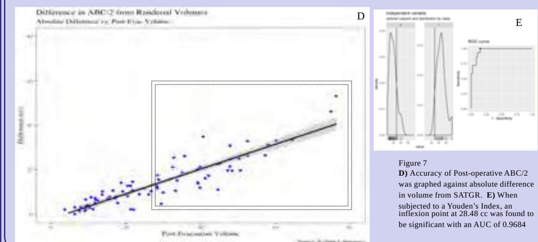


Figure 7
D) Accuracy of Post-operative ABC/2 was graphed against absolute difference in volume from SATGR. **E)** When subjected to a Youden's Index, an inflexion point at 28.48 cc was found to be significant with an AUC of 0.9684

CONCLUSIONS

1. ABC/2 is not as adept at accurately measuring ICH volume without serious modifications to the algorithm that would negate its time-saving value.[5,6]
2. Setting absolute difference thresholds to 15cc, there were distinct inflection points at 52.45cc pre-operatively and 28.48cc post-operatively suggesting that there are structural or systemic factors that cause deviations in accuracy above certain volumes.

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Successful Implementation of Simulation Program and Skills Center in the Dominican Republic Improves Surgical Residents' Laparoscopic Skills

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35

OBJECTIVES

- This study examines the outcomes of establishing a laparoscopic simulation center in the DR for training general surgery residents with the intention of determining the feasibility of implementing a training program in a low and middle income country (LMIC) setting.

INTRODUCTION

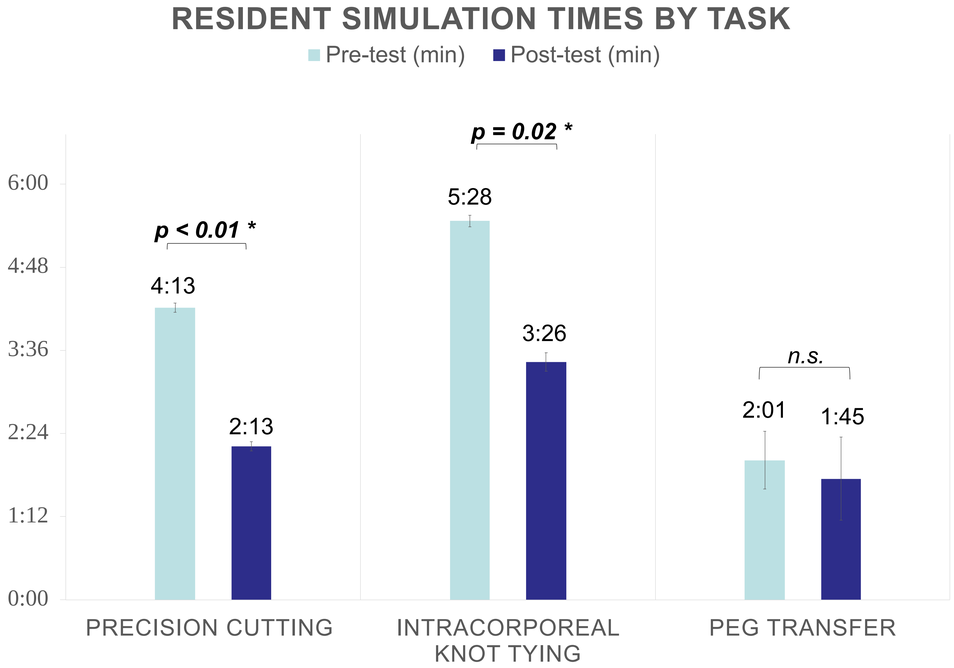
In developed countries, minimally invasive surgeries such as laparoscopy are the preferred method of treatment compared with open surgery due to decreased infection rates and expedited recovery times. However, laparoscopy is still underutilized in low and medium income countries (LMICs) due to financial and training burdens. Mount Sinai Hospital in NY introduced a laparoscopic surgery simulation center to a public hospital in Santiago, Dominican Republic (DR).

METHODS

- In August 2018, recruitment, simulation program introduction, and preliminary data were collected at the Hospital Jose Maria Cabral y Báez in Santiago, DR. The simulation center consists of three simulation stations in a dedicated room.
- Residents were required to practice one hour per week under the guidance of a general surgery PGY3 Mount Sinai resident.
- Ten months later, number of hours practiced was self-reported and follow-up data was collected.
- Study endpoints include times on 3 simulated laparoscopic tasks:
    1. Peg-transfer
    2. Precision cutting
    3. Intracorporeal knot tying
- Two-tailed paired t-tests were used to determine whether simulation times improved significantly

RESULTS

- Simulation was successfully incorporated into the Dominican general surgery resident training infrastructure.
- Residents averaged 25 hours of practice (range: 8-35; SD = 9.95)
- 85% of residents (11/13 residents) participated
    - 5 PGY1, 2 PGY2, 4 PGY3
- Resident simulation times significantly improved for precision cutting and intracorporeal knot tying.
- There was no significant difference in peg transfer times.
- There was no significant difference between resident years.



n.s. indicates no statistical significance

* indicates statistical significance

CONCLUSIONS

- The present study shows the successful integration of laparoscopic simulation program into a single LMIC surgical resident training program.
- In a ten month timeframe, resident simulation skills significantly improved in multiple components of laparoscopic surgery.
- With commitment from the local institution as well as the appropriate external resources, establishment of laparoscopic simulation centers are feasible and expandable in low income countries.

FUNDING AND ACKNOWLEDGMENTS

- The Ramon Murphy MD Program for Global Health Education at the Icahn School of Medicine at Mount Sinai.
- The General Surgery department at the Hospital Jose Maria Cabral y Báez.

Predictors of Early Catheter Removal in Pediatric Patients Undergoing Tunneled Catheter Placement

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36

OBJECTIVES

Identify **pre-operative risk factors** for development of central line-associated bloodstream infections (**CLABSIs**) and **early catheter removal**

INTRODUCTION

- Many pediatric patients undergo placement of tunneled central venous catheters (TCVCs) to receive chemotherapy, parenteral nutrition, and antibiotics[1]
- Infectious and mechanical failures can lead to premature catheter removal, resulting in increased healthcare costs, treatment delay, and more procedures[2]

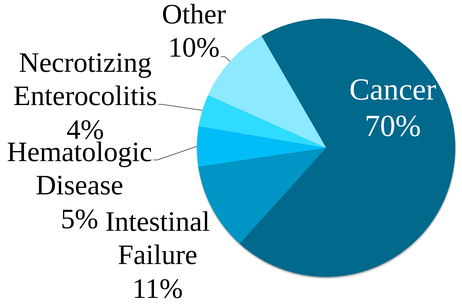
METHODS

- Retrospective cohort study of patients up to age 25 who had TCVCs placed between 2010-2019
- Characteristics were compared between patients who had a CLABSI or underwent catheter removal within 30 days, and those who did not

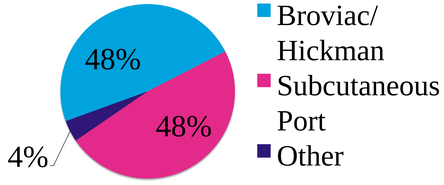
RESULTS

- **612 TCVCs** were placed in **425 patients**
- **64 CLABSIs** in 30 days, 16 (25%) of these necessitated removal
- **72 TCVCs removals** (12%) within 30 days, of which the majority were unplanned (78%)

Reason for Primary Catheter Placement



Type of Catheter Placed



Cause of Early Removal

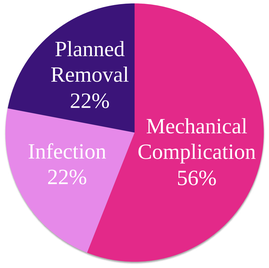


Table 1: Risk factors associated with early catheter removal

	Overall Cohort (n=612)	Early Removal (n=72)	No Early Removal (n=540)	P
Broviac/ Hickman	294 (48%)	64 (88.8%)	230 (42.6%)	<.0001
Prior Catheter	319 (52.1%)	53 (73.6%)	266 (49.3%)	.0001
Cancer	369 (60.3%)	20 (27.8%)	349 (64.6%)	<.0001
Age		Median = 1.3 years old	Median = 9.4 years old	<.0001

Table 2: Risk factors associated with early CLABSI

	Overall cohort (n=612)	CLABSI (n=64)	No CLABSI (n=548)	P
Broviac/ Hickman	294 (48%)	52 (81.2%)	242 (44.1%)	<.0001
Prior Catheter	319 (52.1%)	42 (65.6%)	277 (50.5%)	.0233
Pre op fever	70 (11.4%)	13 (20.3%)	57 (10.4%)	.0266

Table 3: Multivariate analysis for CLABSI development

	Odds Ratio	95% CI	P
Broviac/ Hickman	13.55	5.34-34.38	.008

CONCLUSIONS

- **Mechanical complications** are more common than infectious complications
- **Broviacs/Hickmans** have higher infectious complications and more early removals than ports
- **Younger patients** at more at risk for undergoing early catheter removal
- Patients who have had **prior catheters** are more at risk for CLABSI and early catheter removal
- Placement of TCVCs should be avoided in **febrile patients**
- Pre operative neutropenia is not a risk factor for CLABSI or early catheter removal

FUNDING & ACKNOWLEDGEMENTS

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Clinical Impact of Variants with Moderate-Penetrance Risk for Breast Cancer

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38

OBJECTIVES

Explore the prevalence and clinical impact of variants in genes considered to confer a moderate-penetrance risk for breast cancer in in an unselected, diverse patient population derived from the Bio*Me* biobank.

INTRODUCTION

- Approximately 10% of breast cancer patients harbor germline pathogenic variants,[1,2] of which >50% are in genes other than the high-penetrance BRCA1 and BRCA2 tumor suppressor genes[1,2]
- Multigene "panel testing" is available for 21 genes indicated for breast cancer, but there is a lack of consensus about the clinical validity of variants in genes (*PALB2*, *ATM*, *NBN*, *CHEK2*, and *NF1)*[1,3,4,5,6] with moderate-penetrance risk (relative risk > 2; absolute risk ~18%)[4]
- Moderate-penetrance genetic variants are found in 2-5% of individuals for clinical testing,[7] but the question remains: which results are actionable?

METHODS

- Study Population: Exome sequence data from 30,2223 adult Bio*Me* participants were evaluated for: pathogenic, likely pathogenic, and predicted loss of function (P/LP/pLOF) variants, together termed "expected pathogenic" (EP) variants in *PALB2, ATM, NBN, CHEK2,* and *NF1*
- Measurements: Prevalence of carriers was estimated in an unrelated subset of participants (*N*=27,815). Breast cancer cases and controls were defined with ICD 9/10 diagnosis codes extracted from electronic health records
- Analysis: Odds ratios were calculated and Pearson's chi-squared test was performed

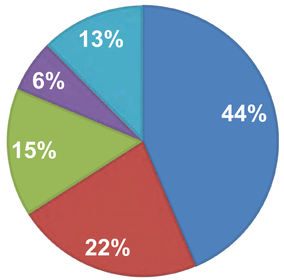
RESULTS

Table 1. Estimated Prevalence of EP Variants in Genes with Moderate-Penetrance Risk for Breast Cancer

Population	*N*	Mod-Pen variant positive, *N* (%)	Estimated prevalence
All sequenced participants	30,223	273 (0.9)	1:111
Unrelated subset	27,815	170 (0.6)	1:164
Self-reported ancestry (unrelated subset)			
African American/African	6,235	36 (0.6)	1:173
East/Southeast Asian	739	4 (0.5)	1:185
European	7600	56 (0.7)	1:136
Hispanic/Latino	9050	40 (0.4)	1:226
Native American	47	1 (2.1)	-
South Asian	585	1 (0.2)	-
Other	2272	9 (0.4)	-
Multiple selected	1078	11 (1.0)	-

Prevalence of *ATM, CHEK2, PALB2, NBN,* and *NF1* variants in all sequenced participants, in an unrelated subset of participants, across self-reported ancestry groups

Figure 1. Distribution of Carriers with EP Variants in Genes Conferring Moderate-Penetrance Risk for Breast Cancer

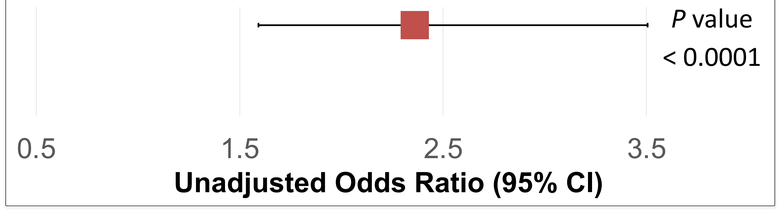


- Percentages (%) indicate carriers
- Legend indicates corresponding EP carrier count

ATM (64 variants)
CHEK2 (15 variants)
NBN (22 variants)
NF1 (16 variants)
PALB2 (23 variants)

RESULTS, CONT.

Figure 2. Association of Moderate-Penetrance EP Variant Carrier Status with Breast Cancer



CONCLUSIONS

- Carriers of EP variants in *PALB2, ATM, NBN, CHEK2,* or *NF1* had **increased odds** of breast cancer (OR 2.36, CI 1.59 to 3.51, p<0.0001) compared to noncarriers (Figure 2)
- Prevalence of EP variants in these 5 genes ranged from 1 in 136 to 1 in 226 across ancestry groups (Table 1)

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The Use of Rotational Thromboelastometry for Monitoring the Effects of Heparin in Pregnant Patients: An In Vitro Study

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41

OBJECTIVE

- To examine the use of rotational thromboelastometry (ROTEM®) for detecting heparin activity in pregnant patients using an in vitro methodology

INTRODUCTION

- Many women require anticoagulation (AC) during pregnancy
- The growing use of AC in pregnancy will have an impact on use and timing of neuraxial anesthesia (NA) for parturients
- Limited data exist on the pharmacokinetics and monitoring of unfractionated heparin in pregnancy
- No study thus far has examined the use of ROTEM® for detecting heparin activity in pregnant patients.

METHODS

- A prospective, in vitro study including 39 patients at 28+ weeks gestation, without history of bleeding or clotting disorder or on anticoagulation
- Venous blood samples were collected and heparin was added to achieve plasma concentrations of 0, 0.05, 0.1, 0.15, 0.2 and 0.3 U/mL
- ROTEM® and PTTs were performed on all samples
- Primary outcome: INTEM CT / HEPTEM CT ratio

RESULTS

Figure 1. INTEM / HEPTEM CT ratio vs plasma heparin concentration (with 95% CI)

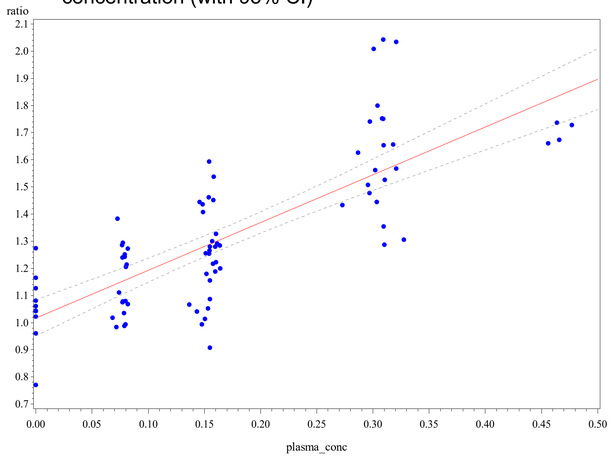
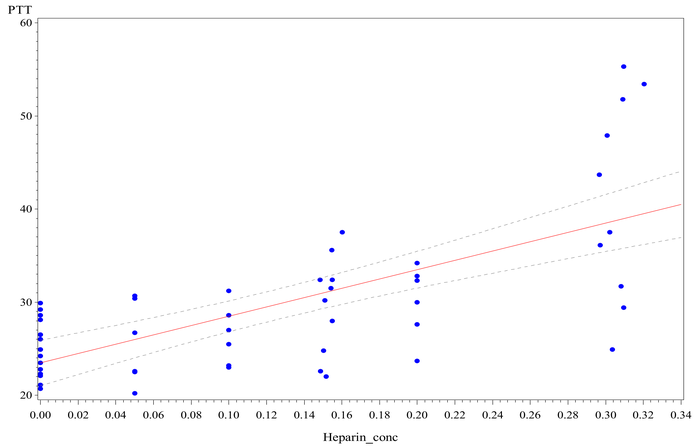
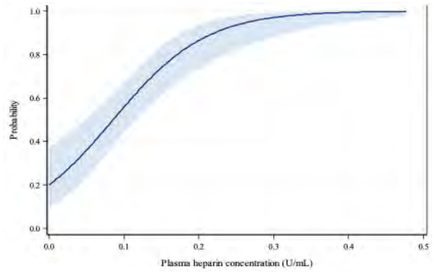


Figure 2 PTT vs plasma heparin concentration (with 95% CI)



Figures 3: Predicted probability of elevated INTEM / HEPTEM CT (>1.1)



Figures 4: Predicted probability of elevated PTT (> 35 s)

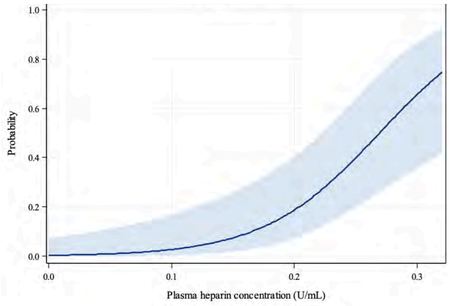


Table 1: Average INTEM CT, HEPTEM CT, INTEM / HEPTEM CT and PTT values at varying heparin concentrations

Heparin [ ] (U/mL)	INTEM CT (s)	HEPTEM CT (s)	INTEM / HEPTEM CT	PTT
0	150.7	146.3	1.0	25.1
0.05	155.8	152.2	1.0	25.5
0.1	169.2	153.3	1.1	26.4
0.15	184.3	147.8	1.3	29.7
0.2	181.7	145.7	1.3	30.1
0.3	250.3	147.8	1.7	41.2

CONCLUSIONS

- ROTEM® is a point-of-care, method for monitoring heparin activity in parturients
- The INTEM CT / HEPTEM CT ratio may be a more sensitive marker of heparin activity compared to PTT
- At routine doses of unfractionated heparin, the associated peak plasma heparin concentration (0.01 U/mL) on average does not demonstrate significant heparin activity using either ROTEM® or PTT

FUNDING & ACKNOLEDGEMENTS

- Thank you to my mentor, Dr. Katz, for his endless support, guidance and expertise - working with him is the greatest privilege
- Thank you to the PORTAL program for the opportunity to work with such incredible faculty and students, and for your support in this research
- The NCATS TL1 NRSA Training Grant for funding this research

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Molecular Mechanism(s) of Resistance to Vandetanib in Medullary Thyroid Carcinoma

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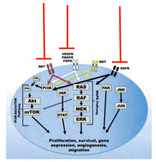
43

OBJECTIVE

Understand genetic and epigenetic alterations in Medullary Thyroid Carcinoma (MTC) that allow for proliferation of cancer and mediate resistance to growth inhibition by Vandetanib

INTRODUCTION

- MTC is a neuroendocrine tumor arising from parafollicular C cells of the thyroid, often associated with Multiple Endocrine Neoplasia (MEN) 2.
- MEN2A is caused by a mutation (C634W) in the rearranged during transfection (RET) gene.
- Vandetanib is a receptor tyrosine kinase inhibitor used to treat patients with MTC, but many patients develop resistant disease.[1]



METHODS

- TT cell line (RET mut p.C634W) was cultured in increasing concentrations of Vandetanib to generate a resistant cell line.
- Both sensitive and resistant cell lines underwent chromosomal analysis, exome sequencing, RNA sequencing, and methylation array analysis.
- Genome-wide CRISPR knock-out screen targeting 18,000 genes was performed using CRISPR-inactivation Toronto Knock-Out Version 3 Library.
- Dose-response curves were generated for molecular therapies targeting significant genes.

RESULTS

Chromosomal analysis and RNA sequencing demonstrated increased expression of RET C634W and other clinically significant genes in Vandetanib-sensitive and Vandetanib-resistant cell lines

Chromosomal Analysis: Changes in Zygosity Across the Genome

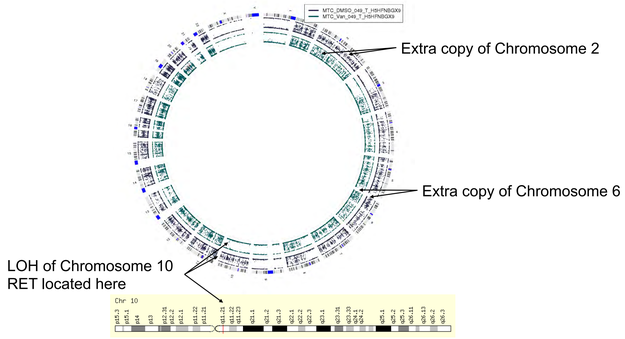
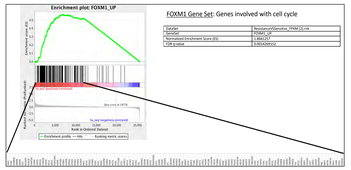
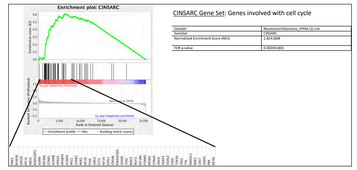


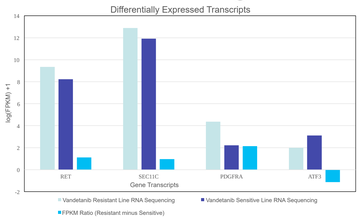
Figure 1: Changes in Zygosity in Vandetanib-Resistant vs Vandetanib Sensitive Cells *The image demonstrates differential chromosome copy number in the cell lines. The inner ring represents the Vandetanib-resistant cell line, while the outer ring represents the Vandetanib-sensitive line. The resistant line has increased heterozygosity of chromosomes 2 and 6, and loss of heterozygosity on part of chromosome 10.*

RNA Sequencing: Gene Set Enrichment Analysis





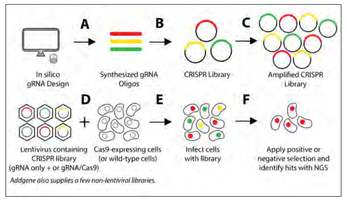
RNA Sequencing: Differential Expression

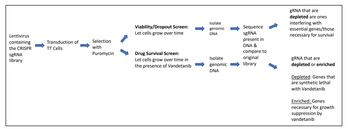


Transcript	Vandetanib-Resistant RNA Sequencing (FPKM)	Vandetanib Sensitive RNA Sequencing (FPKM)	FPKM Ratio (Resistant minus Sensitive)
RET	9.348374075	8.222408523	1.125965552
SEC11C	12.88444148	11.92030074	0.964140731
PDGFRA	4.368768349	2.22342255	2.145345799
ATF3	2	3.119356177	-1.119356177

Table 1: mRNA Transcript Differential Expression *Transcripts above were significantly differentially expressed in biopsies of patient MTC tumors (n=11)[2]. Here we demonstrate significantly greater expression of three transcripts (RET, SEC11C, PDGFRa) in the Vandetanib-resistant cell line as compared to the Vandetanib-sensitive, and significantly greater expression of one transcript (ATF3) in the Vandetanib-sensitive cell line as compared to the Vandetanib-resistant cell line.*

Genome-wide CRISPR knock-out screen identified enrichment of genes necessary for growth suppression by Vandetanib





CRISPR Knock-Out Enriched Gene of Interest	CRISPR Knock-Out gRNA Enrichment P-Values
C1orf94	.005
GORASP2	.003
MACROD2	.0002
MAP3K15	.044

Table 2: CRISPR Knock-Out Enriched Genes *Genes listed above were targets of guide-RNAs that were significantly enriched in the Vandetanib-resistant cell line as compared to Vandetanib-sensitive line, indicating that these genes may be important for growth suppression by Vandetanib. Mutation or upregulation of these genes is a potential mechanism of resistance to drug by MTC.*

CRISPR Knock-Out Depleted Gene of Interest	CRISPR Knock-Out gRNA Depletion P-Values
NEMF	0.00
KRTAP19-1	0.00
PDE4DIP	0.00
FGF22	0.00

Table 3: CRISPR Knock-Out Depleted Genes *Genes listed above were targets of guide-RNAs that were significantly depleted in the Vandetanib-resistant cell line as compared to Vandetanib-sensitive line, indicating that these are genes may be synthetic lethal withVandetanib. Mutation or downregulation of these genes is a potential mechanism of resistance to drug by MTC.*

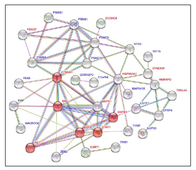
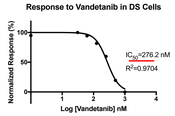
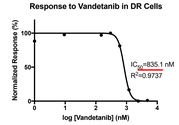


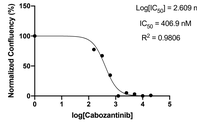
Figure 2: Gene Set Enrichment Analysis Connectivity Map *The image demonstrates the extensive interaction between enriched genes of interest in biologically significant pathways for cell cycle regulation and cell growth.*

Treatment of TT cells with alternative tyrosine kinase inhibitors as possible mechanism to overcome resistance.

DS: Drug Sensitive
DR: Drug Resistant







CONCLUSIONS & FUTURE DIRECTIONS

- DNA mutations and epigenetic modifications confer resistance of MTC to tyrosine kinase inhibition by Vandetanib.
- Adding further therapeutic agents to target these genetic alterations is a potential strategy for overcoming resistance.
- Future directions include exploring treatment of Vandetanib-resistant cells with proteasome inhibition, histone deacetylase inhibition, and HSP90 inhibition.
- CRISPR-activation library screening is a potential next step to identify overexpressed genes of interest.

FUNDING & ACKNOWLEDGEMENTS

Funding for the work was provided by the National Institutes of Health Medical Research Scholars Program and the National Cancer Institute.

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Inefficiency of the Pre-Incision Period of Microvascular Free Flap Reconstructive Surgery

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44

OBJECTIVES

- To evaluate the flow of the pre-incision period of microvascular free flap surgeries.
- To identify pre-incision inefficiencies and formulate potential quality improvement (QI) interventions.

INTRODUCTION

- Microvascular free flap reconstructions are resource intensive procedures.
- Previous work identified that a significant portion of surgery time is not spent operating, but rather during the pre-incision period.
- Correlation between increased OR foot traffic and compromised surgical sterility has been suggested.
- Optimizing OR efficiency to shorten surgical duration is of paramount importance to reduce postoperative morbidity, mortality and total cost.

METHODS

- Observational QI initiative looking at the pre-incision flow of microvascular free flap operations.
- The study was performed at Mount Sinai Hospital by trained medical students in 2 stages:
  1) 23 procedures were observed over a 16-week period with focus on reasons for OR entries and exits during the pre-incision period.
  2) 10 surgeries over a 14-week period were observed during the pre-incision period. Sequence of flow was recorded and analyzed.
- Preoperative huddle, in which information regarding the case is shared before the patient enters the room, was evaluated as a measure of preoperative communication.

RESULTS

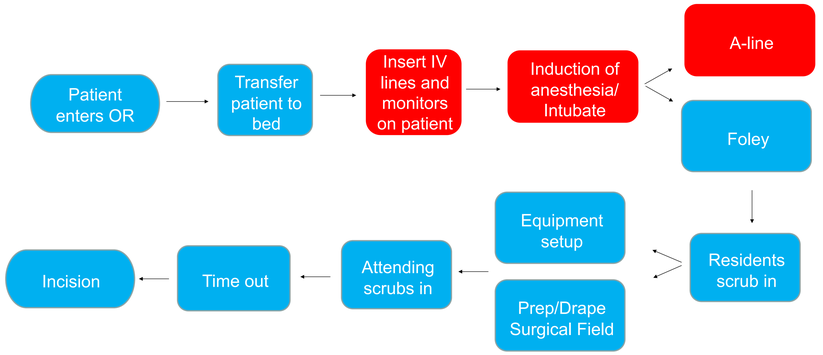

Figure 1. Pre-Incision Process Map

- ~1.6 hours/case (~20% total case time) was spent in the pre-incision period
- The two most time intensive activities during the pre-incision period were (Figure 2):
  - 30%: anesthesiologist procedures (i.e. insertion of IV lines, induction of anesthesia, airway management, A-line placement, etc.)
  - 20%: Sterile prep and draping of surgical site
- 50.2% of all entries and exits during the pre-incision period were for supplies or equipment needed for the case (Figure 3).
- The preoperative huddle only occurred 45% of the time in cases observed.

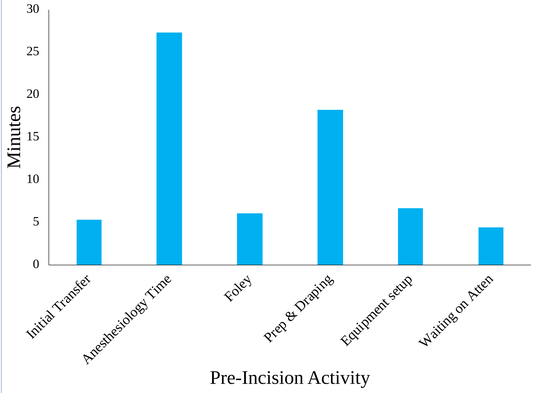

Figure 2. Distribution of Time Per Pre-incision Activity

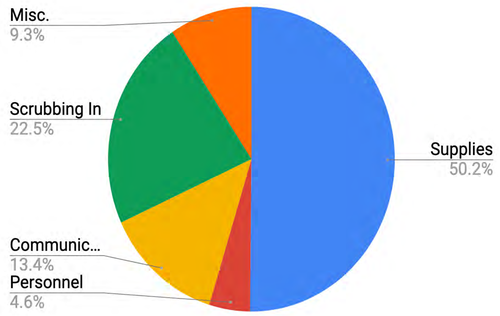

Figure 3. Reasons for Known Pre-Incision Entries and Exits

CONCLUSIONS

- The pre-incision period comprises a significant portion of total OR time during microvascular free flap reconstruction procedures.
- Developing better workflows, particularly for anesthesiology-related procedures and surgical prep may maximize productivity and efficiency.
- Insufficient availability of supplies is a key contributor to time spent during this period of time.
- Emphasis should be placed on consistent preoperative huddles to ensure everyone is one the same page regarding these workflows
- Future QI endeavors will focus on:
  - Strict adherence to the preoperative huddle that includes members from all involved teams
  - Streamlined supplies checklist for each case
  - Placement of IV lines in the pre-op holding area

FUNDING & ACKNOWLEDGMENTS

- This project received support through The Icahn School of Medicine's Summer Student Investigator Award.
- Department of Anesthesiology at the Icahn School of Medicine at Mount Sinai for use of the ORWatch Database.

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A COMPREHENSIVE ANALYSIS OF IMMUNE BIOMARKERS IN BLOOD OF ATOPIC DERMATITIS PATIENTS FROM INFANCY TO ADULTHOOD.

