The Society of Black Academic Surgeons

PRESENTS THE

Thirtieth Annual Virtual Meeting

Table of Contents

A Message from the President

Dear SBAS Members,

As the 25th President of SBAS, I was so looking forward to expressing my humble appreciation for this unbelievable honor in person. Becoming President of SBAS has been the pinnacle of my career and I wish to take this moment to say thank you.

The Society of Black Academic Surgeons Annual Scientific meeting is truly the highlight of the year for our Society and this year's assembly would have been no exception. The Medical College of Wisconsin and the Department of Surgery had prepared the proverbial red carpet for us to visit Milwaukee, accompanied by the largest submission of scientific abstract submissions and acceptances in our history. This would have been the 30th Anniversary since the first Annual Meeting of SBAS hosted by Dr. David Sabiston at Duke University. Unfortunately, with the unprecedented effects of the SAR-CoV-2 pandemic resulting in a national shut down, the Society took the responsible action and canceled this much-anticipated meeting. Efforts are being made to reschedule a meeting at the Medical College of Wisconsin.

On behalf of SBAS, I want to express our sincere gratitude and appreciation to the Medical College of Wisconsin, Dr. Douglas Evans, Chair of the Department of Surgery and the Local Program Chair Dr. Callisia Clarke for the time and effort put into preparing for this meeting. I want to also acknowledge the extraordinary efforts of Dr. Andre Campbell and the Program Committee for another successfully planned Scientific meeting. A sincere expression of thanks goes to all of our Platinum, Gold, and Silver Institutional members whose contributions have been vital in supporting the mission of SBAS. The publication of our program book and video expenses for the Presidential Address was made possible by a grant from Cook Medical.

A Message from the President (cont.)

This Program Book illustrates much of the scholarly work and broad canvas of academic achievement that our Scientific Assembly is known for. I wish to thank all who chose to submit their scientific work to be presented at this year's meeting. The *American Journal of Surgery* is our official journal for publishing the peer-reviewed manuscripts of work presented at our meeting, and the authors will receive an invitation from the journal to have their work published.

Finally, on the anniversary of our 30th Scientific meeting, it is fitting that we acknowledge the passing of three Past Presidents of SBAS that we lost in 2019. SBAS would not have existed were it not for the trailblazing efforts of **Dr. Onyekwere E. Akwari (Onye),** Nigerian-American and first African-American surgeon on the faculty of Duke University, who died on April 14, 2019. **Dr. William Lynn Weaver,** one of the founding members of SBAS and former surgeon and chief of surgery at Morehouse School of Medicine in Atlanta, passed away May 26th, 2019. **Dr. Lasalle D. Leffall,** who served as the first African American President of the American College of Surgeons in 1995, and the first African American President of the American Cancer Society in 1978, died on May 25, 2019, in Washington DC.

It is my hope that the ideas and data presented in this program book will inspire fresh thought and motivate you to come together next year in St. Louis for the 31st Scientific Meeting of SBAS.

I hope that you and your families remain safe during this most challenging of times.

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President
Society of Black Academic Surgeons

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Society of Black Academic Surgeons

Thirtieth Annual Meeting

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KMarie Reid, MD

Selwyn Rogers, MD

Randi Smith, MD

Ala Stanford, MD

Committee for Local Arrangements

We would like to thank our colleagues at the
Medical College of Wisconsin for all their hard work
in planning for the 30th Annual Scientific Meeting of SBAS.

Douglas B. Evans, MD, FACS
Chair, Department of Surgery

Calisia Clarke, MD, MS
Chair, Local Program Committee

Julie Dotson
Heidi Brittnacher

History of The Society of Black Academic Surgeons

The Society of Black Academic Surgeons (SBAS) was founded in 1989. Its goal is to stimulate academic excellence among its members by providing a forum of scholarship in collaboration with the leading Departments of Surgery in the U.S. It encourages and supports professional development of black surgical residents and attempts to recruit the best and brightest medical students into a career in surgery.

The annual meetings of SBAS, attended by members as well as numerous residents and students, provide outstanding programs in both the science and practice of surgery. The first Annual Meeting was hosted by the late Dr. David Sabiston at Duke University. Annual meetings since then have been hosted by Departments of Surgery throughout the U.S., including Harvard University (1991, 2001), the University of California at Davis (1993), the University of Texas Medical Branch at Galveston (1994), the University of North Carolina at Chapel Hill (1995, 2015), the University of Colorado at Denver (1996), SUNY Buffalo (1997), Howard University (1998, 2004, 2012), the University of Louisville (1999), Charles R. Drew University of Medicine and Science (2000), Morehouse School of Medicine (2002), the University of Alabama at Birmingham (2003, 2018), the University of Pittsburgh (2005), the University of Cincinnati (2006), Rush University Medical Center (2007), the Cleveland Clinic (2008), the University of Washington (2009), Duke University (2010), Massachusetts General Hospital (2011), Johns Hopkins School of Medicine (2012), the University of Mississippi (2013), Temple University School of Medicine and the University of Pennsylvania (2014), the Ohio State University (2016), the University of Chicago (2017), and Weill Cornell Medicine (2019).

SBAS is governed by an Executive Committee and has more than 200 members throughout the United States. Membership is not restricted by race; the criteria for membership require that the prospective member be a "reputable surgeon or surgical investigator who occupies a faculty position in a university department of surgery or free-standing surgical residency program." In addition to its Annual Meeting, a website (www.SBAS.net) has been established to improve communication with its constituency and persons interested in the organization. The *American Journal of Surgery* is the official publication of SBAS.

Past Presidents of The Society of Black Academic Surgeons

1989-1991: Arthur W. Fleming, MD

1991-1993: Onye E. Akwari, MD

1993-1995: Eddie L. Hoover, MD

1995-1997: Claude H. Organ, Jr., MD

1997-1998: LaSalle D. Leffall, Jr., MD

1998-1999: Haile T. Debas, MD

1999-2001: L. D. Britt, MD, MPH

2001-2003: Clive O. Callender, MD

2003-2004: Edward E. Cornwell, III, MD

2004-2005: Robert L. McCauley, MD

2005-2006: Selwyn M. Vickers, MD

2006-2007: Michael T. Watkins, MD

2007-2008: Steven C. Stain, MD

2008-2009: Robert S. D. Higgins, MD, MSHA

2009-2010: William Lynn Weaver, MD

2010-2011: Henri R. Ford, MD, MHA

2011-2012: Danny O. Jacobs, MD, MPH

2012-2013: Kenneth Davis, Jr., MD

2013-2014: Edward M. Barksdale, Jr. MD

2014-2015: Lynt B. Johnson, MD

2015-2016: Orlando C. Kirton, MD

2016-2017: Patricia L. Turner, MD

2017-2018: Anthony Stallion, MD

2018-2019: Malcolm V. Brock, MD

Scientific Sessions

Promoting Academic Excellence in Career Development through Mentorship

Scientific Session 1
(Parallel Poster Sessions)

Friday, April 24, 2020

Poster Group 1

NIPPLE SPARING MASTECTOMY IN AN ERA OF BROADENED CRITERIA: A SINGLE-CENTER EXPERIENCE
SENIOR AUTHOR: M. Howard-McNatt; PRESENTER: V.M. Jones

PREDICTING RECURRENCE IN PANCREATIC NEUROENDOCRINE TUMOR: GOING BEYOND THE GRADE
SENIOR AUTHOR: A. Livigstonn; PRESENTER: B. Badu

THE ROLE OF MATERNAL STRESS-DERIVED CORTISOL ON INTESTINAL DEVELOPMENT IN OFFSPRING
SENIOR AUTHOR: C. Martin; PRESENTER: M. Moughnyeh

Scientific Session 1 (Cont.)

SEX DIFFERENCES IN KNEE INJURIES AMONG NATIONAL COLLEGIATE ATHLETIC ASSOCIATION BASKETBALL PLAYERS
SENIOR AUTHOR: A. Colvin; PRESENTER: T. Obi

COMPUTATIONAL DESIGN OF A NOVEL BIORESORBABLE SLEEVE DEVICE FOR ESOPHAGEAL ATRESIA REPAIR
SENIOR AUTHOR & PRESENTER: S. Kunisaki

SOMATIC ALTERATION TESTING IN SPORADIC PANCREATIC NEUROENDOCRINE TUMORS: IS THERE A ROLE?
SENIOR AUTHOR: C.N. Clarke; PRESENTER: E. Strong

MAKING AN IMPACT ON PATIENT RECOVERY: AN ANALYSIS OF AN ENHANCED RECOVERY PATHWAY AND IMMUNONUTRITION ON PATIENTS UNDERGOING PANCREATIC SURGERY
SENIOR AUTHOR: G. Munene; PRESENTER: S. Khalil

A NOVEL USE OF ARTIFICIAL INTELLIGENCE TO CORRELATE DIVERSITY AND HOSPITAL PERFORMANCE
SENIOR AUTHOR: C. Martin; PRESENTER: R. Obiarinze

TRAVEL DISTANCE AND THE IMPACT ON POST-SURGICAL OUTCOMES AND OVERALL SURVIVAL AFTER CRS/HIPEC. A STUDY FROM THE US HIPEC COLLABORATIVE
SENIOR AUTHOR: J. Greer; PRESENTER: W. Nizam

OUTCOMES FOR FIRST-YEAR PEDIATRIC SURGEONS WHO TRAINED UNDER DUTY-HOUR RESTRICTIONS
SENIOR AUTHOR: D.E. Levin; PRESENTER: M. Fleming

AN IN VIVO COMPARISON OF ANKLE KINEMATICS AFTER RIGID SCREW FIXATION AND TIGHTROPE FIXATION
SENIOR AUTHOR & PRESENTER: C. Onyeukwu

Scientific Session 1
Parallel Poster Sessions)

Friday, April 24, 2020

Poster Group 2

REGIONAL PAIN BLOCKS AND PAIN CONTROL IN THE PERI-OPERATIVE SETTING AMONG PATIENTS UNDERGOING BREAST IMPLANT REMOVAL AND CAPSULECTOMY
SENIOR AUTHOR: J. Katsnelson; PRESENTER: E. Nwachuku

EVALUATION OF FALSE POSITIVES IN A SCREENED RURAL LUNG CANCER POPULATION
SENIOR AUTHOR: D.J. Finley; PRESENTER: R. Hasson

EVALUATION OF DOPPLER ULTRASOUND EXAMINATION OF PORTAL FLOW DYNAMICS IN PATIENTS WITH TOTAL PANCREATECTOMY AND AUTOLOGOUS ISLET CELL TRANSPLANT
SENIOR AUTHOR: C.S. Desai; PRESENTER: B. Williams

GLYCEMIC CONTROL IN RELATION TO THE TYPE OF PANCREATIC SURGERY CHOSEN FOR PATIENTS WITH CHRONIC PANCREATITIS
SENIOR AUTHOR: C.S. Desai; PRESENTER: X. Baldwin

USE OF THE PATIENT PORTAL AND ITS ROLE IN SURGICAL CONSENT
SENIOR AUTHOR: S. Schwaitzberg; PRESENTER: K. Collier

PEDIATRIC OUTCOMES FOLLOWING CRANIAL VAULT REMODELING WITH RESTRICTED USE OF POST-OPERATIVE NARCOTICS, A RETRO-SPECTIVE REVIEW
SENIOR AUTHOR: K. Klement; PRESENTER: K. Smith

SAFETY, DIAGNOSTIC YIELD AND THERAPEUTIC IMPLICATIONS OF FLEXIBLE BRONCHOSCOPY WITH BRONCHO-ALVEOLAR LAVAGE IN PATIENTS WITH END STAGE LIVER DISEASE AWAITING LIVER TRANSPLANT
SENIOR AUTHOR: J. Hong; PRESENTER: A. Thompson

Poster Group 2 (Cont.)

WRAPAROUND 2.0. EFFECTIVE STAKE-HOLDER ENGAGEMENT FOR SUCCESSFUL RE-IMPLEMENTATION OF A HOSPITAL-BASED VIOLENCE INTERVENTION PROGRAM
SENIOR AUTHOR & PRESENTER: I. Brown

Scientific Session 1
Parallel Poster Sessions)

Friday, April 24, 2020

Poster Group 3

A CADAVER-BASED FACIAL TRAUMA SIMULATION COURSE: EXPANDING EXPOSURE TO FACIAL FRACTURES AS AN EDUCATIONAL TOOL AT A NON-TRAUMA CENTER
SENIOR AUTHOR & PRESENTER: G. Metoyer

RACIAL DIFFERENCES IN EVALUATION AND MANAGEMENT IN PATIENTS WITH NON-SYNDROMIC CRANIOSYNOSTOSIS
SENIOR AUTHOR: J. Goldstein; PRESENTER: C. Tompkins-Rhoades

FEASIBILITY OF UTILIZING A SOCIAL MEDIA PLATFORM TO IMPROVE SURGICAL EDUCATION IN SUB-SAHARAN AFRICA
SENIOR AUTHOR: B. Nwomeh; PRESENTER: E. Onwuka

DOES HOSPITAL-BASED YOUTH MENTORING AND HEALTHCARE EXPOSURE PROGRAMS IMPROVE THE CONFIDENCE OF HIGH SCHOOL STUDENTS INTERESTED IN PURSUING HEALTHCARE CAREERS?
SENIOR AUTHOR: O.K. Danner; PRESENTER: R. Hoard

Poster Group 3 (Cont.)

UNDER-REPRESENTED MINORITY STATUS IS A RISK FACTOR FOR AXILLARY RECURRENCE FOLLOWING RESECTION FOR BREAST CANCER
SENIOR AUTHOR: S. Jaffer; PRESENTER: N. Gordon

COMPARISON OF NEBULIZED KETAMINE AT THREE DIFFERENT DOSES FOR ACUTE AND CHRONIC PAIN IN THE ED
SENIOR AUTHOR: S. Motov; PRESENTER: D. Dove

CAN YOU FEEL IT? USE OF GRAPHIC ART VISUAL MEDIA TO ASSESS EMOTIONAL RESPONSE TO STOP THE BLEED TRAINING
SENIOR AUTHOR: L. Punch; PRESENTER: I. Wood

THE EFFECTS OF A SURGERY RESIDENT LEADERSHIP CURRICULUM ON RESIDENT SELF-ASSESSMENT
SENIOR AUTHOR: B. Corey; PRESENTER: R. Obiarinze

THE ROLE OF CONCUSSION AVOIDANCE TRAINING AND NECK STRENGTHENING IN REDUCING IMPACT-INDUCED HEAD ACCELERATIONS: A PILOT STUDY
SENIOR AUTHOR: M. Moncure; PRESENTER: M. Yimer

PRESCRIBING FOR PAIN: WHAT MEDICAL STUDENTS LEARN AND WHERE THEY LEARN IT
SENIOR AUTHOR & PRESENTER: C. Tiko-Okoye

BREAST REDUCTION ASSESSMENT: AESTHETIC SHAPE OUTCOMES OF REDUCTION MAMMOPLASTY SURGERY
SENIOR AUTHOR: A. Ross; PRESENTER: E. Maduakolam

INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM ASSOCIATED WITH PERITONEAL METASTASES: A CASE REPORT AND REVIEW OF LITERATURE
SENIOR AUTHOR: C. Chan; PRESENTER: M. Suraju

Scientific Session 2
(Podium Presentations)

Friday, April 24, 2020

TUMOR MARKERS AS PREDICTORS OF DISEASE PROGRESSION IN COLORECTAL PERITONEAL CARCINOMATOSIS TREATED WITH CYTO-REDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: AN ANALYSIS FROM THE US HIPEC COLLABORATIVE
PRESENTER: N. Fackche

CEA AND CA 19-9 PREDICT DISEASE PROGRESSION IN PERITONEAL CARCINOMATOSIS FROM PRIMARY APPENDICEAL ADENO-CARCINOMA: AN ANALYSIS FROM THE US HIPEC COLLABORATIVE
PRESENTER: N. Fackche

BREAST RECONSTRUCTION DISPARITIES IN THE ELDERLY
PRESENTER: C. Cortina

DOES TREATMENT SEQUENCE AFFECT OUTCOMES IN PATIENTS WITH METAPLASTIC BREAST CANCER?
PRESENTER: O. Fayanju

COST DIFFERENCES IN OPERATIVE AND NON-OPERATIVE MANAGEMENT OF UNCOMPLICATED APPENDICITIS
PRESENTER: R. Rendel

COST AND OUTCOME IMPLICATIONS OF THE TIMING OF TRACHEOSTOMIES AND PERCUTANEOUS GASTROSTOMY TUBES IN STROKE PATIENTS
PRESENTER: O. Olufajo

DEPENDENT FUNCTIONAL STATUS IS AN INDEPENDENT RISK FACTOR FOR COMPLICATIONS AFTER SURGERY FOR DIVERTICULITIS
PRESENTER: A. Gillis

EMERGENCY SURGICAL NEEDS IN THE PEDIATRIC PATIENT – ANALYSIS OF SEVEN YEARS OF NATIONAL DATA
PRESENTER: W. Nizam

EMERGENCY SURGERY FOR THE NEONATE: FACTORS INFLUENCING SURVIVAL AND OPERATIVE INTERVENTION
PRESENTER: J. Mitchell

Scientific Session 3
(Oral Quick Shot Presentations)

Saturday, April 25, 2020

DEVELOPMENT OF A LARGE ANIMAL MODEL OF LETHAL POLY-TRAUMA AND INTRAABDOMINAL SEPSIS WITH BACTEREMIA
PRESENTER: G. Wakam

EFFECT OF A PROLYL HYDROXYLASE INHIBITOR ON CARBON TETRACHLORIDE-INDUCED KIDNEY FIBROSIS
PRESENTER: C. Tiko-Okoye

IDENTIFICATION OF CORTISOL-ASSOCIATED GENE EXPRESSION SIGNATURES IN THE OFFSPRING GUT FOLLOWING MATERNAL STRESS DURING GESTATION
PRESENTER: V. Yeramilli

SIMULTANEOUS PANCREAS-KIDNEY TRANSPLANT: THE EFFECTS OF EARLY STEROID WITHDRAWAL, DONOR AND RECIPIENT VARIABLES ON PATIENT SURVIVAL
PRESENTER: C. Young

HCV VIREMIC KIDNEYS FOR UNINFECTED RECIPIENTS WITH DAA TREATMENT OFFERS SUSTAINED VIROLOGIC RESPONSE
PRESENTER: J. Torabi

UTILIZATION OF HIGH TERMINAL CREATININE KIDNEY DONORS FOR SIMULTANEOUS KIDNEY AND PANCREAS TRANSPLANTATION
PRESENTER: J. Torabi

SOCIODEMOGRAPHIC VARIATIONS IN THE MANAGEMENT AND OUTCOMES OF COMPLICATED PEPTIC ULCER DISEASE
PRESENTER: D. Taghipour

ASSESSING CARE EPISODE COST DISPARITIES WITHIN GENERAL SURGERY POPULATIONS THROUGH A SOCIAL DETERMINANTS OF HEALTH LENS
PRESENTER: C. Collins

Scientific Session 3 (Cont.)

PERIOPERATIVE OUTCOMES IN RACIALLY DIVERSE PATIENT COHORTS FOLLOWING SLEEVE GASTRECTOMY
PRESENTER: R. Houston

SURGICALLY AMENABLE PANCREATIC CANCERS: A POPULATION-BASED CLINICAL OUTCOMES STUDY INVOLVING 38,796 PATIENTS FROM THE SURVEILLANCE EPIDEMIOLOGY AND END RESULT (SEER) DATABASE (1975–2016)
PRESENTER: C. Otondi

A POPULATION BASED COMPARISON OF MALE BREAST CANCER WITH FEMALE BREAST CANCER IN THE UNITED STATES
PRESENTER: A. Cobb

IMPACT OF AREA OF DEPRIVATION INDEX AND AGE ON RATES OF COMPLETION OF NEOADJUVANT THERAPY AND SURGERY AMONG PATIENTS WITH PANCREATIC CANCER
PRESENTER: A. Krepline

PERCEIVED SOCIAL SUPPORT IS STRONGLY ASSOCIATED WITH RECOVERY AFTER INJURY
PRESENTER: C.P. Orlas-Bolanos

SURVIVING TRAUMA: THE ASSOCIATION BETWEEN SMOKING AND DRUG OVERDOSE DEATH FOLLOWING TRAUMATIC INJURY
PRESENTER: B. Strong

Scientific Session 4
(Podium Presentations

Saturday, April 25, 2020

ACCOMPLISHMENTS OF LEADERS IN AMERICAN SURGERY AND JUSTIFICATION FOR ENHANCING DIVERSITY AND INCLUSION
PRESENTER: P. Butler

Scientific Session 4 (Cont.)