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45

INTRODUCTION

- Atopic Dermatitis (AD) is an inflammatory skin disease with clinical features including skin dryness, erythema, oozing and crusting, and pruritus.
- The pathogenesis of AD may be due to a variety of factors, to include dysregulations in the innate immune response, skin barrier abnormalities, and an altered skin microbial flora.
- It affects approximately 5 to 20 percent of children worldwide with an incidence that appears to be increasing, with 85% of AD cases presenting before 5 years of age.[1]
- While it has been shown that young adults have a different AD phenotype than that of elderly patients, immune changes in AD between early childhood and adulthood are unknown.[2]
- To date, there have been no studies directly comparing consecutive age groups of AD with age-matched controls, which is important in understanding normal versus pathological development of acquired immunity.
- Therefore we sought to compare the immune activation and cytokine polarization in blood of patients with AD and age-matched controls using flow cytometry.

METHODS

Patient and Samples:

Blood was obtained from AD patients ranging from infants 0-5y/o (n=39), children 6-11y/o (n=26), adolescents 12-17y/o (n=21) and adults >18y/o (n=43), with healthy age-matched controls subjects (24-30 patients for each age group) included to differentiate pathologic from physiologic immune maturation.

Flow Cytometry Analysis:

Flow cytometry was used to measure IFN-γ, IL-9, IL-13, IL-17, and IL-22 cytokine levels in CD4+/CD8+ T cells, with inducible co-stimulator molecule and HLA-DR defining midterm and long-term T-cell activation, respectively, within skin-homing/cutaneous lymphocyte antigen (CLA)+ versus systemic/CLA− T cells

Statistical Analyses:

Statistical analyses were performed using the statistical language R. Unsupervised clustering differentiated patients based on their blood biomarker frequencies..

RESULTS

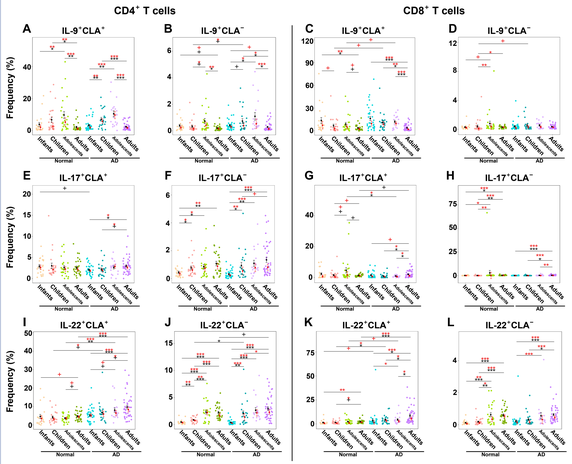


Fig 1. IL-9+ (A-D), IL-17+ (E-H), and IL-22+ (I-L) frequencies in CLA+, CLA−, CD4+, and CD8+ T cells in healthy control subjects and patients with AD across ages. Bar plots represent means (black)/medians (red) ± SEMs. *P < .05, **P < .01, ***P < .001, and +P < .1.

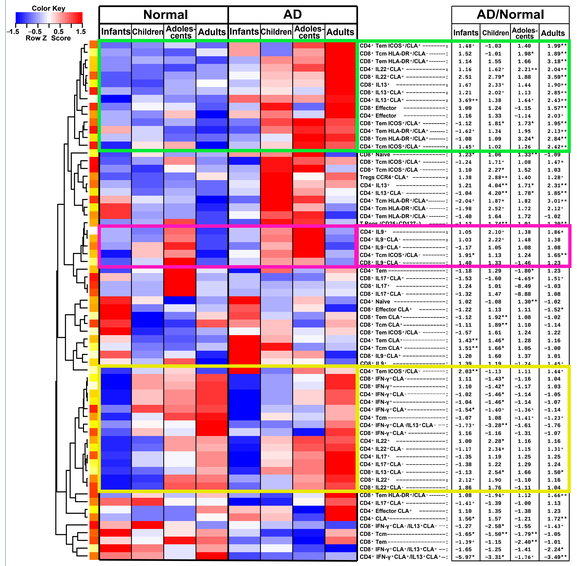


Fig 2. Unsupervised hierarchical clustering heat map displaying polarized T-cell subsets for control subjects and patients with AD across age groups (red, positive/increase; blue, negative/decrease). FCHs of mean frequencies of patients with AD versus control subjects for each age group are listed at *right*. The green cluster includes subsets that were relatively low and stable among control subjects but incrementally increased with age in patients with AD. The *pink box* shows increased IL-9 frequencies in childhood, which decrease in adulthood, particularly in patients with AD. The *yellow cluster* shows markers with increased levels in both control subjects and patients with AD. *P < .05, **P < .01, ***P < .001, and +P < .1.

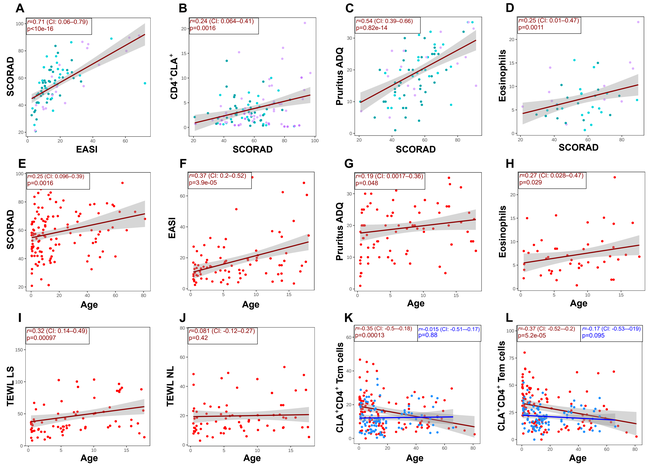


Fig 3. Spearman correlation scatter plots (linear regression [red, AD; blue, control line] with their 95% CIs [gray]) for SCORAD score (A-E) and age (F-L) versus clinical measures and Tem/Tcm cell subset frequencies (percentages). Dot colors in Fig 6, A-D and F, designate different AD patient ages from infancy to adulthood, as shown in Fig 1. ADQ, Atopic Dermatitis Quickscore; LS, lesional; NL, nonlesional.

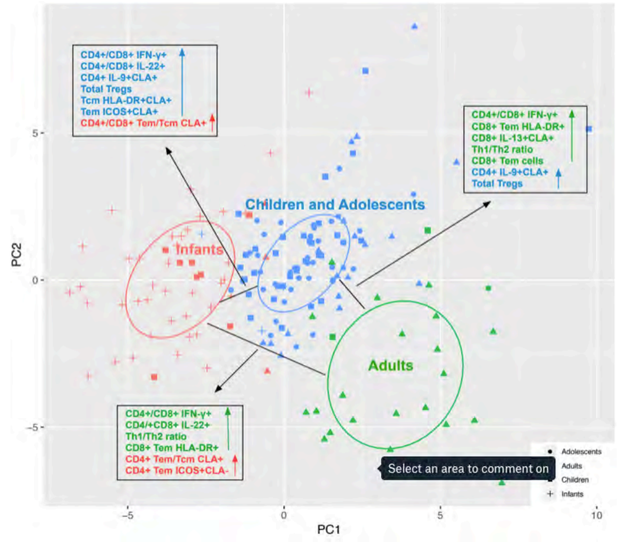
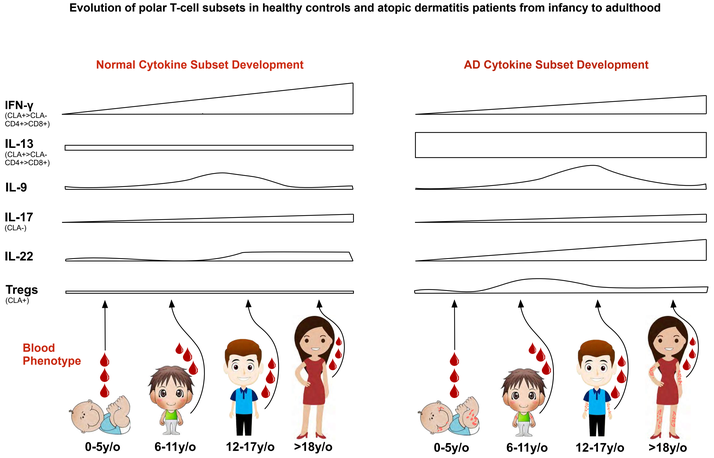


Fig 4. Unsupervised clustering of patients with AD across all principal components of the blood flow cytometric marker frequencies (percentages) by using k-means analysis. In patients with AD, frequencies of different markers defined 3 meaningful age clusters aligning along a spectrum. Although infants (pink ellipse) clustered on the far left and adults (green ellipse) clustered on the right, children and adolescents (blue ellipse) clustered together between the other age cohorts. Markers that best distinguished between clusters appear in the boxes between 2 cohorts (colors of markers parallel colors of the relative age group). Arrows designate increased frequencies of a given marker among the specific age group. In healthy control subjects clusters did not clearly align patients along an age spectrum.



Abbreviations: AD, Atopic dermatitis; CLA, Cutaneous lymphocyte antigen; IFN-γ, Interferon γ; IL, Interleukin; Tregs, T-regulatory cells

CONCLUSIONS

- Th1 frequencies increase with age in both AD and control infants. However, AD subjects display significantly lower IFN-γ frequencies than controls, particularly among CD4+CLA+ subsets
- Conversely, CLA+Th2 cells are similarly increased across all AD age groups and are significantly higher than controls, even in infants.
- Systemic/CLA- Th2 cells are significantly higher in AD starting in childhood, which implies systemic Th2 activation with greater chronicity
- Skin-homing Th22 is elevated in children, adolescents and adults with AD vs. controls.
- Despite common features, particularly elevated Th2 expression, AD is endotypically different across ages, and treatments should rather be tailored to the unique age endotype.
- AD was initially considered an early-onset pediatric disease with 75% “outgrowing” their disease by 10 years of age. However, more recent studies have established AD as a disorder that often persists into adulthood. Therefore, comparing the profile of cleared vs persistent pediatric AD, ideally through longitudinal studies, will better define age-specific characteristics that predict AD clearance.

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EFFECTS OF INHIBITING EARLY INFLAMMATION IN KIDNEY TRANSPLANT PATIENTS

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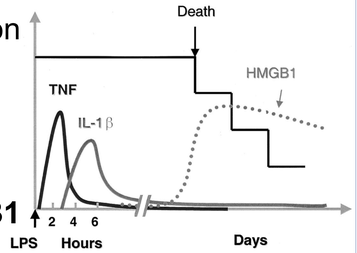
47

INTRODUCTION

- **Ischemia reperfusion (IR)** injury causes **delayed graft function (DGF)**, and negatively impacts long term graft survival
- Causes production and release of inflammatory cytokines and molecules like **TNFa** and **HMGB1**



- In murine studies, **anti-TNFa blockade** prevents the adverse effects of IR

OBJECTIVES

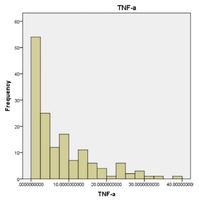
- Characterize levels of **inflammatory cytokines and initial clinical outcomes** in an ongoing clinical trial population of human kidney transplant recipients
- Assess the mechanistic impact of **infliximab** (anti-human TNF) on posttransplant TNFa production

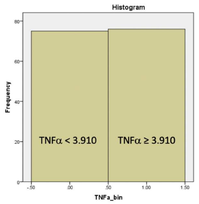
METHODS

- Samples obtained from an **ongoing randomized multicenter clinical trial** of 225 deceased donor kidney recipients
- Levels of serum cytokines and urine HMGB1 measured on days 1 and 7 posttransplant using **ELISA**
- Clinical outcomes reported by the respective centers

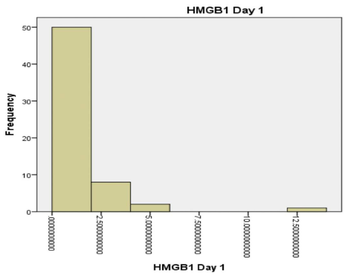
RESULTS

- The distribution of TNFa values was converted into a **binomial distribution** with a cutoff of 3.910

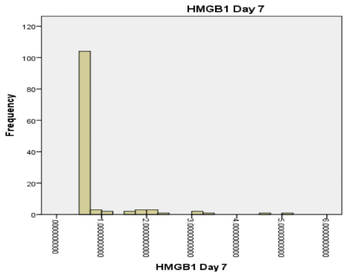




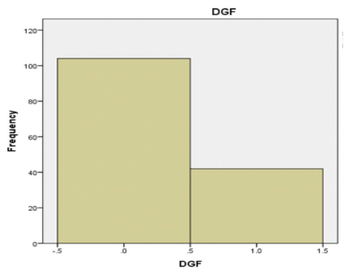
- **HMGB1 Day 1**
  n = 61
  28/61 samples above detection threshold (46%) with 1 outlier



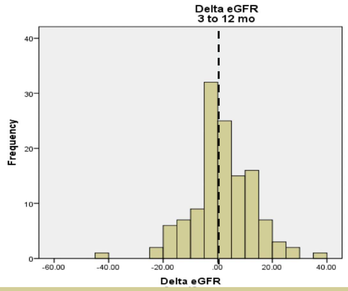
- **HMGB1 Day 7**
  n = 123
  21/123 samples above detection threshold (17%)



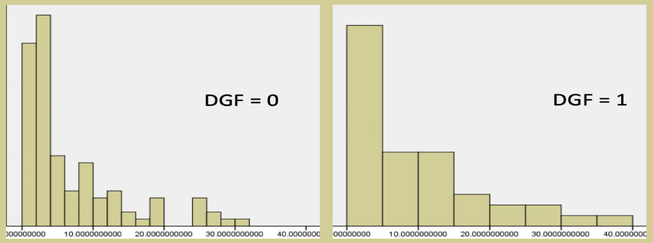
- Out of 146 available samples, 42 patients had an episode of **DGF** while 104 patients did not



- Change in **eGFR** from 3 months to 12 months for all 124 available samples (for 67, ΔeGFR > 0)



Preliminary analyses indicated:



- Higher levels of TNFa on day 7 posttransplant in the DGF group(t=1.9, p=0.061)
- Higher levels of day 7 serum TNFa → elevated levels of day 7 urine HMGB1 (t=1.9, p = 0.052)
- Highest quartile of day 1 urine HMGB1 were more likely to have DGF (X^2=4.4, p = 0.035)

CONCLUSIONS

- Preliminary findings: relationship between TNFa and DGF as well as TNFa and HMGB1
- **Higher levels of inflammatory markers are associated with adverse outcomes**
- Reducing cytokines should yield improved graft function
- When the trial is finished, the **causal effect of infliximab** on posttransplant levels of inflammatory cytokines and clinical outcomes can be measured

FUNDING & ACKNOWLEDGEMENTS

- Funded by the department of Medical Education

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History of UV-related keratinocytinic carcinomas is increased in patients with exfoliation syndrome

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50

OBJECTIVES

- Understand the relationship between **ultraviolet (UV) light exposure** as a risk factor for developing **exfoliation syndrome**

INTRODUCTION

- **Exfoliation syndrome (XFS)** is a systemic disease in which abnormal extracellular matrix deposits are found in the anterior segment of the eye, and can lead to glaucoma (XFG)
- Recent epidemiological studies have showed that **increased time spent outdoors in young adulthood** and activity over water or snow may elevate the risk of XFS[1]
- Wearing sunglasses, but not brimmed hats decreases the risk of XFS[1]

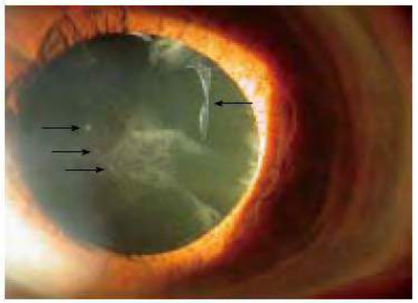

***Figure 1**. Exfoliation material on the anterior lens surface of the eye[2]*

METHODS

- Performed a **cross-sectional clinical survey** to evaluate whether a history of UV-related carcinomas--basal cell (BCC)/squamous cell (SCC) was more prevalent in XFS/XFG patients compared to primary open angle glaucoma (POAG) patients and those without glaucoma
- Patients between ages 50-90 were interviewed
- Inquired about ancestry, natural eye color, glaucoma diagnosis, likelihood of tanning or burning in the sun, natural hair color at age 18, and diagnosis of SCC/BCC
- **Univariate analysis** was performed with ANOVA
- **Multivariate logistical regression** controlling for age, sex, ancestry, eye color, hair color, tan vs. burn, POAG, hypertension, and diabetes was performed comparing SCC/BCC history in XFS vs POAG and controls

RESULTS

	XFS	POAG	Control
Age +/- SD			
Mean age in years [Standard deviation]	77.4[7.2]	74.3[9.5]	67.2[7.8]
Sex			
Male	25	24	18
Female	22	30	17
Eye Color			
Brown	24	20	15
Blue	13	19	11
Green	3	5	3
Hazel	7	10	6
Other	0	0	0
Medical History			
Hypertension	13	19	11
Diabetes	1	9	6
Tan vs Burn			
Tan	25	29	15
Burn	22	25	20
Hair Color			
Black	7	2	3
Dark Brown	18	28	12
Light Brown	0	14	10
Red	2	1	4
Blonde	9	9	6
BCC			
Yes	18	9	6
No	29	45	29
SCC			
Yes	10	5	3
No	37	49	32
BCC or SCC			
Yes	21	10	8
No	26	44	27

***Table 1**. Demographic and medical history data of patients recruited for the study. Total mean age of patients enrolled was 73.6[9.1] years*

- 136 patients with mean age 73.6[9.1] years (51% female; 100% Caucasian) enrolled
- In one-way ANOVA, there **was significant difference in history of BCC/SCC** among the two groups [F(2,133), =4.85, p=0.009]
- Post hoc analysis showed a **nearly two-fold increase** in odds of BCC/SCC in XFS/XFG patients vs controls (44% vs 23% in controls, p=0.03) and vs POAG (19% in POAG patients, p=0.04)
- Multivariable analysis shows XFS/XFG patients had **significantly increased odds of having either BCC or SCC** compared to a combined POAG/control reference group (OR=2.70; 95% CI=1.10-6.6)

CONCLUSIONS

- History of **UV-related keratinocytic carcinomas is increased in XFS/XFG patients** versus patients with POAG or patients without glaucoma
- Consistent with the hypothesis that **UV exposure in young adulthood is a risk factor for developing XFS/XFG**
- 95% CI is very large, so additional recruitment is needed to solidify this effect
- Additional analysis regarding laterality of skin carcinomas and XFS will also help to better incriminate UV exposure as a risk factor for XFS

FUNDING & ACKNOWLEDGEMENTS

- This research was approved by the Institutional Review Boards at the Icahn School of Medicine at Mount Sinai
- The study was funded by the Department of Medical Education at the Icahn School of Medicine at Mount Sinai

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IMPROVEMENT IN PRACTICE OPERATIONS AT AN AMBULATORY SITE IN ACCRA, GHANA

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51

INTRODUCTION

- Korle-Bu Teaching Hospital's Central Outpatient Department in Accra, Ghana sees almost 30,000 patients a month.
- With Ghana's increased prevalence of non-communicable diseases, there is a growing need to alter clinic practices to optimize patient workflows.

OBJECTIVES

- To study existing practices and offer recommendations to optimize the outpatient department's operations

Figure 1. Overflow of waiting room into hallway

METHODS

- A time motion study was conducted that included all patient genders & ages
- Patients were enrolled by stratified random sampling from two populations: those who self-pay and those with insurance.
- A time sheet was placed in their folder for staff at major checkpoints (records office, insurance or cash lines, type of clinical visit, etc.). Time results were analyzed using descriptive statistical analysis.

Time Tracking Form for Out Patient Department

Date: _____

Study ID: _____

Mode of Payment: ☐ Cash ☐ NHIS

Time Log

"Time In" is when the patient enters the queue, "Time Out" is when they finish at your desk

	Time In	Time Out	Comments
1. Pick Up Medical Record			
2. Insurance Processing			
3. Cash Payment			
4. Vitals			
5. Doctor Consult			
6. Booking Follow Up Appointment			

Age: _____ Sex: _____

Type of Appointment ☐ New ☐ Follow Up

Type of Clinic:

☐ General/Physician Specialty

☐ Neuro ☐ Renal ☐ Dermatology

☐ Endocrinology ☐ Rheumatology ☐ Obstetrics

☐ Gastro ☐ Asthma/Respiratory

Patient Assisted (wheelchair or Zimmer Frame use?) ☐ Yes ☐ No

Was the patient with caregiver/family member/accompaniment? ☐ Yes ☐ No

Which clinician saw patient? ☐ HO ☐ MO ☐ Resident ☐ Consultant

Reason for Appointment: _____

Figure 2. Time Tracking Form

RESULTS

Average Time Spent in Clinic	Time
Patients Who Self-Pay	2 hours 55 minutes
Patients with Insurance	3 hours 59 minutes
Average Total	3 hours 44 minutes

Table 1. Average Time Spent in Clinic

Queue	Average Time Spent
Insurance	43 Minutes
Cash (Including Self Pay or After Insurance Processing)	33 minutes

Table 2. Average Time Spent on Cash and Insurance Queues

Average:	
Time Waiting to See Clinician Post Giving Vitals	1 hour 36 minutes
Length of Consultation with Clinician	25 minutes
Number of Patients a Day	75 patients
Number of Clinicians Working a Day	9 Clinicians

Table 3. Average Values

FINDINGS

- Patients who self pay wait on one less queue than those who use insurance, therefore, their wait time is reduced by almost an hour.
- Nearly half of the time a patient spends in the clinic before seeing a clinician is spent waiting for the clinician after taking vitals.
- Along with having a limited total number of clinicians, patient back logs may form because most of the clinicians haven't arrived by the time the nurses have finished taking the vitals of most of the patients.

DISCUSSION AND CONCLUSION

- The staff within and between different points of care have staggered arrival times, which may contribute to the patient back logs in the clinic.
- Recommendations include:
  - Streamline insurance and cash queue processes
  - Creation of appointment time blocks
  - Restructure clinician schedules
  - Offer way-finding signs
  - Reduce gaps in staff arrival times

FUNDING & ACKNOWLEDGMENTS

- The Ramon Murphy MD Program for Global Health Education at the Icahn School of Medicine at Mount Sinai
- Korle Bu Teaching Hospital Accra, Ghana

The Use of Machine Learning to Predict Renal Replacement Therapy-Free Survival in Patients Who Require Continuous Renal Replacement Therapy

52

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Icahn School of Medicine at Mount Sinai

BACKGROUND

- Prior studies have yielded conflicting results for predictors of continuous renal replacement therapy (CRRT) discontinuation and survival after discontinuation.
- Most of these studies used data during or after the courses of CRRT which are not practical for decisions that need to be made before CRRT initiation.
- We tested several approaches to predict renal replacement therapy-free survival (RRTFS) after CRRT initiation in critically ill patients with acute kidney injury (AKI).

METHODS

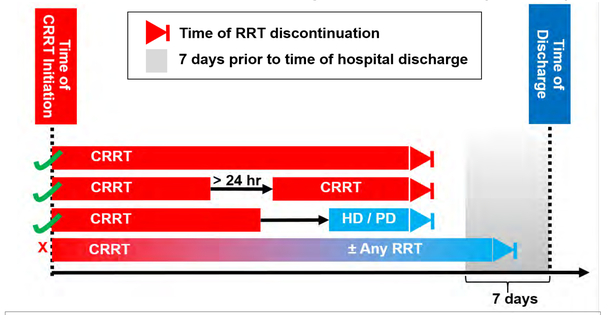
- We included patients who were aged ≥18 with AKI requiring CRRT for ≥24 hours. We considered CRRT sessions with discontinuation <24 hours in-between as the same session with data from the Medical Information Mart of Intensive Care III (MIMIC-III) database. RRTFS was defined as in **Figure 1**.
- Only features between the time of ICU admission and prior to CRRT initiation were used; this included the features shown in **Table 1**.
- We randomly split the dataset into training and test sets (80:20).
- We used logistic regression (LR), random forest (RF), support vector machine (SVM), logistic least absolute shrinkage and selection operator (LASSO), and a multi-input deep learning (ENSEMBLE) to predict RRTFS. The models' performances were evaluated by area under the receiving-operating characteristics (AUROC).

Table 1. | The characteristics of patients in the study.

	Patients with RRTFS n = 179	Patients without RRTFS n = 387
Male, n (%)	110 (62)	258 (67)
Age, years, median (IQR) *	60 (49-70)	65 (52-76)
Weight, kg, median (IQR)	92 (77-111)	93 (80-107)
Race/Ethnicity, n (%) *		
White	130 (73)	260 (67)
Black	17 (10)	27 (7)
Hispanic	11 (6)	11 (3)
Unknown	13 (7)	76 (20)
Charlson comorbidity index, median (IQR) *	4 (3-7)	5 (4-7)
Comorbidities, n (%)		
Diabetes mellitus	65 (36)	124 (32)
Hypertension	86 (84)	196 (51)
Congestive heart failure	71 (40)	174 (45)
Valvular heart disease	35 (20)	82 (21)
Chronic pulmonary disease	35 (20)	77 (20)
Liver disease *	35 (20)	115 (30)
Alcohol abuse *	11 (6)	46 (12)
Solid tumor	7 (4)	14 (4)
Metastatic cancer	2 (1)	13 (3)
Mode of first CRRT session, n (%)		
CVVH	11 (6)	27 (7)
CVVHD	60 (34)	134 (35)
CVVHDF	83 (46)	156 (40)
CVVH + CVVHD	21 (12)	56 (15)
CVVH + CVVHDF	1 (1)	4 (1)
CVVHD + CVVHDF	3 (2)	5 (1)
Parameters prior to CRRT initiation, median (IQR)	74 (69-82)	74 (69-7)
MAP (mmHg)	44.5 (28.0-65.5)	53.0 (33.0-78.0)
BUN (mg/dL) *	2.8 (1.8-4.1)	2.6 (1.7-3.8)
Cr (mg/dL)	9.9 (9.1-10.8)	9.8 (9.2-10.6)
Hb (g/dL)	2.2 (1.5-3.6)	2.5 (1.7-4.6)
Lactate (mmol/L) *		
Parameters at CRRT initiation, median (IQR)	101 (56)	265 (69)
Required any vasopressor *	0.2 (0.1-0.5)	0.3 (0.1-0.6)
Urine (mL/kg/hour) *	65 (25-122)	71 (40-141)
Loop diuretic (mg/day)‡		
In-hospital mortality, n (%) *	0	296 (76)

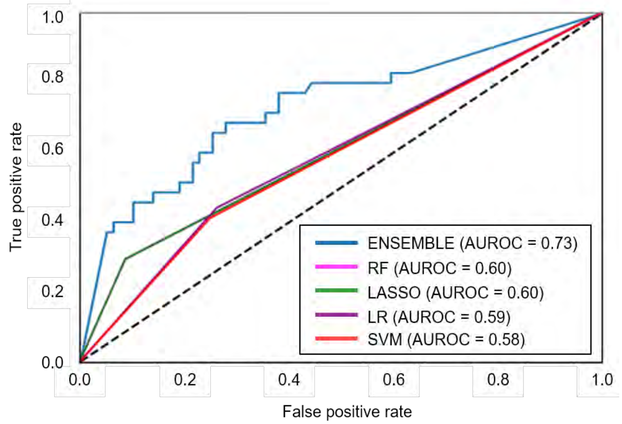
* P value <0.05, ‡Equivalent dose to intravenous furosemide

Figure 1. | The primary outcome of the study: Renal Replacement Therapy-Free Survival (RRTFS).



RRTFS was defined as patients who were discharged alive and did not require any RRT for more than 7 days prior to hospital discharge.

Figure 2. | The performance of machine learning models on RRTFS.



ENSEMBLE, multi-input deep learning (ENSEMBLE); RF, random forest; LASSO, logistic least absolute shrinkage and selection operator; LR, logistic regression; SVM, support vector machine

RESULTS

- The ENSEMBLE model had up to 13,853 time-dependent features, where each measurement accounted for one feature, and there were an additional 606 categorical features for each patient.
- There were 806 patients who met the inclusion criteria. After exclusion of 94 patients with ESRD and 146 patients who received CRRT for <24 hours, we included a total of 566 patients.
- There were 179 (32%) and 387 (68%) patients with and without RRTFS, respectively.
- The median (IQR) age of the patients was 63 (51-74) years, 368 (65%) were male, and 390 (69%) were white. The first CRRT mode were CVVHDF and CVVHD in 239 (42%) and 194 (34%) patients, respectively. Vasopressors were required in 366 (65%) patients. **(Table 1)**
- 296 (76%) patients without RRTFS had in-hospital mortality and 91 (24%) were discharged within 7 days after discontinuing RRT.
- The ENSEMBLE model gave the highest performance with an AUROC of 0.73 (95% CI 0.62-0.83), followed by RF 0.60 (95% CI 0.52-0.72), LASSO 0.60 (95% CI 0.51-0.68), LR 0.59 (95% 0.49-0.68), and SVM 0.58 (95% CI 0.49-0.68). **(Figure 2)**

CONCLUSIONS

- We evaluated a variety of approaches for the prediction of RRTFS in critically ill patients with AKI initiated on CRRT and found that deep learning significantly outperformed other approaches.
- Additional validation is necessary before application into clinical practice.

Investigation of the oral metabolome and cytokine milieu in pediatric food allergy

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OBJECTIVES

- Characterize oral metabolite profiles in children with and without peanut allergy
- Explore the relationship between oral tolerance and the mucosal cytokine milieu

INTRODUCTION

Metabolites produced by commensal bacteria have been shown to modulate oral tolerance and food allergy development in murine models. Short-chain fatty acids (SFCAs) produced by these bacteria have also been shown to protect against food allergies in mice by suppressing Th2 polarization. However, human studies on this topic have been limited.

METHODS

- Saliva was collected from peanut-allergic subjects, atopic controls without food allergy, and nonatopic controls
- SCFA measurements were performed by mass spectrometry
- Cytokine levels were quantified by a cytometric bead array system
- Cytokine and SCFA levels were compared via ANOVA

RESULTS

Table 1. Baseline Demographics and Clinical Characteristics

	Healthy Controls	N	Atopic Controls	N	Peanut-Allergic	N
Age, mean (SD) years	10.5 (4.9)	44	10.7 (4.3)	26	9.00 (3.8)	53
Sex						
Female	50%	22	30%	6	36%	14
Male	50%	22	70%	20	64%	39
Ethnicity						
African-American	18%	8	12%	3	2%	1
Asian	25%	11	23%	6	15%	8
White	36%	16	23%	6	68%	36
Other	20%	9	42%	11	15%	8
Vaginal Delivery	45%	20	50%	13	70%	37
C-Section	55%	24	38%	10	30%	16
Antibiotic Use						
Antibiotics within the past 3 months	5%	2	23%	6	8%	4
Never use or > 3 months	95%	42	65%	17	92%	49
Probiotic Use						
Within the past month	18%	8	12%	3	21%	11
Never use or > 1 month	82%	36	77%	20	77%	41
Multivitamin Use						
Yes	36%	16	54%	14	60%	32
No	64%	28	35%	9	36%	19
Prenatal Antibiotics						
Yes	5%	2	0%	0	13%	7
No	95%	42	100%	26	87%	46
Prenatal Probiotics						
Yes	5%	2	8%	2	8%	4
No	93%	41	81%	21	92%	49
Prenatal Vitamins						
Yes	91%	40	85%	22	83%	44
No	5%	2	4%	1	17%	9
Braces						
Braces	11%	5	4%	1	13%	7
No braces	89%	39	85%	22	87%	46

Figure 1. Metabolite Concentration in Healthy Controls, Atopic Controls, and Peanut Allergic Individuals

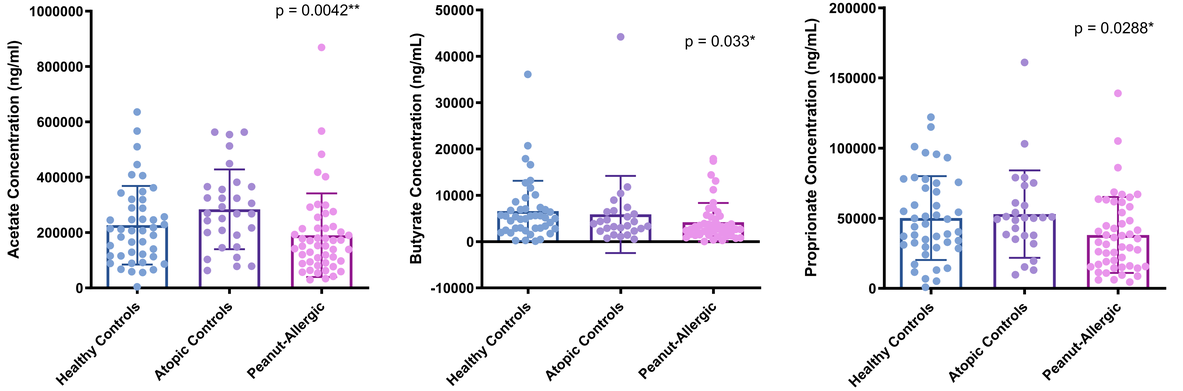
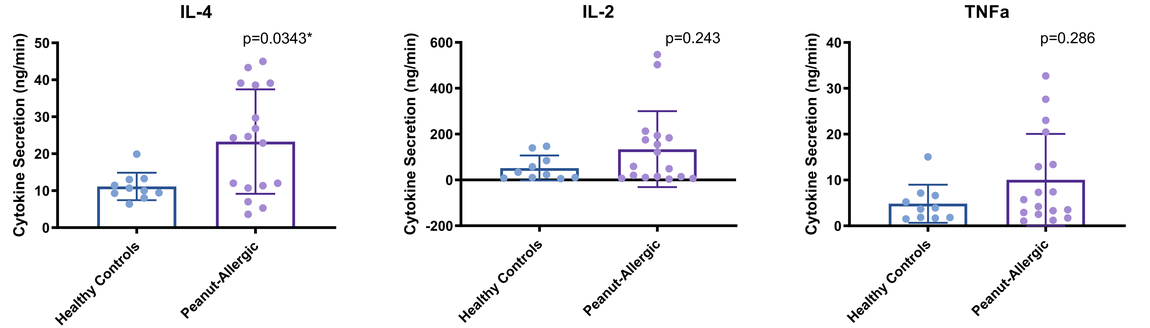


Figure 2. Cytokine Secretion in Healthy Controls, Atopic Controls, and Peanut Allergic Individuals



DISCUSSION

- Acetate, butyrate, and propionate levels were lowest in the peanut-allergic group. IL-4 adjusted for flow rate was higher in peanut-allergic subjects than healthy controls. Th1-related cytokines, such as IL-2 and TNFa were also measured, but differences between groups was not significant (p = 0.243 and p = 0.286, respectively)
- Race, sex & MVI use were associated with food allergy (p = 0.02, 0.0002 & 0.025), only race & subject MVI use were also associated w/ butyrate level (p=0.036, 0.042). Regression models adjusted for race/MVI use showed non-significant p-value for butyrate (p=0.37)
- This study explored associations between oral metabolites, cytokines, and food allergy
- Findings suggest a potentially protective mechanism of SCFA's in food allergy and a link between the inflammatory cytokine IL-4 and food allergy

Prophylactic vs Reactive Feeding Tube Placement for Head and Neck Squamous Cell Carcinoma

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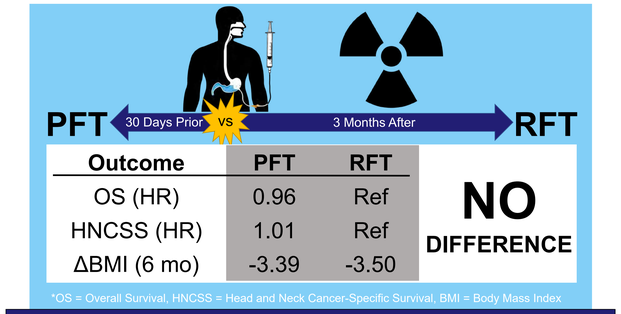
54

ABSTRACT

Prophylactic vs Reactive Feeding Tube Outcomes in Head and Neck Squamous Cell Carcinoma



Outcome	PFT	RFT
OS (HR)	0.96	Ref
HNCSS (HR)	1.01	Ref
ΔBMI (6 mo)	-3.39	-3.50

NO DIFFERENCE

*OS = Overall Survival, HNCSS = Head and Neck Cancer-Specific Survival, BMI = Body Mass Index

INTRODUCTION

- Patients undergoing treatment for head and neck cancer are at a unique risk of malnutrition
- Malnourishment leads to poor immune function, impaired quality of life, limited treatment tolerability, and poorer survival
- Enteral nutrition increases quality of life, reduces treatment interruptions, and decreases nutrition-related hospitalization
- Percutaneous endoscopic gastrostomy (PEG) tubes can be prescribed before treatment begins (prophylactic feeding tube; PFT) or when it becomes medically necessary (reactive feeding tube; RFT)
- It is unclear whether either method has survival or nutritional advantages

OBJECTIVE

- To compare survival and body mass trends for PFT versus RFT placements in veterans with advanced head and neck cancer

METHODS

Population

- 5,060 veterans in the Veterans Health Affairs system with stages III–IVB head and neck squamous cell carcinoma treated with chemoradiotherapy

Outcomes

- Overall survival (OS)
- Head and neck cancer-specific survival (HNCSS)
- Body mass index (BMI) at treatment initiation and 6 months after

Primary Exposure of Interest

- PEG tube placement within 30 days prior (PFT) or 3 months after (RFT) treatment initiation

Analysis

- To minimize ascertainment bias, we propensity score (PS)-matched the two treatment arms
- PS models included age, sex, race/ethnicity, date of diagnosis, chemotherapy regiment, smoking, alcohol use, primary site, tumor stage, comorbidity score, eGFR, baseline neuropathy and hearing loss, BMI, and surgical procedure
- We used Cox proportional hazards methods and *t* tests

CONCLUSIONS

- PFT was **not associated with a survival benefit** compared to RFT in our retrospective cohort
- PFT **did not lessen reductions in BMI** during treatment period

RESULTS

Table 1. Baseline Cohort Characteristics

Characteristic	PFT N=3,186	RFT N=1,874	*p*-value
Age, mean	61.8	61.8	0.85
Men, N (%)	3,181 (99)	1,874 (99)	0.45
Race, N (%)			0.85
Caucasian	2,633 (82)	1,530 (81)	
African American	451 (14)	277 (15)	
Hispanic	76 (2)	49 (3)	
Other/Unknown	50 (2)	32 (2)	
Smoking, N (%)			0.27
Current cigarette	1,969 (62)	1,105 (59)	
Current other	63 (2)	44 (2)	
Former	879 (28)	552 (30)	
Never	236 (7)	149 (8)	
Alcohol Use, N (%)	2,549 (79)	1,447 (77)	0.02
Anatomic Site, N (%)			0.81
Oral Cavity	235 (7)	142 (8)	
Oropharynx	1,932 (60)	1,149 (61)	
Hypopharynx/Larynx	1,043 (33)	597 (32)	
Stage at Dx, N (%)			0.21
III	631 (20)	423 (22)	
IVA	2,156 (67)	1,216 (64)	
IVB	306 (10)	183 (10)	
IVC	93 (3)	52 (3)	

Table 2. Adjusted Hazard Ratios

Outcome	Median (months)	Hazard Ratio	95% CI
OS			
PFT	47.2	0.96	0.89–1.04
RFT	46.5	Ref	Ref
HNCSS			
PFT	53.4	1.01	0.93–1.11
RFT	54.2	Ref	Ref

Figure 1. Adjusted Survival Curves for OS

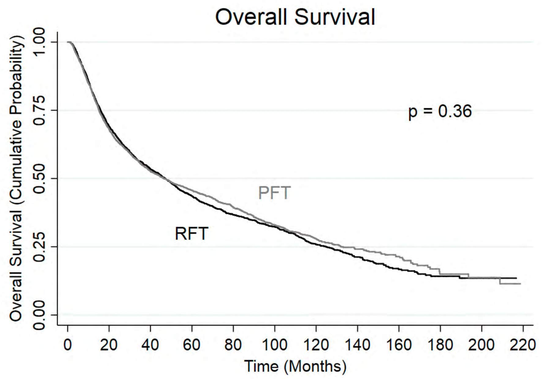


Figure 2. Adjusted Survival Curves for HNCSS

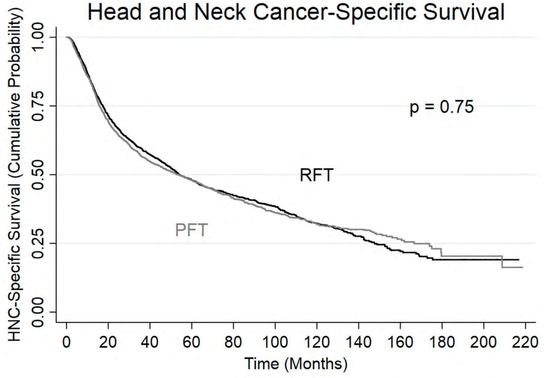


Table 3. Adjusted Hazard Ratios

Outcome	PFT	RFT	*p*-value
BMI			
Treatment Initiation	26.2	26.4	0.26
6 months	23.1	23.0	0.50
Change	-3.4	-3.5	0.28

A NOVEL RESPONSE BIOMARKER FOR ACUTE GVHD TREATMENT

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56

INTRODUCTION

Graft versus host disease (GVHD) is the leading cause of non-relapse mortality (NRM) following allogeneic hematopoietic stem cell transplantation and occurs in ~50% of patients. Clinical response to four weeks of treatment for GVHD is the current gold standard surrogate endpoint but is difficult to measure and is weakly predictive of NRM.

Our lab identified two serum biomarkers, ST2 and REG3a, which can be combined into a single value (MAP) that is a validated prognostic biomarker for long-term mortality at the onset of GVHD.

It remains unknown, however, whether MAP predicts long-term survival better than the current gold standard, clinical response after four weeks of therapy.

OBJECTIVE

To determine if MAP can serve as a response biomarker of Acute GVHD treatment and compare its predictive accuracy to the gold standard, clinical response after four weeks of treatment.

METHODS

125 patients with clinical data and paired serum samples available at onset and after four weeks of systemic corticosteroid therapy were analyzed from the Mount Sinai Acute GVHD Consortium (MAGIC) database and biorepository.

MAPs were calculated from a validated algorithm by measuring ST2 and REG3a concentrations at treatment initiation and four weeks later via enzyme-linked immunosorbent assay (ELISA).

RESULTS

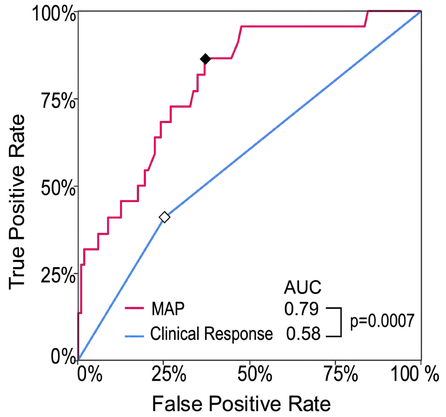


Figure 1. Clinical Response and MAP prediction of NRM.

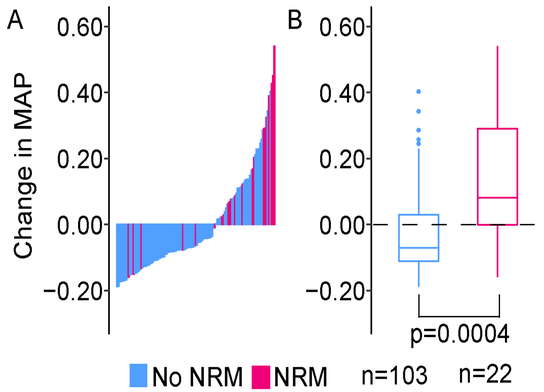
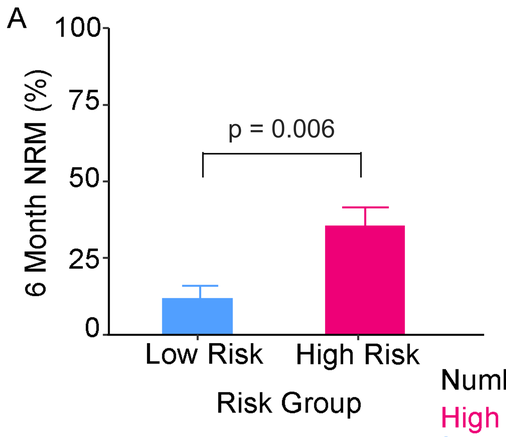


Figure 2. Change in MAP predicts NRM.



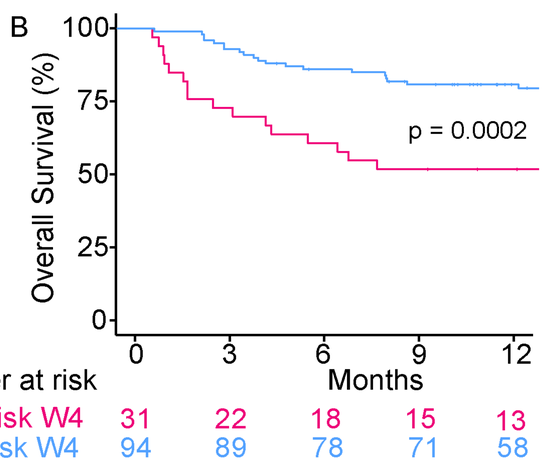


Figure 3. Long term mortality by MAP threshold after four weeks of treatment.

CONCLUSIONS

Change in MAP after four weeks of treatment predicts NRM better than clinical response (Fig 1).

Change in MAP is significantly different between those who experienced NRM and those who did not (Fig 2).

After four weeks of treatment, patients whose MAPs rose above a previously validated threshold experienced significantly worse overall survival than those whose MAPs remained below it (Fig 3).

In patients whose MAPs increased at week 4, none of the pre-transplant risk factors (age, conditioning regimen, indication, HLA matching) were associated with NRM.

DISCUSSION

GI tract is the main driver of GVHD mortality. MAP biomarkers are released during damage of GI crypt. Thus, can serve as a “liquid biopsy” of damage to the GI tract.

Limitations: only intermediate risk patients were analyzed.

Change in MAP may serve as a novel response biomarker for clinical trials.

This project was supported by the Tisch Cancer Institute (TCI) as part of the TCI Summer Scholars Program and by the American Society of Hematology (ASH) as a part of the HONORS (Hematology Opportunities for the Next Generation of Research Scientists) award

Provider Perspectives on a Training Protocol for Novel Anesthesia Administration when no Anesthetist is Available

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58

BACKGROUND

- With only **0.44 anesthetists per 100,000 population in Kenya**, mothers in need of cesarean delivery may be unable to access this essential surgery due to lack of available anesthesia services.
- This gap in critical services contributes towards a maternal mortality ratio considered to be one of the worst in the world.

RESEARCH OBJECTIVES

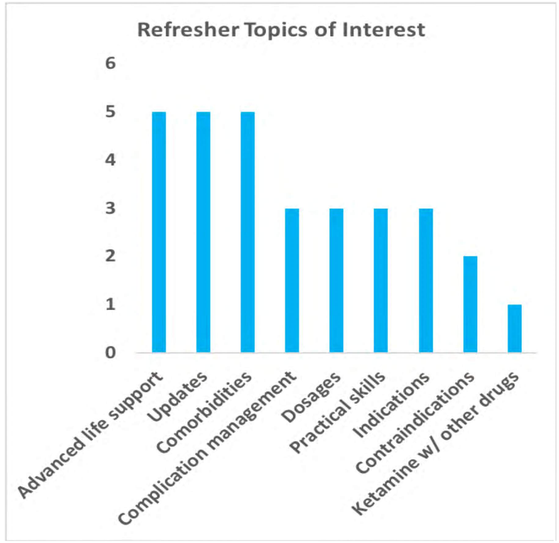
- The objective of this programmatic assessment was to **better understand facilitators and barriers to uptake of a novel ketamine anesthesia package** (ESM-Ketamine) when no anesthetist is available.
- The "Every Second Matters for Emergency and Essential Surgery – Ketamine" (ESM-Ketamine) program addresses this gap by training healthcare providers to provide Ketamine as a form of anesthesia in essential surgery when anesthesiologists are not available.

METHODS

- Staff working at hospitals in Kenya with operating theaters that lacked full-time anesthetist coverage were identified by their county health leaders. They participated in a 5-day training program at Sagam Community Hospital (SCH) with both classroom and practical sessions.
- The training included pharmacology, patient monitoring, respiratory management, suctioning, and bag-mask ventilation.
- **Semi-structured interviews** were performed with ESM-Ketamine-trained staff from **14 hospitals** to gather more information about provider perspectives on the program, and barriers and facilitators to use of the ESM-Ketamine clinical pathway.

RESULTS

- In total, **142 providers** across **26 sites** have been trained. Of the 103 providers trained before April 2018, **24 are still active**.
- **Twenty interviews** were performed with a medical officer (n=1), clinical officers (n=6), and nurses (n=13).
- **19/20 providers** were interested in a refresher.



Quotes from ketamine trained staff demonstrating factors influencing perceived success of training

Shortages in Ketamine providers at trained sites due to high staff turnover	"What I would suggest is that **more people are trained** because you never know about tomorrow. I could be away, I could be on holiday or maybe I am unwell and there is a patient that is in need of that Ketamine. " "We are few providers. Most of our providers in our region, most of them have transferred, others just left the county -- so we have a shortage. One change that I can say that there be **more training of ketamine**, ESM-ketamine trainings. So we can be able to treat cases in every facility that has a theater. So that at least more people have [knowledge] on use of ketamine."
Resistance from untrained medical officers and anesthetists	"It is still **not an accepted concept of anesthesia** within our area of practice. So most of the time we find it is difficult to be granted that permission to go ahead and provide ketamine. Another complaint or another challenge we faced, apart from Ketamine for painful procedures not being a Ministry of Health accepted mode of anesthesia, there was some level of timidness from, especially, junior medical officers. **They seemed to fear going in to the OR with someone trained on ketamine who doesn't have the skills for advanced life support**."
A need for additional days of training	"We [trained] for 5 days so probably **we could do it for more days**. Either, probably you can do some subsequent training. " "Airway management needs to be in details. Airway management, that one, is the one you need to work on. And a few steps, processes, in resuscitation in patients. Because here you are, you're providing ketamine, so you **need to have knowledge in resuscitation**."

INTERPRETATIONS

Provider interviews demonstrated that the ESM-Ketamine are felt to be useful, but overall effectiveness is hampered by **staff turnover**. This information will allow the ESM-Ketamine researchers to consider revising training strategies. Suggested modifications may include **training "ESM-Ketamine trainers" at each facility, improving engagement of medical officers through directed trainings, and providing refresher and additional training for trained ESM-Ketamine providers**.

Funding provided by The Ramon Murphy MD Program for Global Health Education at the Icahn School of Medicine at Mount Sinai

Is the Dorsal Fiber-splitting Approach to the Wrist Safe? A Kinematic Analysis and Introduction of the Window Approach

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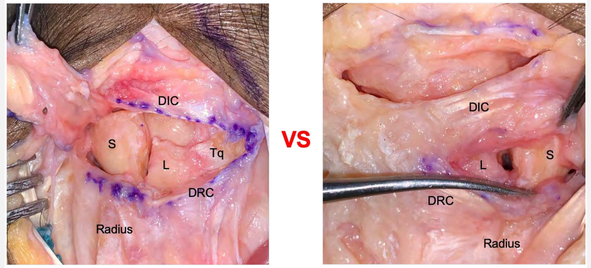
Icahn School of Medicine at Mount Sinai

HSS HOSPITAL FOR SPECIAL SURGERY

59

BACKGROUND

- Fiber-splitting capsulotomy (FSC) is the most popular surgical approach to access the dorsal wrist to address scapholunate joint injury.
- First introduced in 1995 by Dr. Berger in Mayo Clinic and claimed to preserve the “secondary stabilizers” of the scapholunate joint.
- Recent anatomic studies demonstrated the critical importance of the lunate attachment of the dorsal intercarpal ligament (DIC) and the dorsal radiocarpal ligament (DRC) in stabilizing the proximal carpal row.
- We hypothesize that: the FSC approach, in the presence of SLIL division, will result in a significant alteration in proximal carpal bone alignment when compared to the novel “window approach” which spares DIC and DRC and their insertion sites onto the lunate.
- The purpose of our study was to compare the kinematic effects of the fiber-splitting approach to a novel “window” capsular approach to the radiocarpal and midcarpal joints that spares all ligaments.



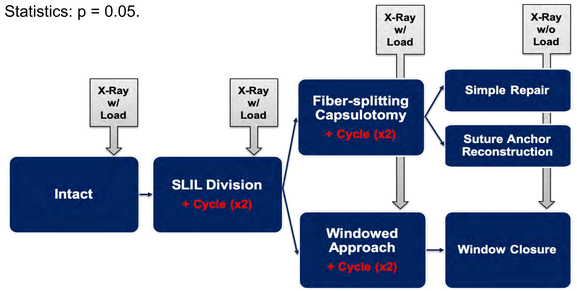
Fiber-splitting Capsulotomy

VS

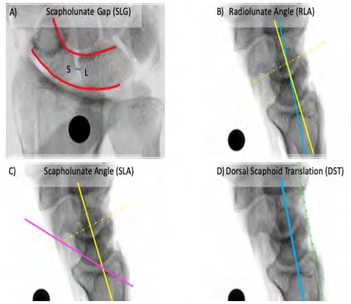
“Window” Approach, Control

METHODS

Twelve matched cadaveric wrist pairs were mounted in a custom loading jig and randomized to the dorsal FSC approach or the window approach following complete, percutaneous scapholunate interosseous ligament (SLIL) division. Loaded posteroanterior and lateral standardized fluoroscopic radiographs were obtained at baseline and after each study condition following cyclic loading. Radiographic measurements included the scapholunate gap (SLG), radiolunate angle (RLA), scapholunate angle (SLA), and dorsal scaphoid translation (DST). Statistics: p = 0.05.

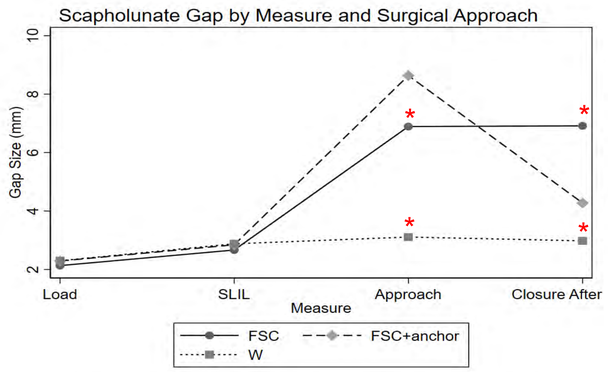


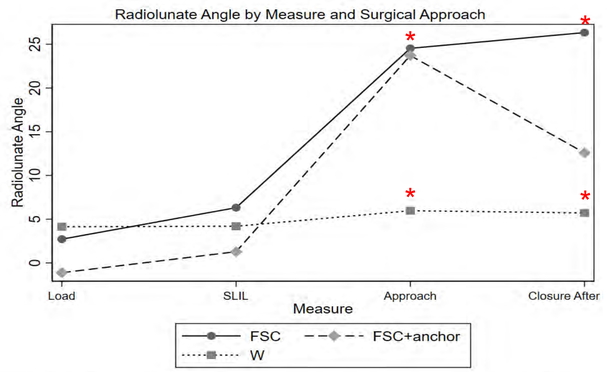
RESULTS

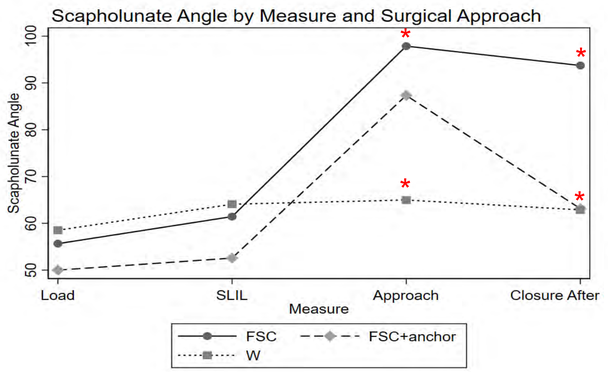


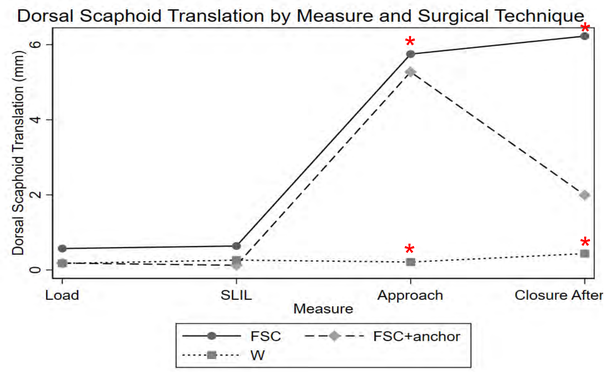
There were no significant differences between the four radiographic parameters at baseline nor following complete SLIL division in any specimen. Following FSC, there were significant increases in SLG (5 ± 2mm), RLA (20 ± 10), SLA (36 ± 14°), and DST (5 ± 3mm). The window approach did not result in significant changes in radiographic parameters. Following FSC closure with suture anchors, parameters improved to SLG (4.4 ± 0.4mm), RLA (11.1° ± 2.5°), SLA (24.2° ± 4.2°), and DST (3.2 ± 0.9 mm); whereas, standard closure failed to improve radiographic parameters.

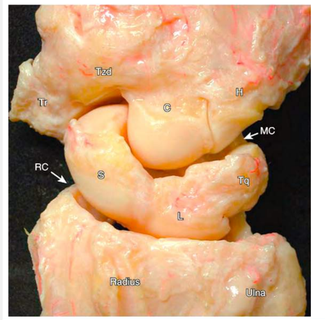
Radiographic parameters	Phases	FSC	FSC + anchor	Window
SLG (mean mm (SD))	Load	2.13 (0.5)	2.29 (0.49)	2.3 (0.51)
	SLIL	2.67 (0.61)	2.84 (0.83)	2.88 (0.95)
	Approach	6.89 (2.72)	8.63 (1.22)	3.11 (1.12)
	Closure	6.91 (2.35)	4.28 (1.9)	2.98 (1.07)
RLA (mean ° (SD))	Load	2.72 (4.13)	-1.12 (9.22)	4.13 (10.86)
	SLIL	6.32 (9.99)	1.28 (9.29)	4.19 (12.63)
	Approach	24.53 (8.91)	23.72 (11.92)	5.97 (11.01)
	Closure	26.33 (12.2)	12.58 (6.87)	5.72 (12.37)
SLA (mean ° (SD))	Load	55.65 (9.58)	50 (9.04)	58.52 (11.51)
	SLIL	61.43 (9.69)	52.57 (8.02)	64.08 (9.66)
	Approach	97.87 (14.42)	87.33 (14.12)	64.98 (11.22)
	Closure	93.73 (12.24)	63.13 (10.61)	62.88 (10.15)
DST (mean mm (SD))	Load	0.57 (0.8)	0.18 (1.16)	0.17 (0.59)
	SLIL	0.64 (0.68)	0.12 (1.32)	0.26 (0.93)
	Approach	5.75 (3.9)	5.27 (2.84)	0.21 (0.53)
	Closure	6.23 (3.64)	1.99 (0.83)	0.43 (0.73)

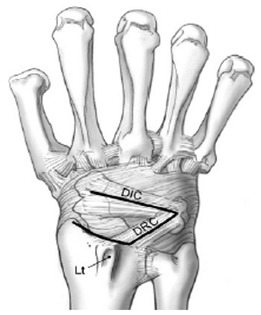












CONCLUSIONS

1. The FSC approach in the face of SLIL injury consistently produced significant changes that suggests increased carpal instability.
2. The Window approach preserved the critical dorsal ligament stabilizers and did not produce any significant changes in carpal posture.
3. The kinematic alterations were not corrected with the standard closure but were statistically improved with re-attachment of the DIC and DRC to the lunate using suture anchors.

DISCUSSION

The FSC was largely popularized by Berger, *et al.* and gained popularity in its ability to expose the dorsal wrist without violating the integrity of the DRC or DIC. However, at the time of publication, the insertions of the DIC and DRC on the lunate as well as their importance was not well understood. This has been more recently clarified in the anatomic work by Wessel *et al.* as well as the biomechanical work by Perez *et al.* Given this new understanding, the safety of the FSC in the setting of an SLIL incompetent wrist may be compromised.

Our data demonstrated the loss of DIC and DRC integrity upon FSC approach to the wrist. We also demonstrate an alternate technique, the Window approach, as well as a suture anchor repair technique, which can preserve the integrity of this ligament complex. Increasing surgeons’ awareness of the complex dorsal ligament anatomy will help to preserve or repair these attachments and reduce the possibility of additional iatrogenic-induced carpal instability.

THE ROLE OF THE HUMAN RIGHTS CLINIC: IMPACT ON MEDICAL EDUCATION, PROFESSIONAL IDENTITY, AND CAREER DEVELOPMENT

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57

OBJECTIVES

- Investigate what, if any, clinically applicable skills students acquire through longitudinal involvement with the Mount Sinai Human Rights Program (MSHRP).
- Investigate how, if at all, participation in the program influences student career trajectories.

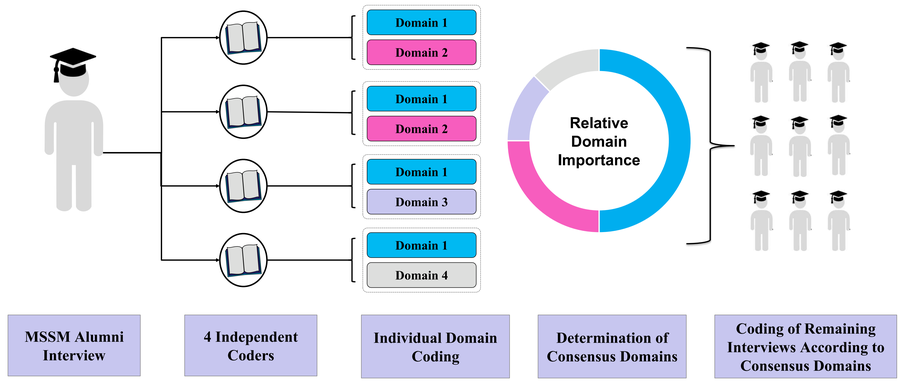
INTRODUCTION

- Medical student groups focusing on health and human rights currently exist at more than 60 different medical schools around the country.
- However, little data exists about the perspectives of medical students active in these programs, and how these programs impact the medical education and career trajectories of those involved.
- In light of the largest refugee crisis since World War II, it is critical to understand the impact these programs have on the future physicians of the nation.