INTERSECTIONALITY IN ACADEMIC SURGERY: THE DOUBLE EDGE SWORD OF BEING BLACK AND A WOMAN IN GENERAL SURGERY RESIDENCY
PRESENTER: A. Keshinro

DOES GENDER PLAY A ROLE IN THE CAREER EXPERIENCES OF BLACK/AFRICAN-AMERICAN (AA) ACADEMIC SURGEONS? A SURVEY OF THE SOCIETY OF BLACK ACADEMIC SURGEONS
PRESENTER: K.A. Joseph

SELECTIVE INHIBITION OF CD38 AT THE CATALYTIC BINDING SITE AMELIORATES LIVER ISCHEMIA REPERFUSION INJURY
PRESENTER: C. Akateh

PAPILLARY MUSCLE APPROXIMATION (PMA) IMPROVES MITRAL LEAFLET COAPTATION AND RELIEVES TETHERING TO CORRECT REGURGITATION IN A BENCHTOP MODEL OF FUNCTIONAL MITRAL REGURGITATION IN DILATED VENTRICLES
PRESENTER: E. Agra

SINGLE-CELL RNA SEQUENCING REVEALS EXERCISE DECREASES LOCAL LIVER INFLAMMATION BY ALTERING MACROPHAGES IN THE MICROENVIRONMENT
PRESENTER: A. Onuma

IMPROVING PACKED RED BLOOD CELLS THROUGH A NOVEL STORAGE SOLUTION
PRESENTER: K. Pulliam

INTRAOPERATIVE PARATHYROID HORMONE MEASUREMENT FACILITATES OUTPATIENT THYROIDECTOMY IN CHILDREN
PRESENTER: R. Obiarinze

THE IMPACT OF THE AFFORDABLE CARE ACT'S MEDICAID EXPANSION ON PATIENTS ADMITTED FOR BURNS: AN ANALYSIS OF NATIONAL DATA
PRESENTER: M. Dalton

EXPLAINING THE HISPANIC PARADOX IN EMERGENCY GENERAL SURGERY: A MEDIATION ANALYSIS STUDY
PRESENTER: M. Castillo-Angeles

Scientific Session 5
(Oral Quick Shot Presentations)

Saturday, April 25, 2020

SURGICAL OUTCOMES AND SURVIVAL RATES OF COLORECTAL CANCER IN CHILDREN AND YOUNG ADULTS
PRESENTER: A. Akinkuotu

OPERATING ROOM TAKE-BACKS AND RE-HOSPITALIZATION FOR PEDIATRIC GENERAL SURGERY PROCEDURES
PRESENTER: M.K. Zuberi

CHARACTERIZING MORTALITY IN A PEDIATRIC POPULATION ON PARENTERAL NUTRITION
PRESENTER: R. Obiarinze

USER ACCEPTANCE OF ELECTRONIC CLINICAL DECISION-MAKING SUPPORT SYSTEMS LAGS BEHIND CLINICAL PRACTICE CHANGE IN PEDIATRIC APPENDICITIS
PRESENTER: K. Marulanda

DIFFERENTIAL EXPRESSION OF CELL ADHESION MOLECULES CONTRIBUTES TO SURVIVAL ADVANTAGE IN EXTRA-ADRENAL NEUROBLASTOMA
PRESENTER: C. Grant

AN EVALUATION OF FALLS FROM HEIGHTS IN CHILDREN VS. ADULTS: A REVIEW OF THE NATIONAL TRAUMA DATABANK
PRESENTER: B. Johnson

INCIDENCE AND IMPACT ON HEALTHCARE RESOURCE UTILIZATION OF DROWNING AND NEAR-DROWNING IN CHILDREN
PRESENTER: A. Raza

PEDIATRIC RESIDENT ATTITUDES AND PRACTICES REGARDING FIREARM SAFETY GUIDANCE
PRESENTER: B. Johnson

RACIAL DISPARITIES IN INCIDENCE OF TESTICULAR TORSION IN CHILDREN PRESENTING WITH ACUTE SCROTAL PAIN
PRESENTER: J. Hunter

Scientific Session 5 (Cont.)

LOW SOCIOECONOMIC STATUS AND RESIDENTIAL DISTANCE OF LESS THAN 10 MILES TO A FRONTIER-STATE NCI-DESIGNATED CANCER CENTER IS ASSOCIATED WITH WORSE OVARIAN CANCER SURVIVAL
PRESENTER: S. Petersen

ADDRESSING RACIAL DISPARITIES IN BREAST CANCER AND BREAST RECONSTRUCTION THROUGH COMMUNITY OUTREACH
PRESENTER: O. Familusi

RACIAL DISPARITIES EXIST IN SURGICAL OUTCOMES FOR PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD)
PRESENTER: I.C. Marques Dos Santos

HEALTH SYSTEM FACTORS DO NOT IMPACT CAESAREAN SECTION RATES IN AFRICAN AMERICAN WOMEN
PRESENTER: T.S. Oseni

ILLUSTRATING DISPARITIES ON THE PATH TO RECONSTRUCTION AFTER BARIATRIC SURGERY: A POPULATION-BASED ANALYSIS OF INPATIENT AND AMBULATORY BODY CONTOURING PROCEDURES
PRESENTER: A. Rios-Diaz

LANGUAGE PREFERENCE AND READMISSION AFTER COLECTOMY
PRESENTER: K. Pandit

“PROTECT THE PIGMENT”: ALTERNATIVE TO FREE NIPPLE GRAFTING IN WOMEN OF COLOR WITH GIGANTOMASTIA
PRESENTER: O. Familusi

A COMPARISON OF ARCH INDEX, FOOT POSTURE INDEX AND SURGEON OBSERVATION FOR FOOT TYPE CLASSIFICATION
PRESENTER: D. LaBaze

PROJECT INSPIRE: A HOSPITAL-BASED INJURY PREVENTION PROGRAM AIMED TO REDUCE RECIDIVISM FOR YOUTH DELINQUENT OF GUN CRIMES
PRESENTER: A. Williams

OUTCOMES OF CANCER NEPHRECTOMIES: DOES VHL PLAY A ROLE?
PRESENTER: O. Olufajo

DO MALE CHAIRS OF SURGERY HAVE IMPLICIT GENDER BIAS IN THE RESIDENCY APPLICATION PROCESS?
PRESENTER: S. Dream

Dr. Claude H. Organ, Jr. Resident Award

Claude H. Organ, Jr., MD, FACS (1926-2005) was a world renowned academic surgeon, a giant in the field of surgery and medicine, and a major force in shaping and supporting the lives and careers of thousands. In 1989, Dr. Organ and several other black academic surgeons founded SBAS and held its first meeting at Duke University. Throughout his career, he oversaw the training of dozens of surgeons, including several African-American women. His lifelong dedication to mentoring young surgeons and encouraging diversity in the field of surgery is represented in the annual Dr. Claude H. Organ, Jr. Resident Award.

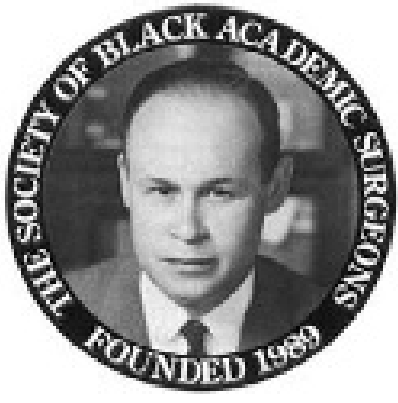
Delos "Toby" Cosgrove, MD, President & CEO, Cleveland Clinic, committed the Cleveland Clinic's endowment of this prestigious award. Starting in 2008 and continuing into the subsequent years, Cleveland Clinic's sponsorship of the Dr. Claude H. Organ, Jr. Resident Award helps insure the success of the future generations of surgeons.

Dr. Claude H. Organ, Jr.
2019 Resident Award Winners

Numa Perez, MD [1st Place]
Massachusetts General Hospital

Erin Strong, MD [2nd Place]
Medical College of Wisconsin

Miquel Miller, MD [3rd Place]
Stanford University



Abstracts

#1

NIPPLE SPARING MASTECTOMY IN AN ERA OF BROADENED CRITERIA: A SINGLE-CENTER EXPERIENCE

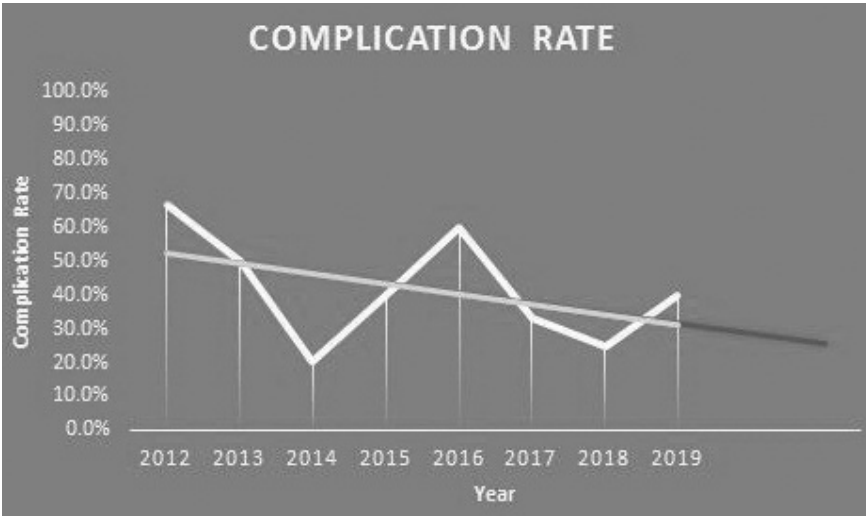
V.M. Jones, C. Velazquez, A. Chiba, E Levine, M. Howard-McNatt.
Wake Forest Baptist Medical Center, Winston-Salem, NC

Introduction: Surgeons are increasingly able to preserve breast tissue while safely eliminating cancer or performing risk reduction. Nipple sparing mastectomy (NSM) was developed to preserve the nipple areolar complex (NAC) for the natural contour of the breast. Initially there were rigorous criteria for safer oncologic outcomes. These criteria have been broadened. This reviews our experience with NSM outcomes and safety. Our hypothesis is that our complication rate has not increased over time.

Methods: After obtaining Institutional Review Board approval, we retrospectively reviewed patients who underwent NSM between 2012 and 2019.

Results: We identified 55 patients with 96 NSM (41 bilateral, 14 unilateral). Average age was 50.6 years. The population was 92.73% white, 5.45% black, and 1.82% Hispanic. Average BMI was 24.53 kg/m^2. Indications for surgery were invasive carcinoma (47.3%), DCIS (25.5%), LCIS (1.8%), genetic mutation (BRCA1/2, CDH1; 18.2%), prophylaxis for other reasons (3.6%), and atypical ductal hyperplasia (3.6%). We found 3.8% of patients had diabetes, hypertension in 16.4%, current tobacco use in 1.8%, and former tobacco abuse in 10.9%. Two patients had chronic steroid use (3.6%). Four patients (7.3%) had previous chest irradiation. There was no significant correlation between complication and these comorbidities. Average tumor size was 1.48 cm. In the first four years of experience, average tumor size was 1.44 cm versus 1.39 cm in the following four years. The majority of our patients were stage 0 (49.09%), 38.18% stage IA, 3.64% stage IB, and 9.09% stage IIA. Incisions used were lateral (45.5%), inframammary fold (32.7%), periareolar (10.9%), inferior hockey stick (3.6%), and Wise (1.8%).

For reconstructions, immediate tissue expander was used in 57.4%, 25.5% were delayed/staged, and 14.6% were direct to implant. Reconstruction was implant based in 74.6%, autologous in 9.1%, 12.7% await final reconstruction, and two patients declined. Complication rate was 40%. In 2012-2015, the rate was an average of 44% versus 40% in 2016-2019. Complications were mastectomy flap necrosis (32%), ischemic skin changes (20%), infection (12%), NAC necrosis (16%), in situ cancer in specimen (12%), close margin (4%), and hematoma (4%). We found no nipples removed intraoperatively for positive frozen section. Three nipples (5%) were removed later for in situ carcinoma. Five nipples (9%) were removed later for necrosis.



Conclusion: In the era of expanded criteria for NSM, it remains a safe and cosmetically beneficial procedure. Few patients had NAC recurrence or necrosis, and the majority of patients have completed their reconstructions.

#2

PREDICTING RECURRENCE IN PANCREATIC NEUROENDOCRINE TUMOR: BEYOND THE GRADE

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Introduction: Prognosis for pancreatic neuroendocrine tumors (PNET) is determined primarily by tumor grade. Even in low-grade disease, however, patients frequently experience recurrent disease with an indolent course.

Objective: To evaluate the impact on patient outcomes for G1 and G2 tumors based on node status.

Methods: We performed a retrospective review of patients with primary G1 and G2 PNETs undergoing pancreatic resection with curative intent at a single institution. Tumor grade was defined by the WHO 2017 Classification system. Primary outcomes were recurrence-free survival (RFS) and overall survival (OS), defined from date of primary pancreatic tumor resection and lymphadenectomy.

Results: 76 patients met inclusion criteria. Median follow-up was 56 months (IQR: 35-85). Median age was 57 years (IQR 48-66). 35 (47%) were women, and 7 (9%) were non-White. 13 patients (17%) had functional tumors, including 8 (11%) insulinomas and 5 (7%) gastrinomas. 13 patients (17%) had inherited genetic syndromes, including 10 (13%) MEN1 and 3 (4%) VHL. 51 patients (67%) had node-negative disease, and 25 (33%) positive nodal disease. There was no difference in median OS between patients with positive lymph nodes compared to negative nodal disease. 1 (2%) patient with node-positive disease died from disease progression. No node-negative patients died from disease; one node-negative patient died from a second malignancy. 10 (13%) patients recurred during the study period, including 3 (6%) with node-negative disease and 7 (28%) with node-positive disease.

Patients with node-positive disease were more likely to recur (p=0.007) and had a shorter median RFS (37 months vs 41 months; p=0.038). Gender, age, tumor size, and Ki-67 were not predictive of recurrence in low- and intermediate-grade tumors. RI resection (HR 7.48 [95% CI 1.53-36.70], p=0.013), positive lymph node status (HR 5.31 [95% CI 1.37-20.55], p=0.016), perineural invasion (PNI) (HR 6.66 [95% CI 1.72-25.85], p=0.006), and lymphovascular invasion (LVI) (HR 3.90 [95% CI 1.11-13.69], p=0.034) were associated with shorter RFS. On multivariable analysis, only PNI was an independent predictor of recurrence (HR 10.910 [95% 1.14-104.38], p=0.038).

Conclusion: The recurrence-free interval for patients with low- and intermediate-grade PNETs is shorter for patients with node-positive disease, R1 resection status, PNI, and LVI. These factors, however, were not predictive of overall survival. Only PNI was independently predictive of recurrence, though the study population was small.

Notes

#3

THE ROLE OF MATERNAL STRESS-DERIVED CORTISOL ON INTESTINAL DEVELOPMENT IN OFFSPRING

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Introduction: Necrotizing enterocolitis (NEC), which typically occurs in premature, formula-fed infants, is characterized by damage to the intestinal tract, ranging from mucosal injury to full-thickness necrosis and perforation. Currently, it is unclear what triggers the development of NEC, but it is believed to have multifactorial causes, including intestinal immaturity and microbial dysbiosis. We hypothesize that heightened prenatal stress during pregnancy contributes to the development of NEC by interfering with intestinal development and microbial colonization in the offspring. Previous studies have shown that maternal stress during gestation impacts infant neurological development. However, little is known about how gestational stress affects intestinal development in the offspring.

Methods: Using a Zebrafish model, we developed a methodology to induce chronic variable stress following which stressed fish were mated and offspring were compared to those derived from unstressed controls.

Results: Consistent with an expected increase in cortisol following stress, we detected higher levels of cortisol in the stressed fish compared to controls. Following TNBS administration, stressed fish exhibited higher mortality and gut pathology compared to unstressed controls. 6-day old larvae derived from stressed females exhibited reduced Thigmotaxis behavior compared to unstressed larvae, indicative of an anxiety-like behavior. However, this difference was lost following TNBS treatment of larvae from days 3-6, suggesting that gut inflammation affects behavior via the gut-brain axis and changes in the microbiome.

Conclusion: Further studies are underway to investigate the development and function of the gut and microbial dysbiosis in larvae derived from stressed fish. Taken together, these studies will provide novel insights into how parental-derived stress hormones can affect the development of the offspring.

#4

SEX DIFFERENCES IN KNEE INJURIES AMONG NATIONAL COLLEGIATE ATHLETIC ASSOCIATION BASKETBALL PLAYERS

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Introduction: Knee injuries in athletes are a significant source of morbidity and time loss from sport. Differences between men and women have been well documented, and basketball is of particular interest as it involves frequent cutting, jumping and contact among players. A study published by Arendt and Dick in 1995 using the same database as this study (National Collegiate Athletic Association [NCAA] Injury Surveillance Program [ISP]) demonstrated the rate of knee injuries was higher in women than men (1.0 versus 0.70 knee injuries per 1,000 athletic exposures). Our goal was to use the updated NCAA ISP database to examine differences in knee injuries among men and women basketball players.

Methods: Using the NCAA ISP database, all men's and women's basketball players with knee injuries from academic years 2004/2005 to 2013/2014 were collected and compared. Knee injuries included in analysis were partial or complete tears of the ACL, medial collateral ligament (MCL), lateral collateral ligament (LCL), medial meniscus, lateral meniscus, posterior cruciate ligament (PCL) and knee articular cartilage injury. Incidence rate was defined as incidence divided by basketball athletic exposures, which was reported per 1,000 athletic events. Incidence rate (IR), incidence rate ratios (IRR) between men and women, and 95% confidence intervals (CI) were calculated. Statistical significance was defined as $p < 0.05$.

Results: The incidence of knee basketball injuries was 0.82 per 1,000 athletic events in men and 0.99 per 1000 athletic events in women (IRR 0.82, 95% CI 0.74 to 0.91, p=0.0002). The most common knee injuries were ACL tears (IR 0.15, 95% CI = 0.13 to 0.17), MCL tears (IR 0.12, 95% CI 0.10 to 0.14) and lateral meniscus tears (IR 0.074, 95% CI 0.062 to 0.089).

Conclusion: This study confirms that there is a significantly higher incidence rate of knee injuries in NCAA women's basketball players. Compared to the ISP data 25 years ago, this incidence rate is essentially unchanged. Although there is increased awareness of this difference among athletes, coaches and health care providers, this data suggests that there has been no meaningful improvement in knee injury rates. Further research investigating more successful injury prevention strategies would hopefully decrease the short- and long-term morbidity of knee injuries in athletes.

Notes

#5

COMPUTATIONAL DESIGN OF A NOVEL BIORESORBABLE SLEEVE DEVICE FOR ESOPHAGEAL ATRESIA REPAIR

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Introduction: Despite ongoing refinements in surgical technique over the past four decades, postoperative anastomotic complications remain the status quo following esophageal atresia repair. Our group hypothesized that these surgical complications may be overcome using a customized device made from the elastomeric polymer, poly-glycerol-dodecanoate (PGD), to help reduce longitudinal tension, increase radial tension, and promote angiogenesis at the anastomosis.

Objective: To design a novel bioresorbable external scaffold device aimed at improving anastomotic healing through scaffold functionalization with bioactive peptide sequences.

Methods: Finite element models of ovine esophageal tissue based on the Gasser-Ogden-Holzapfel nonlinear elastic model were created as a baseline for comparison. We computationally designed esophageal sleeves from PGD using MATLAB based on porosity, suture placement, and opening angle. The material was then functionalized with two cell adhesive peptides (RGD and YIGSR) aimed at improving the endothelial cell microenvironment. Esophageal sleeves capable of being externally sutured to the anastomosis in neonates were then created by laser machining. Statistical analyses were performed as appropriate ($p < 0.05$).

Results: Esophagus tissue was more compliant than PGD in nonlinear stress strain curve analyses. However, the introduction of suture holes and decreasing sleeve thickness reduced sleeve elastic properties toward that of esophageal tissue. The model revealed that sleeves were capable of reducing anastomotic gap displacement by 11.0% and anastomotic strain by 15.5% (*Figure*).

Functionalization of PGD films with RGD and YIGSR peptides was shown by FTIR spectra and XPS analysis. Tagged human umbilical vein endothelial cells showed significant cell spreading and proliferation after 3 hours on peptide-coated PGD. Based on optimal design parameters, prototype sleeves measuring 25 mm length, 10 mm internal diameter, and 2 mm thickness were manufactured (*Figure*). Degradation time in vivo was 5-6 months. Immune responses were not significantly different from silicone controls.

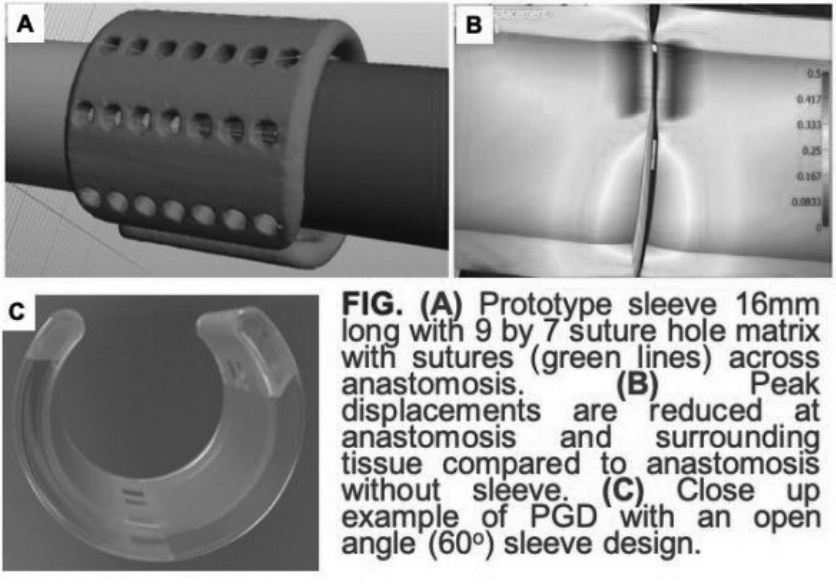

FIG. (A) Prototype sleeve 16mm long with 9 by 7 suture hole matrix with sutures (green lines) across anastomosis. **(B)** Peak displacements are reduced at anastomosis and surrounding tissue compared to anastomosis without sleeve. **(C)** Close up example of PGD with an open angle (60°) sleeve design.

Conclusion: We have designed a temporary prototype structural support device suitable for implantation around the esophageal anastomosis during neonatal esophageal atresia repair. These sleeves accommodate placement of sutures to provide radial tension while simultaneously reducing anastomotic gap displacement and strain. Further development of this bioresorbable sleeve technology is warranted.

#6

SOMATIC ALTERATION TESTING IN SPORADIC PANCREATIC NEUROENDOCRINE TUMORS: IS THERE A ROLE?