METHODS

- This study utilized a Consensual Qualitative Research (CQR) methodology
- 15 semi-structured interviews of medical students active in the MSHRP throughout their educations were analyzed by 4 coders to determine core themes.

Process of Domain Coding in CQR



RESULTS

Nearly all students interviewed indicated they had developed important, clinically applicable skills through their involvement with the MSHRP that enhanced their traditional medical education.

Clinical skills acquired:

1. Navigate the medical-legal process of asylum and affidavit writing
2. Conduct thorough trauma-informed forensic evaluations
3. Effectively lead and manage teams

Impact on professional identities and future career directions:

1. Motivated student to pursue human rights and social justice work
2. Fostered a commitment to working within medical-legal systems
3. Illustrated possible career opportunities in human rights

Domain/Category	*Frequency*	No.
Clinically applicable skills gained through participation in MSHRP		
Navigating the medical-legal process of asylum and affidavit writing	General	15
Trauma-informed interviewing and medical exam	Typical	11
Leadership and team-management	Typical	9
Program establishment, development, and growth	Typical	8
Establishing partnerships and identifying social services	Variant	6
Conducting and presenting research	Variant	3
Personal growth and impact of work		
Provided a formative medical school experience	Typical	13
Provided a community of like-minded peers and mentors	Typical	8
Inspired and humbled by asylum seekers	Variant	5
Increased awareness of and impact on current migrant crisis	Variant	4
Challenges faced		
Program building and operations	Typical	9
Time management and balancing school responsiblities	Typical	9
Establishing roles and responsibilities	Variant	6
External barriers	Variant	6
Emotional burden	Variant	2
Impact on career vision		
Motivated to pursue social justice and human rights work	General	15
Inspired to work within medical-legal systems	Typical	11
Influenced choice of residency program or medical specialty	Typical	10
Unclear at this time	Variant	3

Note. Frequencies are labeled using the following criteria: general categories, 14–15 cases; typical categories, 8–13 cases; and variant categories, 2–7 cases.

CONCLUSIONS

- Longitudinal involvement with the MSHRP contributed to the acquisition of important clinical skills that were not otherwise attained in students' early medical education.
- Exposure to human rights education explicitly shapes professional identity and career path.
- There is significant opportunity for student clinical and leadership development outside the traditional preclinical and clinical settings.

ACKNOWLEDGEMENTS

- I would like to thank Dr. Singer, Dr. Baranowski, and the whole CQR team for their continuing support and hard work
- Thank you to the Icahn School of Medicine at Mount Sinai for generously providing funding for this project

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The Efficacy of Perioperative Antibiotics in the Surgical Management of Gynecomastia

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61

AIM

- To examine the relationship between perioperative antibiotic use and postoperative complication rate of gynecomastia surgery.

BACKGROUND

- The surgical management of gynecomastia involves a variety of perioperative practices.
- Antibiotics use in gynecomastia surgery has not been well-described in the literature.

METHODS

- Retrospectively reviewed patients who underwent gynecomastia surgery at a single institution from 2011 to 2019.
- Recorded patient demographics, preoperative clinical parameters, procedural details, and postoperative surgical outcomes.
- Primary outcomes: antibiotics use and postoperative complications

RESULTS

- 57 operations among 54 patients were reviewed
  - No intraoperative complications
  - Median follow-up: 1.6 months (0.1 – 46 months)

Table 1. Patient Characteristics

Variable	N	(%)
Mean Age (yrs)	30.6 ± 14.7	
History of obesity	31	(54.4)
BMI >30 at time of operation	20	(35.1)
Smoking status		
Cigarette	2	(3.5)
Marijuana	8	(14.0)
Diabetes mellitus	3	(5.3)
Hypertension	6	(10.5)

- Use of antibiotics:
  - 91% intraoperative; 68% postop prophylactic
    - Intraoperative antibiotics:
      - 100% (57) cefazolin
    - Postoperative prophylactic antibiotics:
      - 90% (35) oral cephalosporins +/- bacitracin
      - 5% (2) bacitracin only
      - 3% (1) oral clindamycin

- Surgical approach:
  - 51% (29) periareolar excision; 26% (15) inframammary fold incision; 16% (9) liposuction alone

Table 2. Complications

Complication	N	(%)	Required revision
Wound infection	3	(5.3)	1
Seroma	4	(7.0)	1
Hematoma	2	(3.5)	1
Hemorrhage	1	(1.8)	1
Wound dehiscence	2	(3.5)	1
Minor cosmesis	8	(14.0)	1
Recurrence	2	(3.5)	0

- No difference was detected in wound infection rates, +/- intraop or +/- postop prophylactic antibiotics

CONCLUSIONS

- No difference in infection with or without antibiotics
- Limitations: small sample size, low infection rate
- Future multi-center research needed; to ensure evidence-based practice and antibiotic stewardship

RESEARCH FUNDED BY DEPARTMENT OF MEDICAL EDUCATION

Evaluating Resilience Factors Among Medical Student Survivors of the Great East Japan Earthquake and Tsunami in Fukushima

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66

BACKGROUND

- In March 2011, Fukushima Prefecture suffered from an earthquake, tsunami, and nuclear power plant meltdown, coined the “3/11 triple disaster”
- As a consequence of the acuity and severity of such disasters, survivors often implicitly and explicitly cultivate and adopt adaptive behaviours to persevere

AIM

To compare and contrast resilience behaviours and traits between Fukushima Medical University (FMU) medical students who had experienced the 3/11 triple disaster (YY group) and those who did not (NN group).

METHODS

Study Design

- Cross-sectional study using multiple surveys
- 1-on-1 semi-structured interviews to discuss survey responses

Population

- No statistically significant differences were found between the NN and YY groups in terms of age, gender, marital status, and medical school year

Data Collection

- 12FRBS – measure of resilience promoting behaviours organized under 12 resilience strategies
- CD-RISC – measure of resilience traits
- Davidson Trauma Scale – measure of frequency and severity of PTSD symptoms

Statistical Analysis

- Descriptive statistics and *t*-test (α = 0.05) were used to analyze survey results

RESULTS

Table 1. Comparison of Davidson Trauma Scale Items

Item	NN GROUP Mean (SD)	YY GROUP Mean (SD)	*p* value
1 – Want to help	2.6 (0.93)	2.6 (0.98)	.775
2 - Feel capable of helping	1.7 (0.89)	1.8 (0.93)	.330
3 – Increased your desire to become a physician	2.3 (1.11)	2.6 (1.09)	.034
4 – Feel confused	1.4 (1.14)	1.2 (1.19)	.050
5 – Feel angry	0.9 (1.02)	1.1 (1.15)	.184
6 – Feel sad	1.5 (1.27)	1.5 (1.35)	.711
7 – Feel guilty	1 (0.98)	0.9 (1.06)	.404
8 – Feel anxious	1.6 (1.23)	1.5 (1.31)	.314
9 – Feel safe at home	**2.8 (0.98)**	**3.1 (0.90)**	**.001***
10 – Feel safe at work	2.5 (1.06)	2.6 (0.99)	.275
11 – Have difficulty sleeping	0.8 (1.13)	0.7 (1.04)	.344
12 – Experience a change in appetite	0.9 (1.19)	0.8 (1.10)	.413
13 – Increase the frequency of alcohol or drug use	0.7 (1.12)	0.5 (1.03)	.099
14 – Have problems concentrating	1.1 (1.21)	1.0 (1.25)	.394
15 – Have nightmares	**0.6 (0.95)**	**0.4 (0.79)**	**.036***
16 – Refuse sympathy	**0.8 (1.06)**	**1.2 (1.19)**	**.000***
17 – Pretend to carry on business as usual	**1.3 (1.24)**	**1.6 (1.34)**	**.010***

Table 2. Comparison of 12FRBS Scores by Resilience Strategy

Resilience Strategy	NN GROUP Mean (SD)	YY GROUP Mean(SD)	*p* value
1 – Engage in Positive Attitude / Optimism	13.5 (5.47)	14.2 (4.50)	.187
2 - Cognitive Flexibility Through Re-evaluation of Trauma	**14.6 (5.42)**	**15.8 (4.74)**	**.010***
3 – Moral Compass	8.8 (3.75)	9.4 (3.50)	.087
4 - Turn to Faith	6.6 (4.93)	6.6 (4.45)	.937
5 – Find a Resilient Role Model	7.9 (5.00)	7.9 (4.59)	.911
6 - Facing Fears	**21.0 (8.08)**	**22.5 (7.02)**	**.040***
7 - Developing Active Coping Skills	**8.1 (3.20)**	**8.9 (2.96)**	**.012***
8 – Establish and Nurture A Supportive Social Network	**13.5 (5.26)**	**14.6 (4.53)**	**.020***
9 – Attend to Physical Well-Being	12.3 (5.43)	12.9 (4.83)	.207
10 – Developing Brain Fitness	**8.8 (3.78)**	**9.50 (3.40)**	**.040***
11 - Finding and Fostering Strengths	**11.1 (4.23)**	**12.3 (3.90)**	**.002***
12 – Finding Meaning and Purpose in Things	**6.9 (3.06)**	**7.5 (2.64)**	**.037***
Cumulative Resilience Behaviour Score	**133.2 (44.2)**	**142.6 (36.4)**	**.021***

Table 3. Comparison of CD-RISC Scores

	Group	Mean (SD)	*p* value
CD-RISC Total Score	**NN**	**56.20 (14.69)**	**.040***
	YY	**59.17 (14.98)**	
Factor 1	NN	18.60 (5.56)	.167
	YY	19.35 (5.67)	
Factor 2	**NN**	**15.00 (4.60)**	**.005***
	YY	**16.24 (4.48)**	
Factor 3	NN	12.11 (3.22)	.077
	YY	12.67 (3.36)	
Factor 4	NN	6.42 (2.44)	.121
	YY	6.78 (2.37)	
Factor 5	NN	3.93 (1.89)	.507
	YY	4.05 (1.84)	

CONCLUSIONS

- FMU medical students who had experienced the 3/11 Triple Disaster tended to self-report more resilience behaviours and traits than their counterparts
- Weathering stressful disaster circumstances may create opportunities for positive personal growth and the development of more robust resilience behaviours and traits

FUNDING & ACKNOWLEDGMENTS

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Microencapsulation of Annulus Fibrosus Cells in Oxidized Alginate Microbeads for Intervertebral Disc Cell Delivery

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70

Introduction

- Discectomy can alleviate pain from intervertebral disc (IVD) herniation, but annulus fibrosus (AF) defects increase risk of recurrent symptoms [1].
- Cell-seeded biomaterials offer promise to improve IVD healing [2], but biomaterials that withstand high-magnitude spine loads require high degree of crosslinking, which can be cytotoxic [3].

Objectives

1. **Quantify release time and viability of microencapsulated AF cells.**
2. **Assess whether OA MBs can protect AF cells from acute exposure to genipin, a natural crosslinker.**

Methods

- AF cells were added to 1.5% (w/v) and 2% OA at 1M cell/mL and dripped through a syringe into a polymerization bath.
- MBs untreated, exposed to DMSO, or 0.1 mg/mL genipin for 3 hr, were cultured for 11 days and imaged every other day.
- Cell viability was quantified before and after release using flow cytometry.
- AF markers expression and extracellular matrix proteins was assessed with qRT-PCR

Results

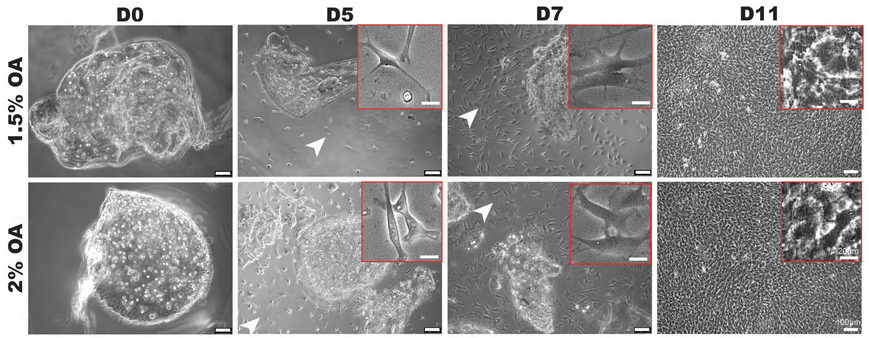

Figure 1: Adherent, proliferative AF cells released from degradable OA MBs. Arrowheads indicate adherent AF cells with phenotypic elongated processes. Bar = 100 μm; inset bar = 20 μm.

Results

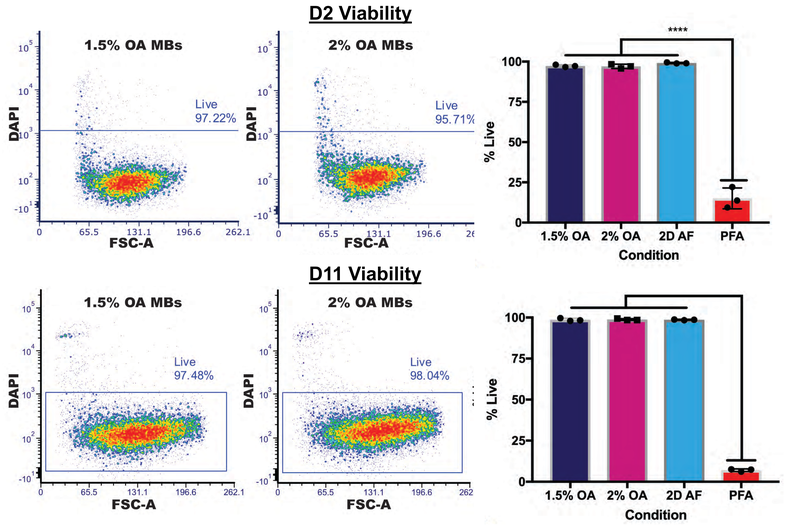

Figure 2: Microencapsulated AF cells maintain high viability. >97% of flow sorted AF cells were viable at D2 and D11. PFA = 4% Paraformaldehyde in PBS.

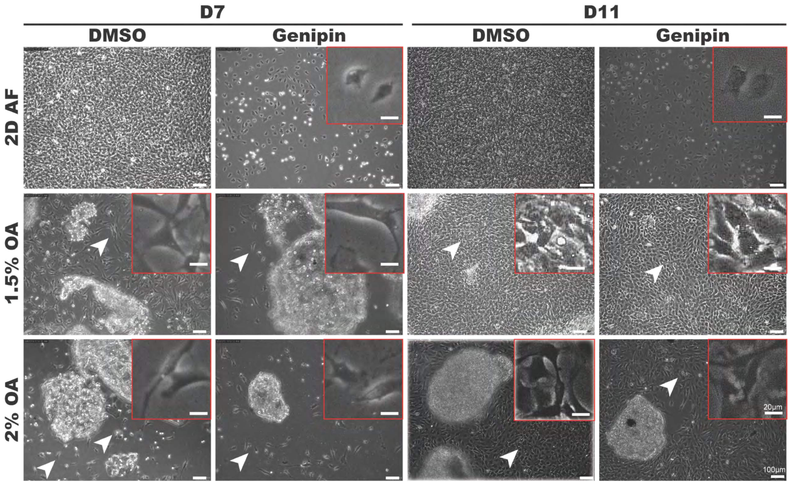

Figure 3: AF cells released after acute genipin exposure. Arrowheads indicate phenotypic AF cells. Bar = 100 μm; inset bar = 20 μm.

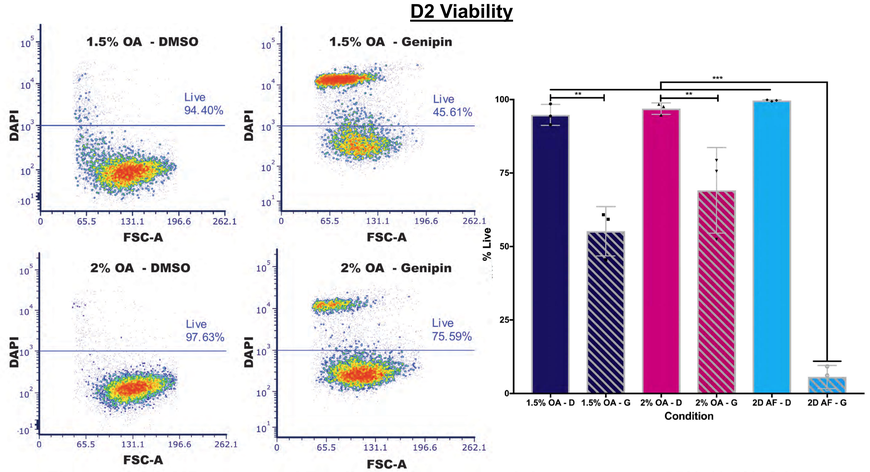

Figure 4: OA MBs protect AF cells from acute genipin exposure. >55% (1.5% OA) and >65% (2% OA) viable at D2.

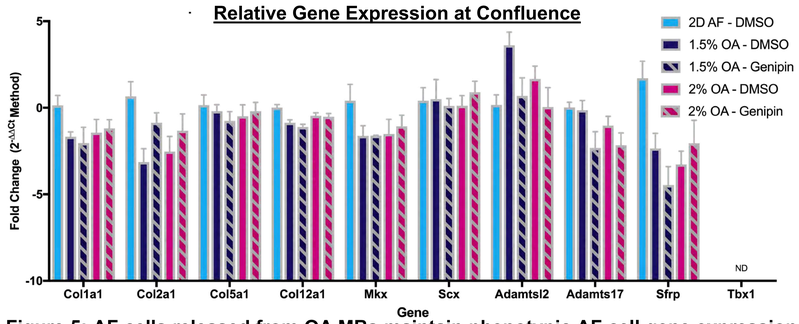

Figure 5: AF cells released from OA MBs maintain phenotypic AF cell gene expression after genipin exposure. AF gene [6] expression normalized to GAPDH and 2D AF cells treated with DMSO using $2^{-\Delta\Delta Ct}$ method.

Discussion & Significance

- Proliferative AF cells released from OA MBs on D5 (DMEM) with phenotypic elongated processes and high viability.
- OA MBs protected AF cells from genipin cytotoxicity and released viable AF cells on D7 that express AF marker genes.
- This novel strategy may enable the development of next-generation biomaterials that provide immediate biomechanical stability and deliver phenotypical cells for long-term healing.

References

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Effect of Median Lobe Enlargement on Early Prostatic Artery Embolization Outcomes

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71

OBJECTIVES

- To evaluate outcomes after prostatic artery embolization (PAE) in patients with severe intra-vesical prostatic protrusion (IPP)

INTRODUCTION

- PAE increasingly used to treat lower urinary tract symptoms (LUTS) associated with benign prostatic hyperplasia (BPH)
- Previous research suggests that significant intra-vesicle prostatic protrusion (IPP) due to enlarged median lobe may decrease the efficacy of transurethral therapies

METHODS

- Retrospective, two-hospital study from April 2015-December 2018
- Study population split into two cohorts: severe IPP (≥10mm) and non-severe IPP (<10mm)
- Outcomes including International Prostate Symptom Score (IPSS) and Quality of Life (QOL), were collected at follow-up
- Linear regression performed to examine impact of IPP on outcomes
- 54 elective PAE patients with mean age of 67.5 years (SD=8.5), ellipsoid prostate volume 100.1cm^3 (SD=56.7), baseline IPSS 18.7 (SD 8.2), baseline QOL 4.1 (SD=1.4), follow-up 38 days (range: 10-656)

TABLES AND FIGURES

Table 1: Outcome Improvements Reduction Multiple Linear Regression

QOL Score Reduction Multiple Linear Regression

Model	R-square	F Value	P-Value
	.5	8.7	<.0001

Variable	Estimate	Standard Error	P-Value
Intercept	-7.2	4.4	.107
Baseline IPP	.05	.1	.702
Baseline IPSS	.7	.1	<.0001
Ellipsoid Volume	.01	.02	.583
Length Until Follow-Up	.03	.02	.166
Unilateral	-5.2	2.2	.0228

QOL Score Reduction Multiple Linear Regression

Model	R-square	F Value	P-Value
	.5	6.2	.0003

Variable	Estimate	Standard Error	P-Value
Intercept	-1.7	1.2	.142
Baseline IPP	.05	.03	.108
Baseline QOL	.7	.2	.0002
Ellipsoid Volume	.002	.005	.652
Length Until Follow-Up	.003	.005	.651
Unilateral	-1.9	.6	.0027

Clinical Success Logistic Regression

Risk Factor	Odds Ratio (95% CI)	P-Value
Severe IPP >10mm	1.2 (.2-6.3)	.805
Ellipsoid Volume ≥100cm^3	5.9 (.6-55.8)	.122
Unilateral Procedure	.3 (.05-1.3)	.0931

Table 2: Outcomes with Severe and Non-Severe Intra-Vesical Prostatic Protrusion (IPP)

Post-PAE Reduction of IPSS Score

n	<10mm (n=16)	≥10mm (n=29)	P-value
45	6.0	8.2	.431

Post-PAE Reduction of QOL Score

n	<10mm (n=15)	≥10mm (n=25)	P-value
40	1.0	2.0	.127

Clinical Success

n	<10mm (n=17)	≥10mm (n=37)	P-Value
54	82%	84%	.896

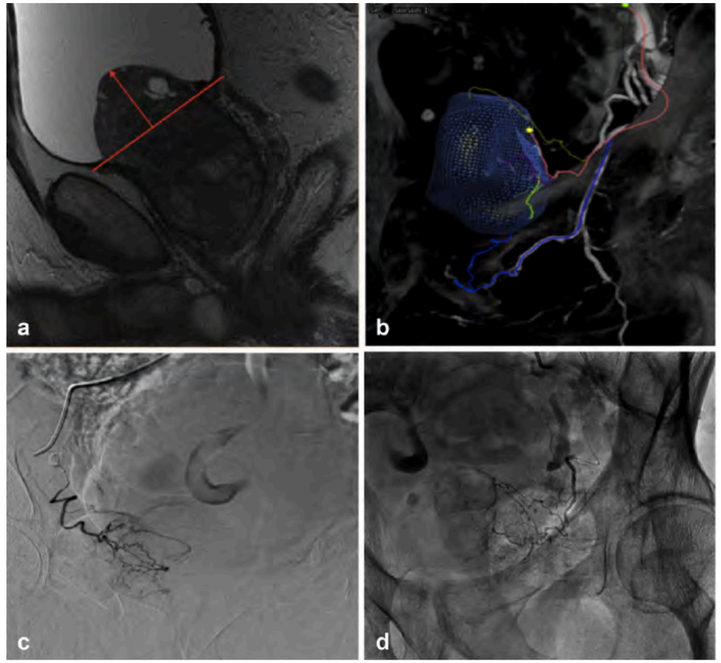

Figure 1. (a) Preprocedure sagittal T2 weighted image of the prostate. Intravesical prostatic protrusion measurement was done using the greatest distance from the tip of prostate gland to the base of the bladder (red arrow) ensuring that these vectors were orthogonal. (b) EmboGuide (Philips) vessel detection software with cone beam computed tomography demonstrating several feeding vessels to the prostate with a superior median lobe branch in yellow. (c, d) Digital subtraction angiography of left and right prostatic arteries.

RESULTS

- No significant differences in patient characteristics were found between non-severe (n=17) and severe (n=37) IPP patients
- Both cohorts showed significant IPSS/QOL reduction
- No significant differences in IPSS or QOL score reduction were found between the two cohorts
- Linear regression found that baseline IPP was not a significant contributor to any outcomes

DISCUSSION

- This study shows that patients with both severe and non-severe IPP show significant improvement with PAE
- Future studies would benefit from a larger study cohort
- The short and variable time to follow-up may underestimate the impact of PAE on outcomes; longer-term studies are therefore warranted
- Different shapes of protrusion were not classified and IPP may thus be a limited metric

CONCLUSION

- There were no significant differences in early outcomes in PAE between patients with severe and non-severe IPP

Insulin Resistance and Vimentin Expression in Human Breast Cancer

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74

OBJECTIVE

To determine whether vimentin expression is associated with insulin resistance (IR) or prognosis in newly diagnosed breast cancer.

INTRODUCTION

Pre-clinical studies have found that insulin stimulates the expression of vimentin in breast cancer.[1]

Vimentin is an intermediate filament frequently expressed in cancer cells, and has been linked to the progression of breast cancer.[1]

METHODS

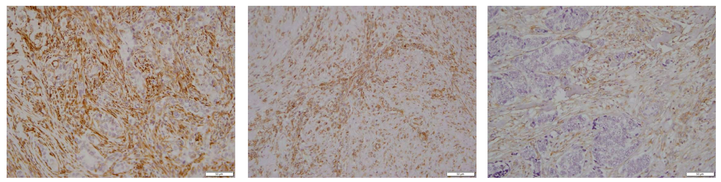
- Women 21+ with newly diagnosed breast cancer were recruited as part of an IRB approved, NIH funded, cross sectional study (R01CA171558).
- Waist circumference (WC), body mass index (BMI), fasting blood glucose, and insulin measurements were collected.
- IR was calculated using homeostasis model assessment of IR (HOMA-IR) ([fasting plasma glucose (mg/dL) × fasting serum insulin (µU/ml)]/405).
- Prognosis was determined by Nottingham Prognostic Index (NPI).
- Formalin fixed paraffin embedded (FFPE) slides were stained using vimentin D2H13 Rabbit mAb (Cell Signaling Technology).
- Imaging was performed using an Olympus AX70 microscope.
- Statistical analyses were performed using SPSS.

RESULTS

Table 1. Characteristics of patients recruited for study

Patient Characteristics (n = 74)	
Age (mean yrs ± SD)	58.3 ± 12.3
Insulin (mean µU/ml ± SD)	6.3 ± 4.2
Glucose (mean mg/dl ± SD)	97.1 ± 47.1
HOMA-IR (mean ± SD)	1.6 ± 1.2
BMI (mean kg/m^2 ± SD)	28.0 ± 7.5
BMI category [n, (%)] underweight: <18.5 normal weight: 18.5-24.9 overweight: 25-29.9 obese: ≥30	 0 (0%) 41 (55.4%) 11 (14.9%) 22 (29.7%)
WC (mean cm ± SD)	101.4 ± 15.9
WC category [n, (%)] normal: <88cm increased: ≥88 cm	 13 (20.3%) 51 (79.7%)
NPI (mean ± SD)	3.7 ± 0.9
Breast cancer subtype [n, (%)] Estrogen receptor (ER) positive Her2 positive Triple negative	 60 (82.2%) 7 (9.6%) 3 (4.1%)
*missing data on WC for 10 patients and on breast cancer subtype for 1 patient	

Figure 1. Representative images of vimentin staining taken at 20x objective



A. Strong 3+ B. Moderate 2+ C. Weak or negative

Figure 2. Vimentin expression (n = 74 slides)

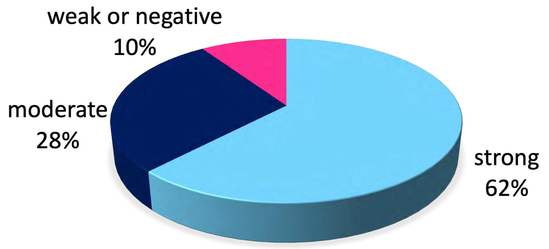


Table 2. Association between patient characteristics and vimentin expression

	Strong (n=45)		Moderate/weak (n=28)		
	Mean	SD	Mean	SD	P value
Age	56.0	11.2	62.3	13.2	0.033
HOMA-IR	1.4	1.2	1.8	1.1	0.14
BMI	27.0	7.1	29.6	8.1	0.15
WC	97.0	13.9	107.7	16.7	0.007
NPI	3.7	1.0	3.8	0.7	0.94
Breast Cancer Subtype	n (%)		n (%)		
ER positive	40 (88.9%)		20 (71.4)		0.07
HER2 positive	2 (4.4%)		5 (17.9%)		0.10
Triple negative	1 (2.2%)		2 (7.1%)		0.55

*missing data on one patient from strong category

Comparing tumors that stain strong with the other groups, tumors that stain strong were from women who were younger, had lower HOMA-IR scores, lower BMI, and lower WC.

CONCLUSIONS

In this cohort of patients with newly diagnosed breast cancer, strong vimentin staining was not associated with IR, as measured by HOMA-IR, and was surprisingly associated with lower waist circumference.

LIMITATIONS

Results are limited by a small sample size.

IMPLICATIONS & FUTURE DIRECTIONS

Therapies targeting vimentin could play a role in improving outcomes for patients with breast cancer.

Further examination of vimentin localization within the tumor, and within and between breast cancer subtypes is needed.

FUNDING & ACKNOWLEDGMENTS

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Downsizing a Baerveldt Glaucoma Implant for the Management of Persistent Postoperative Hypotony

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75

Purpose

To describe a surgical technique for the treatment of persistent hypotony after Baerveldt glaucoma implant (BGI) surgery.

Background

- Recent studies have demonstrated that the Baerveldt Glaucoma Implant (BGI) is able to achieve greater IOP reduction and greater surgical success compared with the Ahmed Glaucoma Valve but is also associated with a greater incidence of postoperative hypotony.[1,2]
- Postoperative hypotony is known to occur in 3-15% of BGI surgeries within 5 years post procedure.[1,2] Chen *et al*. successfully managed late postoperative hypotony via truncation of a BGI endplate in two patients.[3] We elaborate on this important technique and confirm its effectiveness in a larger cohort of patients.

Methods

- Retrospective chart review of patients who underwent BGI revision for chronic hypotony between 01/2002 to 07/2018
- The following data was obtained from patients' charts:
  - oPre- and postoperative best corrected visual acuity (BCVA)
  - oIntraocular Pressure (IOP)
  - oNumber of IOP-lowering medications
  - oDemographic characteristics
  - oSize of BGI endplate
  - oPost-operative complications
- Hypotony was defined as IOP ≤ 5 mm Hg with choroidal effusion, with or without the presence of maculopathy.

Surgical Technique

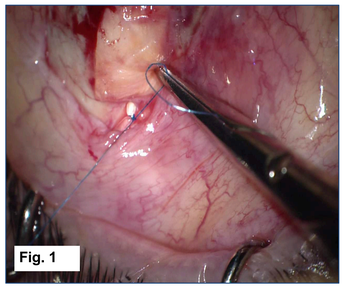


Fig. 1

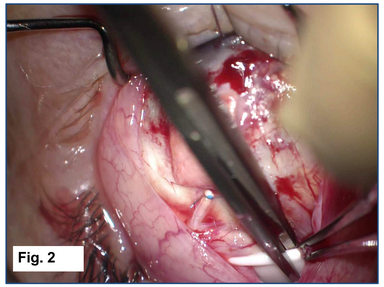


Fig. 2

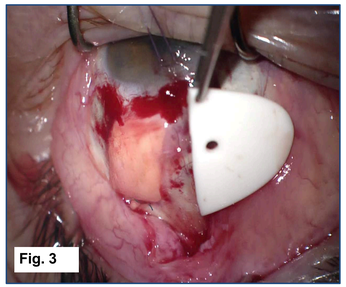


Fig. 3

- Using blunt Westcott scissors and non-toothed conjunctival forceps, a radial relaxing incision is made through the conjunctiva and Tenon's capsule, and extended 6 mm posterior to the limbus.
- After careful dissection to free the tube from the surrounding capsule, a 7-0 polypropylene (non-absorbable) suture is tied around the tube to achieve total occlusion of the lumen with the knot positioned beneath the tube **(Fig. 1).**
- The capsule is incised just posterior to the anterior ridge with a 15-degree blade and Vannas scissors, and the opening is extended laterally along the ridge.
- The fibrous stalk through the 2 distal plate fenestrations is identified and severed using Westcott scissors.
- Stevens scissors are used to transect the tip of one or both wings from the main body of the plate **(Figs. 2 + 3),** just lateral to the end of the ridge

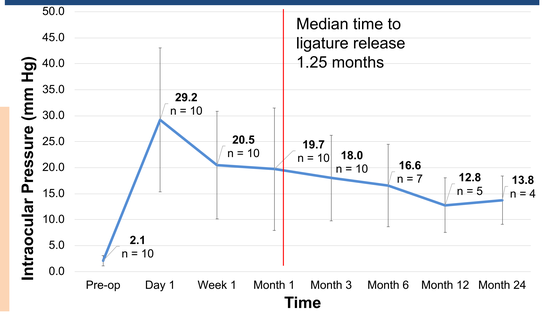
Results

- **10 eyes of 10 patients** were included.
- Average patient age of patients was **71.0 ± 16.4 years** (range: 42 to 93 yrs).
- Median time **interval between primary BGI and truncation** was **5 months** (range, 1.5 months to 8 years)
- Median **time to ligature release was 1.25 months** (range, 3 wks to 4 yrs)
- Median post-revision **follow-up time was 10.5 months** (range, 5 mo to 15 yrs)

Key Point #1: ***All 10 eyes exhibited resolution of hypotony within 24 hours and resolution of choroidal effusion within the first 2 postoperative weeks.***

Key Point #2: ***4 patients demonstrated improvement of ≥ 2 lines on Snellen visual acuity, while 1 demonstrated improvement of ≥ 3 lines.***

Mean Intraocular Pressure over Time



Case-by-case Overview

Case No.	Interval between BGI and Revision (months)	No. Wings Clipped	Interval between Revision and TLR* (months)	Pre-Op IOP (mm Hg)	Preo-Op BCVA (Snellen)	Post-Op IOP (mm Hg)			Post-Op BCVA (Snellen)		Last Follow Up			
						D1	M1	M3	D1	M1	Follow-up interval (months)	IOP (mm Hg)	No. AGM**	BCVA (Snellen)
1	3	1	2.5	3	CF @ 1'	43	32	4	HM	20/60	7	10	0	20/400
2	1.5	2	0.75	3	20/200	8	14	18	20/200	20/400	36	12	1	20/80
3	14	2	6	2	HM	30	9	24	LP	CF @ 1'	24	18	1	NLP
4	3	1	5	1	20/400	20	19	23	CF @ 1'	20/150	9	18	3	20/50 +1
5	30	2	Not released	1	20/70+2	20	19	15	20/150	20/100	6	21	2	20/70
6	96	2	1	1	HM	44	26	17	HM	HM	5	9	1	HM
7	2	2	1	4	HM	11	12	7	HM	HM	180	4	0	HM
8	7	1	48	2	CF @ 1'	32	15	16	CF @ 1'	CF @ 1'	96	5	1	HM
9	18	2	0.75	2	20/400	38	6	25	20/400	20/200	12	17	2	20/200 - 1
10	3	1	1.25	2	HM	46	45	31	LP	HM	5	19	2	20/150

*TLR = Tube Ligature Release

**AGM = Anti-Glaucoma Medications

Conclusion

Excision of one or both wings of the BGI endplate with suture ligation of the tube can provide an immediate resolution of hypotony. If the pressure becomes too high, reopening the tube allows aqueous drainage into a smaller-surface-area capsule, thereby reducing the risk of recurrent hypotony. This technique is effective in reestablishing IOP control for patients with ocular hypotony after BGI surgery.

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IN SITU CODE SIMULATION INITIATIVE AT NYC H+H/ELMHURST: A SYSTEM FOR NOVEL TEAMWORK ASSESSMENT, EDUCATIONAL NEEDS ASSESSMENT, AND IDENTIFICATION OF LATENT SAFETY THREATS

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77

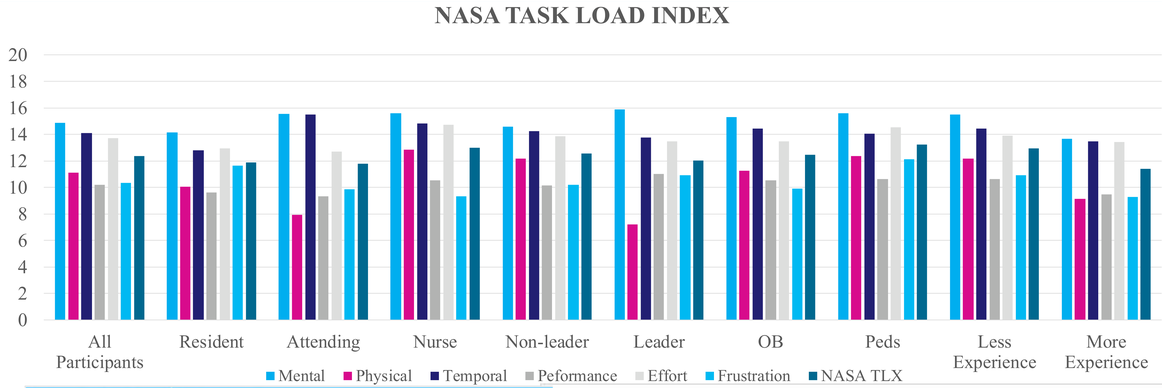
Objectives

- Utilize impromptu, in situ, high-fidelity simulation to evaluate, educate, and maximize code team management outside of the traditional simulation lab.
- Assess the individual cognitive load of participants on the Cardiac Arrest Team, utilizing the National Aeronautics and Space Administration-Task Load Index (NASA-TLX).
- Perform systematic assessment and capture of areas of weakness and latent safety threats (LSTs).
- Evaluate team performance and adherence to established guidelines.

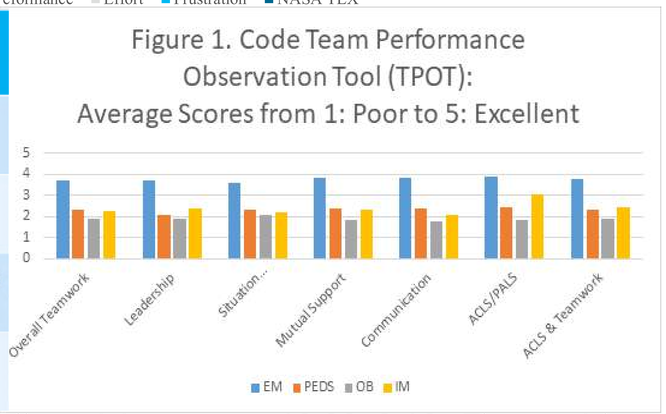
Methods

- 56 in situ cardiac arrest simulations throughout the hospital.
- NASA-TLX questionnaire completed by 87 participants, rating 6 subcategories of taskload on a scale from 0-20.
- LSTs identified during standardized post simulation debriefing and video analysis.
- Validated team performance observation tool (TPOT) used to measure performance on a scale from 1-5.

Results



LST Category (n=46)	Examples
Equipment (n=18)	EZ-IO kit not properly stocked Could not readily obtain scalpel
Medication (n=2)	Unsure of infant epinephrine dosing
Resource/System (14)	Inconsistent responding code team members Lack of clear team leader or roles
Technical Skill (12)	Lack of awareness of goal c-section time Incorrect defibrillator pad placement



- NASA-TLX: mean taskload score of all participants was 12.39±3.10. Those with less prior simulation or code experience reported higher total taskload (12.93±2.95 vs 11.40±3.16, $p<0.05$), physical demand (12.19±5.25 vs 9.13±6.45, $p<0.05$), and mental demand (15.52±3.57 vs 13.64±4.52, $p<0.05$).
- LST: 46 unique threats identified. Multiple improvements made in response.
- TPOT: EM demonstrated highest scores. Peds, L&D, and Medicine teams had average scores less than 3 on all categories. No team scored greater than 4.

Conclusions and Next Steps

- NASA-TLX after cardiac arrest simulation provides valuable insights into the subjective cognitive load of Cardiac Arrest Team members and may be used to tailor future simulation education, as well as possibly alter team structure and task delineation by roles.
- In situ simulation affords high yield clinical systems testing leading to maximized team education.
- TPOT scores, identified areas of deficiencies, and formal assessment of LSTs offer great insights into high yield target areas of remediation and future educational topics.
- Initiation of a process of change has been implemented to evaluate and improve the quality of care delivered to cardiac arrest patients and the quality of education employed for team training.

Acknowledgements

- NYC H+H/Elmhurst Simulation Center
- Patricia S. Levinson Research Award
- Medical Student Research Office

Estimating Health Utility Scores and Expenditures for Cardiovascular Disease from the Medical Expenditure Panel Survey

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INTRO

- Long-term health utility scores and costs used in cost-effectiveness analyses of cardiovascular disease (CVD) prevention and management can be inconsistent, outdated, or invalid for the diverse population of the United States.
- Our aim was to develop a user-friendly, standardized, publicly available code and catalog to derive more valid values for health utility and expenditures following CVD events.

METHODS

- Individual-level Short Form (SF)-12 Version 2 health-related quality of life and expenditure data were obtained from the pooled 2011 – 2016 Medical Expenditure Panel Surveys (MEPS).
- We developed code using the R programming language to estimate preference-weighted SF-6D utility scores from the SF-12 for quality-adjusted life-year (QALY) calculations and predict annual health care expenditures.

RESULTS

- Predictors included CVD diagnosis, sociodemographic factors, and comorbidity variables.
- CVD diagnoses with the lowest utility scores were heart failure (0.64, 95% CI 0.62 to 0.66), angina pectoris (0.65, 95% CI 0.63 to 0.67), and ischemic stroke (0.65, 95% CI 0.65 to 0.66).
- Highest annual expenditures were for heart failure ($20,764, 95% CI $17,500 to $24,027), angina pectoris ($18,428, 95% CI $16,102 to $20,754) and ischemic stroke ($16,925, 95% CI 15,672 to $20,616

The developed code and catalog **improves the quality and comparability** of cost-effectiveness analyses by providing standardized methods for extracting health utility scores and expenditures from MEPS data, which **are more current and representative of the US population** than previous sources.

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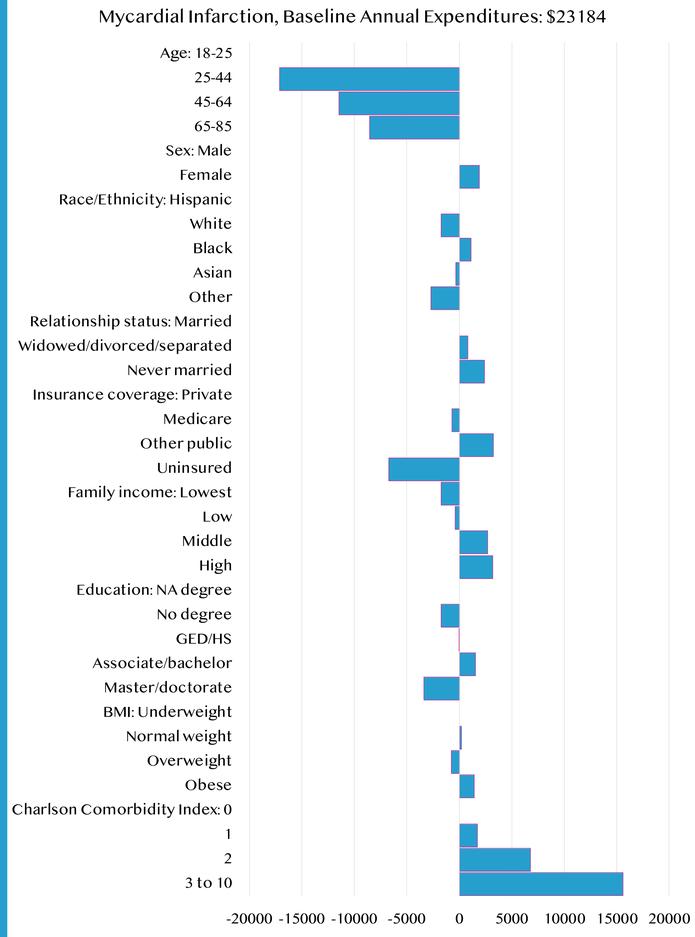
78

DISCUSSION

- Our estimates are within the range of estimates from previous analyses using earlier years of MEPS
- MEPS estimates are consistently greater than those provided by sources using medical and pharmacy claims data from commercial and managed Medicare enrollees from a large US health plan.
- Thus, interventions that prevent CVD events using other sources may be undervalued.
- The strengths of our study are recent data, large sample size, and national representation.



SOURCES OF FUNDING

- Glorney-Raisbeck Medical Student Grant in Cardiovascular Disease Research from The New York Academy of Medicine.

Surgeon Volumes and Outcomes for Rhinological Procedures with Respect to Industrial Funding

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OBJECTIVES

- Examine the relationships between **industrial funding and complication rate**, total procedures, and balloon volume.

INTRODUCTION

- **Physician Payments Sunshine Act** requires mandatory disclosures for financial interactions between industry.
- Recent study has shown BD volume is increased in physicians with more payments

METHODS

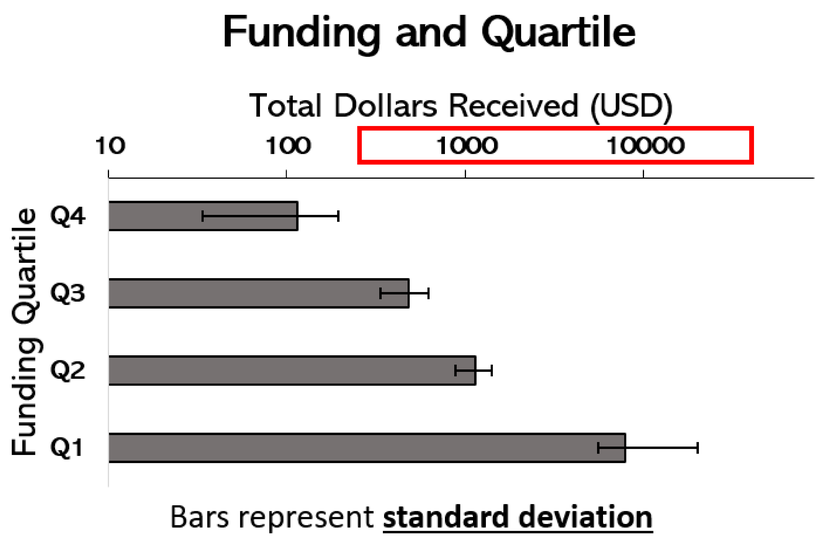
- Using **the NY State SPARCS** database and **Open Payments Database**, we identified
  - Otolaryngologists who performed an endoscopic sinus procedure and received an industrial payment from 2013-2015
- Examined funding received, total surgeries performed, complications.
- Stratified into **4 quartiles** following prior studies.

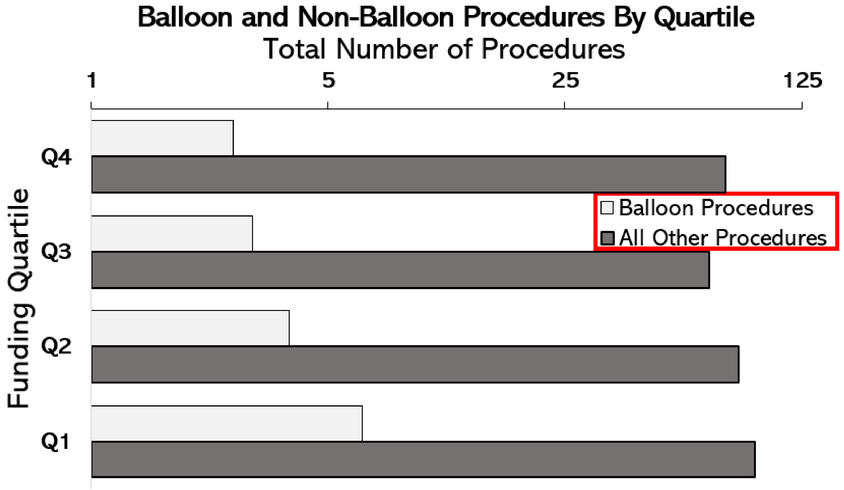
RESULTS

Table 1 – Mean, Median, Mode

Mean	$2386
Median	$754
Range	$10-$78,322

- Given the statistically significant association between increased funding and increased BD procedures, we examined if there was a **cut-off where this was no longer true**.
- Cut-off value: **$2,817**
- Physicians who received **more than $2,817** performed the same number of BD procedures with statistical significance
- Example: **Physician A** receives **$30,000** and **Physician B** receives **$3,000**. There is no statistically significant difference between the BD volume of Physicians A and B.





CONCLUSIONS

- Physicians who received the **least funding** had the **most epistaxis** and **skull base fracture** complications
- Physicians who received the **most funding** performed the **most total procedures**
- **Below $2,817 received**, there is a statistically significant increasing association between funding received and number of BD procedures performed.

FUNDING & ACKNOWLEDGEMENTS

- Medical Student Research Office – Summer Student Investigator
- Department of Otolaryngology
- Leslie Waters-Martin

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Use of Natural Language Processing and Deep Learning to Identify Recommended Follow-Ups in Diagnostic Imaging Reports

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OBJECTIVES

- Automate retrieval of follow up recommendations as well as relevant information

INTRODUCTION

- Imaging utilization is increasing and up to 12% of radiology reports include follow-up recommendations for additional imaging
- Hard to extract follow ups from radiology reports given the varied language radiologists use

RESULTS

Table 1 Performance of attempts to pull clinical details

Information Extracted	Sensitivity	Specificity	precision	recall	F1-Score	Accuracy
Follow Up Status	.77	.88	.88	.92	.90	85%
Clinical Concern	.47	.94	.61	.94	.74	69%
Diagnostic Imaging Test	.84	.87	.71	.87	.78	85%
Time Frame	.50	.97	.50	.50	.50	96%

Table 2 Performance compared to baseline efforts

Information Extracted	Baseline Method	Baseline Method Accuracy	Implementation accuracy	P-Value
Follow Up Status	LSTM alone	59%	85%	<.001
Clinical Concern	Report retrieval program	52%	69%	.014
Diagnostic Imaging Test*			85%	
Time Frame	Temporal tagger alone	82%	96%	.002

Great Example

IMPRESSION:

1. Increased conspicuity of a couple subcentimeter left lung pulmonary nodules, suspicious for metastatic disease. Continued attention on follow-up imaging is recommended.
2. No definite evidence of metastatic disease in the abdomen or pelvis.

Predicts: Follow-up needed and for pulmonary nodules

Good Example

IMPRESSION:

1. Persistent middle lobe predominantly groundglass nodule which has minimally increased in size as well as attenuation in 3 months. Solid component laterally is unchanged. Given persistence, continued follow-up imaging with repeat chest CT in 3 months is recommended. While this is still more likely infectious/inflammatory, an indolent lung neoplasm is also in the differential.
2. Tubular branching structure in the right upper lobe likely reflecting mucoid impaction with associated bronchiectasis and bronchitis.
3. Additional subcentimeter pulmonary nodules bilaterally unchanged when compared to the most remote prior study from 16 months ago.

Predicts: Follow up needed in 3 months for pulmonary nodule via chest ct. Would want it to pick up ground glass nodule, it's getting lucky since both concerns are lung nodules but it's picking up the wrong thing.

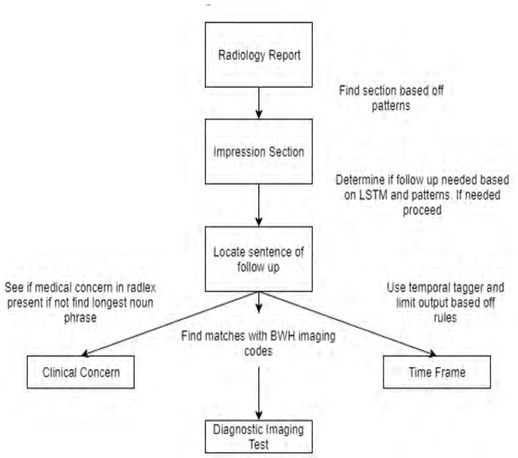

Figure 1. Experimental Design Flowchart

CONCLUSIONS

- It's possible to gain semantic information and reliably predict follow-ups from radiology report.
- Providing physicians more details about follow-ups help ensure that more appropriate testing is performed, allowing for early detection of pathologies before it's too late.

General Surgery Resident Perception of Laparoscopic Surgery and Training in the Dominican Republic

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OBJECTIVE

As laparoscopic procedures and techniques become incorporated into the formal education of residents in lower middle income countries (LMICs), it is pertinent to evaluate the perspective of the local surgical residents.

INTRODUCTION

The implementation of laparoscopy has propelled a shift in training residents with relevant surgical techniques in LMICs. In lieu of the benefits the procedure provides to patients, including but not limited to reduced infection rates, reduced blood loss, and faster post-operative recovery times, there has been a massive push towards implementing laparoscopic techniques in LMICs.

This study focuses specifically in Santiago, Dominican Republic (DR), where laparoscopy exists as a new concept in both the public and private hospitals sectors in resource limited settings.

METHODS

Translated Google Survey Administered

↓

Residents from Public Hospitals in Santiago, DR

↓

Analysis

RESULTS

- 23 residents who participated in the overall survey, surmounting an overall response rate of 72%.
- Male (69.6%) and female (30.4%) surgeons responded to the survey. R1 (21.7%), R2 (17.4%), R3 (26.1%), and R4(34.8%) residents participated.
- 69.6% of the residents identified as under the age of 30.

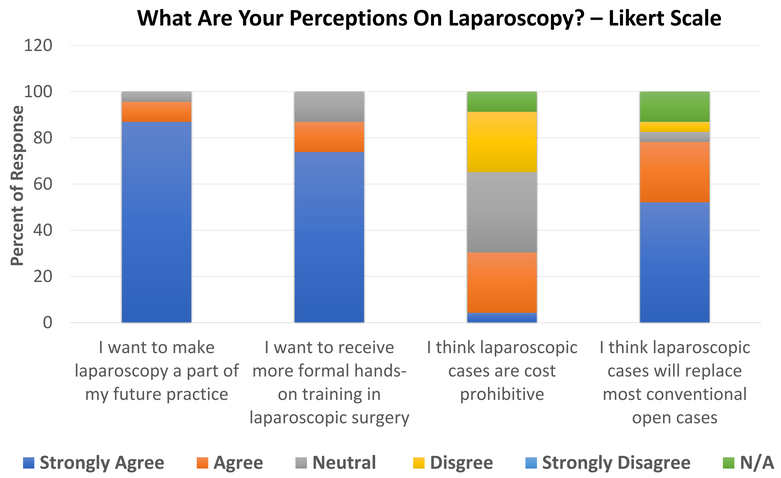

Figure 1. 86.9% of the residents strongly agreed in wanting to make laparoscopy a part of their future practice. Additionally, 73.9% of residents expressed the desire to make laparoscopy a more formal hands-on training.

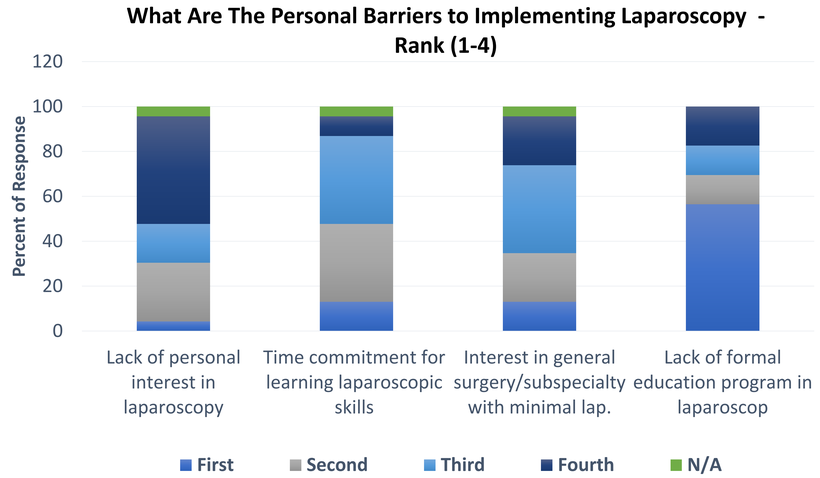

Figure 2. A significant proportion of residents reported lack of formal education program as their personal barrier to incorporating laparoscopy into their routine. (p-value <0.01)

CONCLUSIONS

All residents reported needing laparoscopy as part of their future practice and more formal hands on training, as they believe laparoscopic cases will replace most conventional open methods.

A limitation of this study was the number of residents who were able to participate. A future study would be to chart a 4-year longitudinal study and examine the impacts of laparoscopy on the residents.

FUNDING & ACKNOWLEDGEMENTS

The Ramon Murphy MD Program for Global Health Education at the Icahn School of Medicine at Mount Sinai.

The Department of Surgery, Icahn School of Medicine at Mount Sinai

Health Related Quality of Life After Small Bowel Neuroendocrine Tumor Resection

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89

OBJECTIVES

- Assess predictive factors of HRQoL in patients who underwent SB-NET resection

INTRODUCTION

- With numerous avenues to combat tumor growth and prolong survival, it is more important than ever to investigate quality of life in this patient population.

METHODS

- NET resection patients from MSH between 2011-2019
- Self-reported Short Form-12 Health Survey
- Studied patient-, tumor-, and treatment-related factors in relation to various determinants of HRQoL

RESULTS

Table 1. Patient Demographics, Treatments, and Pathological Characteristics

Outcome Variable (missing data)	n (Percentage)
Sex:	
Male	16 (42%)
Female	22 (58%)
Ever smoker	14 (35%)
Symptoms of:	
Abdominal pain	25 (66%)
Diarrhea	23 (61%)
Flush	13 (34%)
Carcinoid Heart Disease	3 (8%)
Bowel Obstruction	3 (8%)
Carcinoid Syndrome	21 (55%)
ASA Score:	
2	2 (5%)
3	31 (82%)
4	5 (13%)
Grade (20%):	
1	28 (74%)
2	9 (24%)
Disease Stage:	
Stage III	7 (18%)
Stage IV	28 (74%)
Mesenteric invasion	31 (82%)
Multifocality	18 (47%)
Lymphovascular invasion	19 (50%)
Perineural invasion	23 (61%)
Elevated pre-operative chromogranin	17 (45%)
Elevated pre-operative serotonin	24 (63%)
Elevated pre-operative pancreastatin	13 (34%)
Pre- operative somatostatin analogs	23 (61%)
Post- operative somatostatin analogs	36 (95%)
Post- operative hepatic embolization	7 (18%)

Percentage of missing data is reported in parentheses. Med (IQR), median (interquartile range).

- Median physical component summary score (PCS) was 49.54
- Median mental health component summary score (MCS) was 50.60
- No significant difference between standard SB resection and complex debulking surgeries.

Table 2. Patient-Reported Health Outcomes

	Median (IQR)	Mean (SD)
General Health (GH)	2, [2 - 3]	2.342 (1.07)
Bodily Pain (BP)	2, [1 - 2]	2.026 (1.30)
Vitality (VT)	3, [2 - 4]	3.316 (1.47)
Social Functioning (SF)	5, [3-5]	3.974 (1.30)
Physical Component Summary (PCS)	49.54, (38.2 - 52.9)	45.62 (10.3)
Mental Component Summary (MCS)	50.6, (44.4 - 57.9)	48.19 (11.62)

CONCLUSIONS

- Overall mental health related quality of life comparable to general population in our cohort.
- Flushing most predictive of negative outcomes.
- Liver metastases negatively impact physical health.
- Y90 Hepatic embolization severely hurt patient vitality.

FUNDING & ACKNOWLEDGEMENTS

- Received funding from the Icahn School of Medicine at Mount Sinai to conduct this research.

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Insights on Physician Instructions to Inject Epinephrine with Mild or No Symptoms on Food Allergy Emergency Plans.

Icahn School of Medicine at Mount Sinai — Elliot and Roslyn Jaffe Food Allergy Institute

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95

Introduction

- Recommended practice is to provide epinephrine auto-injectors and food allergy action plans to patients at risk of anaphylaxis.[1,2,3,4]
- Food Allergy Research & Education (FARE) and American Academy of Pediatrics (AAP) plans have an option to instruct patients to inject epinephrine for mild ("Option A") or no ("Option B") symptoms following allergen ingestion.
- Early epinephrine injection may prevent progression but also may result in peak epinephrine levels prior to the severe symptoms, adding equipoise.[4,5,6,7]
- There are no data on this approach

Methods

- Surveys were administered to a convenience sample of doctors via email and in-person
- Surveys were anonymous and assessed how often practitioners use the options and in what circumstances they would use these options such as past anaphylaxis, past intubation, past cardiovascular collapse, etc.
- A retrospective chart review of 1,000 food allergy action plans in a pediatric allergy practice was performed
- 9 Practitioners contributed data for the chart review
- Comparisons were made by chi square
- The study was approved by the institutional review board of the Icahn School of Medicine at Mount Sinai.

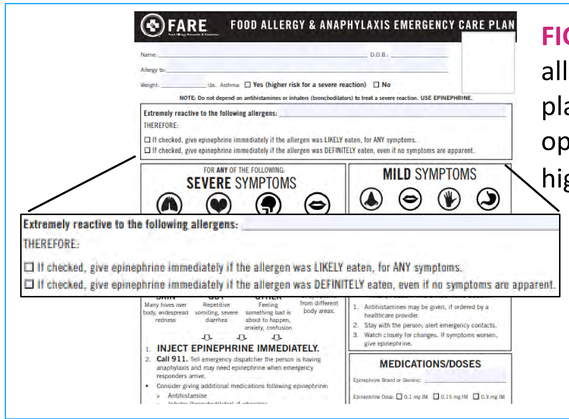

FIGURE 1. FARE allergy action plan with the options highlighted.