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Introduction: Comprehensive genomic profiling has shown prognostic and predictive benefit in a variety of gastrointestinal tumors. However, the incidence of actionable somatic alterations in pancreatic neuroendocrine tumors is unknown.

Objective: To evaluate the clinical implications of somatic alteration testing in patients with sporadic pancreatic neuroendocrine tumors (PNET) treated at a single tertiary oncology care center.

Methods: A retrospective review of patients undergoing resection of sporadic PNET was performed. Patients with known endocrine genetic syndromes were excluded. Surgical specimens subjected to comprehensive genomic profiling between 2012-2018 using commercially available platforms from Caris Life Sciences and Foundation Medicine were identified. Genomic alterations were identified by Next Generation Sequencing (NGS).

Results: 26 patients with sporadic PNETs met inclusion criteria. Median age was 56 years (IQR 46-63), and 14 (54%) were female. 6 (23%) had sporadic functional tumors, including 3 (12%) insulinomas and 3 (12%) gastrinomas. Tumor grade according to WHO 2017 classification schema was G1 in 8 (31%), G2 in 15 (58%), and G3-NEC in 3 (11%). 16 (62%) patients developed distant metastases during their disease course; 14 (54%) presented with synchronous metastasis and 2 (8%) with metachronous metastases. The liver was the site of metastases in 15 (94%) and peritoneal disease in 1 (6%). Caris testing consisted of either a 472-gene or 88-gene NGS panel. Foundation testing interrogated either 315 genes plus 47 introns from 19 genes frequently rearranged in cancer or more recently 324 known cancer predisposing genes. 11 (42%) patients had no genomic alterations identified.

The most common somatic gene alterations identified were pathologic variants in MEN1 in 6 (23%) patients, ATRX in 5 (19%), and TP53 in 4 (15%). 2 (8%) patients had alterations with clinically actionable targets, including one BRCA2 and one BRAF alteration. One patient had systemic therapy directed by somatic testing.

Table
Frequency of Somatic Alterations in Known Cancer-Disposing Genes Identified Using Comprehensive Genomic Profiling Panels in Patients with Sporadic Pancreatic Neuroendocrine Tumors

Gene	Patients with Alteration n (%)	Potential Agent	Received Potential Agent
MEN1	6 (23%)	No Available Agent	N/A
ATRX	5 (19%)	No Available Agent	N/A
TP53	4 (15%)	No Available Agent	N/A
DAXX	2 (8%)	No Available Agent	N/A
PTEN	2 (8%)	No Available Agent	N/A
RB1	2 (8%)	No Available Agent	N/A
ARID1A	1 (4%)	No Available Agent	N/A
BRCA2	1 (4%)	Platinum-Based Antineoplastic Agent	No
BRAF	1 (4%)	Tyrosine Kinase Inhibitor	Yes
CKDN2A/B	1 (4%)	No Available Agent	No
MSH6	1 (4%)	No Available Agent	N/A
cMET	1 (4%)	No Available Agent	N/A
Her2/Neu	1 (4%)	No Available Agent	N/A
PDGFRA	1 (4%)	No Available Agent	N/A
MUTYH	1 (4%)	No Available Agent	N/A
SF381	1 (4%)	No Available Agent	N/A
VHL	1 (4%)	No Available Agent	N/A

Conclusion: Somatic alteration testing may have predictive relevance in patients with sporadic PNETs, particularly in those with metastatic and/or high-grade disease. Larger cohorts are needed to further investigate the predictive impact of comprehensive genomic profiling panels in sporadic PNET.

#7

MAKING AN IMPACT ON PATIENT RECOVERY: AN ANALYSIS OF AN ENHANCED RECOVERY PATHWAY AND IMMUNONUTRITION ON PATIENTS UNDERGOING PANCREATIC SURGERY

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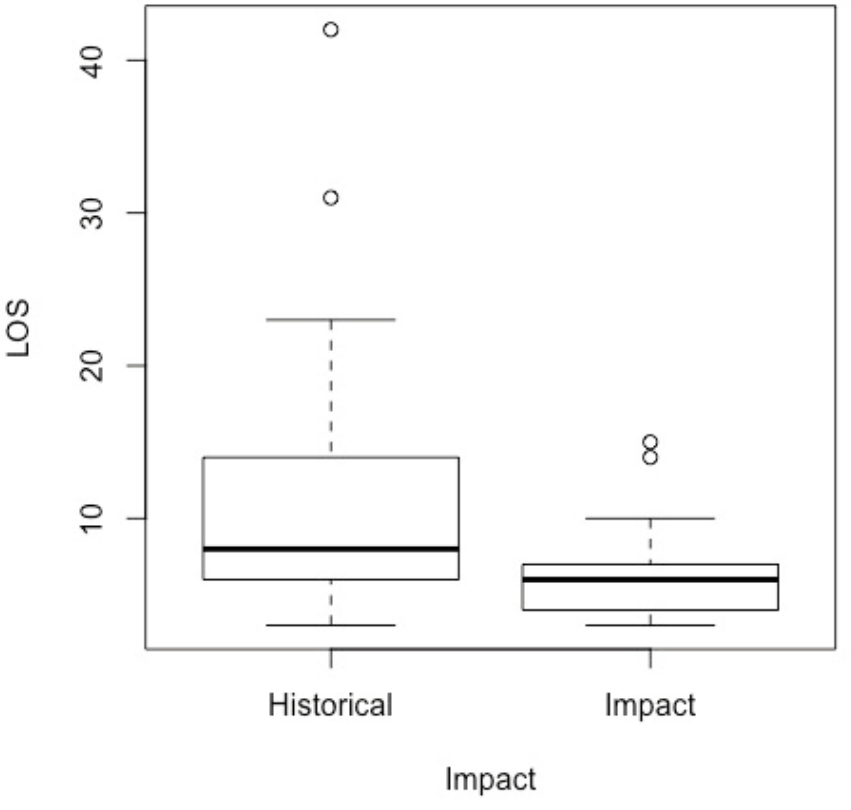
Introduction: Enhanced Recovery Protocols (ERP) have improved outcomes across multiple surgical disciplines. Additionally, perioperative immunonutrition, a key ERP component, has been associated with a shorter length of stay and favorable effect on complication rates. However, the effect of preoperative immunonutrition and ERP in pancreatic surgery patients remains poorly characterized.

Methods: A surgery quality improvement pilot study was performed for patients undergoing pancreatic surgery at a community hospital. The first group of patients constitutes a historical control of 61 patients. The ERP implemented for the experimental group of 13 patients included the same institutional protocol except for the addition of preoperative immunonutrition for five days prior to surgery. The primary outcomes of interest included length of stay (LOS) and major morbidity. Descriptive analysis consisted of Welch's two sample t-test as appropriate. All tests were two-tailed with $p < 0.05$ defined as statistical significance.

Results (*see Figure*): Baseline characteristics were similar between the control and experimental groups. There was no significant difference in major morbidity between pancreas patients (15% experimental versus 31% historical, p=0.1229). However, the mean LOS was decreased in the experimental group (6.76 days vs. 10.18 days, $p = 0.02131$).

Conclusion: The results demonstrate that an ERP combined with preoperative immunonutrition is associated with a significantly lower length of stay.

Hospital Length of Stay (Days) in Historical (Control) and Impact (Experimental) Groups



NOTES

#8

A NOVEL USE OF ARTIFICIAL INTELLIGENCE TO CORRELATE DIVERSITY AND HOSPITAL PERFORMANCE

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Introduction: The United States population is becoming more racially and ethnically diverse. Research supports that cultural diversity within organizations increases teams performances, yet this theory has not been explored in the field of surgery. Furthermore, patients often prefer their care provider to mirror their own race and ethnicity. We hypothesize that there is a positive correlation between greater racial, ethnic and gender diversity among gastroenterology and gastrointestinal (GI) surgery faculty and exceptional hospital outcomes.

Methods: The U.S. News Best Hospitals specialty rankings score departments using data based on measurable outcomes such as risk-adjusted mortality. We utilized these rankings to categorize gastroenterology and GI surgery departments into 2 groups: 1-50 and 51-100. Hospital websites of the top and bottom 50 were compared to determine if racial diversity and inclusion were highlighted in each group's core values and/or mission statements. Betaface (Betaface.com) artificial intelligence software deciphered the race, ethnicity, and gender of the physicians using facial analysis of photos taken from the hospitals' websites. We then ran the independent samples t-test to determine if there was a difference in rankings of departments with more non-white, underrepresented minorities and female faculty. Finally, we used U.S. census data to determine if the racial and ethnic makeup of the populations served by these hospitals matched the demographics of the physicians.

Results (*see Table*): Hospitals with gastroenterology and GI surgery departments in the top 50 were more likely to mention diversity on their websites compared to those that ranked from 51-100 (82% vs. 64%; $p=0.04$). The top 50 hospitals also had a statistically significant higher percentage of underrepresented minority physicians (7.01% vs. 4.04%; $p<0.001$).

In the 31 states where the hospitals were located, there were more African Americans (13% vs. 3%; p<0.001) and Hispanics (12% vs. 2%; p< 0.001) in the population compared to the faculty.

Racial, Ethnic and Gender Diversity among Gastroenterology Physicians and GI Surgeons in the Top 100 Departments According to the U.S. News Best Hospitals Specialty Rankings			
	Rank 1-50 mean ± SD	Rank 51-100 mean ± SD	p value
GI Physicians and Surgeons			
% Non-white	28.70 ± 9.08	26.62 ± 10.94	0.295
% Underrepresented minorities	7.01 ± 4.75	4.04 ± 3.86	0.001*
% Female	28.83 ± 9.93	24.63 ± 9.81	0.070

Conclusion: We utilized artificial intelligence software to determine the degree of racial and ethnic diversity in highly ranked gastroenterology and GI surgery departments across the country. Better ranked departments were more likely to emphasize diversity in their mission statements and had more underrepresented minorities in their faculty. Hospitals stress the importance of having a culturally diverse staff, yet their care providers do not always adequately reflect the populations they serve. Further research is necessary to track diversity rates over time among surgical faculty and the populations they serve to correlate these changes with measurable outcomes.

Notes

#9

TRAVEL DISTANCE AND THE IMPACT ON POST-SURGICAL OUTCOMES AND OVERALL SURVIVAL AFTER CRS/HIPEC: A STUDY FROM THE US HIPEC COLLABORATIVE

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Introduction: There has been a gradual increase in the utilization of CRS/HIPEC; however, given limited availability, patients may often be required to travel variable distances prior to therapy. Previous research has described travel bias, whereby greater travel distances are associated with improved surgical outcomes for patients undergoing oncologic resections. We sought to evaluate the possible impact of travel distance on post-surgical outcomes and overall survival in patients undergoing CRS/HIPEC.

Methods: A retrospective review of data from the multicenter US HIPEC Collaborative database was done. A zip-code centroid model was utilized to categorize patients into three travel areas (250 miles: Far). Demographic information and patient characteristics and outcomes related data were compared between patients within these groups. Overall survival was chosen as the primary outcome variable. Univariate and multivariate Cox proportional hazards regression analysis was performed to assess relationships between travel distances, demographics, patient and disease characteristics with overall survival and progression-free survival.

Results: Demographic differences related to race ($p<0.001$), gender ($p=0.05$) and ASA class ($p<0.001$) were observed. There was no detected difference with regards to pre-operative albumin (3.98 vs. 3.99), tumor markers or PCI score (17.9 vs. 18.7). Greater travel distance was associated with a trend toward greater risk of perioperative cardiopulmonary complications ($p=0.05$); however, no difference in outcomes was observed with respect to overall length of stay, ICU stay, or other surgical complications (wound, GU, GI).

On univariate analysis, the furthest travel group was found to have a statistically significant decreased overall survival (Median: 18 months vs. 22 months). No significant difference in overall survival was found on multivariate analysis.

Conclusion: Increased travel distances were associated with greater risk of perioperative cardiopulmonary complications and decreased overall survival after CRS/HIPEC, contrary to other data regarding travel bias in cancer surgery. Ongoing studies will need to be undertaken to better delineate this relationship.

Notes

#10

OUTCOMES FOR FIRST-YEAR PEDIATRIC SURGEONS WHO TRAINED UNDER DUTY-HOUR RESTRICTIONS

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Introduction: In July 2003, the Accreditation Council for Graduate Medical Education (ACGME) mandated an 80-hour work week restriction averaged over four weeks for all residency programs. This mandate was met with skepticism from general surgeons who worried that this would negatively impact residents' operative training and their performance in the 6 ACGME core competencies. Results from studies assessing the impact of these restrictions on surgery residency training have been inconsistent. No study to our knowledge has examined the impact training during this duty-hour restriction era has had on first-year pediatric surgery outcomes of common operations. We hypothesized that there is no difference in first-year surgical outcomes within 30 days for pediatric surgeons who trained under these restrictions when compared to published complication rates.

Methods: We performed a retrospective analysis of all pediatric patients who underwent one of the five most common pediatric operations – inguinal or umbilical hernia repair, appendectomy, central venous access (CVA) or pyloromyotomy between January 2013 and December 2018 by first-year pediatric surgeons who trained entirely under duty-hour restrictions. Demographic and clinical data were collected for each operation. Two sample tests of proportions were performed to compare our institutional rates to published rates on data collected prior to 2003. A p-value of 0.05 was considered significant.

Results: No difference was found in laparoscopic appendectomy (n=82) rates of infection, bleeding or intra-abdominal abscess when compared to published data (n=141); p-values of 1, 1 and 0.77, respectively.

Similarly, there was no difference in CVA (n=24) complication rates of bleeding, pneumothorax or hemothorax compared to published data (n=1257); p-values of 1, respectively. Pyloromyotomy (n=25) rates of infection, bleeding or duodenal perforation compared to published data (n=901) were no different; p-values of 1, 1 and 0.62 respectively. No difference was found between rates of infection, recurrence or testicular atrophy for inguinal hernia repair (n=83) when compared to published data (n=6361); p-values of 1, 0.63 and 1, respectively. Umbilical hernia (n=24) rates of infection, bleeding and recurrence were also no different compared to published data (n=377); p-values of 0.22, 1 and 1, respectively.

Conclusion: First-year complication rates for pediatric surgeons who trained entirely during the duty-hour restriction era are no different when compared to published rates from larger samples. Obtaining data on a national level is warranted to better address this question.

Notes

#11

AN IN VIVO COMPARISON OF ANKLE KINEMATICS AFTER RIGID SCREW FIXATION AND TIGHTROPE FIXATION

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Introduction: Ankle sprains are the most common injury sustained by athletes at all levels of competition and are usually external rotation injuries that result from quick cuts, rolling of the ankle, or other sudden movements. The less severe injuries are typically treated non-surgically while more severe injuries require surgical correction. Syndesmotic, or high ankle, injuries account for 1-11% of all ankle sprains and can result in poor long-term sequela, with evidence that it is the most predictive factor of chronic ankle dysfunction 6 months after injury. Therefore, it is imperative that options for management and surgical repair are carefully evaluated. The two verified treatment options are suture button fixation and rigid screw fixation. Andersen et al (2018) have shown that compared to patients who underwent rigid screw fixation, patients who underwent suture button fixation yielded better clinical outcome scores, less pain with walking, and better radiographic results confirmed by postoperative CT. However, there are currently no published studies comparing the in vivo biomechanics of suture button and rigid screw syndesmotic fixation. Additionally, there is no report of how the in vivo kinematics correlate with the functional and clinical outcomes in the postoperative period.

Objective: We would like to characterize and understand the 3D kinematics of the native ankle syndesmosis, as well as the kinematics of ankles post-fixation with rigid screw and suture button. We will also assess patient-reported outcomes to determine if better kinematic outcomes are associated with better patient-reported outcomes. By comparing the relative motion at the syndesmosis, it may help to identify the mechanism for improved patient-reported outcomes based on the fixation method.

Methods: *Data Collection*: Subjects visited the lab for testing between 3 months and 2 years post-surgery, once they had finished their rehabilitation and were able to perform daily activities without symptoms. During testing, the subjects performed three different movements: a forward running motion, a backpedaling motion, and an angle hop (side to side) motion within a biplane radiograph system while images were collected. A high-resolution computed tomography (CT) scan (0.5 x 0.5 x 1.25 mm) (GE Lightspeed Pro 16) of the ankle was collected after movement testing. The tibia, fibula, talus and calcaneus bone tissue were segmented from the CT images in mimics software and reconstructed into subject specific bone models. *Data Processing*: Anatomic coordinate systems were created in each bone. After this, the volumetric model-based tracking process that matches subject-specific bone models obtained from the CT to the biplane radiographs was used to track the bones throughout the different movements.

Results: 6 degrees of freedom were analyzed for each of three motions: Back, Angle, and Run. Kinematic data was analyzed for the tibiotalar rotation (TTR), tibiotalar translation (TTT), and tibiofibular translation (TFT). Preliminary results show that there are larger values for the Back motion compared to Angle and Run for TTR, TTT, and TFT. For tibiotalar motion, the largest difference was observed for plantar flexion and lateral-medial motion for TTR and TTT, respectively. For TFT, the greatest difference was seen for lateral-medial translation.

Conclusion: Preliminary results show that, regardless of intervention, there is much greater variability for the backwards motion than the angle or run motion. Results indicate movement specific relationships between the different bones at the ankle syndesmosis across all movements, indicating that increased flexibility provided by suture button fixation may be responsible for movement that closely mirrors native ankle movement and promote better outcomes and less pain following surgery compared to rigid screw fixation.

#12

REGIONAL PAIN BLOCKS AND PAIN CONTROL IN THE PERIOPERATIVE SETTING AMONG PATIENTS UNDERGOING BREAST IMPLANT REMOVAL AND CAPSULECTOMY

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Introduction: Breast implant removal and exchange constitutes one of the most common plastic surgery procedures performed on an outpatient basis, with nearly 48,000 performed in 2018. Intraoperative and postoperative analgesia is often difficult due to increased scar tissue surrounding the implant, the potential for an extensive dissection during capsulectomy, and the variable innervation of the underlying breast. There is a paucity of literature to support a particular perioperative analgesic regimen for these patients. Previous studies have found that ultrasound-guided regional blocks can provide a significant and durable analgesic effect in patients undergoing breast surgery, but the applicability to patients undergoing implant removal and exchange has been limited in the literature thus far.

Objective: To assess perioperative pain control and postoperative opioid requirements based on type of regional block performed for patients undergoing implant removal with capsulectomy in the outpatient setting.

Methods: Patients undergoing breast implant removal with capsulectomy at an outpatient surgical center were included. After induction of general anesthesia, all patients underwent an ultrasound-guided regional pain block with combination of either a serratus anterior (SP), erector spinae (ES), pecto-intercostal fascial plane (PIFP), or pectoral nerve I block (PECS1). All blocks were performed by a board-certified anesthesiologist. Comparisons were made in terms of intraoperative opioid administration, postoperative opioid administration, and patient-reported pain on the first postoperative day (POD1) using chi-square analysis. A p-value < 0.05 was considered statistically significant.

Results: 128 patients met inclusion criteria. 20% of the patients underwent serratus anterior plane block (SP), 10% underwent a combined erector spinae and pecto-intercostal fascial block (ES+PIFP), and 70% underwent an erector spinae and pectoral nerve I block (ES+PECS1). 34% of patients required opioids postoperatively in the recovery unit, and 45% reported minimal to mild pain on postoperative day 1. ES+PECS1 was associated with less intraoperative opioid use compared to the SP and ES+PIFP groups ($p< 0.001$); however, there was no significant association between type of regional block and postoperative opioid requirement ($p=0.91$) or level of pain on POD1 ($p=0.30$).

Conclusion: Regional pain blocks offer an effective pain control regimen for patients undergoing breast implant removal and capsulectomy in the outpatient setting, resulting in less opioid consumption and high patient satisfaction in the postoperative period.

Notes

#13

EVALUATION OF FALSE POSITIVES IN A SCREENED RURAL LUNG CANCER POPULATION

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Introduction: Rural populations face lower socioeconomic status and increased rates of poverty that influence health care decisions. Fear of false positive findings and their resulting financial burden represent a significant barrier when considering participation in lung cancer screening. We specifically sought to understand the rate of benign pathology and reasons for surgical resection in an eligible, rural, lung cancer population.

Methods: We retrospectively surveyed our prospective database at a rural, tertiary, academic institution from January 2015 to June 2018. All patients who underwent resection for primary lung cancer were reviewed to assess the pre-operative occurrence of low-dose computed tomography (LDCT) per USPSTF and CMS guidelines. The patients were then divided into two groups: screened (those eligible, that completed screening) and screening eligible (those that were eligible, but not screened). The intent was to evaluate the number of screen-detected nodules requiring surgical resection, and the rate of benign final pathology within the two groups.

Results: 522 patients underwent surgical intervention for lung cancer, of which 446 had a primary resection. 252 met screening criteria, of which 50 completed LDCT screening. Six (12.0%) of the screened patients that underwent surgical intervention for a detected nodule were found to have benign pathology post-operatively. Five underwent wedge resection, and 1 underwent lobectomy (performed robotically, and completed given the proximity of the nodule to the pulmonary artery [PA]). All had only 1 LDCT prior to resection. Of the screening-eligible population (195), 30 (15.4%) patients that underwent resection for detected nodules demonstrated benign pathology.

23 underwent wedge resection, and 3 patients underwent lobectomy (2 performed robotically, and 1 open). Reasons for lobectomy included size and proximity of the nodule to the PA.

Conclusion: Our false positive rate was lower than the national averages, however this trend was appreciated in both groups suggesting that we are not screening enough of this eligible population, and thoughtful discussion with patients to address innaccurate fears regarding false positive results and subsequent cost is needed. Given the low volume of screening CT scans required, and similar rates of lobectomy for benign disease appreciated, further study in a larger population to define this specific risk profile is also warranted. More importantly, these findings provide compelling reasons for continued improvement of methods for differentiation of benign and malignant screen-detected nodules and better description of the resulting care cascade to increase patient participation and decrease mortality from this disease.