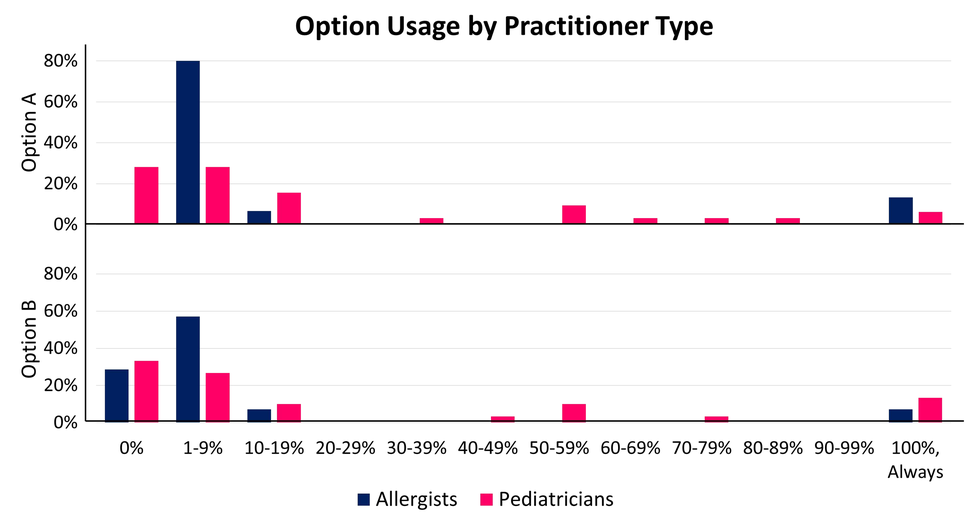

Figure 2. Option Usage by Practitioner Type

- Allergists (80%) indicated they used OptionA in 1-9% of plans, vs. 28% of Peds (p<.05).
- Most allergists (57%) used OptionB in 1-9% of plans, compared to 26% of Peds (p=.05).
- 20%/14% of allergists and 44%/40% of pediatricians used Option A (p=.11)/Option B (p=.09) in over 9% of plans.

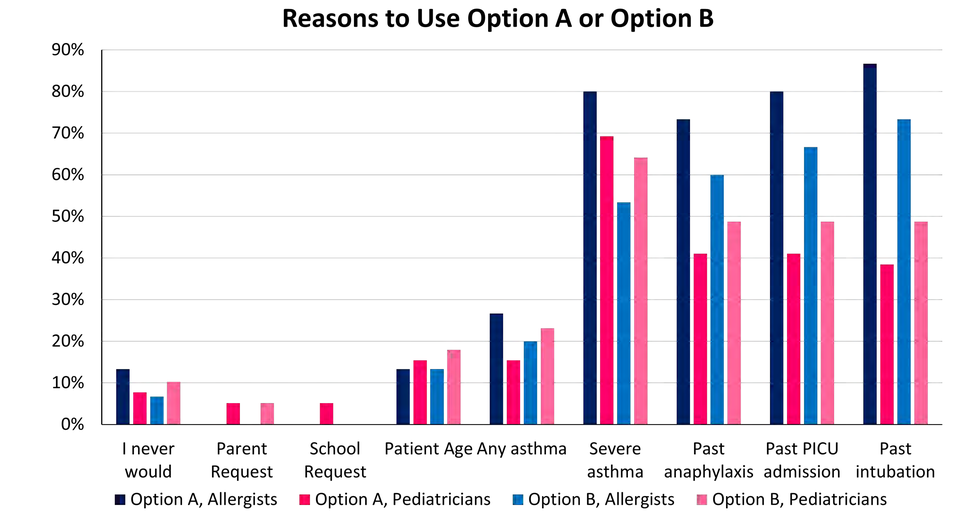

Figure 3. Reasons to Use Option A or Option B by Practitioner Type

- Top reasons to use the options for both allergists and pediatricians included past anaphylaxis, PICU admission, intubation, and cardiovascular collapse
  - The latter 3 were identified more often by allergists (p<0.05)

Results

Survey

- Response rate 35.3% (15 allergists, 43 pediatricians)
- 100% allergists and 74% pediatricians were familiar with Option A; 93% and 72% for Option B, respectively.

Chart Review (allergists)

- Option Usage: 4.1% overall
- By provider, usage rates varied from 0-9%
- Option chosen more often for:
  - Any asthma (p<0.001), Any asthma treatments (p<0.001), Past anaphylaxis (p<0.001), Past epinephrine use (p<0.001)

Discussion/Limitations

- **DISCUSSION**
  - Pediatricians tended to endorse usage of epinephrine for mild/no symptoms more often than allergists.
  - Severity of past reactions were drivers of selecting these options (more so for allergists than pediatricians).
- **LIMITATIONS**
  - Survey had small sample size with more pediatricians than allergists
  - Potential bias-convenience sample within the New York City area

Conclusions

- Variation in usage of these options varies from 0-100% amongst providers.

Implications

- Use of the options is associated with severe past reactions and risk factors for anaphylaxis- in this way the options are being used as intended.
- Wide variety in practice based on provider necessitates further education on the usage of the options.
- Further research is needed on the ramifications of using the options.

Acknowledgements: Supported in part by the Icahn School of Medicine and the Jaffe Food Allergy Institute

PROGRESSION TO CHRONIC KIDNEY DISEASE IN CHILDREN WITH A HISTORY OF PRETERM BIRTH AND NEONATAL ACUTE KIDNEY INJURY

Icahn School of Medicine at Mount Sinai

Cassandra Pruitt BA, Margaret Pulju MD, Andrea Weintraub MD Department of Pediatrics, Icahn School of Medicine at Mount Sinai

OBJECTIVES

- To assess whether infants born at <30 weeks gestation with a history of acute kidney injury (AKI) have kidney dysfunction at age 5-10 years.

INTRODUCTION

- Preterm birth increases the risk for development of chronic kidney disease (CKD) even in the absence of AKI or known nephrotoxic exposures.
- Incidence of AKI in this population is 12-40%.

METHODS

Study Design: Prospective cohort study.

Subjects: Children born <30 weeks gestational age in the Mount Sinai NICU from 2007-2013 ± history of AKI during birth hospitalization.

Outcomes: Renal dysfunction, defined as: eGFR <90 mL/min/1.73m^2 and/or urine protein: Cr > 0.2. Both the Schwartz and CKiD equations were used to calculate eGFR.

RESULTS

Table 1. Characteristics of the study population

Perinatal Factors	All Subjects (n=43)
Gestational age (weeks), Mean ± SD	27± 2
Birth weight (g), Mean ± SD	1036 ± 257
SGA, n	6 (14%)
Female, n	16 (37.2%)
CRIB II Score Mean ± SD	9.1 ± 2.7
Stage 1 AKI, n	13 (30.2%)
Peak Cr, mg/dL, Mean ±SD	1.1 ± 0.2
Final Cr, mg/dL, Mean ± SD	0.48 ± 0.17
Symptomatic PDA, n	21 (48.8%)
Medically treated PDA, n	21 (48.8%)

Table 2. Clinical characteristics at follow-up

	Renal Dysfunction	No Renal Dysfunction	P value
Age	6.9 ± 1.9	7.8 ± 1.8	NS
Female, n (%)	12 (27.9%)	4 (9.3%)	<.001
Stage 1 AKI	4 (9.3%)	9 (20.9%)	NS
Serum NGAL (ng/L), mean, (range)*	66.6 (41.5-91.7)	63.7 (31-96.4)	0.03
SGA	5 (11.6%)	1 (2.3%)	0.015

* Serum NGAL from first 28 subjects only

- Female sex and SGA were significantly associated with renal dysfunction at follow-up.
- Renal dysfunction at follow-up was not significantly more likely in children with a history of neonatal AKI.
- eGFR calculated by Schwartz equation was significantly higher than eGFR calculated by CKiD equation.

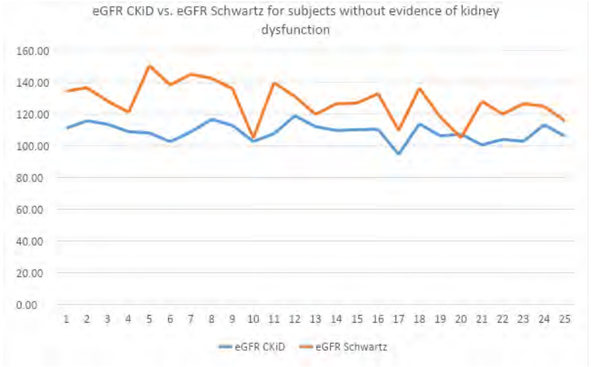

Figure 1. eGFR calculated using the Schwartz and CKiD equations in subjects without evidence of renal dysfunction

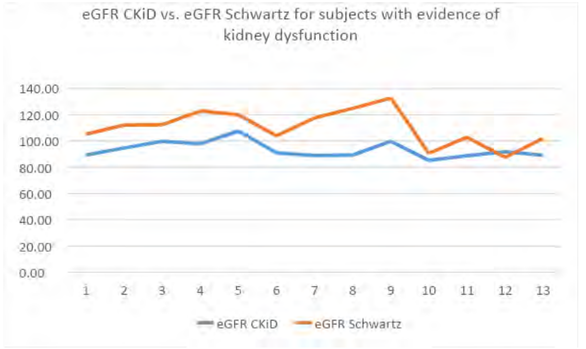

Figure 2. eGFR calculated using Schwartz and CKiD equations in subjects with evidence of renal dysfunction

CONCLUSIONS

- History of stage 1 AKI was not associated with renal dysfunction at follow-up at age 5-10 years.
- Reliance on serum BUN and creatinine alone may miss evolving CKD in children born prematurely.
- Use of the Schwartz equation may underestimate eGFR when evaluating renal function in ex-preterm infants.
- Screening prior to age 7 may be warranted in ex-preterm infants who were SGA, particularly girls.
- Serum NGAL may be a promising future biomarker of evolving CKD in ex-preterm infants.

FUNDING & ACKNOWLEDGEMENTS

1. This research was approved by the IRB of the Icahn School of Medicine at Mount Sinai.

2. Funding was provided by the Department of Medical Education and the Division of Newborn Medicine at the Icahn School of Medicine at Mount Sinai.

Urine Collection for Environmental Chemical Exposure Assessment in the NICU

Jacqueline Roig, BA; Emily Spear, MM; Srinivasan Narasimhan, PhD; Syam Andra, PhD; Annemarie Stroustrup, MD, MPH

Departments of Pediatrics and Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai

103

BACKGROUND

- **Phthalates** enhance flexibility and durability in medical products
- Phthalates leach from medical equipment and metabolites, excreted in **urine** and stool
- **NICU** environment = higher metabolites in the urine (feeding (TPN), respiratory support, IVs, intubation, etc.)
- Early exposure to phthalates = **adverse neurodevelopment**
- Method of specimen collection may significantly impact the yield of specific organic chemicals of interest
- Challenges of urine collection in the NICU: vulnerable population, cost of materials, contaminants, yield
- The specific impact of collection method has not been rigorously evaluated in the NICU

OBJECTIVES

- To quantify the yield, accuracy, and feasibility of multiple methods for preterm infant urine specimen collection for phthalate biomarkers.

This study is performed under the ongoing IRB-approved NICU-HEALTH study, GCO 12-0332.

METHODS

Part One: Laboratory Trials

- **Aliquot NIST into material in glass jar**
  - Aliquot thawed NIST standard into chosen material inside glass jar
  - Place jar in water bath previously heated to body temperature, sit for 60 minutes
- **Material to Specimen Cups**
  - Extract glass jar from water bath, place material into specimen cups, allow to sit for 15 minutes
- **Express NIST from Material into Vial**
  - Use 20mL disposable polypropylene syringe to extract
  - Store samples at -80 degrees C
- **Samples to Lab**
  - Analyze for a panel of nine phthalate metabolites
  - SPE-LC-tandem mass spectrometry

Part Two: Clinical Feasibility

- **Recruit NICU participants**
  - Babies born at Mount Sinai between 28-32 weeks gestation
  - Excluded- congenital anomalies or inborn errors of metabolism
- **Attempt Urine Collection**
  - Each method attempted 10 times
  - Instructions and materials left for nurse
  - Record failures and successes, volume collected
- **Process Material**
  - Nurse transfers from diaper to specimen cup
  - Use 20mL disposable polypropylene syringe to extract urine
  - Store samples at -80 degrees C

RESULTS

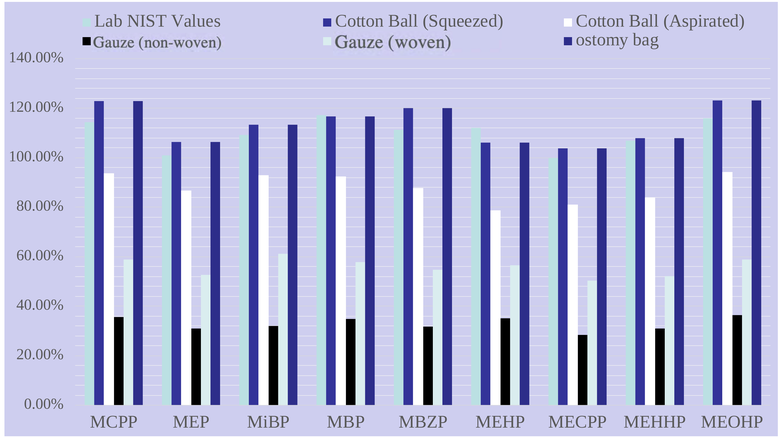

Figure 1. Percent recovery analyzed for a panel of nine phthalate metabolites

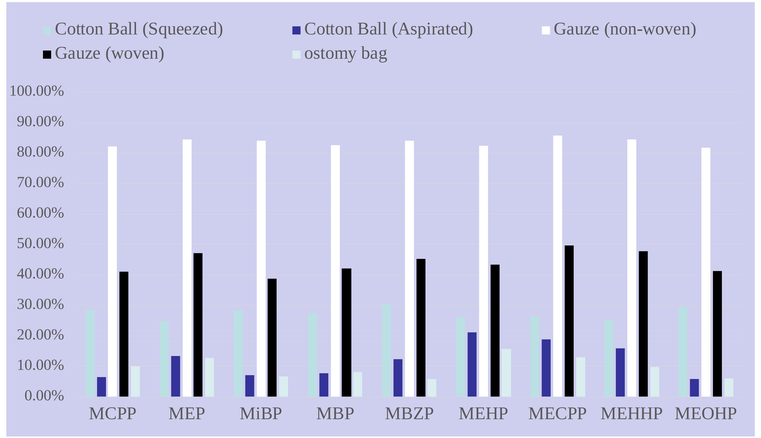

Figure 2. Percent difference from NIST reference value per collection method analyzed for a panel of nine phthalate metabolites

% Yield of Volume Injected	Mean ± sd (%)
Ostomy bag	73.4 ± 9.4
Gauze, woven	15.0 ± 1.4
Gauze, non-woven	6.5 ± 9.2
Cotton ball, aspirated	53.3 ± 0.0
Cotton ball, squeezed	36.7 ± 4.7
Diaper	0.0 ± 0.0

Table 1 Percent Yield – Laboratory Trials

Collection Method	Successful Trials (%)
Cotton ball, squeezed	60.0
Cotton ball, aspirated	60.0
Gauze, woven	10.0
Gauze, non-woven	40.0
Ostomy bag	66.7
Diaper	30.0

Table 2 Trial Success – Clinical Feasibility

Volume Collected	Mean ± sd (mLs)
Cotton ball, squeezed	1.8 ± 0.8
Cotton ball, aspirated	1.6 ± 1.2
Gauze, woven	0.2 ± 1.4
Gauze, non-woven	1.4 ± 1.4
Ostomy bag	10.9 ± 2.0
Diaper	1.2 ± 0.5

Table 3 Volume Collected – Clinical Feasibility

CONCLUSIONS

- Percent Recovery in acceptable range for **ostomy bags + aspirated + squeezed cotton balls**
- Percent difference from NIST reference value lowest in **ostomy bags + aspirated cotton balls**
- Laboratory trial % yield highest for **ostomy bags + aspirated cotton balls**
- NICU trial success rate and volume collected highest for **ostomy bags + aspirated + squeezed cotton balls**
- **Overall, aspirated cotton balls performed best by all metrics**

ACKNOWLEDGEMENTS

- The Stroustrup Lab
- The Senator Frank R. Lautenberg Laboratory
- Mount Sinai NICU Nurses
- Thank you to the ISMMS Summer Student Investigator Award for funding

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Icahn School of Medicine at Mount Sinai

ASSESSING TREATMENT OUTCOMES AMONG DEPRESSED PATIENTS IN A STUDENT-RUN OUTPATIENT PSYCHIATRY CLINIC

Alexandra Saali, MS., Samuel K Powell, MS., Craig Katz, MD.

BACKGROUND

East Harlem Health Outreach Partnership's Mental Health Clinic (MHC) is a student-run, faculty-facilitated outpatient psychiatry clinic serving uninsurable individuals

HYPOTHESIS

Care provided by the **MHC reduces depressive and anxious symptoms** in depressed patients

STUDY DESIGN

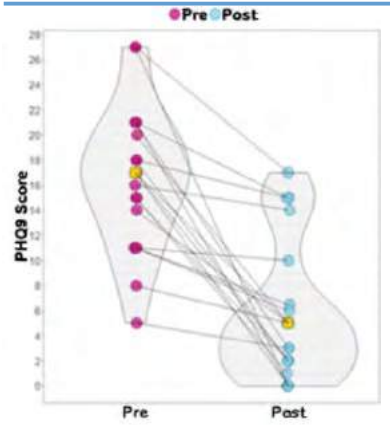
- Inclusion criteria: current patients with MDD/Depression and ≥ 4 clinic visits (n=19)
- Data collection: anxious and depressive symptoms assessed with standardized questionnaires each visit
- Analysis: paired t-test to determine whether or not patients had significant improvement in their symptom severity from baseline (in pre-, post- fashion)

METHODS

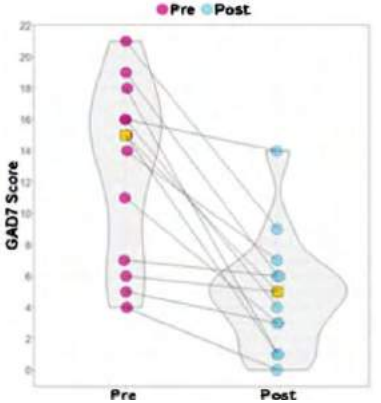
- Patient Health Questionnaire (PHQ)-9 results quantify patients' depressive symptoms on a scale from 0-27
- Scores of 5, 10, 15 and 20 represent cutpoints for mild, moderate, moderately severe, and severe depression

- Generalized Anxiety Disorder (GAD)-7 questionnaires measure anxious symptoms on a scale from 0-21
- Scores of 5, 10, and 15 represent cutpoints for mild, moderate, and severe anxiety

RESULTS



~10.6 point **decrease** in **PHQ-9** scores (p-value= 1.275e-05)



~7.9 point **decrease** in **GAD-7** scores (p-value= 0.0002292)

Our findings support the effectiveness of our student providers in the MHC

Approved by the Mount Sinai Program for The Protection of Human Subjects

Automated Measurement of Spinopelvic Parameters on Lateral Lumbar Radiographs Using Machine Learning

John T. Schwartz, BS, Peter Tang, MD, Javin Schefflein MD, Brian H. Cho, BS, Jun Kim, MD, Samuel K. Cho, MD

Icahn School of Medicine at Mount Sinai

OBJECTIVES

- Develop an algorithm for the automated measurement of spinopelvic parameters.
- Evaluate accuracy against surgeon measurement.

INTRODUCTION

- Sagittal spinal alignment measurements correlate with clinical outcomes, pain, and health-related quality of life[1].
- Manual measurements are time-consuming to acquire and subject to rater-dependent error.

METHODS

- 816 lateral lumbar radiographs were gathered sequentially.
- 652 radiographs used to train a convolutional neural network for segmentation.
- A computer vision script was written to measure spinopelvic parameters from segmentations.
- Algorithm accuracy was compared with 2 surgeons relative to a gold standard.
- Statistical analysis included Pearson correlation coefficients and Wilcoxon rank-sum test of mean absolute difference.

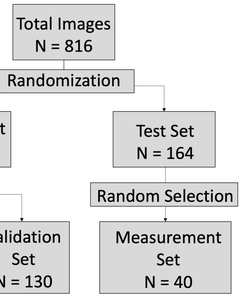


Figure 1. Image allocation for algorithm training, validation, and testing.

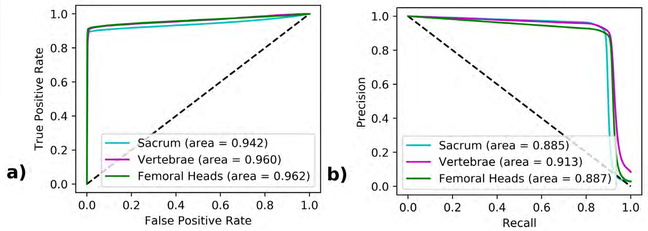


Figure 2. Receiver operating characteristic (a) and precision recall characteristic (b) for the segmentation convolutional neural network.

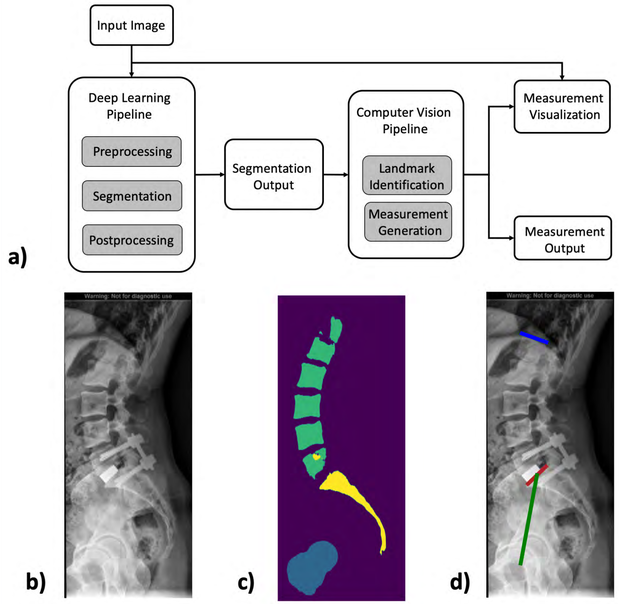


Figure 3. Flowchart of the overall measurement algorithm pipeline and an example case. a) Flowchart of the complete algorithm pipeline. b) An input image example. c) An algorithm-generated segmentation example. d) A measurement visualization example.

RESULTS

Measurement	Min.	Q1	Median	Q3	Max.	Mean	SD
L1-S1 Cobb Angle	0.40	44.60	54.85	64.43	81.00	53.52	16.76
Pelvic Tilt	0.80	9.00	17.00	21.95	55.20	16.86	10.03
Pelvic Incidence	40.30	49.85	55.00	64.60	76.40	56.79	10.31
Sacral Slope	-3.20	34.15	41.00	45.93	60.70	39.93	11.47

Table 1. Descriptive statistics of spinopelvic parameters of the 40 test set radiographs as determined by the Gold Standard surgeon. SD, Standard Deviation.

Measurement	Operator	Min.	Q1	Median	Q3	Max.	Mean	SD
L1-S1 Cobb Angle	relative to gold standard (deg)							
	Algorithm	0.10	1.30	2.23	6.16	14.15	4.30	4.14
	Surgeon 1	0.20	2.80	5.15	8.30	28.00	6.01	4.96
	Surgeon 2	0.20	2.28	3.75	5.28	38.30	4.86	6.00
	relative to surgeon average (deg)							
	Algorithm	0.18	1.22	3.53	6.42	11.30	4.21	3.40
Pelvic Tilt	relative to gold standard (deg)							
	Algorithm	0.01	0.32	0.69	1.10	38.60	2.14	6.29
	Surgeon 1	0.10	0.28	0.60	1.20	37.40	1.82	5.88
	Surgeon 2	0.00	0.20	0.40	0.73	39.00	1.54	6.10
	relative to surgeon average (deg)							
	Algorithm	0.00	0.36	0.53	1.46	13.34	1.54	2.91
Pelvic Incidence	relative to gold standard (deg)							
	Algorithm	0.25	1.51	2.76	5.54	29.12	4.56	5.40
	Surgeon 1	0.20	1.78	3.95	5.63	15.70	4.39	3.48
	Surgeon 2	0.30	2.00	3.40	5.13	12.40	3.92	2.65
	relative to surgeon average (deg)							
	Algorithm	0.17	2.13	3.19	5.36	25.68	4.46	4.41
Sacral Slope	relative to gold standard (deg)							
	Algorithm	0.03	1.13	2.80	5.47	40.16	4.76	6.93
	Surgeon 1	0.10	2.48	4.15	6.05	30.50	5.43	5.54
	Surgeon 2	0.50	2.38	3.70	5.47	39.30	4.89	6.12
	relative to surgeon average (deg)							
	Algorithm	0.13	1.40	3.16	5.91	16.89	4.19	3.74

Table 2. Measurement performance of the algorithm and surgeons relative to the gold standard as well as performance of the algorithm relative to surgeon average. SD, standard deviation; deg, degrees.

Figure 4. Correlation matrices comparing all combinations of measurement operators. Spearman correlation coefficients are provided for Cobb angle, pelvic tilt, pelvic incidence, and sacral slope measurements. A, Algorithm; GS, Gold Standard; S1, Surgeon 1; S2, Surgeon 2.

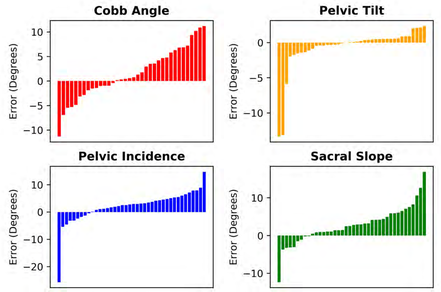


Figure 5. Sorted bar plots of the algorithm error for each test image measured by both the surgeons and the algorithm. Error is calculated by subtracting the average surgeon measurements from the algorithm measurements for Cobb angle, pelvic tilt, pelvic incidence, and sacral slope.

CONCLUSIONS

- This algorithm measure spinopelvic parameters with comparable accuracy to surgeons.
- This algorithm could streamline the clinical workflow or be used to study spinopelvic parameters at large scale.

FUNDING & ACKNOWLEDGMENTS

1. Icahn School of Medicine at Mount Sinai Summer Student Investigator Award
2. The first author would like to express his gratitude to Dr. Cho for his support and guidance.

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An Analysis of the Experiences and Needs of LGBTQ Torture Survivors at the Libertas Center for Human Rights at Elmhurst Hospital, Queens

Nausheen Singh, Benjamin McVane MD, Sara Wagner MA, Dinali Fernando MD MPH

Icahn School of Medicine at Mount Sinai

112

OBJECTIVES

- This study aims to understand the unique needs and experiences of the Libertas Center's LGBTQ clients to better tailor services

INTRODUCTION

- Of the more than one million torture survivors living in the United States, LGBTQ survivors are a particularly vulnerable subset
- Little research exists documenting this population's experiences and needs
- Since March 2010, the Libertas Center for Human Rights at Elmhurst Hospital has provided comprehensive mental health, medical, social, and legal services to torture survivors

METHODS

- 392 LGBTQ clients were identified by retrospective chart review of the Libertas database and Elmhurst Hospital's medical records from 2010-2019. Demographic information and torture histories were compared between LGBTQ and non-LGBTQ clients.

RESULTS

- LGBTQ clients were more often male (71% vs. 49% in non-LGBTQ group), and more highly educated (71% with 13+ years of education vs. 52% in the non-LGBTQ cohort)
- LGBTQ clients experienced sexual torture (57% vs 29.5%) and community persecution (44% vs 7%) at higher rates than the non-LGBTQ cohort, and more (22% vs 11%) first experienced torture by the age of 10
- More LGBTQ clients identified emotional/psychological services as their primary need (63.5% vs 46.5%) and reported past suicidal ideation at a markedly higher rate (46% vs. 17%)

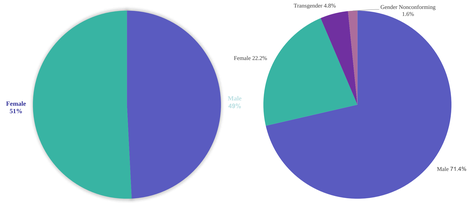

Figure 1. Gender Breakdown of Non-LGBTQ and LGBTQ Clients

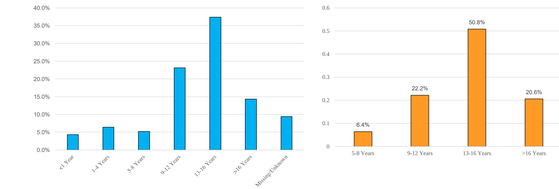

Figure 2. Years of Schooling in Non-LGBTQ and LGBTQ Groups

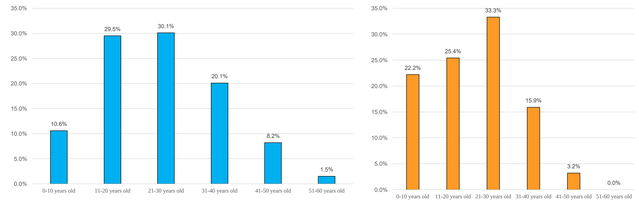

Figure 3. Non-LGBTQ and LGBTQ Clients' Age at First Torture

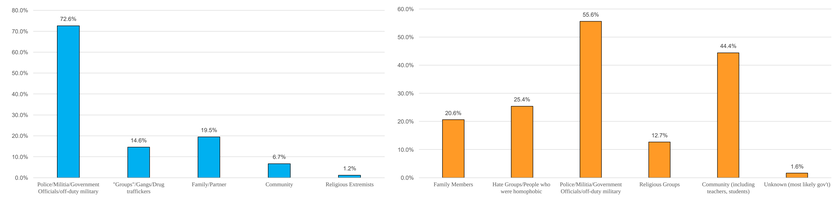

Figure 4. Perpetrators of Non-LGBTQ and LGBTQ Clients

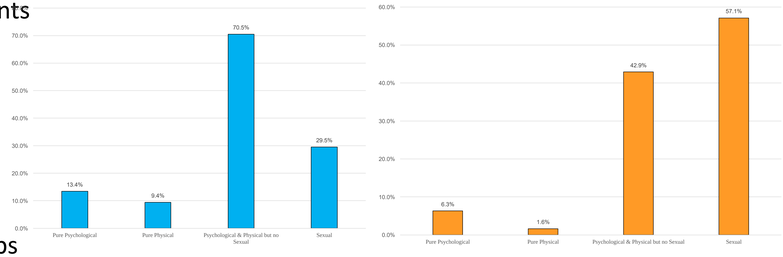

Figure 5. Types of Torture Experienced by Non-LGBTQ and LGBTQ Clients

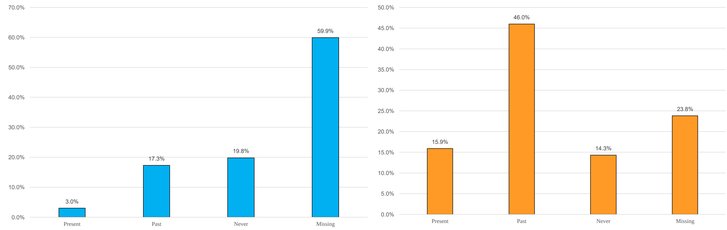

Figure 6. Suicidal Ideation Reported by Non-LGBTQ and LGBTQ Clients at Intake

RESULTS *cont.*

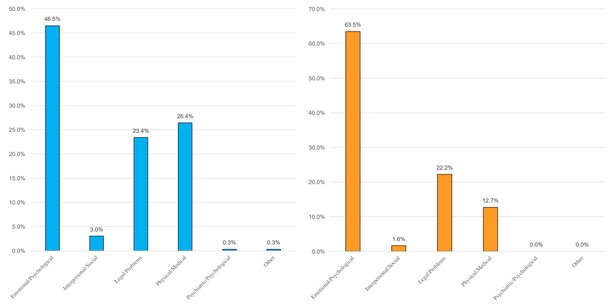

Figure 7. Non-LGBTQ and LGBTQ Clients' Primary Concern at Intake

CONCLUSIONS

- These findings demonstrate the increased vulnerability of LGBTQ torture survivors, warranting enhanced sexual and mental health screening and support for these clients to mitigate their high risk for adverse health outcomes. Further, they point to the pressing need for greater advocacy to end the high degree of community persecution faced by LGBTQ torture survivors.

FUNDING & ACKNOWLEDGEMENTS

- Thank you to my mentors Dr. Dinali Fernando, Dr. Ben McVane, Sara Wagner and the entire Libertas Center team for their support
- The Ramon Murphy MD Program for Global Health Education at the Icahn School of Medicine at Mount Sinai

Factors Impacting Knowledge and Perceptions of Health in Pregnancy Among Women in Rural Kenya

Emily Spiera[1], Unwana Abasi[1], Chemuttaai Lang'at MS,[2] Debora Rogo JD[3], Maryanne Nyamogo MD[3], Khama Rogo MD PhD[3], Tanya Rogo MD MPH[1,4]

[1]Icahn School of Medicine at Mount Sinai; [2]Medtronic Labs; [3]Sagam Community Hospital; [4]BronxCare Health System

115

OBJECTIVES

- To identify factors affecting women's knowledge, perceptions, and preferred resources for health in pregnancy information
- To identify areas for intervention to improve maternal health

INTRODUCTION

- Kenya's maternal mortality rate is 1.6 times the global rate[1]
- Knowledge and perceptions about health in pregnancy (HIP) are important determinants of antenatal care (ANC) utilization and health behaviors[2-5]
- Medtronic's "Maisha Mapya Hypertension in Pregnancy Feasibility Pilot" (MMP) assessed a community-based, technology-enhanced ANC model based out of Sagam Community Hospital

METHODS

Patient Population

- English speaking pregnant women actively enrolled in MMP in Siaya County, Kenya

Data Collection

- Surveys were conducted during routine home visits for MMP during July and August 2019
- Surveys included 55 open- and close-ended questions with additional questions for positive responses
- Health and demographic data were taken from MMP

Data Analysis

- Thematic analysis was used to code open-ended questions
- Descriptive statistics performed in Excel. Fisher's exact tests, correlations, t-tests, and risk ratios performed in SAS
- Participants with incomplete health and demographic data were excluded from final analysis

RESULTS

- 41 of 95 eligible women actively enrolled in MMP at time of study were interviewed. 37 were included in analyses
- Healthcare professionals were ranked the most important information resource (91.4%, n=32). The second most preferred resource varied by level of educational attainment (p=0.02) (Figure 1)
- Women that believed pregnancy can cause health problems were more likely to have schooling beyond primary education (OR=7.8, CI [1.5, 39.8])
- There was no correlation between the number of ANC visits attended in prior pregnancies and the number of known danger signs in pregnancy (p=0.9)
- There was also no significant relationship between the number of ANC visits in prior pregnancies and knowing the two most frequently mentioned danger signs, bleeding (59.0%, n=23) and headache (53.8%, n=21) (p=0.22 and p=0.21, respectively) (Figure 2)
- Most women were on anti-anemia (100%, n=35) and antimalarial (77.1%, n=27) prophylaxis, but there was little awareness of recommendations to take anti-anemia (54.5%, n=18) and antimalarial (12.1%, n=4) medications.

Population Demographics	
Language	
Speaks English %(n)	78.38 (29)
Speaks Swahili %(n)	100 (37)
Speaks Luo %(n)	81.08 (30)
Educational Attainment	
Primary education incomplete %(n)	8.11 (3)
Primary education complete %(n)	21.62 (8)
Secondary education incomplete %(n)	10.81 (4)
Secondary education complete %(n)	27.03 (10)
College incomplete %(n)	2.70 (1)
College complete %(n)	29.73 (11)
Average household income (Ksh)	3343.24
Insurance Status	
None %(n)	59.46 (22)
Has Linda Mama %(n)	100 (22)
NHIF %(n)	40.54 (15)
Children	
Nulliparous %(n)	29.73 (11)
Average number of previous pregnancies among multiparous women (range)	2.04 (1-5)
Average number of ANC visits per prior pregnancy (range)	3.70 (0-9)

Table 1. Demographics of study participants

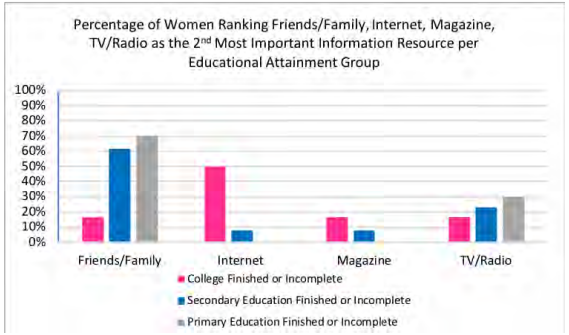

Figure 1. Percentage of women in groups of educational attainment ranking the 2nd most important information resource

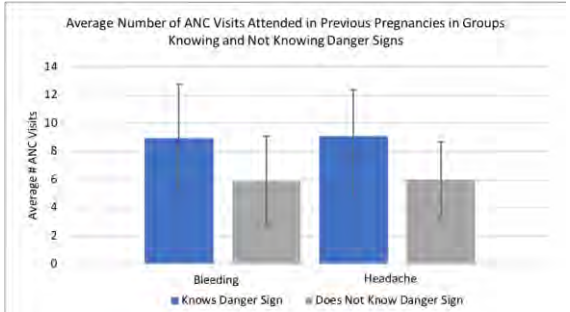

Figure 2. Average number of ANC visits among women knowing and not knowing two danger signs

CONCLUSIONS

- Educational attainment is a key factor affecting knowledge and perceptions
- Healthcare professionals are considered important resources for health in pregnancy information
- Nevertheless, ANC attendance does not sufficiently improve health in pregnancy knowledge
- Health education during ANC should target knowledge retention

LIMITATIONS

- Could not recruit all women enrolled in MMP due to time constraints
- Non-English speakers were excluded
- All women had voluntarily attended ANC at Sagam Community Hospital

FUNDING & ACKNOWLEDGEMENTS

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The MAGIC Algorithm Probability: A Novel Response Biomarker for Acute GVHD Treatment

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116

INTRODUCTION

Graft-versus-host disease (GVHD) is the leading cause of non-relapse mortality (NRM) after allogeneic hematopoietic cell transplant (HCT). Clinical response after 4 weeks of systemic acute GVHD treatment is the current gold standard to predict NRM, but response is difficult to quantitate and better measures are needed.

Our lab identified two protein biomarkers important in acute GVHD pathogenesis: suppressor of tumorigenesis 2 (ST2) and regenerating islet-derived 3α (REG3α). These biomarkers are combined in the Mount Sinai Acute GVHD International Consortium Algorithm Probability (MAP), which generates an individual's estimated probability of 6 month NRM. The MAP predicts long-term mortality when measured at single time points (Hartwell et al., *JCI Insight* 2018; Major-Monfried et al., *Blood* 2018).

Unknown, however, is whether the MAP predicts long-term survival better than the current gold standard, clinical response after four weeks of treatment. Changes in the MAP over the first month of therapy also have not been evaluated.

METHODS

Patients who received HCT at one of 20 centers in the Mount Sinai Acute GVHD International Consortium (MAGIC) between January 2016 and February 2018, developed acute GVHD, and were treated with systemic steroids were included in this study (n=367).

Clinical data were recorded in the MAGIC database prospectively, and serum samples were collected and stored in a biorepository.

ST2 and REG3α concentrations were measured at weekly time points from treatment initiation to four weeks later via enzyme-linked immunosorbent assay (ELISA).

The MAP was calculated according to the previously published equation (Hartwell et al., JCI Insight, 2018).

Receiver operating characteristic curves (ROC) were created for biomarker probability and clinical response, and the area under the curve (AUC) was computed to characterize predictive accuracy.

The cumulative incidence of NRM was calculated considering relapse and second allogeneic transplant as competing risks.

OBJECTIVE

To determine if the MAP can serve as a response biomarker of acute GVHD treatment and compare its predictive accuracy to the gold standard of response: reduction in clinical symptoms after four weeks.

RESULTS

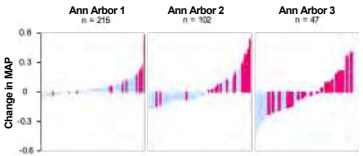

Figure 1. Changes in MAPs after four weeks according to initial Ann Arbor score. Reverse waterfall plots of changes in MAPs in consecutive patients who provided samples at the start of treatment and four weeks later by initial Ann Arbor score in patients with (—) and without (—) six month NRM. A. Ann Arbor 1 patients (MAP < 0.141 at treatment initiation). B. Ann Arbor 2 patients (0.141 ≤ MAP ≤ 0.290 at treatment initiation). C. Ann Arbor 3 patients (MAP > 0.290).

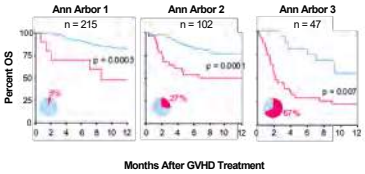

Figure 2. Long-term mortality by MAP threshold (0.290) after four weeks of treatment. Kaplan-Meier estimates of overall survival according to Ann Arbor score for patients whose MAPs after four weeks of treatment rose/remained above (—) or fell/remained below (—) the threshold of 0.290. Ann Arbor scores were determined as in Figure 1.

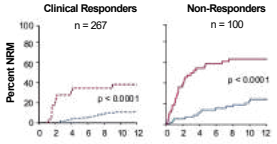

Figure 3. Prediction of NRM by MAP and clinical responses after four weeks of systemic therapy for GVHD. Cumulative incidence of NRM for patients according to clinical response to GVHD therapy (left) and no response (right) analyzed by high (—) or low (—) MAPs.

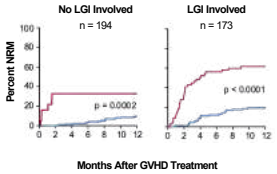

Figure 4. Non-relapse mortality in patients according to lower gastrointestinal symptoms and MAP. Patients were classified based on absence or presence of significant diarrhea (> 500 cc/day) during any week during of therapy. Left: Patients with no lower GI symptoms and either high (—, n=18) or low MAPs (—), n=176). Right: Patients with lower GI symptoms during the first month of therapy and either high (—, n=53) or low MAPs (—, n=120).

CONCULSIONS

Changes in the MAP from the start of treatment to four weeks later cluster based on survival (Fig 1).

The change in MAP after four weeks of treatment was significantly different higher in those who experienced six month NRM vs. those who did not for each Ann Arbor group (p<0.05 for all groups).

After four weeks of treatment, patients with initially low or intermediate MAPs (Ann Arbor 1 and 2, respectively) whose MAPs rose above a previously validated threshold (MAP = 0.290) experienced significantly worse overall survival than those whose MAPs remained below that threshold (Fig 2).

Patients with initially high MAPs (Ann Arbor 3) whose MAPs fell below the same threshold experienced significantly improved survival compared to those whose MAPs remained high (Fig 2).

The MAP threshold of 0.290 identified patients at increased risk of NRM within bot clinical responders and non-responders (Fig 3) and those with or without lower GI symptoms (Fig 4).

MAP after one week of treatment more accurately predicts six month NRM than clinical response after four weeks (AUC=0.81 vs. 0.70, p=0.0003)

DISCUSSION

Survival and NRM cluster based on changes in individual patients' MAPs.

Change in MAP to above or below a single threshold predicts long-term OS.

MAP determination at any timepoint more accurately predicts 6 month NRM than clinical response after four weeks.

Limitation: unknown if MAP predicts response to novel therapies.

MAPs may serve as novel response endpoint for clinical trials.

Acknowledgments: the authors thank the patients, their families, and the research staff for their participation. This work was supported by grants (P01CA03942 and P30CA196521) from the National Cancer Institute and (TL1 TR001434) from the National Center for Advancing Translational Sciences of the National Institutes of Health. The authors also thank the PORTAL Program leadership at Mount Sinai for their support and mentorship.

Do Socioeconomic Disparities Exist in Postoperative Opioid Prescription & Consumption?

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OBJECTIVES

- Investigate socioeconomic disparities in patterns of opioid prescription & consumption following ambulatory surgery

INTRODUCTION

- Number of opioid overdose deaths 6x greater in 2017 than 1999
  - >200,000 people have died in the US from prescription opioid overdose
- Lower SES → risk factor for chronic opioid consumption and overdose among patients previously prescribed opioids
- Conflicting relationships between SES and opioid prescription patterns
- Little evidence of opioid consumption patterns following surgical procedures and related effects of SES

RESULTS

Table 1. Patient Population Characteristics

	High SES	Low SES
No. Patients (Total = 128)	96 (75.0%)	32 (25.0%)
Age (years)		
Median (IQR)	56.0 (37.8-67.0)	51.0 (37.8-64.8)
Sex		
Male	60 (62.5%)	12 (37.5%)
Female	36 (37.5%)	20 (62.5%)
ADI Score (national percentile)		
Median (IQR)	6 (2-12.3)	94.5 (81.3-97.3)
Pain Immediately Post-op (scale of 1-10)		
Median (IQR)	7.0 (5.0-9.0)	6.5 (3.0-9.0)
Pain Two Weeks Post-op (scale of 1-10)		
Median (IQR)	2.0 (1.0-3.0)	2.0 (0.5-3.0)
Satisfaction		
Yes	82 (85.4%)	28 (87.5%)
No	13 (13.5%)	3 (9.4%)
Pills Prescribed (# pills Oxycodone 5mg)		
Median (IQR)	20 (15-30)	20 (15-27.5)
Opioid Consumption (# pills Oxycodone 5mg)		
0	28 (29.2%)	8 (25.0%)
1 to 9	39 (40.6%)	15 (46.9%)
10+	26 (27.1%)	6 (18.8%)
Leftover Pills (# pills Oxycodone 5mg)		
0	21 (21.9%)	8 (25.0%)
1 to 9	17 (17.7%)	3 (9.4%)
10+	31 (32.3%)	10 (31.3%)
What was done with leftover pills? (discarded, saved, none leftover)		
Discarded	9 (9.4%)	10 (31.3%)
Saved	54 (56.3%)	15 (46.9%)
None leftover	15 (15.6%)	6 (18.8%)

No statistically significant difference in opioid prescription or consumption between high & low SES groups following ambulatory surgery

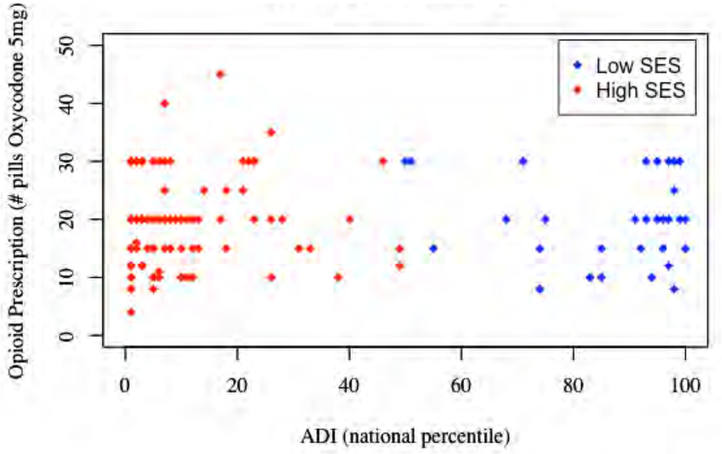

Figure 1. Opioid Prescription Distribution Over ADI National Percentile, Low & High SES

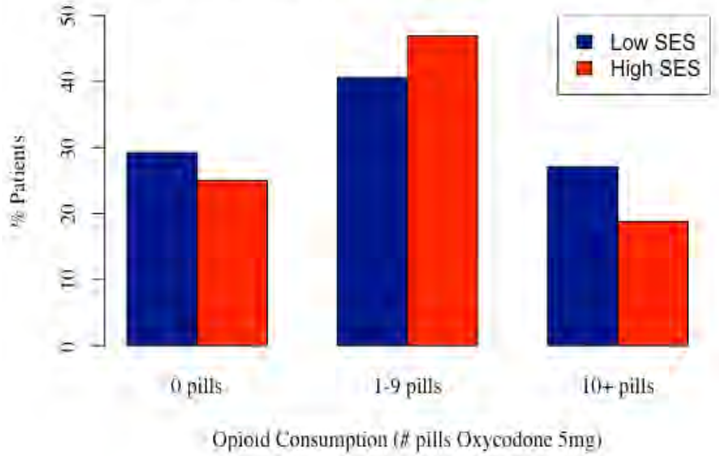

Figure 2. Opioid Consumption in Low & High SES

METHODS

- 128 patients; September 2018-April 2019
  - post-op survey → opioid consumption, pain levels, satisfaction with pain management
  - matched to operative, perioperative prescription, and demographic data
- Area Deprivation Index (ADI) → measure of SES
  - "high SES" = top 3 quartiles
  - "low SES" = bottom quartile

CONCLUSIONS

- Similar patterns of opioid prescription & consumption in patients of all socioeconomic backgrounds
- Suggests that SES disparities may not exist in postoperative opioid prescription and consumption
- A unified approach should be taken with patients of all SES to mitigate the prescription opioid epidemic concerning postoperative pain management

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“I’d Like to Let People Know What We Did:” Values of Fukushima Medical Students Following the Great East Japan Earthquake

118

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Study Objective

To illuminate some **individual stories** of medical students at Fukushima Medical University (FMU) who lived in Fukushima Prefecture at the time of the Earthquake

Background

>> The Great East Japan Earthquake and the resulting tsunami and nuclear disaster on March 11, 2011 resulted in 15,000+ casualties and displaced 154,000 residents[1,2]

>> Lingering effects include **post-traumatic psychological distress** particularly among evacuees[3]

Methods

>> **10 open-ended ethnographic interviews** with FMU medical students who lived in Fukushima Prefecture during the Earthquake

>> Thematic analysis of interview transcripts under the lens of **ethnographic anthropology**

Results

Three major themes emerged in analysis:

1. All interview participants attributed an aspect of their **medical careers** to their experiences following the Earthquake
2. These students shared their experiences out of a desire to **change public perception** of Fukushima Prefecture
3. The students saw the discussion of their experiences as **healing**, both for themselves and for the future

Twitter: @San_kaido
https://twitter.com/san_kaido/status/603513371934130176

1 *“[The Earthquake] was the trigger of my studying radiation…If there were no disaster, I would want to go to some big city, but there was a disaster, so now I want to help Fukushima.”*

2 *“There’s still a lot of prejudice about Fukushima going around, so by speaking out, I hope I can clear some of it up. This is important to me.”*

3 *“I hope nothing like [the Earthquake] happens ever again, but in case it does, I’d like to let people know what we did.”*

Next Steps

>> Further ethnographic research should be conducted to explore the wealth of **other narratives** not touched by this research

>> Cross-cultural studies between survivors of nuclear accidents would allow for the development of a **framework for potential future survivors** of nuclear disasters

Acknowledgments

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Approved by the Program for the Protection of Human Subjects

Evaluating Effects of State Reporting Policies on the Impacts of Intimate Partner Violence

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119

OBJECTIVES

- To better understand the relationship between reporting policies and the impacts of intimate partner violence (IPV).

INTRODUCTION

- IPV is a serious public health issue that affects over 32 million Americans[1]
- Policies mandating provider screening for and reporting of IPV varies widely by state[2,3]

METHODS

- Public data pooled from CDC NIPSVS phone survey from 2010-12 (n=41,174)
- States coded for IPV/DV policies
- Multivariate analyses conducted in R 3.5.3

RESULTS

- Mandatory reporting of suspected IPV/DV cases does not appear to significantly affect the statewide incidence of IPV-related impacts
- Mandatory screening, protocols, training, and fatality reporting for IPV in healthcare facilities, in addition to insurance protections are associated with significant reductions in some types of IPV impacts

Table 1. Number of US Territories with IPV Policies

IPV Healthcare Policy	#
Fatalities reporting	32
Insurance protection	46
Case reporting	47
Protocols disclosure	15
Screening requirement	5
Training requirement	23

Table 2. One-Way ANOVA with Bootstrapping

Factor	Dependent	SS_T	F	P
Screening	Injury impacts	144.86	3.78	<.05
	PTSD impacts	99.18	4.10	<.05
Insurance	Legal impacts	35.22	7.94	<0.01
	Activity limitations	106.28	4.52	0.04
Protocols	Chronic pain	71.90	3.17	0.04
	Sleep issues	89.47	3.61	<0.01
	Miss 1+ day work/school	103.42	5.12	0.03
Training	Medical impacts	35.26	3.03	0.04
	IPV (women)	42.12	8.12	0.03
Fatality reporting	Legal impacts	87.22	6.72	0.02

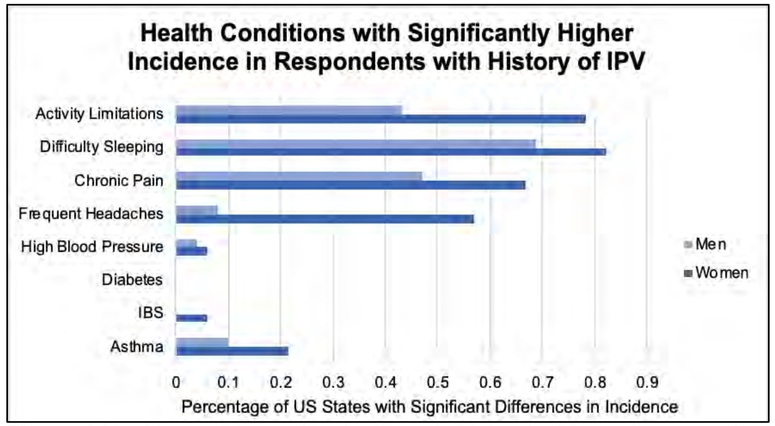

Figure 1 Health conditions with significantly higher incidence in respondents with history of IPV, reported by gender across 50 US states and DC. Significance defined by chi-square test of independence; p-value < .05.

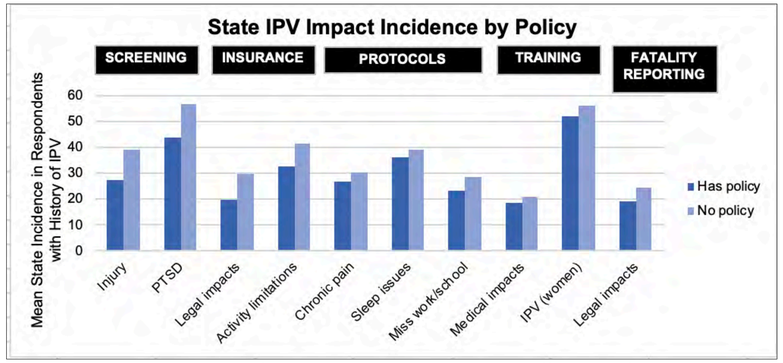

Figure 2 Mean levels of IPV-related impacts that differ significantly by presence of policy.

CONCLUSIONS

- There is evidence to suggest that mandatory policies regarding the response to IPV in healthcare facilities is beneficial to survivors
- Future research should evaluate the impacts of recent changes made to statewide IPV policies

FUNDING & ACKNOWLEDGEMENTS

- Thank you to Dr. Jacob Appel for his mentorship and the Futures Without Violence Project for their guidance.
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Maternal Trait Anger Expression and Lifetime Traumatic Stress are Associated with Preterm Birth

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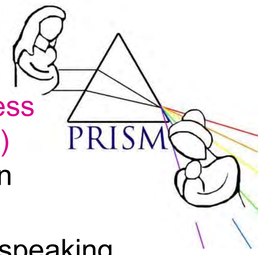
120

INTRODUCTION

- Psychosocial factors experienced over a lifetime contribute to increased risk for **preterm birth (PTB)**
- Few studies explore the impact of negative emotions during pregnancy
- ***We examined associations between maternal anger expression and lifetime experience of stress and trauma on the risk of PTB***

COHORT

628 mother-newborn pairs enrolled in the **PR**ogramming of **I**ntergenerational **S**tress **M**echanisms (**PRISM**) study based in Boston and New York City



- English or Spanish speaking
- Age ≥ 18 years at enrollment
- Single gestation birth

During pregnancy mothers completed:

- State-Trait Anger Expression Inventory-2 (**STAXI-2**) Anger Expression-In (**AX-I**) and Anger Expression-Out (**AX-O**) subscales
- Life Stressor Checklist-Revised (**LSC-R**)
- Childhood Trauma Questionnaire (**CTQ**)

ANALYSIS

Main effect models:
We estimated the adjusted relative risk (aRR) of PTB (<37 weeks gestation) associated with:

1. A 1-point increase in STAXI-2 AX-I and AX-O scores
2. A 1-point increase in LSC-R score
3. Experiencing vs. not experiencing CTQ sexual, emotional, or physical abuse

Interaction models:
We used cross-product terms to examine interactions between AX-I or AX-O and:

1. LSC-R scores
2. CTQ sexual abuse
3. CTQ emotional abuse
4. CTQ physical abuse

Covariates:

- We used Directed Acyclic Graph (DAG) theory to select covariates.
- We adjusted models for maternal age, race/ethnicity, education, cigarette smoke exposure, parity, relationship status, and pre-pregnancy body mass index

RESULTS

Table 1. Demographic characteristics of participants

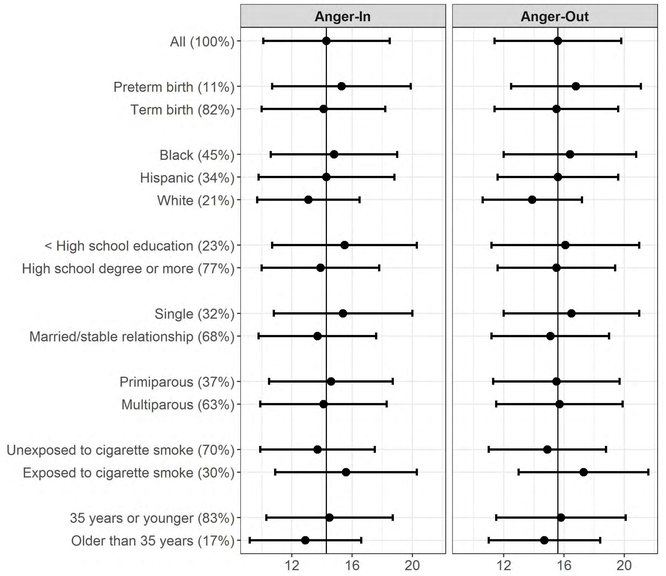
	n	%
Maternal Race/Ethnicity		
Black	281	45
Hispanic	217	35
White	130	21
Less than high school degree	144	23
Single relationship status	204	32
Any cigarette smoke exposure	186	30
Premature birth (<37 weeks gestation)	67	11
CTQ Emotional Abuse	395	63
CTQ Physical Abuse	239	38
CTQ Sexual Abuse	59	9
	Median	**IQR**
Maternal age at enrollment (years)	28.7	9.2
Gestational age (weeks)	39	2
Pre-pregnancy BMI	25.5	8.4
STAXI-2 Anger-Out	15	5
STAXI-2 Anger-In	14	6
LSC-R	9	12

Table 2. Preterm birth in relation to maternal trait anger expression, lifetime stress, and childhood trauma

Instrument	aRR (95% CI)
STAXI-2 AX-O	**1.06 (1.01, 1.11)**
STAXI-2 AX-I	**1.05 (1.00, 1.10)**
LSC-R lifetime stress	**1.02 (1.00, 1.03)**
CTQ sexual abuse	0.89 (0.41, 1.96)
CTQ physical abuse	1.06 (0.63, 1.76)
CTQ emotional abuse	1.41 (0.81, 2.45)

- **Higher STAXI-2 and LSC-R** scores were associated with **increased PTB risk**
- We did not observe interactions between STAXI-2 and LSC-R or CTQ scores

Figure 1. Mean±SD STAXI-2 AX-I and AX-O scores by sociodemographic and lifestyle characteristics



CONCLUSION

Higher anger expression & suppression and higher lifetime traumatic & non-traumatic stress were individually associated with an increased risk of PTB

FUNDING

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High Rates of Locoregional and In-Field Failures of Squamous Cell Carcinoma of the Oral Tongue Among Nonsmoking and Nondrinking Patients: A Single Institutional Study

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127

PURPOSE

- Smoking, alcohol, and old age are known risk factors for squamous cell carcinoma of the oral tongue (SCCOT).
- While SCCOT in nonsmoking and nondrinking young patients has been described as having an aggressive phenotype, risk factors and oncological outcomes in this cohort are poorly understood.
- Previous studies have found rates of locoregional failure over 50% in patients under 40 with SCCOT.[1]
- The purpose of this study was to characterize outcomes of SCCOT in young, non-smoking, non-drinking patients compared to older patients.

METHODS

- Approval was obtained from the Icahn School of Medicine at Mount Sinai Institutional Review Board.
- A retrospective review of patients presenting to the Mount Sinai Health System with SCCOT between January 2008 and June 2019 was performed.
- Inclusion criteria were diagnosis of primary SCCOT of the oral tongue no history of alcohol use or smoking. The distinction between younger and older cohorts was 45 years of age.
- Patients with available data were staged according to the American Joint Committee on Cancer (AJCC) TNM, Eighth Edition Staging Manual for oral squamous cell carcinoma. Patients who presented prior to the release of the Eighth Edition Cancer Staging Manual in 2017 were restaged based on relevant clinical and pathological data.
- Clinical staging data were based off PET/CT scan and biopsy prior to surgical or chemoradiation treatment. Pathological staging data were based off surgical resection specimen or other biopsied specimen evaluated by the Department of Pathology at Mount Sinai Medical Center.
- Locoregional recurrences were determined as either infield or out-of-field by comparing treatment planning CT scans with axial CT images confirming recurrent locoregional disease. Failures were defined as infield if occurring within the planning target volume (PTV; including gross tumor volume, subclinical microscopic disease, and an additional margin) and out-of-field if occurring outside of the PTV.
- Chi-square and fisher's exact test were used to determine significance. Kaplan-Meier curves stratified by age group were created for LRC, DMFS, and OS and the log-rank test was used to determine significance.

PATIENT COHORT

Table 1 | Demographics of patients with SCC of the oral tongue

	< 45 years	50-69 years	p-value
Number of patients	33	28	
Age at time of diagnosis			< 0.0001
Average ± SD	37.3 ± 7.3	61.5 ± 4.8	
Median	40.8	61.5	
Range	19.6 - 44.6	51.6 – 69.2	
Male	21 (63.7)	16 (57.1)	
Female	12 (36.3)	12 (42.9)	0.60
Body Mass Index	27.4 ± 7.7	24.9 ± 3.24	
Race			0.61
White	19 (57.6)	20 (71.4)	
Asian	5 (15.2)	3 (10.7)	
Other	5 (15.2)	2 (7.1)	
Not specified	4 (12.1)	2 (7.1)	
Black or African American	0	1 (3.6)	
Native Hawaiian or Pacific Islander	0	0	
Ethnicity			0.56
Non-Hispanic or Latino	23 (69.7)	23 (82.1)	
Not specified	6 (18.2)	3 (10.7)	
Hispanic or Latino	4 (12.1)	2 (7.1)	

Table 2 | Medical history

	< 45 years	50-69 years	p-value
Smoking history			
Never	32 (97.0)	28 (100.0)	
Former	1 (3.0)	0	
Chewing tobacco history			
Never	33 (100.0)	28 (100.0)	
Alcohol history			0.14
None	22 (66.7)	23 (82.1)	
Social drinker	11 (33.3)	5 (17.9)	
Number of drinks per week (range)	0.33 (0-2)	0.14 (0-2)	
PMH and comorbid conditions			
COPD	3 (9.1)	1 (3.6)	
Diabetes	2 (6.1)	8 (28.6)	
Hypertension	3 (9.1)	9 (32.1)	
Immunocompromised	2 (6.1)	4 (14.3)	
Family history of cancer	9 (27.3)	6 (21.4)	0.77
Family history of head and neck cancer	0	0	

Tables 1 and 2: Demographics and medical history.