Notes

#14

EVALUATION OF DOPPLER ULTRASOUND EXAMINATION OF PORTAL FLOW DYNAMICS IN PATIENTS WITH TOTAL PANCREATECTOMY AND AUTOLOGOUS ISLET CELL TRANSPLANT

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Introduction: Total pancreatectomy and autologous islet cell transplant (TPAIT) is an established treatment for patients with chronic and recurrent pancreatitis. The major complications of this procedure include portal vein thrombosis (PVT) and bleeding due to anticoagulation.

Objective: To evaluate the correlation between US doppler flow dynamics and liver function tests (LFTs), islet cell mass, and outcomes.

Methods: Retrospective analysis of prospectively collected data was done at a single institution from February 2018 to September 2019. Doppler ultrasonography (US) measuring individual major portal vein (PV) branch velocity (PVV) was performed on post-operative day (POD) 1, 2, and 5, and as applicable due to abnormal liver function tests (LFT). All patients received anticoagulation per protocol. Pearson's correlation analyses of PVV and LFTs, islet cell volume, and islet cell mass were performed.

Results: During the study period, 14 cases of TPAIT were performed. The change in portal vein pressure at infusion ranged from 1.5 to 26, with a mean of 5.4 cm H_2O (SD 6.3). LFTs peaked on post-operative day (POD) 2. The lowest mean flow in the main and right posterior portal veins were observed on POD 1, while in the right anterior and left portal veins the lowest flow was seen on POD 2. Correlation analysis found a very weak correlation between LFTs and PVV that was not statistically significant until POD 5 ($r = 0.55$, $p = 0.04$). In the post-discharge period, the correlation between LFTs and PVV was strong and statistically significant ($r = 1.0$, p-value < 0.001).

There was a strong negative correlation between islet cell volume infused and right anterior PVV on POD 2 ($r = -0.88$, $p = 0.02$). Islet cell mass and PVV did not significantly correlate until POD 5 ($r = 0.80$, $p = 0.03$). No patients had portal vein thrombosis. Two patients had post-operative bleeding, both of which had extremely low velocities (main PVV 0.181).

Conclusion: In this study, we found that the correlation between PVV and LFTs is weak in the immediate post-operative period, and did not become significant until the post-discharge period when doppler ultrasonography was performed due to clinical concern rather than protocol. The value of scheduled post-operative velocity measurement in relation to portal vein thrombosis evaluation may be overstated. Repeated doppler ultrasonography may be anxiety provoking and lead to supratherapeutic anticoagulation, which could result in bleeding.

Notes

#15

GLYCEMIC CONTROL IN RELATION TO THE TYPE OF PANCREATIC SURGERY CHOSEN FOR PATIENTS WITH CHRONIC PANCREATITIS

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Introduction: Surgery for chronic pancreatitis (CP) is fraught with potential complications of type 3c diabetes such as severe hypoglycemic events (SHE) and hypoglycemic unawareness (HU). As various surgical therapies exist for CP, the aim of this study is to examine the difference in glycemic outcomes between total pancreatectomy and autologous islet cell transplant (TPAIT) and parenchymal preserving surgery (PPS).

Methods: All patients undergoing CP surgery at a single center under a single surgeon from February 2017 to September 2019 were included. The patients were divided into 2 groups: Group 1 -TPAIT and Group 2 - PPS. The groups were further divided between pre-operatively diabetic/pre-diabetic (PreDM/DM) and non-diabetic (NDM) patients.

Results: 32 patients underwent surgery for CP [14 (43.8%) TPAIT and 18 (56.2%) PPS - 6 (18.8%) Whipple procedures, 9 (28.1%) distal pancreatectomies, and 3 (16.7%) duct drainage procedures]. In Group 1, 6 (42.9%) patients were PreDM/DM pre-operatively. Following TPAIT, 5 (35.7%) patients were insulin independent at discharge, of which 4 (28.6%) remain off insulin at current follow up. When stratified by pre-operative diabetes status, there were no statistically significant differences in insulin requirement until 3 months, at which time all PreDM/DM patients remained on insulin, but NDM patients began weaning off ($p=0.046$). In Group 2, 12 (66.7%) were PreDM/DM preoperatively, but there was no significant difference in insulin requirement throughout their hospital stay. When comparing TPAIT to PPS, there was a significant difference in number of patients requiring insulin in the immediate post-operative period (64.3% vs. 22.2%, respectively, $p =0.016$).

However, even when stratified by pre-operative diabetes status, there was no significant difference between the insulin requirement in either group by 3 months (p=0.134). The odds of requiring insulin was significantly higher at discharge for TPAIT patients (OR 38.1, 95% CI 1.1-1369.3); however, the odds ratio decreased by 3 months (OR 5.4, 95% CI 0.08-366.8). No patient in either group experienced SHE or HU.

Conclusion: While there are higher odds of developing insulin dependence following TPAIT, this decreases over time. TPAIT can help reduce hypoglycemic complications, hence insulin requirement should not cause hesitation in offering TPAIT to those with diffuse pancreatic disease. In PPS patients with preoperative insulin requirements, insulin doses may actually decrease post-operatively, attributed to the loss of inflammatory response within the body.

Notes

#16

USE OF THE PATIENT PORTAL AND ITS ROLE IN SURGICAL CONSENT

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Introduction: The essence of a surgical procedure begins in the consent process. It establishes the patient-provider relationship, improves quality of care, and substantiates the medical-legal record of informed consent. Documenting the consent process on a piece of paper is woefully inadequate. Many patients do not keep a copy of the consent record. Access to components of the surgical consent process within patient portals may augment patient education, yet current efforts have yet to go beyond template-based material. Our pilot study utilized a unique portal platform to provide patients with video documentation of their personal consent process.

Objective: To quantify patient portal usage in surgical patients who have undergone informed consent and were given access to the patient portal.

Methods: This was a retrospective chart review of all adult patients who were registered for the Rati-Fi® patient portal and underwent elective surgery between August 2017 through September 2019. Patients were excluded if they did not undergo an elective surgery procedure, or transferred their respective surgical care outside the Kaleida Health System.

Results: Eighty-one patients qualified for study inclusion and completed a video record of their actual informed consent. 67 patients (83%) underwent elective surgery; 27 (40%) of those patients registered and accessed the patient portal outside of clinic. Median count of portal log-on events was 4 (IQR 4), with a majority of the patients who accessed the portal undergoing abdominal surgery (90%). Of those who registered, the average age was 54.6 years (SD 17 years) with 55.5% of the patients male. Of those who did not register, 40 (49%) still went on receive elective surgery.

Conclusion: The ethical principles of an informed consent should include patient autonomy and a general respect for person. Recording this endeavor and making it available on a secure patient portal may serve as an innovative way to encourage surgeons to do an excellent consent process for their patients. It offers these patients an opportunity to refresh their knowledge about their upcoming procedure and share insight with their significant others. This allows patients to engage with their surgical team, offer a solution to improve documentation, and ensure quality informed consent. Future studies will need to evaluate the patients who utilized the patient portal for this purpose to further understand their motivations, barriers, and overall effectiveness of the video consent process.

Notes

#17

PEDIATRIC OUTCOMES FOLLOWING CRANIAL VAULT REMODELING WITH RESTRICTED USE OF POSTOPERATIVE NARCOTICS, A RETROSPECTIVE REVIEW

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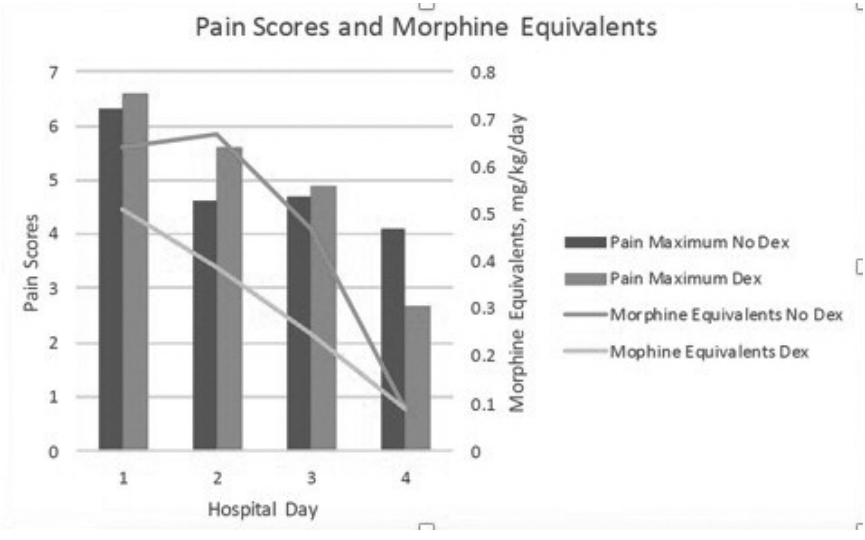
Introduction: The appropriate use of narcotics for postoperative pain control is controversial in most surgeries. The concern stems from known complications such as nausea, emesis, constipation, pruritus and respiratory depression. This presents a unique concern following intracranial surgery because their use can mask the early signs of intracranial disaster and increase the risk of intracranial pressure and cerebral edema secondary to hypercapnia related to respiratory depression. Previous studies have evaluated narcotic use in the pediatric population following cranial vault remodeling and attempted to identify independent predictors of emesis and length of stay.

Objective: To directly compare two cohorts of patients, one with limited use of narcotics and one with liberal use of narcotics, and compare the previously listed outcomes.

Methods: Retrospective chart review was conducted on patients who underwent treatment of non-syndromic craniosynostosis December 2012 to February 2015. Variables recorded included demographic data, preoperative diagnosis, operative procedure, and postoperative course. The postoperative course included pain scores using FLACC scale, heart rate, morphine equivalents, dexmedetomidine, ICU stay, hospital stay, emesis, time to bowel movement, and respiratory events. Postoperative pain regimen was recorded and converted to morphine equivalents to allow for comparison.

Results (*see Figure*): There is positive correlation between total morphine equivalents for the length of hospital stay as well as time to first bowel movement. The morphine equivalents in the first 24 hours did not correlate with the time to oral intake.

Four patients (7%) had a respiratory event documented with a statistically significant difference in average morphine equivalents in the group with documented respiratory events. Sixty-eight percent of patients had dexmedetomidine as an adjuvant for pain management and this group had a trend towards a decrease in administration of narcotic pain medication in the first 24 hrs and had a statistically significant decrease in narcotic administration during the hospitalization.



Conclusions: Variation in postoperative management of pain following cranial vault surgery exists within the literature. Our study demonstrated correlation with the total dose of morphine equivalents and the timing of return of bowel function and number of respiratory events. Additionally, we demonstrated a decrease in the amount of narcotics administered during the hospital stay when dexmedetomidine was used. Based on our findings, further studies are indicated to explore outcomes in a larger patient population.

#18

SAFETY, DIAGNOSTIC YIELD AND THERAPEUTIC IMPLICATIONS OF FLEXIBLE BRONCHOSCOPY WITH BRONCHO-ALVEOLAR LAVAGE IN PATIENTS WITH END STAGE LIVER DISEASE AWAITING LIVER TRANSPLANT

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Introduction: Flexible bronchoscopy (FOB) with bronchoalveolar lavage (BAL) has become a standard of care in the management of critical care patients. Data on safety and utility of FOB in high acuity patients with end stage liver disease (ESLD) awaiting liver transplantation (LT) remain limited.

Objective: To evaluate the safety, diagnostic yield, and therapeutic implications of FOB in patients with ESLD hospitalized in the transplant intensive care unit (TICU).

Methods (*Table 1*): We conducted a single-center analysis of 61 ESLD patients admitted in the TICU who underwent FOB with BAL from January 2016 to November 2018. A total of 80 FOB with BAL flexible were performed. Variables were compared between Group I (MELD > 35), n=50; and Group II (MELD score < 35), n=30. The mean follow-up was 5.8 months.

Table 1: Indications for Fiberoptic Bronchoscopy Procedure

	MELD >35 n=50	MELD<35 n=30	P value
Indication for mechanical ventilation:			
Respiratory failure	31 (62%)	23 (77%)	0.168
Altered mental status	17 (34%)	4 (13%)	0.039
Others	2(4%)	3 (10%)	0.286
Indication for bronchoscopy			
Radiological findings	35 (70%)	20 (67%)	0.780
Aspiration	6 (12%)	5 (17%)	0.534
Hypoxia	5 (10%)	4 (13%)	0.681
Sepsis	4 (8%)	1 (3%)	0.369

Results (*Table 2*): Alcohol-related cirrhosis was the most common etiology of ESLD (51%) while radiographic pulmonary infiltrates were the most frequent indication for FOB (68.7%). Overall diagnostic yield was 76%. Comparing groups I and II, the pathogens were similar: fungal organisms accounted for 24 (50%) and 14 (47%), p=0.79; while bacterial for 11 (21%) and 11 (37%), p=0.15, respectively. FOB and BAL findings resulted in a change in antimicrobial treatment in 26 (52%) and 17 (57%), p=0.66, respectively. Only 1 patient experienced a complication (reintubation). Average duration of mechanical ventilation after FOB was comparable for both groups, 10.6 days vs. 12.9 days, p=0.34, respectively.

Table 2: Bronchoscopy and Bronchoalveolar Lavage Results

	MELD >35 n=50	MELD <35 n=30	P Value
Bronchoscopy diagnostic yield	36 (72%)	25 (83%)	0.266
Types of pathogen Fungal	24 (50%)	14 (47%)	0.796
Bacterial	11 (22%)	11 (37%)	0.148
Change in antimicrobial treatment	26 (52%)	17 (57%)	0.666
Upgrade in antimicrobial coverage	15 (30%)	10 (33%)	0.780
Downgrade in antimicrobial coverage	11 (22%)	7 (23%)	0.918
ICU time after bronchoscopy (days)	28.0	19.7	0.217
Ventilator days after bronchoscopy	10.5	12.9	0.339

Conclusion: FOB with BAL is safe and has a high diagnostic yield with good therapeutic implications in high acuity ESLD patients awaiting liver transplantation.

NOTES

#19

WRAPAROUND 2.0. EFFECTIVE STAKE-HOLDER ENGAGEMENT FOR SUCCESSFUL RE-IMPLEMENTATION OF A HOSPITAL-BASED VIOLENCE INTERVENTION PROGRAM

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Introduction: Hospital-based violence intervention programs (HVIPs) promote comprehensive recovery from violence-related trauma and decrease risk of future injury. The University of California Davis, Medical Center (UCDMC) adapted the Wraparound Project HVIP model from San Francisco General Hospital (SFGH) in 2010. In this initial attempt, sustainability was not achieved beyond the 18-month pilot period. For subsequent re-implementation, stakeholders were engaged to identify and address perceived barriers. We describe adaptation and re-implementation of an HVIP model at an urban Level 1 academic trauma center.

Methods: A review of pilot evaluation findings was conducted, followed by discussion with internal and external stakeholders to identify perceived institutional and community barriers to sustainability. Implementation components included community and culturally sensitive case management, comprehensive rehabilitation, referral relationships with existing community programs and a comprehensive evaluation program.

Results: Institutional barriers included inadequate administrative buy-in, insufficient staff knowledge of the program, and implicit bias. Community barriers included insufficient support service access, lack of service area focus on the most affected communities, and insufficient strategic collaborations.

We developed a comprehensive approach to educating hospital staff, providing presentations for internal stakeholder departments, and introductions to hospital units. We additionally launched a public awareness campaign with local media. Collaboration with the Black Child Legacy Campaign, a community-driven initiative established to reduce African American child deaths in Sacramento, and a formal Memorandum of Understanding with the Greater Sacramento Urban League improved access to resources. A comprehensive evaluation program employed a mixed methods strategy to ensure efficient and effective resource utilization.

Conclusions: Pre-emptive engagement of key stakeholders to address implementation barriers is critical for HVIP success. Institutional and community differences may require adaptation of a program model to facilitate sustainability.

Notes

#20

A CADAVER-BASED FACIAL TRAUMA SIMULATION COURSE: EXPANDING EXPOSURE TO FACIAL FRACTURES AS AN EDUCATIONAL TOOL AT A NON-TRAUMA CENTER

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Introduction: Protocols for triage, stabilization and transfer for trauma-related injuries to tertiary centers have been long established with known survival benefits. Subsequently, residency training and the operative volume at non-tertiary centers are impacted across all surgical specialties. Covering a large portion of craniomaxillofacial trauma at most institutions, the operative experience for plastic surgery residents is fundamental for their development of adequate technical skills. The Department of Plastic Surgery at the Cleveland Clinic Main Campus, a non-tertiary center, developed a cadaver-based, facial trauma simulation course to better educate residents on management of craniomaxillofacial fractures. This study aims to depict the educational value of this course in lieu of 3D biomodel alternatives.

Methods: In a prospective survey study, data were collected during a resident physician trauma simulation course. Over a one-day lecture and wet lab funded by a Stryker educational grant, fresh frozen cadaver models were fractured with osteotome and repaired by resident groups that were randomized to mix experience levels. Eleven plastic surgery residents completed pre and post questionnaires, assessing comfortability level with facial fracture management (range 1-10, with 10 as most), rating their overall exposure to facial fractures during residency and rating their repair based on exposure, reduction and internal fixation using mandible and midface plating systems. Six in-service questions covering facial fracture patterns were answered to assess clinical knowledge pre and post course. Attending instructor was present throughout simulation course, providing support through all phases of fracture repair, and a debriefing was organized with each group to provide appropriate feedback.

Results: The residents viewed their exposure to facial fractures overall as limited during residency. Post-course questionnaire results showed that 100% of residents had a comfort level above 5, compared to only 40% before the course. Improvements in comfort level with technical skill of exposure, reduction and fixation were noted. Similar results were obtained on in-service questionnaire scores, improving from 50% of residents scoring above 50% to 90% scoring above 80%.

Conclusion: Cadaver-based instruction may be of higher value in centers with limited facial trauma exposure. Conducting a facial trauma simulation course increases residents comfort level with management of facial fractures, improving technical skill and clinical knowledge.

Notes

#21

RACIAL DIFFERENCES IN EVALUATION AND MANAGEMENT IN PATIENTS WITH NON-SYNDROMIC CRANIOSYNOSTOSIS

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Introduction: Craniosynostosis is a pathologic craniofacial condition resulting from the premature fusion of an infant's skull bones. Prompt recognition, accurate diagnosis, and subsequent referral for management is critical to avoiding potential sequelae, including intracranial hypertension (ICH), vision disturbance or blindness, airway compromise, abnormal speech and hearing, and developmental delay. Current literature suggests racial disparities exist in the diagnostic approach and outcomes of craniosynostosis surgery. This study examines socioeconomic and racial disparities that specifically exist in the early management and referral of pediatric patients with craniosynostosis. Elucidating these initial disparities, whether in referral, subspecialist evaluation, or diagnosis, can help the healthcare community better manage these patients in the future.

Methods: A retrospective chart review of patients with craniosynostosis who were evaluated between 2012 and 2017 within the Division of Pediatric Plastic Surgery at a tertiary pediatric hospital was performed. Patient demographic factors, clinical history and radiologic data were recorded. Outcomes assessed include age at diagnostic imaging scan and age at definitive treatment. Statistical analysis was performed to analyze differences observed in Black or African-American patients compared to Caucasian patients.

Results: A total of 218 patients were included, with 99 identifying as Black or African-American and 119 Caucasian. There was a statistically significant difference in mean age at diagnostic head CT between Caucasian and Black or African-American patients, 2.09 years versus 4.02 years, respectively ($p=0.011$). For the Black or African-American patients that went on to receive surgical intervention (n=24, 24%), the mean age at the time of surgery was 2.51 years and mean age at time of diagnostic head CT was 2.64 years.

For Caucasian patients, mean age at first diagnostic CT was 2.09 years and mean age at first surgery was 2.67 years. No significant difference was detected in average age at surgical intervention between the two cohorts (p=0.847).

Conclusions: Systematic barriers to diagnosis and health-care access exist in this population. Diagnostic imaging, specifically computed tomography, is a critical component of the evaluation of patients with non-syndromic craniosynostosis. Our data suggests those who required surgery for more severe craniosynostosis symptoms are evaluated and treated earlier, while less severe patients are evaluated later than the national averages. Studies elucidating the relationship and timing between referral to and evaluation by a specialist, diagnostic imaging, and access to surgical intervention are needed to understand how socio-economic barriers affect outcomes of patients with craniosynostosis.

Notes

#22

FEASIBILITY OF UTILIZING A SOCIAL MEDIA PLATFORM TO IMPROVE SURGICAL EDUCATION IN SUB-SAHARAN AFRICA

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Introduction: Residency training by the West African College of Surgeons (WACS) and College of Surgeons of East, Central and Southern Africa (COSECSA) is central to surgical capacity building in Sub-Saharan Africa. However, this effort has been fraught with low pass rates in fellowship examinations (WACS, < 40%), partly due to inadequate training resources and poor preparation of candidates.

Objective: To test the feasibility of developing an educational intervention consisting of case discussions in a social media platform with the overall goal of improving success rates in the fellowship examinations.

Methods: We created a discussion group on the social media platform, Telegram, for residents and faculty surgeons across Sub-Saharan Africa. Faculty-led case discussions were conducted twice weekly on the platform, based on WACS and COSECSA curriculum. Quizzes were constructed by researchers and surgery faculty at a large academic medical center, creating a large question bank spanning numerous surgical subject domains. Quizzes were administered via the Research Electronic Data Capture (REDCap) system, a secure, web-based application designed to support data capture for research studies. Surveys assessing the perception of the quizzes were administered at varying intervals, with the last administered after the final quiz.

Results: The Telegram group attained 952 study-consenting members from 13 countries. Word of mouth between co-trainees seemed to be the most effective means of spreading awareness of the forum, as most participants discovered the group through co-trainees (65.8%). The majority of participating trainees were pursuing a career in General Surgery (40.7%), followed by Orthopedics (17.9%), and Urology (10.6%).

Most participants were actively preparing for a fellowship examination within 6 months (38.4%) or 6-12 months (23.6%) at the time they joined the study. There were 266 respondents to the final survey. Of these, 85.7% either agreed (41%) or strongly agreed (44.7%) that the quizzes were a valuable study tool, and 77.7% felt that the forum discussion based on quizzes was useful. Forty-three percent believed the frequency of quizzes should be increased, while 56.4% thought the frequency was just right. Of those that had completed their respective examination, 83.9% either agreed (40.9%) or strongly agreed (43%) that the quizzes prepared them for the exam.

Conclusion: We have demonstrated the feasibility of using social media platforms to improve dissemination and uptake of educational materials among surgical trainees in Sub-Saharan Africa. Further research is required to objectively ascertain the impact of this pilot program on candidate preparedness and pass rates in the WACS fellowship examinations.

Notes

#23

DOES HOSPITAL-BASED YOUTH MENTORING AND HEALTHCARE EXPOSURE PROGRAMS IMPROVE THE CONFIDENCE OF HIGH SCHOOL STUDENTS INTERESTED IN PURSUING HEALTHCARE CAREERS?

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Introduction: Given the changing landscape of medicine, it is essential for academic medical centers to continue to evolve as it relates to the development of a diverse healthcare workforce. It has been shown that underrepresented minorities (URMs) enroll in healthcare and/or Science, Technology, Engineering and Mathematics (STEM) related majors at a lower rate than other ethnic groups, and have a higher rate of changing to non-STEM degree programs. The exact reason for this phenomenon remains largely unknown, but one component may be related to their self-confidence. We hypothesize that structured, hospital-based youth mentoring and medical exposure programs positively influence high school students' confidence in their ability to succeed in their healthcare career pursuits.

Methods: A pre- and post-program exposure 10-point survey of a Hospital-Based Youth Mentoring and Medical Exposure Program was performed between September 2016 and December 2017. The results of 56 high school student participants were summarized. The success product was generated by multiplying their belief in future success by their principal healthcare career choice. Student T-test and One-way ANOVA were used to analyze the data. The study was approved by the Institutional Review Board.

Results (*see Table*): Of the 56 students, 42 (75%) were female and 14 were male; 53 (95%) of the students were African American and 3 were Caucasian. Participants' confidence in their ability to be successful in their chosen healthcare field increased by 13% to 86% post-intervention versus 73% pre-program (p value = 0.0003).

Table
Results of Pre-Intervention and Post-Intervention Survey Showing Impact of Hospital-Based Youth Mentoring and Medical Exposure Program on Healthcare Career Choice and Confidence in Future Success of Student Participants

Healthcare Career Category Surveyed	Pre-Intervention Mean	Post-Intervention Mean	p value
Surgery	6.411	7.411	0.0171
Primary Care	7.25	6.732	0.2074
Emergency Medicine	6.625	6.714	0.8265
Neurology	5.429	3.821	0.0007
OB/GYN	6.643	6.143	0.3404
Non-Physician HCP	4.196	4.607	0.4096
Clinical Res/Basic Scientist	4.714	4.25	0.3607
HC as MD	8.446	9.036	0.0394
Success in Field of Healthcare	9.232	9.464	0.3046
Confidence in Future HC Career Success	73.2	86.98	0.0003

Conclusions: Participation in hospital-based, multidisciplinary youth mentoring programs positively influences the confidence of aspiring high school students' ability to be successful in their healthcare career pursuits. By eliminating this barrier to attainment of careers in the field of medicine, similar programs may improve enrollment of URMs in healthcare professions and advance diversity to help achieve health equity.

NOTES

#24

UNDER-REPRESENTED MINORITY STATUS IS A RISK FACTOR FOR AXILLARY RECURRENCE FOLLOWING RESECTION FOR BREAST CANCER IN HCV NON-INFECTED RECIPIENTS

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Introduction: Under-represented minorities (URMs) have poorer breast cancer outcomes when compared to European American counterparts due to multiple factors such as higher incidence of more aggressive disease and adverse social determinants of health. We chose to explore this divergence in patients with axillary recurrence. Risk factors for axillary recurrence were examined in the context of health disparities among URMs.

Methods: A retrospective review from a single institution between 2009-2019 was conducted to identify all women with axillary recurrence following resection of their primary tumor. Surgical management of the axilla, radiation, systemic therapy, race, and pathologic characteristics of the tumor were examined. A T-test and Fisher's exact statistical analysis were used to compare the two groups.

Results: A total of 51 patients with axillary recurrence were identified with a median follow-up of 85 months. Fourteen were excluded due to incomplete records. An additional 11 patients were excluded due to simultaneous axillary and distant disease recurrence. Of the remaining 27 patients, a disproportionate 61% were URMs (8 black, 5 Caribbean, 1 Hispanic/Latino, and 2 South American women) and 33% were white. During the same period of time 62% of the patients at this institution treated for breast cancer were white, and 22% were URMs. Among those with recurrence, there was no difference in receptor status between URMs vs. white women. URMs were younger at age of primary resection, 49.5 years vs. 66 years (p value 0.01). URMs were more likely to have incomplete or interrupted chemoradiation and endocrine therapy (p= 0.04).

Barriers to completing adjuvant therapy included disruption in insurance coverage (1), desire for pregnancy (2), and alcohol abuse (1) in the URM group. There was no difference in time to recurrence, 61 months vs. 41 months in URMs and white women, respectively (p=0.11).

Conclusion: Axillary recurrence occurred more often in under-represented minorities. Earlier age of onset and lack of completion of recommended therapy may contribute to this outcome.

NOTES

#25

COMPARISON OF NEBULIZED KETAMINE AT THREE DIFFERENT DOSES FOR ACUTE AND CHRONIC PAIN IN THE ED

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Introduction: A nebulized route of administration of ketamine has been shown to be effective in relieving post-operative sore throat. Currently, there are no clinical trials evaluating the role of nebulized ketamine in managing pain in the ED.

Objective: To compare the analgesic efficacy and rate of adverse effects of nebulized ketamine given at three different doses (0.75 mg/kg, 1 mg/kg and 1.5 mg/kg) for ED patients with acute pain.

Methods: A double-blind study of patients age 18 with moderate to severe pain (NRS5) were randomized to 3 dosing regimens: 0.75, 1 or 1.5 mg/kg dose. Primary outcome included reduction in pain on numeric rating scale (NRS) at 30 min. Secondary outcome included rate of adverse events in each group. ANOVA and 2 test were used for data analysis.

Results: To date, 60 out of 120 patients are enrolled (20 in each group). Mean NRS pain scores at baseline are 8.9, 8.5, and 8.5 (p=0.572), and at 30 min are 4.9, 3.7, 4.5 (p=0.400). The difference in mean NRS pain scores at 30 min between 0.75 mg/kg and 1 mg/kg recipients is -0.90 (95% CI: -2.8 to 1.0); between 0.75 mg/kg and 1.5 mg/kg recipients -0.10 (95% CI: -1.7 to 1.5); and between 1 mg/kg and 1.5 mg/kg recipients is 0.80 (-1.1 to 2.7). Reduction in mean NRS pain scores is statistically significant from baseline to 30 min in all groups: 4.0 (95% CI: 2.8 to 5.1); 4.9 (95% CI: 3.3 to 6.4) and 4.1 (95% CI: 2.9 to 5.2). No serious adverse events occurred in either group.

Conclusion: Recipients of nebulized ketamine at 0.75, 1 and 1.5 mg/kg doses reported statistically significant pain relief from baseline to 30 min. The reduction in NRS pain was largest at the 1.0 mg/kg dose, yet this was not statistically significant when compared to patients receiving 0.75 or 1.5 mg/kg. The nebulized route of ketamine administration is a viable modality for pain management in the ED.

#26

CAN YOU FEEL IT? USE OF GRAPHIC ART VISUAL MEDIA TO ASSESS EMOTIONAL RESPONSE TO STOP THE BLEED TRAINING

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Introduction: Stop the Bleed training as part of the national American College of Surgeons campaign has been shown to effectively teach bleeding control skills and improve participants' self-reported preparedness to stop bleeding. However, the emotional impact of bleeding control training has not been well studied. For those living in communities with high levels of violence, such training may seem futile. We hypothesized that bleeding control training would change participants' emotional response to bleeding.

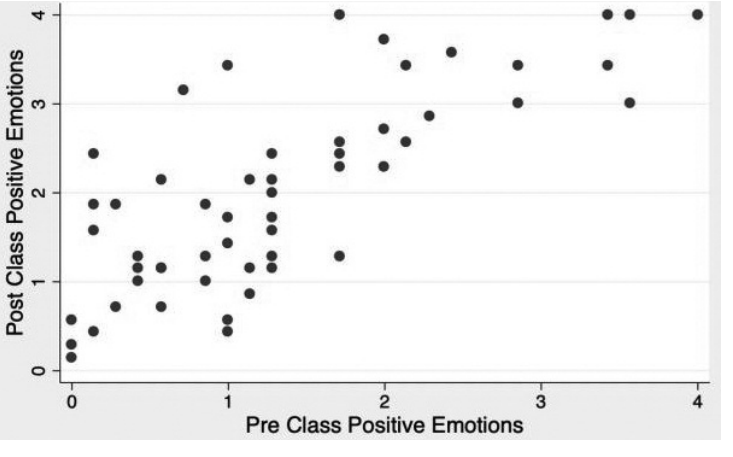
Methods: As part of our Stop the Bleed class, we created a 3-minute graphic art video utilizing illustrations that depict a scenario of serious bleeding. Prior to beginning the class, participants were shown the video of bleeding without hemorrhage control and asked how much they identified with 15 emotions on a scale of 0 not at all to 4 extremely. Following the bleeding control class, participants were then shown a video of the same scenario with utilization of bleeding control techniques and given the same emotional appraisal survey. Composite positive and negative emotion scores were created from the sum of the individual emotional responses and normalized. Responses were compared using paired t-tests.

Results: 60 Stop the Bleed class participants filled out a survey in response to the video representing a range of prior trauma first aid training and violence exposure. After taking the class, participants identified significantly less with being worried, fearful, anxious, angry, sad, and disgusted (*Table 1*). They identified significantly more with being confident, hopeful, eager, pleased, happy and relieved. The greatest change was seen in being confident; median rating pre-class of 1 a little bit confident compared to median post-class rating of 3 very much confident. Almost all respondents (50/54) had an increase in the composite positive emotion score (*Figure 1*).

Table 1: Self-identified Emotions Before and After Trauma First Aid Training

VARIABLE	BEFORE MEAN	BEFORE STANDARD DEVIATION	AFTER MEAN	AFTER STANDARD DEVIATION	P-VALUE
WORRIED	2.64	1.31	1.91	1.13	0.0003
FEARFUL	2.35	1.35	1.56	1.12	0.0001
ANXIOUS	2.53	1.26	1.62	0.97	<0.0001
CONFIDENT	1.26	1.23	2.78	0.86	<0.0001
HOPEFUL	1.95	1.24	2.69	1.18	<0.0001
EAGER	1.65	1.48	2.09	1.48	0.0076
ANGRY	1.50	1.37	1.11	1.21	0.0182
SAD	2.11	1.37	1.45	1.27	0.0001
DISAPPOINTED	1.33	1.30	0.94	1.12	0.0373
GUILTY	0.78	0.96	0.48	0.91	0.0623
DISGUSTED	1.27	1.25	0.75	1.08	0.0022
EXHILARATED	1.04	1.35	1.11	1.30	0.6506
PLEASED	1.11	1.45	1.65	1.59	0.0040
HAPPY	1.07	1.51	1.55	1.54	0.0006
RELIEVED	1.35	1.61	2.07	1.50	0.0005

Figure 1: Impact of Trauma First Aid Training on Emotional Response to a Bleeding Scenario



Conclusion: The use of graphic art visual media provokes an emotional response in participants of Stop the Bleed classes, which changes after bleeding control techniques are learned. More participants had a positive emotional response to a bleeding scenario after receiving bleeding control training, which suggests empowerment. Addition of this video may augment readiness to learn in participants as well as encouraging a more hopeful outlook on the potential outcome of personal violence.

#27

THE EFFECTS OF A SURGERY RESIDENT LEADERSHIP CURRICULUM ON RESIDENT SELF-ASSESSMENT

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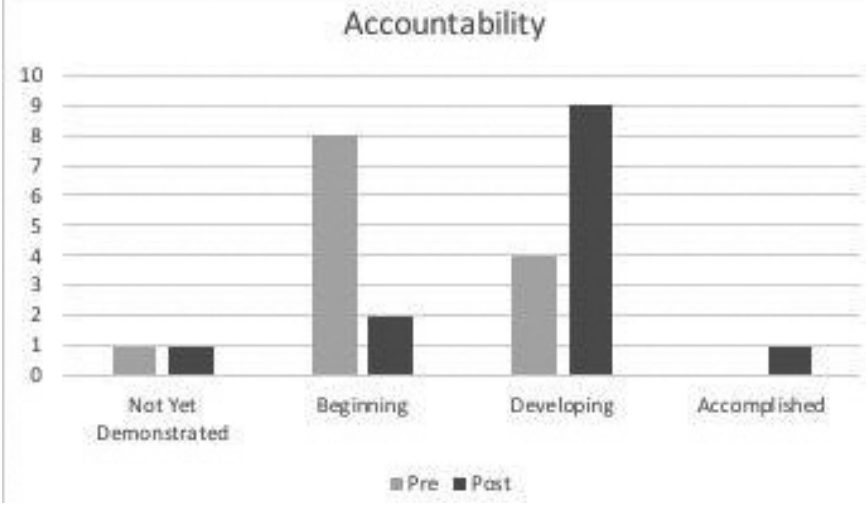
Introduction: Residents begin their roles as leaders from the start of residency. Without formal leadership training, poor leadership qualities may be established without the insight provided by formal leadership training. We hypothesized that resident self-assessed leadership skills would improve with the implementation of a leadership skills curriculum.

Methods: We conducted a cross-sectional study of first and second-year general surgery residents at a large academic tertiary care hospital. Residents underwent a leadership training course and were administered identical surveys before and after completion of the course assessing their view of their own leadership skills. The self-assessment of leadership skills was adapted from the NCHL Healthcare Leadership Competency model and focused on four domains: self-development, organizational awareness and collaboration, accountability, and talent development. Respondents rated their own perceived competency in each category as not yet demonstrated, beginning, developing, accomplished, or exemplary. Residents then underwent three leadership training sessions: (1) the science of leadership, organizational awareness, and collaboration; (2) DiSC personality profile assessment to gain insight on their own motivations and behavior styles; and (3) talent development by practicing coaching techniques in small groups. Participants with missing data were excluded. IRB was attained and approved prior to beginning this study. Paired t-test statistics were used to describe changes in self-perception.

Results (*see Figure*): 13 residents in their first and second year of general surgery residency completed the survey and curriculum. The majority of the residents were PGY1 (n=8) and 54% were female.

An increase in all competency domains of the self-assessment post-test ratings were observed compared to pre-test ratings. We observed a significant improvement in self-assessed accountability (p=0.03).

Figure
Self-Assessed Accountability of Residents Before and After Participation in Formal Leadership Training



Conclusion: The broad increase in self-assessed leadership ratings indicated that the residents had a positive experience in the leadership curriculum. This highlights the benefits of formalized leadership training with resident training.

NOTES

#28

THE ROLE OF CONCUSSION AVOIDANCE TRAINING AND NECK STRENGTHENING IN REDUCING IMPACT-INDUCED HEAD ACCELERATIONS: A PILOT STUDY

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Introduction: Approximately 1.6-3.8 million concussions occur every year. Concussions are a form of mild traumatic brain injury (TBI) characterized by inertial forces of the brain within the skull. Specifically, rotational acceleration can induce shear deformation and diffuse axonal injury. It is a clinically diagnosed condition, as there are no specific imaging parameters in place. Given the ambiguity in the diagnosis and treatment as well as the potential serious long-term sequelae, establishing evidence-based methods of concussion prevention is imperative. Several studies have established the correlation between increased neck strength and neck stiffness at the time of impact, and fewer concussions. It stands to reason that if head motion is restricted to prevent rotation, the occurrence of concussive injury would decrease. We devised a Concussion Avoidance Training (CAT) utilizing Pavlovian motor training in order to reduce impact-induced head rotation while playing football.

Objective: To evaluate the force of impact-induced head rotation after conditioning athletes to respond to impact with increased neck stiffness.

Methods: This was a non-randomized controlled study to determine the effectiveness of CAT and neck strengthening. Players underwent CAT after a control period of 4 weeks, wearing the CUE Sport Sensor (Athlete Intelligence, Kirkland WA) during the control period and during the 4 weeks following CAT. Training was done by the players on their own time after a formal training session. Neck strengthening exercises were also demonstrated at the session for players to perform on their own time. The sensors were worn during the games and during practice. The G force of hits was measured by the sensors, downloaded, and recorded into a chart for analysis. The players were interviewed at the end of training to evaluate compliance.

Results: Out of 30 semipro players, 10 agreed to participate following IRB approval and consent. Athletes were less likely to incur a force above 40Gs following CAT training ($p < .01$).

Conclusion: Our study suggests a potential role for CAT in reducing impact-induced head rotation. This pilot study had many obstacles including a small study size, compliance difficulties, and not having complete medical data (e.g., concussions). The results suggest a randomized controlled trial should be undertaken with a devoted organization and training staff ensuring compliance, symptom checks, and regular balance and cognitive testing to document concussive events.

Notes

#29

PRESCRIBING FOR PAIN: WHAT MEDICAL STUDENTS LEARN AND WHERE THEY LEARN IT

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Introduction: The misuse of, and addiction to, opioids is a worsening national crisis that has long-term effects on public health as well as social and economic welfare. With this growing incidence, physicians have a significant role to play in preventing misuse and abuse. However, there is an unclear understanding of when such education occurs.

Objective: The purpose of this study is to understand how medical students and residents are educated on prescription pain management and addiction, assess how confident they are in treating patients with pain and addiction, and document their ideas on how to improve education for pain management and addiction. The results of this study will be used to improve the quality of education that medical students and providers receive about pain management and addiction.

Methods: We performed a qualitative study with medical student focus groups. We recruited one group of 8-10 first- and second-year medical students and one group of 8-10 third- and fourth-year medical students from each of the five partnering medical schools in Philadelphia. All sessions were audio-recorded, transcribed, with names and other identifiable information removed, and analyzed for themes using an inductive content analysis approach.

Results: The following themes were identified from the focus group transcripts: 1) the role of physicians in opioid crisis, 2) the impact of friends/family suffering from addiction, 3) impact of the current crisis on their future practice, 4) lack of practical engagement in the current medical school curriculum, and concerns over their lack of knowledge about how to care for patients with a co-existing history of drug use/misuse.

The confidence rating for how students felt they would manage patient care issues related to the use of these drugs and pain treatment given their knowledge at the time was higher among 3rd and 4th year students (with a median score of 4) compared to 1st and 2nd year students (with a median score of 1.75).

Conclusion: Medical students are very concerned about their lack of understanding around managing patients who misuse and abuse drugs. There appears to be a significant disconnect between the education being provided and the information being retained. This may be because most of the students preferred to learn the material in a more practical and engaged manner as opposed to the current lecture-based formats. Future recommendations include an increase of hands-on experiences for students by medical schools, which will provide real-world examples to recall in the future.

Notes

#30

BREAST REDUCTION ASSESSMENT: AESTHETIC SHAPE OUTCOMES OF REDUCTION MAMMOPLASTY SURGERY

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Introduction: Reduction mammoplasty or breast reduction surgery is a procedure that results in functional, psychological and aesthetic benefits. A quality aesthetic outcome is defined by improved breast shape, size, and proper nipple relocation with minimal scaring. Postoperative complications include poor scars, unsatisfactory breast shape, dissatisfaction with size and asymmetry. Scars are often cited as the most concerning complication. Therefore, many of the techniques for reduction mammoplasty have focused on minimizing scar. However, breast shape is also very important for optimal aesthetic outcome. We aim to determine how reduction techniques affect breast shape.

Methods: A retrospective chart review from a single senior author's cohort of breast reduction patients from 2010 to 2015 was performed. Twenty-four patients were included in the study with the following reduction pattern/pedicle combinations: inverted T technique with inferior pedicle (ITI), inverted T technique with medial pedicle (ITM), vertical technique with superior medial pedicle (V) and apron technique with inferior pedicle (A). Photographs of patients were digitally modified to mask scar type in three views. Photographs were then reviewed, in a blinded fashion, by five board certified plastic and reconstructive surgeons. A numeric value assigned to each category was used for data analysis to determine significance based on a shape assessment tool questionnaire.

Results: Of 24 breast reduction patients, the overall breast appearance with V and A techniques had a significant lower percentage of appearance as Good or Excellent as compared with ITI or ITM ($p=0.0203$). The V technique resulted in a greater percentage of Poor or Unacceptable scores as compared to the cohort for overall body harmony ($p=0.0327$).

The V and A techniques had a significant lower percentage of Good or Excellent scores as compared to ITI or ITM for overall breast shape ($p=0.0082$). The A and ITM techniques were found to have significantly different ratings for post-operative breast size based on ideal size ($p= 0.0041$). The V technique also was shown to have discrepancy in ideal breast position ($p=0.0395$) as well as nipple areolar complex (NAC) position ($p=0.0018$) as compared to the other techniques.