RESULTS

PATHOLOGY

Table 3 | American Joint Committee on Cancer (AJCC) TNM, Eighth Edition Staging for oral SCC

	< 45 years	50-69 years	p-value
pT, n (%)			
TX	0	0	
Tis	2 (6.1)	0	
T1	10 (30.3)	7 (25.0)	
T2	11 (33.3)	5 (17.9)	
T3	5 (15.2)	9 (32.1)	
T4a	5 (15.2)	6 (21.4)	
T4b	0	1 (3.6)	
pN			
NX	4 (12.1)	0	
N0	17 (51.5)	13 (46.4)	
N1	4 (12.1)	5 (17.9)	
N2a	3 (9.1)	1 (3.6)	
N2b	2 (6.1)	5 (17.9)	
N2c	0	1 (3.6)	
N3a	0	0	
N3b	3 (9.1)	3 (10.7)	
pM			
cM0	33 (100.0)	33 (100.0)	
cM1	0	0	
pM1	0	0	
pStage			< 0.0001
Stage 0	2 (6.1)	0	
Stage I	10 (30.3)	4 (14.3)	
Stage II	7 (21.2)	1 (3.6)	
Stage III	3 (9.1)	10 (35.7)	
Stage IVA	8 (24.2)	9 (37.5)	
Stage IVB	3 (9.1)	4 (14.3)	
Stage IVC	0	0	

Table 3: AJCC Eighth Edition Staging for oral SCC. 19 young (57.6%) vs five old (17.9%) patients had pathological stage I-II tumors and 14 young (42.4%) vs 23 old (82.1%) had pathological stage III-IVB tumors (p < 0.001).

Table 4 | Pathological features

	< 45 years	50-69 years	p-value
Size of tumor (cm)	2.55 ± 1.88	3.02 ± 1.71	0.22
Depth of invasion (cm)	0.71 ± 0.63	1.37 ± 0.65	
Margins			
Positive margins	8 (24.2)	6 (21.4)	0.23
Closest margins (mm)	1.77 ± 1.96	1.48 ± 2.93	0.20
Close margins (< 5mm)	19 (57.6)	14 (50.0)	0.61
Lymphovascular invasion	5 (15.2)	10 (35.7)	0.08
Perineural invasion	17 (51.5)	17 (60.7)	0.47
Extranodal expansion (ENE)	7 (21.2)	7 (25.0)	0.51
ENE average (mm)	1.33 ± 0.58	0.1	0.35

Table 4: Pathological features. Mean tumor sizes were 2.55 ± 1.88cm^3 (young) and 1.02 ± 1.71 cm^3 (old) (p = 0.22). The mean depth of invasion was significantly greater in old patients (1.37 ± 0.65 cm^3 vs 0.71 ± 0.63 cm^3) (p < 0.05). The old cohort 10 (35.7%) demonstrated comparatively higher rates of lymphovascular invasion compared to young patients 5 (15.2%) (p = 0.079).

TREATMENT

Table 5 | Treatment with surgical resection, radiotherapy, and chemotherapy

	< 45 years	50-69 years	p-value
Method of treatment, n (%)			0.70
Surgery, RT, and chemotherapy	18 (54.5)	10 (35.7)	
Surgery alone	8 (24.2)	8 (28.6)	
Surgery and RT	7 (21.2)	10 (35.7)	
Surgery	33 (100.0)	28 (100.0)	
Time from diagnosis (median, days)	26.9	17.3	
Neck dissection	29 (87.9)	26 (92.9)	
Flap	24 (72.7)	22 (78.6)	
Radiotherapy	23 (69.7)	20 (71.4)	
Preoperative RT	0	0	
Recurrent before RT	1 (4.3)	0	
Time after surgery (days)	45.9 ± 15.4	51.2 ± 13.8	
Time of radiotherapy (days)	41.4 ± 8.6	41.9 ± 5.5	
Total gray	64.6 ± 4.2	62.1 ± 3.7	
Number of fractions	32.6 ± 2.5	31.1 ± 1.8	
Dose of fraction	2 ± 0	2 ± 0	
Chemotherapy	15 (45.5)	10 (32.1)	
Induction chemotherapy	2 (13.3)	1 (11.1)	
PEG	13 (39.4)	11 (39.3)	0.51
PEG removed	7 (53.8)	3 (27.2)	
PEG length of time (days)	185.5 ± 114.6	669.5 ± 255.2	

Table 5: Treatment with surgical resection, radiotherapy, and chemotherapy. All patients were treated with upfront surgery. 16 (26.2%) had surgery alone, 17 (27.9%) had surgery and adjuvant radiation therapy (RT) only, and 28 (45.9%) had surgery and adjuvant chemoradiotherapy.

OUTCOMES

Table 6 | Outcomes of patients with SCC of the oral tongue following treatment with surgery, radiotherapy, chemotherapy

	< 45 years	50-69 years	p-value
Locoregional Failure, n (%)	**14 (42.4)**	**6 (21.4)**	< 0.05
Oral tongue	7	1	
Neck	4	4	
Base of tongue	1	1	
Retromolar trigone	1	0	
Hard palate	2	0	
Maxilla	1	0	
Tonsil	1	0	
Floor of mouth	1	0	
Time treatment to locoregional failure (years)	1.15 ± 1.36	1.54 ± 1.98	
Distant failure	**8 (24.2)**	**3 (10.7)**	**> 0.05**
Pulmonary	6	0	
Bone	5	0	
Liver	1	0	
Kidney	1	0	
Mediastinum	1	1	
Thyroid	1	1	
Brain	0	1	
Time treatment to distant failure (years)	0.88 ± 1.4	0.98 ± 0.87	
Survival			
Living	23 (69.7)	17 (60.7)	
Deceased	10 (30.3)	11 (39.3)	
Length of survival (median, years)	2.31 ± 1.39	2.31 ± 2.29	
Age at death (years)	44.7 ± 3.9	65.4 ± 4.7	

Table 6: Outcomes of patients with SCC of the oral tongue. The younger cohort had a significantly higher rate of locoregional failure 15 (45.5%) compared with the older cohort 6 (21.4%) (p < 0.05). Young patients had a shorter treatment-to-failure interval (15.0 and 18.5 months), although this was not statistically significant (p = 0.11). Young patients exhibited a higher rate of distant failure (8, 24.2%) compared with old patients 3 (10.7%), with a shorter time to distant failure after treatment (10.6 vs 11.8 months), with the same length of survival from treatment at 27.7 months.

IN FIELD FAILURES

Table 7: In-field failure

Cohort	Months to failure	Site
Younger	1.6	Left submandibular surgical bed
Younger	4.9	Hard palate, upper tongue, left lingual tonsil
Younger	6.1	Left hard palate; left and right maxillary bone
Younger	7.5	Mandibular retromolar trigone
Younger	29.6	Floor of mouth
Younger	66.0	Left base of tongue
Older	2.1	Neck/LN
Older	62.5	Left oral tongue

Table 7: In-field failure. 100% of Of patients with locoregional failure who received RT, 100% demonstrated in-field failures.

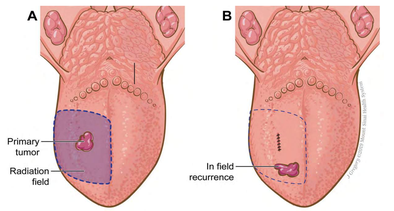

Figure 1: A) Primary tumor within field of radiation therapy B) locoregional failure at different location within field of radiation therapy

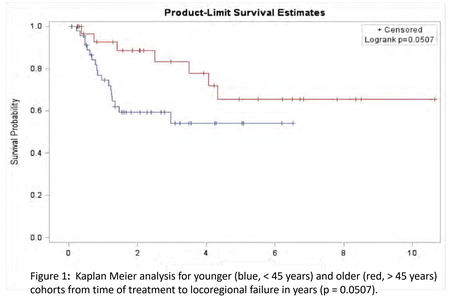

Figure 1: Kaplan Meier analysis for younger (blue, < 45 years) and older (red, > 45 years) cohorts from time of treatment to locoregional failure in years (p = 0.0507).

SUMMARY / CONCLUSION

- This study characterizes SCCOT in young, non-drinking, non-smoking patients as highly aggressive with high rates of locoregional failure and distant metastasis.
- Of patients who experienced locoregional failure with available PET scans and RT plans, 100% demonstrated in-field failure.
- To our knowledge, this is the first study to identity high rates of in-field failures for SCCOT in these patients.
- Future studies are warranted to understand the underlying factors driving the pathogenesis of these malignancies in this unique cohort.

ACKNOWLEDGEMENTS

- Medical Research Fellowship Grant, National Medical Fellowships
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ANALYSIS OF PARKINSON'S DISEASE (PD) SUBTYPES VIA CLUSTER ANALYSIS

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129

OBJECTIVES

To uncover PD subtypes via unbiased cluster analysis of symptoms.

INTRODUCTION

- PD is a common and heterogenous neurodegenerative disorder
- Finding distinct clinical subtypes could inform subject selection in clinical trial design

METHODS

- *Data collection:*

  Chart review (MSMD cohort); download existing data (PPMI cohort)
- *Data analysis:*

  Nonhierarchical kmeans clustering of subjects (via Principal Component Analysis (PCA))

RESULTS

PPMI cohort clusters:

- ***Cluster 1:*** Tremulous PD and older onset, worse cognition
- ***Cluster 2:*** Atremulous PD, worse psychiatric and autonomic symptoms
- ***Cluster 3:*** Milder symptoms

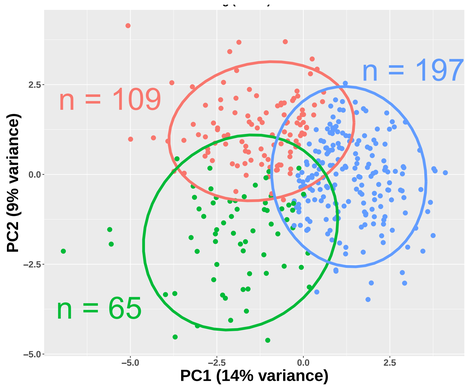

Figure 1. PPMI: PCA with K-means clustering (n=371)

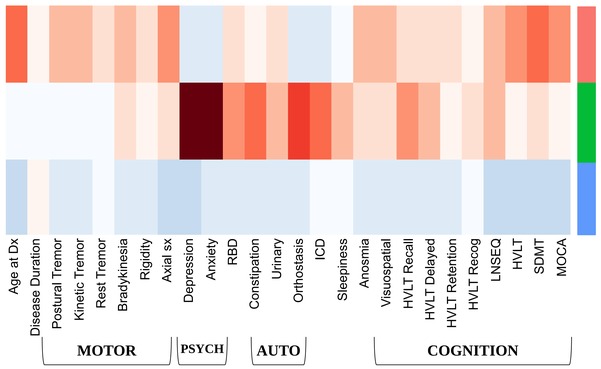

Figure 2 PPMI: Symptom Severity Comparison

MSMD cohort clusters:

- ***Cluster 1:*** Milder symptoms
- ***Cluster 2:*** Severe (Enriched in fluctuations, dyskinesias, freezing of gait, and depression)
- ***Cluster 3:*** Enriched in dyskinesias and fluctuations

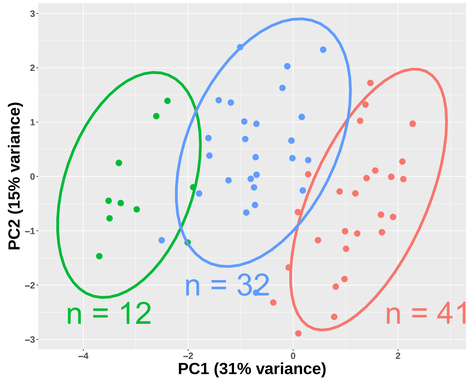

Figure 3. MSMD: PCA with K-means clustering (n=85)

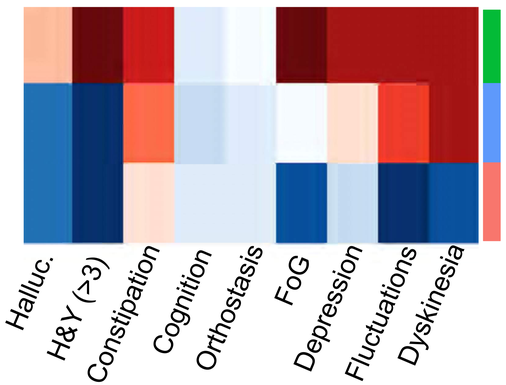

Figure 4 MSMD: Binary Trait Prevalence Comparison

CONCLUSIONS

- Multiple clinical subtypes were found in both cohorts
- Differences between cohorts make comparison difficult
- PPMI cohort results support existing literature
- Further characterizing PD subtypes may advance development of personalized treatment for PD

FUTURE PLANS

- Combine NYU movement disorder center data with MSMD data
- Incorporate RNA-sequencing data to better characterize subtypes

FUNDING & ACKNOWLEDGEMENTS

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Investigating Racial Disparities in Advanced Stage Pancreas Cancer Patients

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130

OBJECTIVE

- Examine racial disparities in clinical outcomes in advanced stage pancreas cancer (PDA) patients treated with modern chemotherapy at Mount Sinai Hospital (MSH).

BACKGROUND

- African-American (AA) PDA patients are diagnosed younger and at more advanced stages than Whites (W).[1]
- Controversy exists about racial inequities in PDA risk factors, treatment, and survival in the modern chemotherapy era.

METHODS

- Retrospective review of PDA patients who were W, AA, Asian (A), or Other (O) treated at MSH (2012-2017).
- Inclusion criteria: race (self-reported), age ≥ 18, histopathologic diagnosis of PDA, receipt of FOLFIRINOX (FFX) and/or gemcitabine/nab-paclitaxel (G/NP).
- Exclusion criteria: other cancer diagnosed and curatively treated within 3 years of PDA diagnosis excluding carcinoma in situ, treated basal cell carcinoma, and superficial bladder tumors (Ta, Tis, and T1).

RESULTS

Table 1. Clinical Characteristics & Treatment

	W	AA	A	O
Number	69	34	15	27
Age*	72 (38,89)	67 (45,85)	61 (50,78)	63 (39,83)
Gender				
Male	47 (68%)	15 (44%)	7 (47%)	16 (59%)
Female	22 (32%)	19 (56%)	8 (53%)	11 (41%)
Ethnicity*				
Hispanic	6 (9%)	1 (3%)	0 (0%)	17 (68%)
Not Hispanic	62 (91%)	32 (97%)	15 (100%)	8 (32%)
Insurance*				
Public	30 (44%)	23 (68%)	9 (60%)	15 (56%)
Private	13 (19%)	5 (15%)	5 (33%)	9 (33%)
Both	26 (38%)	6 (18%)	1 (7%)	3 (11%)
Smoking				
Yes	38 (56%)	20 (59%)	3 (21%)	14 (52%)
No	30 (44%)	14 (41%)	11 (79%)	13 (48%)
Diabetes				
Yes	17 (25%)	15 (44%)	4 (27%)	11 (41%)
No	52 (75%)	19 (56%)	11 (73%)	16 (59%)
PDA Stage				
II	0 (0%)	0 (0%)	0 (0%)	1 (4%)
III	3 (5%)	2 (7%)	0 (0%)	1 (4%)
IV	59 (95%)	26 (93%)	13 (100%)	24 (92%)
CA 19-9	484 (1, 6.0E5)	245 (1, 1.2E5)	4,267 (1, 1.3E6)	811 (1, 1.8E5)
ECOG*				
0	23 (41%)	6 (19%)	8 (67%)	7 (27%)
1	29 (52%)	17 (55%)	4 (33%)	18 (69%)
2	4 (7%)	8 (26%)	0 (0%)	1 (4%)
Surgery				
Yes	4 (6%)	0 (0%)	1 (7%)	0 (0%)
No	64 (94%)	34 (100%)	13 (93%)	27 (100%)
Chemo (1st Line)				
Gem based	34 (51%)	25 (74%)	6 (43%)	14 (52%)
G/NP	27 (40%)	19 (56%)	6 (43%)	10 (37%)
5-FU based	27 (40%)	7 (21%)	6 (43%)	12 (44%)
FFX	17 (25%)	7 (21%)	6 (43%)	7 (26%)
Other	6 (9%)	2 (6%)	2 (14%)	1 (4%)
Tx Duration (m)	3 (0,41)	3 (0,19)	4 (1,9)	3 (0,16)

Figure 1. Overall Survival (N=132)

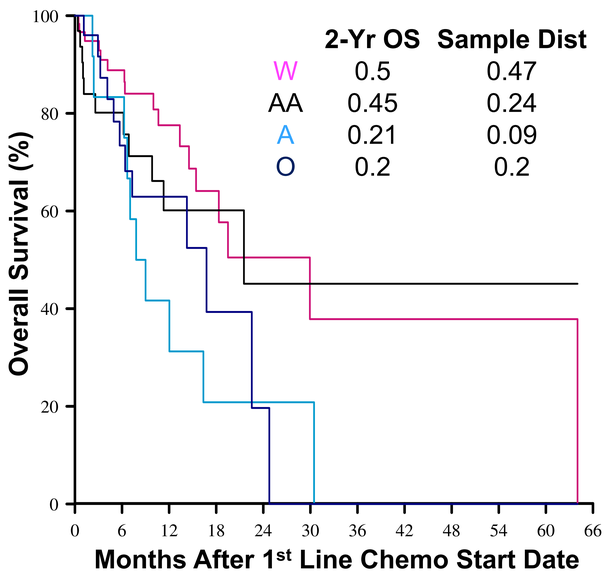

Table 2. Univariable OS Model Results

	HR	95% CI
Ethnicity (Hisp vs Not Hisp)	1.38	(0.69, 2.78)
Surgery (Y vs N)	0.28	(0.04, 2.03)
Gender (Male vs Female)	1.43	(0.80, 2.57)
Race		
AA vs W	1.51	(0.70, 3.25)
A vs W*	2.74	(1.24, 6.05)
O vs W	2.05	(0.96, 4.36)
ECOG		
1 vs 0	0.86	(0.46, 1.62)
2 vs 0	1.82	(0.68, 4.88)
CA19-9 (log10)	1.16	(0.92, 1.45)
Insurance		
Both vs Private	0.59	(0.26, 1.31)
Public vs Private	0.88	(0.45, 1.72)
Chemo Type (Gem vs 5-FU)*	2.43	(1.26, 4.69)

Table 3. Multivariable OS Model Results

	HR	95% CI
Race		
AA vs W	1.25	(0.57, 2.72)
A vs W*	2.86	(1.29, 6.35)
O vs W	1.75	(0.81, 3.80)
Chemo Type (Gem vs 5-FU)*	2.56	(1.31, 5.02)

CONCLUSION

- In a cohort of advanced stage PDA patients treated with modern chemotherapy at an urban quaternary medical center, AA and W patients had comparable outcomes.
- A had worse OS compared to W patients in both univariable and multivariable models.
- 1st line gemcitabine based therapies were inferior to 5-FU based therapies in both univariable and multivariable OS models.
- **Future Directions:** Further investigation of potential socioeconomic risk factors and biologic manifestations of this health disparity is warranted.

FUNDING & ACKNOWLEDGEMENTS

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Predicting the Relationship between O-Link Analytes and Different Phenotypes after Endoscopy in Patients with Inflammatory Bowel Disease.

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132

OBJECTIVES

- Does activity in the plasma of patients with Crohn's Disease correlate with the results of endoscopic evaluation?

INTRODUCTION

Crohn's Disease (CD) symptoms do not correlate well with inflammation.

Blood tests are preferred by patients.

We are looking for blood biomarkers that are more specific than CRP at predicting phenotype post-ileocecal resection

METHODS

- CD patients undergoing ileocecal resections were recruited by the NIDDK IBD Genetics Consortium.
- 240 blood samples were used for analysis
- Recurrence of disease was defined as Rutgeerts score ≥ i2
- Anti-TNF use was defined as having any anti-TNF use pre or post surgery.

RESULTS

- Regression Coefficient divided by the standard error was plotted for the 89 analytes and values over 3 and under -3 were significant.
- **Rutgeerts Regressions-** Analytes **IL6** and **MMP1** (Coefficient range 0. 58-0. 78, $p<.05$) were significantly upregulated in recurrence.
- **TNF regressions-** Analytes **CXCL9**, **CXCL10**, **CCL4**, **TNFRSF9**, **MCP1** (Coefficient range -0.71- -1.71, $p<.05$) were down-regulated with TNF use .

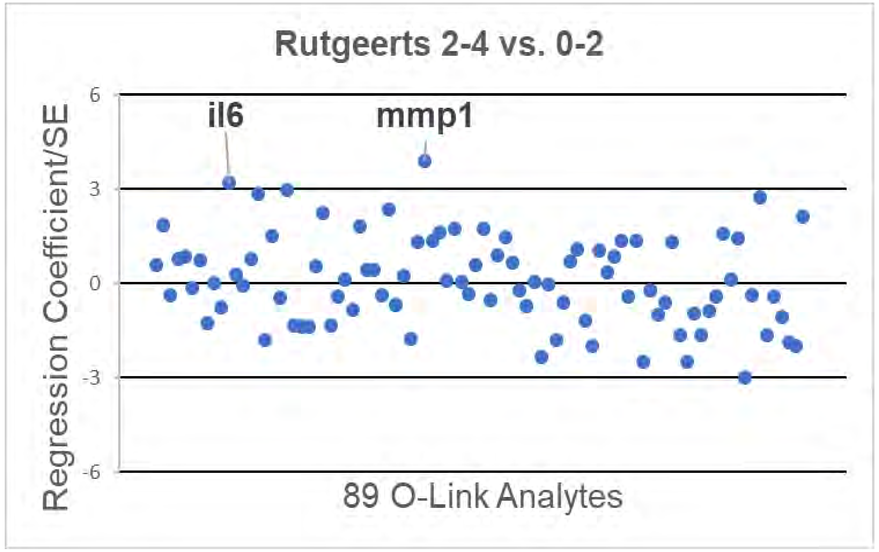

Figure 1. Correlations between analytes and disease state

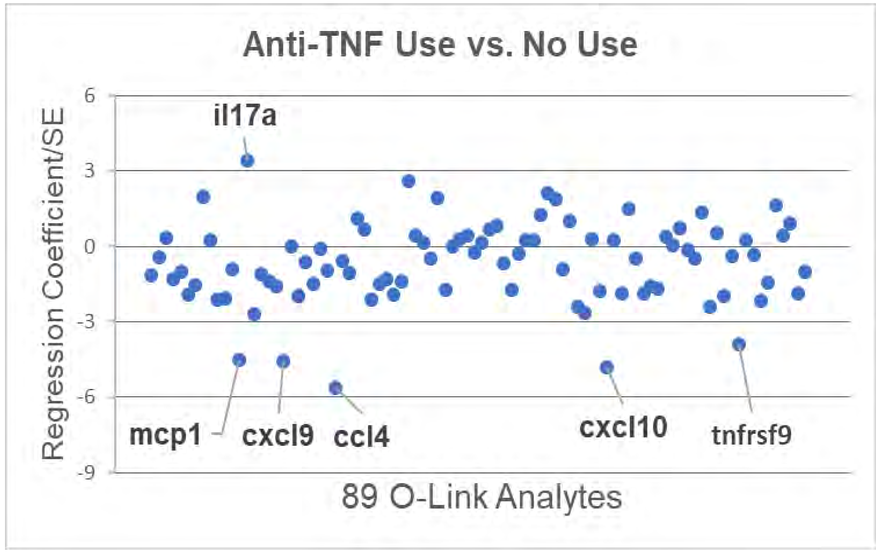

Figure 2. Correlations between analytes and the use of Anti-TNF agents.

CONCLUSIONS

- There are two analytes upregulated in patients with recurrence of disease, and five analytes downregulated in patients using anti-TNF.
- These analytes can be potential targets for future studies looking for Crohn's biomarkers.

Implications

- These analytes may be potential areas for further study, it could be expanded on by controlling for time.

Limitations

- Modest sample size.
- Time of colonoscopies following surgery was not exact.
- The O-Link analytes are reported in normalized values, so there is no way to look for correlations between the analytes.

Funding

- Funding was provided by the MSRO office at Mount Sinai.

Spatial mapping of collagen content and structure in human intervertebral disc degeneration

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135

Introduction

- Collagen is a primary key structural component in the IVD [1], and its disruption can result in painful structural defects.
- Second harmonic generation imaging (SHG) may be used to identify alterations in collagen structure and fibrosis with degeneration [2][3].
- Collagen within human IVDs has previously been assessed with SHG [4], yet there has not been comparison of collagen changes across degenerative grades and between Annulus Fibrosus (AF) and nucleus pulposus (NP) tissues.

Objective: Use SHG to characterize collagen structural changes in human IVD at various degeneration grades and determine alterations in fibrosis.

Methods

SHG has multiple outputs for distinct IVD parameters

SHG Intensity: affected by collagen content and integrity

Coherency: provides a measure of disorder on the fibrillar level.

Entropy: provides information on image complexity, using either intensity or orientation inputs.

Mid-sagittal human L2/3 or L3/4 IVD (n=23; 11 M, 12 F) sections from cadaveric biobank with Thompson [4] grades 1-5 (n=2-5/grade) and age 57.6±22.7 years.

- Samples were graded according to the Rutges histological degeneration scale [5]
- Tiled SHG images were taken at standardized positions (Figure 1).
- After thresholding to avoid account for histological defects, intensity and entropy were measured in masked SHG images, and OrientationJ used to determine coherency and orientation.

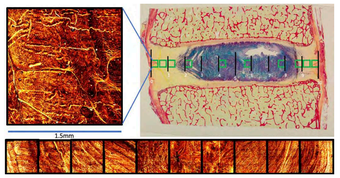

Figure 1: Image sampling parameters 10 images were taken at positions 0, 0.5, 1, 2, 4, 6, 8, 9, 9.5, and 10 at midline. Composite is shown.

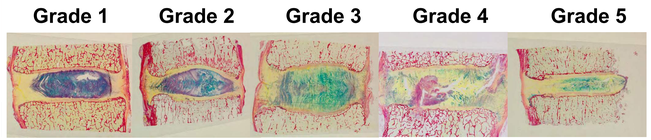

Figure 2: Picrosirius red/alcian blue stains. Representative mid-sagittal images of IVDs of increasing Thompson degenerative grades.

Results

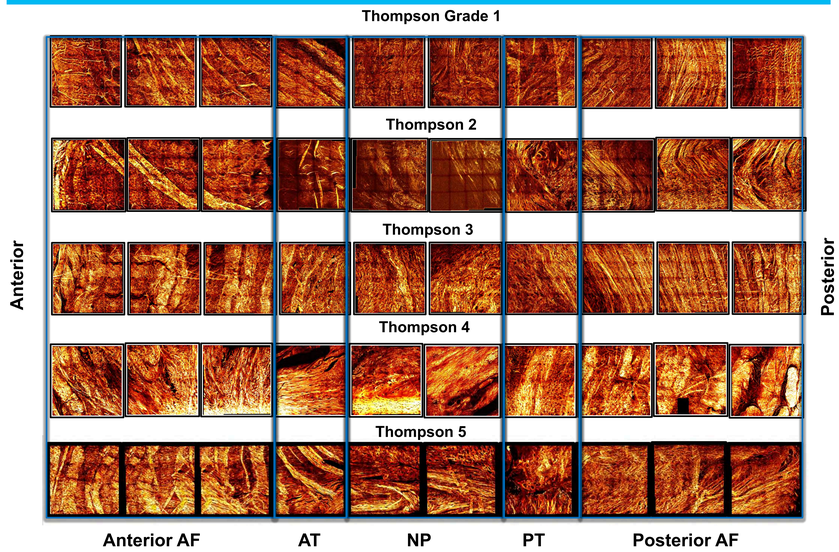

Figure 4: NP Heterogeneity in high grade IVDs suggests fibrosis. Representative composites shown. Anterior annulus fibrosus (AAF), nucleus pulposus (NP), and posterior annulus fibrosus (AAF) binned regions are shown.

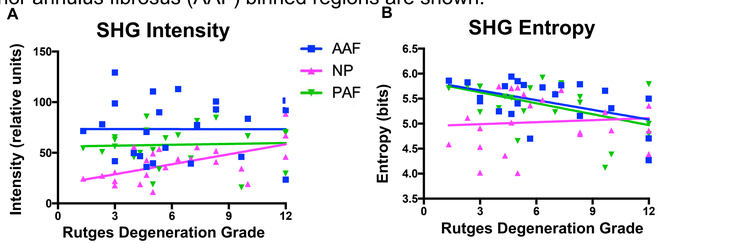

Figure 5: SHG Intensity and entropy show changes by degeneration (A) SHG intensity, binned by region (AAF, NP, PAF). NP intensity increases with degeneration ($p=0.0029$, $R^2=0.3509$). (B) Entropy binned by region. AAF and PAF entropy decrease with degeneration (AAF: $p=0.0114$ $R^2=0.2682$; PAF: $p=0.0216$ $R^2=0.227$)

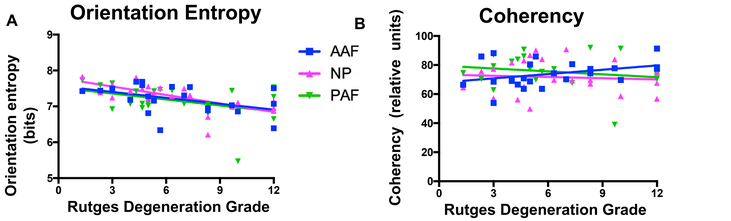

Figure 6: Orientation. (A) SHG orientation entropy, binned by region. Orientation entropy decreases with degeneration (AAF: $p=0.0291$ $R^2=0.2072$; NP: $p=0.000547$ $R^2=0.4412$ (B) Coherency binned by region. No statistical differences detected.

Discussion

- Increasing SHG intensity in the NP, along with previous evidence of a decrease in NP collagen with degeneration [6] suggests fibrotic replacement with more organized type I collagen.
- Entropy characterizes structural complexity and decreases as tissues become more uniform from processes like collagen deposition [7] and fibrosis [8].
- Decreased entropy in the AF is consistent with loss of distinctly alternating lamellar structure, shifting toward a more uniform image field.
- Orientation analysis has been applied to study disorganization of collagen [9]. Decreased orientation entropy in the NP and AAF indicates more uniformity of fiber direction and loss of complex fiber structure.

Increased SHG intensity and decreased orientation entropy in the NP suggest a shift from a complex mesh of collagen to a simpler fibrotic structure. Decreased entropy of intensity and entropy of orientation in the AF suggests loss of alternating lamellar structure and complex microstructure.

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