Conclusions: The V reduction pattern was associated with lower scores in regards to general breast appearance, overall body harmony, overall breast shape, and both breast and NAC position based on surgeon aesthetic selection. The A technique also was shown to have lower scores for overall breast appearance, breast shape and breast size. We conclude from this study that ITI and ITM had equivalent outcomes for shape and size when compared with one another. Both inverted T techniques had superior results when compared with V and A techniques. Based on the finding of this study, surgeons should critically assess their own post-operative results for various type of reduction patterns to determine which style achieves the most harmonious breast shape. This will allow for better surgeon/patient decision making in regards to breast reduction pattern choice.

Notes

#31

INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM ASSOCIATED WITH PERITONEAL METASTASES: A CASE REPORT AND REVIEW OF LITERATURE

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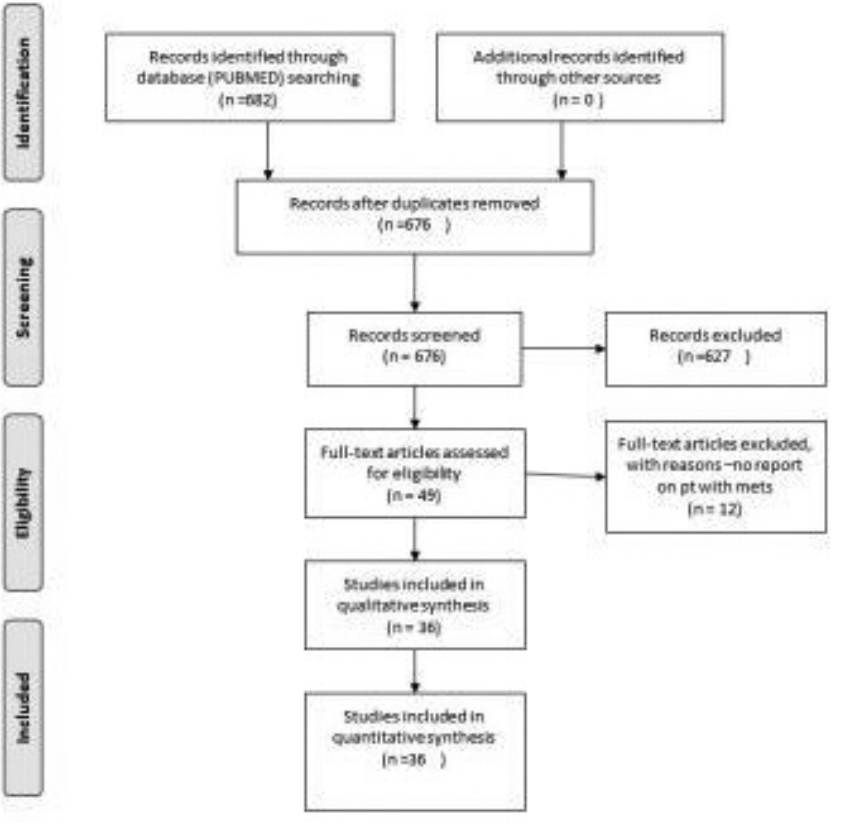
Introduction: Peritoneal metastases associated with Intraductal Papillary Mucinous Neoplasms (IPMNs) are rare and have poor prognosis. This has severely limited our understanding of the epidemiology of this disease process. One such rare case was recently evaluated at our institution and we present it here. Furthermore, we performed a scoping review to characterize the landscape of literature on this phenomenon.

Methods: PUBMED was queried for all literature published up to October 2019 with the following terms: IPMN AND Recurrence (362 hits), IPMN AND Metastatic pancreatic cancer (243 hits), IPMN AND Peritoneal carcinomatosis (35 hits), IPMN AND Peritoneum (15 hits), IPMN AND Peritoneal metastases (15 hits), IPMN AND Pseudomyxoma (12 hits). 36 articles met inclusion criteria, i.e., English articles, with report of number of patients with peritoneal metastases in the setting of IPMN, and in the absence of pancreatic ductal adenocarcinoma, or a history of malignancies other type. We extracted information about: study (location, study type etc.), patient (age, sex etc.), and tumor characteristics (histology, duct type, margin status, etc.).

Results: There were 3,634 patients with IPMN across all 36 articles that fit inclusion criteria. 127 (3%) patients had either pseudomyxoma peritonei (n=8), or peritoneal carcinomatosis (n=119). 76% of patients were male (26/34), 79% were 60 (27/33), 70% had invasive carcinoma on surgical pathology (52/74) while 23% (17/74) had noninvasive histology; average interval time from surgery to discovery of peritoneal metastases was 19.2 months (2.9-63 months; n=26); interval time from discovery of metastases to death was 10.1 months (3-37 months; n=13).

Figure
PRISMA Article Selection Flow Diagram



Conclusion: Peritoneal metastases from IPMN are more common in patients with male gender, age 60, and those with invasive histology. Interestingly, peritoneal metastases may also be observed in IPMN with benign histology. This report is an important addition to the ongoing debate on the appropriate surveillance monitoring for noninvasive IPMN.

#32

TUMOR MARKERS AS PREDICTORS OF DISEASE PROGRESSION IN COLORECTAL PERITONEAL CARCINOMATOSIS TREATED WITH CYTO-REDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: AN ANALYSIS FROM THE US HIPEC COLLABORATIVE

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Introduction: Patients with colorectal peritoneal carcinomatosis (CRPC) are increasingly treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC), as there is improved survival compared with systemic therapy alone. Unfortunately, data defining preoperative risk factors for poor oncologic outcomes after aggressive surgical intervention are limited. We therefore sought to determine the prognostic value of preoperative CEA, CA125, and CA19-9 on disease progression or recurrence after CRS/HIPEC.

Methods: Patients with CRPC treated with curative intent CRS/HIPEC from 12 participating sites in the United States from 2000-2017 were identified. Progression-free survival (PFS), defined as progression or recurrence of disease, was the primary outcome.

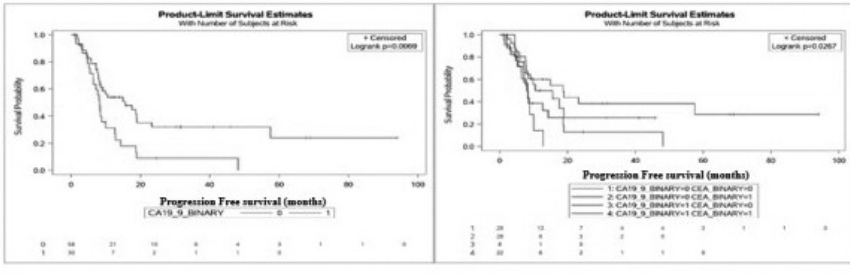
Results: In 279 patients who met inclusion criteria, the mean age was 53.5 years (+/- 12), the median PCI was 11 (IQR 11), and the rate of disease progression was 63.8%. Elevated CA 19-9 was associated with dismal PFS at two years [8.9%: elevated vs. 30%: normal; p=0.007]. There was no statistically significant association between PFS and either elevated CEA or elevated CA 125. All patients with concurrent elevation of CEA and CA 19-9 had experienced progression of their disease within two years. In 113 patients who underwent CRS/HIPEC without prior neoadjuvant therapy (NAT), CA19-9 emerged as the sole independent predictor of worse PFS [HR 2.88 p=0.048]. No association between tumor markers and PFS was noted in the NAT + CRS/HIPEC subgroup.

Table
Predictors of Progression-Free Survival

Univariate and Multivariate Predictors of PFS, CRS/HIPEC only vs. NAT+ CRS/HIPEC

	CRS/HIPEC Only						NAT + CRS/HIPEC					
	Univariate			Multivariate			Univariate			Multivariate		
Clinical Characteristics	HR	95 CI%	P-value	HR	95 CI%	P-value	HR	95 CI%	P-value	HR	95 CI%	P-value
Age (1year increase in age)	0.99	0.98-1.02	0.84	-	-	-	0.99	0.84-1.15	0.88			
Gender Female vs Male	0.7	0.4-1.1	0.12	-	-	-	1.2	0.81-1.74	0.39	-	-	-
Race White vs Other	1.36	0.6-2.9	0.43	-	-	-	0.97	0.63-1.5	0.90		-	-
ASA Class II vs I	2.75	1.1-7.1	0.034	12.6	0.95-168.3	0.055	1.48	0.78-2.8	0.23			
III vs I	**3.98**	1.3-12.3	**0.016**	15.6	0.94-260.1	0.056	1.92	0.79-4.6	0.15			
CEA (binary) Elevated vs NL	1.45	0.9-2.3	0.13				1.16	0.77-1.7	0.45			
Elevated CEA by tertile vs NL												
eCEA1 vs NL	1.19	0.6-2.3	0.62	1.9	0.54-6.7	0.32	1.11	0.65-1.88	0.69			
eCEA2 vs NL	1.35	0.7-2.5	0.33	1.15	0.29-4.5	0.85	1.15	0.71-1.87	0.55			
eCEA3 vs NL	**2.20**	1.1-4.3	**0.022**	0.6	0.11-3.4	0.57	1.26	0.66-2.43	0.48			
CA 19-9 Elevated vs NL	**2.3**	1.1-4.9	**0.034**	**2.88**	1.0-8.23	**0.048**	1.8	0.84-4.15	0.12			
CA 125 Elevated vs NL	1.46	0.6-3.7	0.42				1.78	0.39-8.1	0.44			
PCI (1 unit increase in PCI)	1.06	1.03-1.09	**<0.0001**	1.01	0.95-1.06	0.83	1.02	0.99-1.05	0.083			
CCR 1 vs 0	1.34	0.76-2.39	0.31	-	-	-	1.5	0.88-2.57	0.13			
≥2 vs 0	1.60	0.22-11.8	0.64	-			1.5	0.80-2.87	0.20			
Postoperative Complication Yes vs No	1.73	1.04-2.89	**0.035**	1.2	0.46-2.9	0.75	0.97	0.65-1.45	0.87			

Figure
Progression-Free Survival by Tumor Marker Levels



Conclusion: Elevated CA19-9 is associated with decreased PFS in patients with CRPC. All patients with concurrent elevation of CA19-9 and CEA had disease progression within two years of diagnosis, potentially highlighting a subset with aggressive disease biology. While traditionally CEA is the main tumor marker assessed in colon cancer, we found that CA19-9, in combination with CEA, may inform preoperative risk stratification for poor oncologic outcomes; however, prospective studies are required to confirm this association.

#33

CEA AND CA 19-9 PREDICT DISEASE PROGRESSION IN PERITONEAL CARCINOMATOSIS FROM PRIMARY APPENDICEAL ADENOCARCINOMA: ANALYSIS FROM THE US HIPEC COLLABORATIVE

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Introduction: Prognostication tools relying solely on preoperative clinical factors are lacking in patients undergoing CRS HIPEC. This study aims to determine the value of preoperative CEA and CA19-9 as predictors of disease progression for patients with mucinous appendiceal carcinomatosis (MACA).

Methods: The US HIPEC Collaborative, a database of 2,306 patients with peritoneal carcinomatosis treated with CRS-HIPEC at 12 institutions in the USA between 2007 and 2016, was queried, and patients with MACA treated with curative intent CRS-CIPEC were identified and included in this study. Elevated CEA was broken into tertiles (ex: eCEA1 = elevated CEA tertile 1) to further elucidate the impact of CEA on outcomes.

Results: 409 patients met inclusion criteria. Tumors markers were elevated in 63.19%, 29.65%, and 30.77% with CEA, CA19-9, and CA 125, respectively. In 299 patients who did not receive neoadjuvant therapy (NAT), independent predictors of progression-free survival (PFS) included elevated CA19-9 [HR 2.23 p=0.013], and elevated CEA [eCEA1 (HR 2.86 P = 0.032), eCEA3 (HR 2.96 p = 0.0432)]. While eCEA and eCA 19-9 were individually associated with poor PFS at 5 year [eCEA3 vs nlCEA: (19% vs. 69%) and eCA19-9 vs nl CA19-9: (20% vs. 64%)], concurrent elevation of CEA and CA19-9 bestowed the worse PFS [5YPFS 14% p < 0.0001]. Remarkably, no association between tumor markers levels and PFS was noted in the NAT subcohort.

Table
Univariate and Multivariate Predictors of Progression-Free Survival

	Univariate			Multivariate		
Clinical Characteristics	HR	95 CI%	P-value	HR	95 CI%	P-value
Age						
(1-year increase in age)	0.986	0.974-0.998	0.0205	0.99	0.970-1.012	0.2794
Gender						
Female vs Male	0.967	0.72-1.30	0.9471	-	-	-
Race						
White vs Other	0.863	0.571-1.307	0.487	-	-	-
BMI						
Healthy Weight vs. Overweight	1.294	0.970-1.725	0.0793	1.157	0.709-1.888	0.5594
ASA Class						
II vs I	1.048	0.887-1.603	0.795	1.202	0.532-2.539	0.6451
> III vs I	2.373	1.289-4.291	0.011	2.326	0.732-6.658	0.1343
Symptoms						
Yes vs No	0.990	0.759-1.345	0.9435	-	-	-
Neoadjuvant Chemotherapy						
Yes vs No	2.014	1.187-3.417	0.0094	1.982	1.175-3.342	**0.0094**
CEA (binary)						
Normal vs Elevated	2.343	1.659-3.309	<0.0001			
Elevated CEA by Tertile						
eCEA1 vs NL	2.493	1.639-3.792	<0.0001	2.061	1.102-4.197	**0.0355**
eCEA2 vs NL	1.639	1.201-2.879	0.0054	1.254	0.440-2.329	0.5770
eCEA3 vs NL	2.746	1.821-4.139	<0.0001	2.485	1.305-6.299	0.0252
CA19-9						
Elevated vs Normal	3.069	2.088-4.511	<0.0001	1.978	1.152-3.396	**0.0134**
CA 125						
Elevated vs Normal	1.103	0.730-1.665	0.6424			
PCI						
(1 unit increase in PCI)	1.037	1.020-1.054	<0.0001	1.020	0.984-1.058	0.2745
CCR						
1 vs 0	1.621	1.154-2.279	0.0054	1.224	0.689-2473	0.5379
≥2 vs 0	1.617	1.259-2.765	0.0019	1.017	0.444-2.460	0.9694
Postoperative Complication						
Yes vs No	1.397	1.040-1.879	0.0266	1.230	0.654-2.032	0.4735

Figure
Progression-Free Survival by Tumor Marker Levels

Progression free survival stratified by CA19-9 levels | Progression free survival stratified by CEA levels | Progression free survival stratified by CA19-9CEA and levels

Conclusions: Elevated CEA and CA19-9 demonstrate great potential as markers of disease progression in patients with MACA who have not received NAT, and may have a synergistic impact on PFS. These could be used to guide both risk stratification by the clinical team and informed decision making by patients and caretakers. Further prospective study is required to elucidate this association fully.

#34

BREAST RECONSTRUCTION DISPARITIES IN THE ELDERLY

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Introduction: Breast cancer is the most common cancer in US women and its incidence in women age 70 and older continues to rise. Previous publications have shown breast reconstruction disparities exist; however, this age group is often not included. While the incidence of breast reconstruction increases, it is imperative to examine if reconstruction disparities exist within the elderly population.

Methods: We performed a retrospective review on breast cancer patients age 70 and older who underwent mastectomy in the NCDB patient registry from 2004-2015. Patients with Stage 4 disease, T4 tumors, males, and those without DCIS or non-invasive tumors were excluded. Chi-squared tests were performed to analyze variables.

Results: The cohort consisted of 73,973 patients and 5.8% underwent reconstruction. Of those who underwent reconstruction, 74% had unilateral reconstruction and 26% had bilateral reconstruction. Data on type of reconstruction was available in 82% of patients, of whom 36% had tissue reconstruction, 49% had implant-based reconstruction, and 15% had combined tissue-implant reconstruction.

Race and insurance type were significantly associated if patients underwent reconstruction, and type of reconstruction. Race was significantly associated if patients underwent unilateral or bilateral reconstruction, insurance type was not. Non-white females, and those uninsured or with government issued insurance, were significantly less likely to undergo reconstruction. When patients received reconstruction, non-white women were more likely to receive tissue-based reconstruction, and those with government provided insurance were more likely to receive implant-based reconstruction (*see Table*).

Examined Variables		No Reconstruction n=62,421 (93.2%)	Reconstruction n=4,552 (5.8%)	p value
Race				<0.0001
	White	59,909	4,052	
	Black	6,686	345	
	Other	2,826	155	
Insurance Status				<0.0001
	Not Insured	318	9	
	Private Insurance	6,950	586	
	Government Provided	61,343	3,922	
	Unknown	810	35	

Examined Variables		Unilateral n=3,346(74%)	Bilateral n=1,206 (26%)	
Race				<0.0001
	White	2,925	1,127	
	Black	298	47	
	Other	123	32	
Insurance Status				0.36
	Not Insured	6	3	
	Private Insurance	425	161	
	Government Provided	2,885	1,037	
	Unknown	30	5	

Examined Variables		Tissue-Based n=1,350 (36.2%)	Implant-Based n=1,817(48.0%)	Combined n=565 (15.1%)	
Race					0.0004
	White	1,167	1,660	505	
	Black	121	107	44	
	Other	62	50	16	
Insurance Status					<0.0001
	Not Insured	4	1	68	
	Private Insurance	181	229	492	
	Government Provided	1,154	1,578	5	

Conclusion: Overall, we found that in patients age 70 and older, both race and type of insurance are significant factors that influence breast reconstruction. These findings suggest that a health disparity exists, and further investigation is warranted to eliminate these disparities.

NOTES

#35

DOES TREATMENT SEQUENCE AFFECT OUTCOMES IN PATIENTS WITH METAPLASTIC BREAST CANCER?

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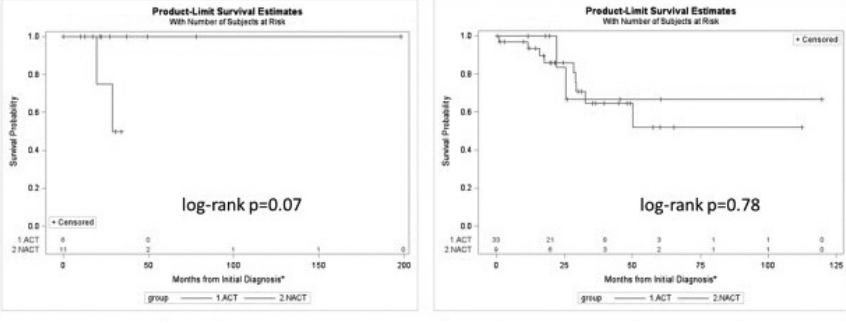
Introduction: Metaplastic breast cancer (MBC) is a rare and aggressive subtype that represents 0.25-1% of breast cancers and is characterized by sarcomatoid histology and hematogenous spread. Often triple-negative and previously believed to be chemoresistant, recent studies have suggested that patients with MBC do, in fact, benefit from chemotherapy as part of a multimodal therapeutic approach. But it is unclear what effect, if any, treatment sequence that is, whether chemotherapy is administered before or after surgery may have on outcomes. Here, we compare the characteristics and outcomes of MBC patients who received neoadjuvant chemotherapy (NACT) versus adjuvant chemotherapy (ACT).

Methods: Women age 18 years old who were diagnosed with stage I-III MBC between 2003 and 2018 and received any oncologic treatment at our comprehensive cancer center were identified. Chi-square and t-tests were used to compare intergroup differences in categorical and continuous variables as appropriate. Overall survival (OS) was defined as time from initial diagnosis to death or last follow-up. Unadjusted OS was estimated with the Kaplan-Meier method; the log-rank test was used to compare survival differences between NACT and ACT recipients, and $p<0.05$ was deemed significant.

Results: Of the 94 patients diagnosed with MBC during our inclusion period, 60 patients received some form of chemotherapy: 20 received NACT and 40 received ACT. Median length of follow-up was 22 months. NACT recipients (median age 46.5 years, IQR 37.5-58) were significantly younger than ACT recipients (median age 61 years, IQR 53-68, $p < 0.001$).

NACT and ACT recipients were otherwise similar with regards to other characteristics including race/ethnicity (% non-Hispanic Black: NACT 35% vs. ACT 25%), biomarker status (% triple-negative: NACT 45% vs. ACT 67.5%), type of breast surgery received (% receiving mastectomy: NACT 35% vs. ACT 47.5%), and rates of radiation receipt (NACT 90% vs. ACT 80%, all p>0.05). There was no significant difference in OS between NACT and ACT recipients (log-rank p=0.15), and this remained true when patients were stratified by age (*Figure*).

Figure
Unadjusted Overall Survival
Metaplastic Breast Cancer Patients, 2003-2018



Conclusions: Although NACT recipients were younger than ACT recipients, there was no difference in unadjusted survival between NACT and ACT recipients among patients with MBC.

NOTES

#36

COST DIFFERENCES IN OPERATIVE AND NON-OPERATIVE MANAGEMENT OF UNCOMPLICATED APPENDICITIS

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Introduction: Laparoscopic appendectomy is currently the standard of care for acute, uncomplicated appendicitis. However, non-operative management (NOM) is emerging as a viable alternative treatment, typically defined as a course of intravenous antibiotics, followed by outpatient oral antibiotics. Success rates of NOM have been reported as between 80-90%, with a 10-20% recurrence rate of appendicitis, and a failure rate of about 10% requiring appendectomy during the index hospitalization. Comparative analysis of laparoscopic appendectomy versus NOM in acute, uncomplicated appendicitis was performed to evaluate for differences in costs, complication rates and re-admission rates between the two treatment modalities.

Methods: Virginia Health Information (VHI) database was used to calculate the average cost of appendectomies statewide for uncomplicated appendicitis between 2008 through 2014. Cost for NOM was estimated from the average daily cost of a hospital admission in the state of Virginia, 3 days of IV Piperacillin/Tazobactam, and CT abdomen/pelvis. Using VHI, the rates of 30-day readmission and mortalities were calculated for the operatively managed patients. Recurrence rate for NOM was extrapolated from published studies.

Results: Utilizing the VHI database, 3465 cases of acute appendicitis were identified between 2008 through 2014. Total charges for operatively managed patients averaged $19,951.17, 95% CI [$19502.32, $20400.02]. Radiology charges averaged $183.00, 95% CI [$167.02, $198.98]. OR charges averaged $6168.08, 95% CI [$6033.85, $6302.31]. 30-day readmission rate was 0.76%, and 30-day mortality rate was 0.06%.

Extrapolated NOM costs included the average daily cost of a hospital admission of $1953 per day, intravenous antibiotic regimen (typically 1-3 days of Piperacillin/Tazobactam at an estimated $12.36 per dose) and cost of CT scan of the abdomen/pelvis of $323.99 for an estimated total inpatient cost of $6331.31.

Conclusions: Operative management of appendicitis is more expensive than NOM, with the bulk of costs associated with the operating room. However, appendectomy has a lower re-admission and failure rate and remains the standard of care for uncomplicated appendicitis. Compared to recent published data for appendectomy, VHI data demonstrated a less frequent 30-day re-admission rate. NOM is becoming a viable treatment option with success reported as 80-90%. NOM is a cost-effective way to manage appendicitis in appropriately selected patients. The risk of recurrence may necessitate future hospitalization or even operation, implying higher overall system costs. Further prospective studies are needed to truly define the optimal management of uncomplicated appendicitis.

Notes

#37

COST AND OUTCOME IMPLICATIONS OF THE TIMING OF TRACHEOSTOMIES AND PERCUTANEOUS GASTROSTOMY TUBES IN STROKE PATIENTS

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Introduction: Tracheostomies and percutaneous endoscopic gastrostomies (PEGs) are commonly performed among patients with debilitating strokes. However, there is no clear standard regarding how early they should be performed. Moreover, it is not clear if there are outcome advantages in performing the two procedures during the same time period when there are indications for both. The aim of this study was to evaluate how relative timing of these procedures was associated with hospital outcomes among stroke patients.

Methods: Patients admitted for ischemic stroke were selected from the National Inpatient Sample, 2005 2014. Those who underwent both tracheostomies and PEGs were identified. Using a cut-off of 7 days, procedures were classified as early or late creating 3 patient categories (both procedures early, one early and one late, both procedures late). Demographic and hospital characteristics were extracted. Outcomes measured were hospital cost, length of stay (LOS), pneumonia rates, mortality, and post-operative complications. Descriptive analyses and multivariate analyses were used in identifying differences between the patient categories.

Results: There were 882,282 patients admitted with ischemic stroke; 5,846 (0.7%) had tracheostomies and 38,412 (4.4%) had PEGs. Among patients who had both tracheostomies and PEGs, 626 (14.3%) had both procedures early, 539 (12.3%) had one early and one late, and 3,222 (73.4%) had both procedures late.

Compared to patients in the both early group, patients who had both procedures late were older (65y vs. 63y, P=0.009) and less likely male (56.6% vs. 62.5%, P=0005). A comparison of the outcomes of the 3 groups is shown in the *Table*. Multivariate analyses of outcomes showed that compared to the both early group, patients in the both late group had longer LOS [12.9d, 95% Confidence Interval (95%CI) 11.3-14.6], higher hospital cost ($15,136, 95%CI 11,553-18,720), higher pneumonia rates (Odds Ratio 1.71, 95%CI 1.41-2.09) but similar mortality (Odds Ratio 1.12, 95%CI 0.81-1.54) and post-operative complications (Odds Ratio 0.99, 95%CI 0.73-1.34). Patients who had one early and one late were similar to the both early group for all outcomes except LOS (7.1d, 95%CI 4.8-9.5).

Table
Comparison of Cost and Outcomes of Patients Across Procedure Timing Categories

	Both Early	One early, One late	Both Late	P-value
Median Hospital Cost, $	51,207	58,696	69,572	0.001
Median Length of Stay, d	16	22	25	0.001
Pneumonia Rates, %	31.5	37.3	42.8	0.001
Mortality, %	8.2	7.1	9.7	0.088
Complications, %	10.4	7.4	10.3	0.113

Conclusion: Patients who have tracheostomies and PEGs late in their hospital course have longer hospital stays, higher hospital costs and pneumonia rates compared to those who undergo these procedures early. These data suggest that in patients where it is likely that they will require these procedures, performing them early could lead to improved outcomes.

#38

DEPENDENT FUNCTIONAL STATUS IS AN INDEPENDENT RISK FACTOR FOR COMPLICATIONS AFTER SURGERY FOR DIVERTICULITIS

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Introduction: Diverticulitis is a common and complex surgical disease that may require protracted non-operative or surgical management. The outcomes after colectomy for diverticulitis in individuals with reduced ability to care for themselves are not defined. The aim of this study is to investigate the influence of functional dependent status on complications after surgery for diverticulitis.

Methods: Functional dependence is a National Surgical Quality Improvement Program (NSQIP) variable that characterizes individuals who require assistance from another person for any activities of daily living (ADLs) as evaluated prospectively within the 30 days prior to surgery. Colectomy for diverticulitis was identified utilizing the NSQIP database from 2012-2018. Demographics and perioperative variables of these patients were compared using univariate and multivariate methods.

Results: A total of 72,963 patients were identified with 1,309 classified as partially or fully dependent status. Functionally dependent patients were significantly older (mean 72 vs. 58 years), more male (54% vs. 69%), had higher ASA class (40% class IV or higher vs. 5%, $P < 0.001$) and were more underweight (BMI < 18.5) (30% vs. 21%, $P < 0.001$). Dependency was significantly associated with more emergent colectomies (46% vs. 15%, $P < 0.001$), more open procedures (62% vs. 27%, $P < 0.001$), longer operative times (153 vs. 117 minutes), as well as higher rates of postoperative complications including urinary tract infection (4.3% vs. 1.8%, $P < 0.001$), reintubation (7.9% vs 1.3%, $P < 0.001$), blood transfusions (30% vs. 6%, $P < 0.001$), prolonged hospital stay (61% vs. 21%, $P < 0.001$), and higher mortality (16% vs. 1%, $P < 0.001$).

Interestingly, the rate of intestinal leak was not different between the groups. On multivariate analysis, controlling for age and comorbid conditions, the odds ratio of mortality (2.1 [95% CI: 1.6-2.7]), prolonged length of stay (1.66 [1.3-2]), and any morbidity (2.3 [1.9-2.8]) remained significantly higher for functionally dependent patients. Likewise, a separate analysis of elective procedures showed higher odds for morbidity (1.7 [1.3-2.3]) and prolonged length of stay (1.5 [1.2-2.1]) among dependent patients.

Conclusion: Dependent functional status is an independent risk factor for complications after both elective and emergent surgery for diverticular disease. This should be carefully considered when counseling patients and directing resources.

Notes

#39

EMERGENCY SURGICAL NEEDS IN THE PEDIATRIC PATIENT: ANALYSIS OF SEVEN YEARS OF NATIONAL DATA

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Introduction: Non-traumatic pediatric surgical emergencies comprise a significant portion of the surgical case-load of pediatric surgeons. Substantial work has been undertaken to understand the burden of emergency surgery among adult patients; however, corresponding studies are lacking in the pediatric population. The objective of this study was to delineate national estimates of surgical outcomes and determine predictors of in-hospital complications and mortality among pediatric emergency surgery patients.

Methods: The Kids Inpatient Database (2006-2012) was queried for pediatric patients (18 years) admitted emergently, who underwent a major surgical intervention within 48h of admission. Primary procedure codes were queried to identify the most common operations. Outcomes, assessed using risk-adjusted logistic regression, included occurrence of a major complication (pneumonia, urinary tract infections, renal failure, cardiac arrest, acute respiratory distress, sepsis/septic shock) and in-hospital mortality. Variations in LOS and index hospital cost were also considered. Multivariable logistic regression analyses for complications and mortality were used to identify risk factors from among the following domains: patient demographics, pediatric surgical risk score, and hospital-level factors.

Results: A total of 244,627 records were included, weighted to represent 378,605 patients nationally. Average age was 9.7(±6.2) years, with a male predominance (58.2%). The majority were White (45.4%), had private insurance (50.2%), and were treated at a teaching hospital (62.7%). Crude rates of mortality and major complications were 0.9% and 3.7%, respectively.

Median index-hospital LOS and cost were 2 (IQR:1-4) days and 8,804 (IQR:5,781-14,938) 2015 USD, with an estimated total national cost, due to pediatric emergency operations, of $1,666,619,210 per year. The most common procedures performed were appendectomies (38.9%), pyloromyotomies (4.7%), and laparoscopic cholecystectomies (2.7%). Younger, minority (non-White), lower-income, and teaching hospital-presenting pediatric patients experienced consistently worse outcomes for both morbidity and mortality ($p < 0.05$) (*Table*).

Table: Patient demographic and hospital-level characteristics influencing outcomes in pediatric acute care surgery

	Mortality	Complications
	Odds Ratios [95% Confidence Interval]	
Age Categories (Reference: 0-1 years)		
13-18 years	0.58 [0.53-0.65]*	0.78 [0.74-0.83]*
Race (Reference: Non-Hispanic White)		
Non-Hispanic Black	1.37 [1.20-1.56]*	1.23 [1.15-1.32]*
Insurance Status (Reference: Private)		
Government (Medicaid)	1.01 [0.91-1.11]	1.10 [1.05-1.15]*
Uninsured	1.82 [1.54-2.16]*	0.81 [0.97-1.29]
Income (Reference: Lowest Quartile)		
Highest Quartile	0.77 [0.67-0.89]*	0.84 [0.78-0.90]*
Teaching Hospital	2.56 [2.19-2.99]*	1.60 [1.50-1.71]]*
Urban Location	1.87 [1.25-2.81]*	1.13 [0.99-1.28]
Hospital Volume (Reference: Lowest Quartile)		
Highest Quartile	1.45 [0.58-3.5]	0.87 [0.65-1.15]

**Two-sided p-value<0.05; Models were risk-adjusted for variations in categorical age (0-1, 2-5, 6-10, 11-12 and 13-18), sex, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, other, Not reported), insurance (private, government, uninsured), familial income quartile, pediatric surgical risk score, rurality, geographic region (Northeast, Midwest, South and West), teaching status, bed size (small, medium and large), and quartile of emergency procedure volume.*

Conclusion: This study takes an important first step towards benchmarking emergency surgery needs in children, utilizing a nationally-representative sample.

#40

EMERGENCY SURGERY FOR THE NEONATE: FACTORS INFLUENCING SURVIVAL AND OPERATIVE INTERVENTION

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Introduction: Complex surgical issues in neonates often represent a challenge in management due their physiological immaturity and often co-occurring congenital abnormalities. Little work has gone into quantifying the operative disease burden associated with high-risk surgical issues. The aim of this analysis is to determine factors influencing survival and decision for surgical intervention.

Methods: The Kid Inpatient Database (2000-2012) was queried for neonates (age 28 days) with a diagnosis for necrotizing enterocolitis, intestinal atresia, volvulus and gastroschisis. Outcome measures of interest were mortality, cost of index hospitalization (inflation adjusted to 2016 USD) and operative intervention. Multivariable regression models adjusted for demographic parameters (age, sex, race/ethnicity and insurance status), hospital level characteristics (hospital location, teaching status and bed size) and type of diagnosis.

Results: A total of 33,586 neonates were identified, weighted to represent 50,463 admissions nationally. NEC constituted the highest proportion of admissions (50.5%), followed by IA (37.3%), volvulus (10.7%) and gastroschisis (6.8%). Average age was 1.9 (±5.1) days. There was a male predominance (55.3%). Majority of patients were White (36.6) followed by Hispanic (15.7%) and Black (15.0%) patients. Surgery was attempted in 30.1% of patients. Compared to their White counterparts, Black patients were 17% less likely to undergo surgery (OR[95%CI]:0.84[0.78-0.90]). Patients treated at children's hospitals were more likely to undergo surgery (OR[95%CI]:4.80[4.28-5.40]).

Unadjusted mortality rate was 8.9%. Black patients were 18% more likely to die. Mortality was higher in patients presenting to children's hospitals and teaching hospitals. Mean cost of index hospitalization was $91,760 (±108,303).

Conclusion: Neonatal surgical emergencies represent a source of significant burden on the healthcare infrastructure. It also represents an area where disparities in care provided to children have not been adequately explored. The results of this study will aid in prioritizing efforts towards optimizing care in the high-risk neonate.

NOTES

#41

DEVELOPMENT OF A LARGE ANIMAL MODEL OF LETHAL POLYTRAUMA AND INTRA-ABDOMINAL SEPSIS WITH BACTEREMIA

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Introduction: Traumatic injuries and sepsis are individually two of the leading causes of death worldwide. When combined, the mortality is greater than 50% especially in the setting of polytrauma. Thus, it is imperative to have a reproducible and reliable animal model to study the effects of multiple traumatic injuries and sepsis on survival and explore novel treatment options. Currently, murine models are commonly used due to their availability and inexpensive maintenance. However, many treatments that have shown promise in mice models have not translated in human trials. Porcine models, while more expensive, have proven to be much more translatable to humans due to the similarities in anatomy and physiological response. We embarked on a study to develop a reproducible and dependable porcine model of lethal polytrauma and intra-abdominal sepsis.

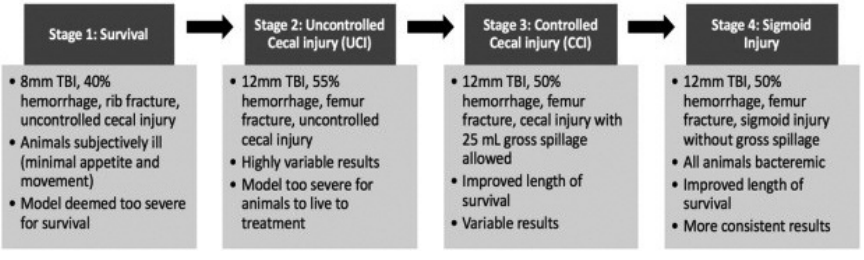
Methods: Our lab has a well-established porcine model of traumatic brain injury (TBI) and hemorrhage that was used as the foundation. We performed a rectus crush injury, long bone fracture, liver laceration and spleen laceration to complete the polytrauma portion of the model. A colon injury was made to introduce intrabdominal sepsis which was confirmed with positive peripheral blood cultures. All animals underwent injuries with a period of shock, followed by resuscitation and simulated prolonged field care, and finally finished with definitive care (source control and antibiotic treatment).

Results: The initial plan was to create a long-term survival model (N=7), but the animals had poor appetite and activity level postoperatively. We shifted to an 8-hour end point.

The polytrauma injury pattern remained constant and the colon injury pattern changed with the intention of creating a model that was ultimately lethal but potentially salvageable with a therapeutic drug.

One group had an uncontrolled cecal injury (UCI, N=4) which resulted in very early deaths. A controlled cecal injury group (CCI, N=4) with 25 mL stool contamination had prolonged time prior to mortality, with one surviving to the endpoint. The sigmoid injury (SI, N=5) produced a similar survival curve to CCI, but no animals surviving to the end point. All animals had blood culture proven sepsis.

Figure
Stages of Model Development



Conclusion: We have described a porcine model of polytrauma and sepsis that is reproducible and may be used to investigate novel treatments for trauma and sepsis.

NOTES

#42

EFFECT OF A PROLYL HYDROXYLASE INHIBITOR ON CARBON TETRACHLORIDE-INDUCED KIDNEY FIBROSIS

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Introduction: Chronic kidney disease is a condition increasing in prevalence that carries significant morbidity and mortality. Fibrosis is a common underlying factor for kidney disease and there are no current in vivo therapies that halt its progression. Studies focused on reducing renal fibrosis have largely focused on stem cell therapy and bone morphogenetic proteins. Our study offers a novel approach with the use of 1,4-dihydrophenonthrolin-4-one-3-Carboxylic acid (1,4-DPCA). The drug acts as an inhibitor of prolyl hydroxylase (PHD) and has potential usage in controlling excess collagen deposition in pathological fibrosis. By inducing fibrosis with carbon tetrachloride, a well-known toxicant which induces tissue damage via oxidative stress, our study sought to discover if 1,4-DPCA could have a significant impact on improving the subsequent renal fibrosis.

Methods: BALB/c male mice were given CCL4 intraperitoneally 6 times over a three-week period. A set of these mice were also given 1,4 DPCA/hydrogel subcutaneously once at 2 weeks and once at 3 weeks. Five weeks later, kidneys were removed from euthanized mice from which histological slides were made and stained for fibrosis. Images of Trichome-stained sections were captured and processed using Adobe Photoshop CS3 software. Analysis consisted of digitally excising 5 sections from each kidney slide and quantifying fibrosis by comparing the ratio of fibrotic area to the total tissue area across all sections.

Results: Mice given CCL4 alone showed significant fibrosis in both the medulla and the cortex (with a score of 10) compared to control mice injected with PBS (with a score of 3.5). Mice given CCL4 + DPCA showed much reduced fibrosis (with a score of 5) and looked similar to control untreated mice.

Conclusions: These preliminary findings suggest that 1,4-DPCA may play a role in improving pathologic renal fibrosis. There are several possibilities to consider. First, DPCA may block fibrosis from occurring. On the other hand, the more intriguing possibility is that DPCA may have an effect of eliminating preformed fibrotic tissue, perhaps through its remodeling effects. Finally, those two may be functioning together. Experiments are underway to distinguish these possibilities.

Notes

#43

IDENTIFICATION OF CORTISOL-ASSOCIATED GENE EXPRESSION SIGNATURES IN THE OFFSPRING GUT FOLLOWING MATERNAL STRESS DURING GESTATION

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Introduction: Uncontrolled activation of inflammatory cascades by the immature neonatal immune system contributes to the development of many pediatric diseases including necrotizing enterocolitis (NEC) which is characterized by mucosal injury, necrosis, perforation, and microbial dysbiosis. While the mechanism(s) of pathogenesis is unknown, it is believed to have multifactorial causes. Because women in psychologically stressful environments have a higher incidence of adverse birth outcomes, we hypothesized that psychological stress during pregnancy negatively impacts the development of intestinal tissues in offspring. Consistent with this hypothesis, we previously observed shorter villi and a decrease in total surface area in the small intestine of pups derived from dams that were chronically stressed during gestation. In this study, we investigated the molecular changes in the gut following psychological stress.

Methods: To identify differentially expressed genes (DEGs), RNA was isolated from the ileum of 2-week-old mice derived from dams that were either stressed or not stressed during gestation and sequenced at a high-resolution.

Results: In a principal component analysis, unlike females, stressed males clustered separately from controls indicating that the effects of gestational stress are sex-dependent. Gene ontology pathway analysis revealed genes involved in the activation of complement cascade were upregulated in males. To determine if activation of the complement cascade contributed to intestinal injury following stress, we subjected 2-week-old pups derived from stressed and non-stressed dams to mesenteric ischemia followed by reperfusion and found that stressed pups had a higher tissue injury scores compared to controls.

The injury scores in stressed pups were however significantly reduced when complement was depleted prior to the surgery using Cobra venom factor. In addition to Complement, PPAR signaling, mucin type-O glycosylation, and epidermal growth factor receptor signaling genes were also upregulated.

Conclusion: These findings advance our understanding of how gestational stress affects the development and function of the intestine in offspring. Ongoing studies are focused on understanding how activation of the complement cascade in the neonatal gut following maternal stress leads to the development of tissue inflammation and injury.

Notes

#44

SIMULTANEOUS PANCREAS-KIDNEY TRANSPLANT: THE EFFECTS OF EARLY STEROID WITHDRAWAL, DONOR AND RECIPIENT VARIABLES ON PATIENT SURVIVAL

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Introduction: Simultaneous pancreas-kidney transplantation (SPK) improves survival in type I diabetic patients with end-stage renal disease (ESRD). Corticosteroids have traditionally been an integral component of maintenance immunosuppression but are associated with significant side effects. We hypothesize that a phenotype of SPK recipients exists in whom early steroid withdrawal (ESW) is practical and does not compromise graft or patient survival.

Methods: Patients who underwent SPK between 1998 and 2017 were identified from our institutional database. Information was available for patient and donor demographics. Univariate and multivariable cox proportional hazards models were used to investigate the association between patient survival and factors of interest. Data were analyzed using intent-to-treat analysis.

Results: We identified 275 SPK of whom 148 (121 treated, 27 intent-to-treat) were classified as ESW. ESW patients were younger (36 vs. 40, p= < 0.001), higher BMI (24.5 vs. 23.4, p=0.022), greater HLA mismatch (4.5 vs. 4.1, p= < 0.001), more likely to experience postop reoperation (26 % vs. 14% p=0.018) and more commonly received SPK from black donors (38% vs 18%, p= < 0.001) than non-ESW patients. In multivariable cox proportional hazard intent-to-treat analysis, we observed no association between pancreas graft loss and ESW (p=0.600). In multivariable analysis of overall patient survival, early ESW regimen exhibited a significant survival benefit [HR (95% CI): 0.33 (0.13-0.83), p=0.019]. There was no significant interaction between race and ESW for either graft loss or patient survival.

Conclusions: In this single-center cohort, patients undergoing SPK with maintenance immunosuppression and ESW demonstrated no difference in graft survival and improved patient survival compared with their non-ESW counterparts. Therefore, a role remains for ESW maintenance immunosuppression among select SPK recipients.

NOTES

#45

HCV VIREMIC KIDNEYS FOR UNINFECTED RECIPIENTS WITH DAA TREATMENT OFFERS SUSTAINED VIROLOGIC RESPONSE

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Introduction: Development of direct acting anti-viral medications (DAA) have offered cure rates for hepatitis C infection (HCV) approaching 100%. This has provided the ability to transplant HCV positive kidneys into noninfected recipients.

Methods: Forty HCV negative patients who received HCV NAT positive kidneys (D+/R-) were age matched to 40 HCV negative patients who received non-infected kidneys (D-/R-). Postoperative complications and graft function were compared. D+/R- patients were monitored postoperatively for development of viremia and subsequently treated with DAAs.

Results: The D-/R- group were age matched to the D+/R- group (64.9 vs. 66.9 years, p=0.02) (*Table 1*). The mean donor age was higher in the D-/R- group (43.3 vs. 35.1, p=0.01). KDPI was comparable in both groups (62.9 vs. 60.9, p=0.54), however removal of HCV status from the KDPI equation unmasked higher KDPI in the D-/R- group (62.9 vs. 37.3, p=0.01). In the D+/R- group 100% of patients develop HCV viremia on a median of POD 2.5 (*Table 2*). The median initial viral load was 876± copies/uL with a median peak viral load of 4.8x10^5 copies/uL on median of POD 7. Median days to viral clearance occurred on POD 58. All patients achieved SVR 12. LOS (7.0 vs. 5.1, p=0.01) and DGF (55 vs. 27.5%, p=0.01) was higher in the D-/R- group. Rates of acute rejection, graft loss and death were comparable in both groups (*Table 1*). GFR was lower in the D-/R- group at 1-, 3- but comparable at 6-months (*Table 1*).

Conclusion: D+/R- transplantation offers patients an alternative strategy to increase access to kidney transplantation. Development of HCV viremia was consistently observed but cleared following DAA treatment.

Table 1: Demographics and Outcomes of Age-Matched Cohort

Demographics	D-/R-	D+/R-	*p-value*
N	40	40	
Recipient Age	64.9 ± 9.5	66.9 ± 8.0	0.32
Gender (%M)	60	70	0.35
ABO n (%)			0.75
A	16 (40)	16 (40)	
AB	1 (2.5)	0	
B	5 (12.5)	4 (10)	
O	18 (45)	20 (50)	
Donor Age	43.3 ± 19.1	35.1 ± 6.9	0.01
KDPI	62.9 ± 22.8	60.9 ± 17.0	0.65
KDPI calc w/o HCV	62.9 ± 22.8	37.3 ± 18.7	0.01
Donor Terminal Creatinine	2.4 ± 2.3	2.6 ± 1.9	0.65
DCD n (%)	8 (20)	10 (25)	0.59
Induction			0.36
Simulect	14 (35)	20 (50)	
Thymo	18 (45)	15 (37.5)	
Thymo/IVIG	8 (20)	5 (12.5)	

Outcomes	D-/R-	D+/R-	*p-value*
LOS (days)	7.0 ± 3.7	5.1 ± 2.4	0.01
DGF n (%)	22 (55)	11 (27.5)	0.01
BPAR	4 (10)	2 (5)	0.4
Death	1 (2.5)	0	0.31
Graft Loss	4 (10)	1 (2.5)	0.17
1 Month Cr	2.0 ± 1.6	1.6 ± 1.2	0.14
3 Month Cr	1.8 ± 1.0	1.3 ± 0.4	0.01
6 Month Cr	1.5 ± 0.7	1.3 ± 0.7	0.26
1 Month GFR	39.6 ± 18.8	51.3 ± 18.7	0.01
3 Month GFR	43.8 ± 17.6	57.7 ± 17.5	0.01
6 Month GFR	48 ± 15.9	55.5 ± 18.4	0.08

Table 2: Viral Kinetics of D+/R- group

D+/R- Viral Kinetics	Median	Mean
Viral Detection (days)	2.5	2.8 ± 2.8
Initial Viral load (copies/uL)	876	4038342 ± 18333993
Viral Load Peak (days)	7.0	8.9 ± 6.3
Peak Viral Load (copies/uL)	483578	8755658 ± 191194556
POD DAA start (days)	10.0	12.6 ± 9.1
Viral Clearance (days)	57.5	57.4 ± 24.3

#46

UTILIZATION OF HIGH TERMINAL CREATININE KIDNEY DONORS FOR SIMULTANEOUS KIDNEY AND PANCREAS TRANSPLANTATION

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Introduction: The use of kidneys with high terminal creatinine has been demonstrated in renal transplantation with excellent outcomes. Here we explore the use of high terminal creatinine donors for simultaneous pancreas-kidney recipients.

Methods: A retrospective, single center study of 54 simultaneous pancreas-kidney (SPK) recipients who received a kidney from a non-AKI donor (n=32) compared to donors with acute kidney injury (AKI) (n=22). AKI was defined as a terminal creatinine level 1.5x greater than the initial admitting creatinine. Post-operative outcomes included length of stay (LOS), delayed graft function (DGF), glomerular filtration rate (GFR), and hemoglobin A1c (HbA1c).

Results (*see Table 1*): There was no difference in recipient age (39.2 vs. 39.4 years, p=0.95) or sex (53 vs. 68% male, p=0.27) in the non-AKI and AKI groups. There was no significant difference in donor age (22.7 vs. 23.8 years, p=0.55). There was no difference in LOS between the non-AKI and AKI groups (9.8 vs. 11.6 days, p=0.46). However, significantly lower rate of DGF occurred in the non-AKI group (9.4 vs. 40.9%, p=0.01). Graft function between two groups was comparable at 1-month (59.3 ml/min vs. 51.3 ml/min; p=0.20), 3-months (62.7 ml/min vs. 69.3 ml/min; p=0.23), 6-months (62.6 ml/min vs. 65.6 ml/min; p=0.56) and 12-months postoperatively (60.0 ml/min vs. 62.8 ml/min; p=0.70). HbA1c was not statistically significant in the non-AKI group compared to AKI group at 3-months (5.3% vs. 5.3%; p=0.78), 6-months (5.3% vs. 5.3%, p=0.89) and 12-months (5.6% vs. 5.4%; p=0.43). There was one death in the non-AKI group.

Conclusion: Kidneys from AKI donors with high terminal creatinine demonstrated comparable outcomes to non-AKI donors.

Table 1: Demographics and Outcomes

Demographics	**No Donor AKI**	**Donor AKI**	***p-value***
N	32	22	
Gender (%M)	53	68	0.27
Recipient Age	39.2 ± 9.1	39.4 ± 9.3	0.95
ABO			0.52
A	7 (21.9)	9 (40.9)	
AB	2 (6.3)	1 (4.5)	
B	6 (18.8)	3 (13.6)	
O	17 (53.1)	9 (40.9)	
Donor Age	22.7 ± 6.0	23.8 ± 7.2	0.55
Pancreas CIT (min)	662 ± 262	668 ± 210	0.92
Kidney CIT (min)	696 ± 261	733 ± 258	0.62
Peak Amylase	259 ± 369	283 ± 236	0.81
Peak Lipase	225 ± 236	313 ± 472	0.38
Terminal Creatinine	1.1 ± 0.9	4.4 ± 2.4	0.01

Outcomes	**No Donor AKI**	**Donor AKI**	***p-value***
LOS (days)	9.8 ± 4.7	11.6 ± 12.0	0.46
DGF n (%)	3 (9.4)	9 (40.9)	0.01
Acute Rejection n (%)	5 (15.6)	2 (9.1)	
1 M Creatinine	1.4 ± 0.7	1.8 ± 1.2	0.14
3 M Creatinine	1.2 ± 0.3	1.2 ± 0.6	0.84
6 M Creatinine	1.2 ± 0.4	1.2 ± 0.4	0.93
12 M Creatinine	1.3 ± 0.4	1.3 0.4	0.94
1 M GFR	59.3 ± 22.3	51.3 ± 22.0	0.20
3 M GFR	62.7 ± 17.6	69.3 ± 22.4	0.23
6 M GFR	62.6 ± 18.6	65.6 ± 17.8	0.56
12 M GFR	60.0 ± 21.7	62.8 ± 19.6	0.70
3 M HbA1c (%)	5.3 ± 0.8	5.3 ± 0.7	0.78
6 M HbA1c (%)	5.3 ± 0.6	5.3 ± 0.6	0.89
12 M HbA1c (%)	5.6 ± 0.9	5.4 ± 0.7	0.43

#47

SOCIODEMOGRAPHIC VARIATIONS IN THE MANAGEMENT AND OUTCOMES OF COMPLICATED PEPTIC ULCER DISEASE

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Introduction: Peptic ulcer disease (PUD) affects over 6 million Americans annually. With improved medical treatment, only a small proportion of patients with complicated PUD undergo operative interventions, and when they do, they are less likely to have acid-reducing procedures (ARP). Although the recent patterns of treatment of complicated PUD have been previously described, it is not clear if there are sociodemographic or hospital variations in the use of ARP among these patients. Therefore, the objective of this study was to identify disparities in the choice of management and outcomes of complicated PUD.

Methods: Data was extracted from the National Inpatient Sample, 2005-2014. Using International Classification of Disease, 9th Edition codes, patients with complicated PUD (hemorrhage, perforation, or obstruction) were identified. Operative interventions were classified as ARP or Non-ARP. Patients were classified by their demographic and hospital (safety net vs. non-safety net; rural vs. urban teaching vs. urban non-teaching) characteristics. Outcomes measured were hospital mortality and post-operative complications. Multivariate regression analyses were used to identify independent associations.

Results: There were 337,886 patients with complicated PUD and 40,442 (12%) of them had operative interventions. The incidences of indications among the operative cohort were perforation (62%), hemorrhage (25%), and obstruction (5%). The majority (81%) of the operations were Non-ARP. Compared to patients with Non-ARP, patients with ARP were more likely White (21% vs. 18%, $P < 0.001$) and more likely to experience post-operative complications (15% vs. 11%, $P < 0.001$).

On multivariate analyses, factors associated with complications were ARP (Odds Ratio, 95% Confidence Interval: 1.33, 1.23 1.45), age 65 (1.57, 1.30 1.89), being in the highest income quartile (1.17, 1.06 1.30), and hospital safety net status (1.11, 1.02 1.21). On bivariate analyses, mortality was similar between the 2 groups (12% vs. 12%, P=0.570). However, when the outcomes of patients receiving surgery at hospitals that performed at least 10 ARPs were subjected to multivariate analyses, those patients with ARPs had lower mortality (0.83, 0.70 0.99).

Conclusion: Although ARPs were infrequently used in the management of complicated PUD, patients with ARPs were more likely White and to have more post-operative complications. There is a survival advantage of ARPs in hospitals that perform relatively large numbers of these procedures. These data suggest that ARPs should remain in the curriculum of surgical training programs.

Notes

#48

ASSESSING CARE EPISODE COST DISPARITIES WITHIN GENERAL SURGERY POPULATIONS THROUGH A SOCIAL DETERMINANTS OF HEALTH LENS

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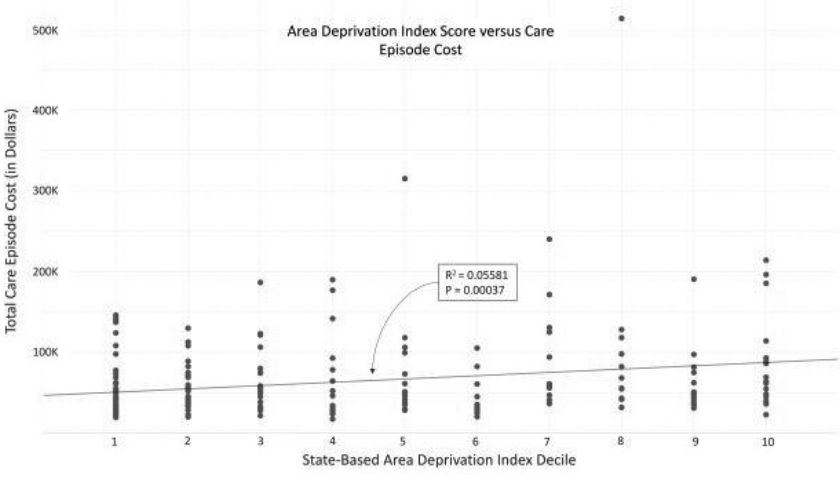
Introduction: The Center for Medicare and Medicaid Services (CMS) offers voluntary enrollment in a Bundled Payment for Care Improvement Advanced (BPCI-A) major bowel program. BPCI-A major bowel represents an alternative payment model for general surgery patients, in which hospital systems are paid a fixed price to cover all patient expenses during a 90-day care episode. As part of our participation in this program, we have analyzed various risk stratification metrics alongside care episode cost data. Our previous research demonstrated limited predictive ability for determining care episode cost when utilizing pre-operative risk stratification tools based on co-morbid medical conditions. We additionally found little improvement in cost prediction when including post-operative complications. Given the inadequacy of these prior predictive models, we believed that much of the variability in care episode cost stemmed from disparate social determinants of health risk profiles. Specifically, we hypothesized that area deprivation indices as a measure of social disadvantage would highly correlate with care episode cost in our bundled payment population.

Methods: Using 90-day CMS claims data provided to prepare for participation in the program, we conducted a retrospective cohort study of 254 patients who met criteria for BPCI-A major bowel. We then mapped their home address to the corresponding Census Group Block and used the Neighborhood Atlas to match each patients Census Block Group with an area deprivation index (ADI)a decile score of socioeconomic disadvantage based on state population data obtained from the American Community Survey. Higher scores indicate more disadvantage.

Any patient with a PO Box listed as their address was excluded from the analysis. Additionally, a small number of patients were excluded because their Census Block Group did not have a reported ADI due to high group quarters. We then compared individual ADI scores to each patient's total 90-day care episode cost.

Results: A total of 223 patients were included in the final analysis. The mean care episode cost was $63,076 (range: $17,609-$514,224). The median ADI decile score was 3 (range: 1-10). The linear regression between care episode cost and ADI decile generated an R2 value of 5.6% (*Figure*), indicating that the ADI score only explains 5.6% of variation in care episode cost ($p < 0.001$).

Figure
Area Deprivation Index Score versus Care Episode Cost



Conclusions: We have noted significant variation in care episode cost within our general surgery bundled payment population. Some cost appears to be driven by pre-morbid condition, some by post-acute care utilization, and other costs by post-operative complication. Yet a large portion of this variability remains unexplained even when examining more holistic measures of surgical risk, namely social determinants of health. If social determinants of health play a significant role in the cost of care for general surgery Medicare patients, we are failing to capture this effect in current models of social risk.

#49

PERIOPERATIVE OUTCOMES IN RACIALLY DIVERSE PATIENT COHORTS FOLLOWING SLEEVE GASTRECTOMY

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Introduction: It is unclear if racial disparity affects outcomes after sleeve gastrectomy for morbid obesity as there is paucity of data on outcomes in ethnically diverse patient cohorts. Herein we compare the perioperative outcomes in racially diverse patient cohorts following sleeve gastrectomy.

Methods: All patients whose race was White, Black or Hispanic undergoing sleeve gastrectomy for morbid obesity at a tertiary medical center from January 2012 until December 2017 were retrospectively analyzed regarding baseline demographics, intraoperative and postoperative outcomes. Propensity matching utilizing a logistic regression model was used to evaluate the 3 cohorts in relation to age, gender, ASA, preoperative BMI plus any significantly different baseline variables (length of stay, type of bougie and staple line reinforcement). Pairwise propensity matching was performed to analyze the three groups (White vs. Black, White vs. Hispanic and Black vs. Hispanic). When analyzing the matched pairs, continuous variables were compared between the groups using Wilcoxon rank sum test, and categorical variables were compared using Chi-squared test or Fisher's exact test.

Results: A total of 767 patients were included in the analysis (White n = 244, Black n = 324, and Hispanic n = 199). Numerous significant baseline differences between the groups including age, sex, ASA, preoperative weight, BMI and percent of excess weight loss were observed (*see Table*). When comparing the entire study population, Black patients were noted to have a higher BMI (35, p =0.0019) and less percent excess weight loss (55%, p = 0.0055) at 12 months. White patients were noted to be more likely to have a bougie size less than 40Fr (56.2%, p = 0.0073) and staple line reinforcement (63.2%, p = 0.0019).

No significant differences were identified in postoperative bleeding, leak, VTE, or stricture. Cross group comparison showed significant differences in perioperative outcomes to include operation time and percent excess weight loss in 1 month, 3 month and 9 months. However, all the differences no longer existed in the propensity matched analysis.

Conclusion: In matched patients undergoing sleeve gastrectomy for weight loss, there were no racial or ethnic differences in overall perioperative outcomes.

Table
Perioperative Outcomes in Black vs. White Propensity Matched Cohort

	White	Black	*p* value
Operative Time, min (SD)	166.8 (67.99)	170.0 (60.69)	0.6612
Length of Stay, hrs (SD)	30.7 (12.72)	39.5 (54.13)	0.1558
All Complications, n (%)	15 (9.6%)	24 (15.4%)	0.1703
Bleeding, n (%)	2 (1.3%)	2 (1.3%)	1
Leak, n (%)	0 (0.0%)	1 (0.6%)	1
VTE, n (%)	0 (0.0%)	1 (0.6%)	1
Stricture, n (%)	0 (0.0%)	2 (1.3%)	0.4984
Dysphagia, n (%)	1 (0.6%)	3 (1.9%)	0.6226
Nausea/vomiting, n (%)	1 (0.6%)	8 (5.1%)	0.0364
BMI at 3 months, Mean (SD)	36.6 (5.24)	37.4 (7.41)	0.8679
Percent excess weight loss at 3 months, Mean (SD)	34.8 (40.11)	40.3 (10.79)	0.8232
BMI at 12 months, Mean (SD)	33.4 (6.72)	33.0 (7.02)	0.4454
Percent excess weight loss at 12 months, Mean (SD)	58.0 (19.67)	59.4 (14.88)	0.2777

NOTES

#50

SURGICALLY AMENABLE PANCREATIC CANCERS: A POPULATION-BASED CLINICAL OUTCOMES STUDY INVOLVING 38,796 PATIENTS FROM THE SURVEILLANCE EPIDEMIOLOGY AND END RESULT (SEER) DATABASE (1975-2016)

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Introduction: Pancreatic cancer (PC) poses a significant economic burden on the healthcare industry in the United States (US) and is the fourth leading cause of overall cancer-related mortality. So far, in 2019, more than 56,770 patients comprising 29,940 males and 26,830 females have been diagnosed with PC. To better understand the demographic, clinical, and pathologic factors which impact prognosis and survival, the current study examines one of the largest population-based cohorts of the RPCs.

Methods: Demographic and clinical data were abstracted from 38,796 patients' RPCs from the SEER database (1975-2016). Statistical analysis was performed with SPSS©v20.0 software.

Results: Most common primary tumor sites were head of the pancreas (62.4%), tail (14.7%), body (7.6%), and others (15.4%), $p<0.001$. Overall, RPCs had a higher incidence amongst males (50.4%) $p < 0.023$), and Caucasians (82%, $p<0.001$). When reported, the majority of RPCs were moderately-differentiated (37%), had regional spread and a size of 2-4 cm. Chemotherapy in conjunction with surgery was used in 49.3% of the patients, $p=0.052$, while radiation in conjunction with surgery was used in 28 %, $p= < 0.001$. More than four lymph nodes were retrieved during the surgery (55.7%), while 1-3 lymph nodes were retrieved in 5.7% of the patients. More than 57.9% of the lymph nodes retrieved were positive with the disease, and most of the patients had 1-5 positive lymph nodes (80.9%), followed by the 6-10 lymph nodes (13.1).

The 5-year observed survival rate after surgery was 21%, while it was 17.30% in patients who received surgery and radiation, and 16% in patients who received chemotherapy in conjunction with surgery. The Cox model multivariate analysis identified older age, adenosquamous RPCs, tumors >4 cm in size, and distant metastasis to be independently associated with increased mortality.

Conclusion: RPCs are most commonly prevalent in Caucasian males, located in the head of the pancreas, present with regional distribution and have a tumor size of 2-4 cm. The addition of chemotherapy and radiation appeared to provide no added survival benefits compared to surgical resection alone. We recommend that all RPCs patients should be enrolled in nationwide and international registries to better understand multi-modality management and to optimize clinical outcomes.

Notes

#51

A POPULATION BASED COMPARISON OF MALE BREAST CANCER WITH FEMALE BREAST CANCER IN THE UNITED STATES

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Introduction: Male breast cancer is relatively uncommon when compared to the high prevalence of female breast cancer. Much research has been directed toward female breast cancer, but there have been few studies to compare how male breast cancer patients are faring compared to their female counterparts. This study aims to compare male breast care patients with female patients over the course of 40 years using a population-based cancer registry.

Methods: A cross-sectional review of 1,115 male breast cancer patients and 147,032 female breast cancer patients pulled from the Surveillance, Epidemiology, and End Results Program (SEER) between the years 1973 and 2013. Overall patient characteristics of both groups were performed using univariate statistics; chi square for categorical variables and Student t-test for continuous variables. Male breast cancer patients were then matched with female breast cancer patients on the basis of year of diagnosis, race, overall stage, size of the tumor, and nodal status for Kaplan-Meier analysis to compare overall survival, disease free survival and breast cancer specific mortality.

Results: The average age at diagnosis was 66.5 and 61.7 years of age for male and female breast cancer patients, respectively. Both groups were largely Caucasian, had invasive cancer, and majority of tumors were less than 2 cm. Male patients showed overall higher histological grade, overall stage, and higher rates of node positive disease. Men were also had higher rates of estrogen and progesterone receptor positivity, whereas female patients were more likely to be Her2 positive. Men were more likely to die of causes other than breast cancer. Matched analysis showed that female patients had lower overall 5 year survival compared to males with approximately 65% vs. 70%, respectively, and this persisted with 5 year disease-free survival (75% vs. 90%).

The mean number of months survived was 73 months for men vs. 36 months for women ($p < 0.001$).

Conclusion: Male breast cancer patients tend to have better overall survival as well as breast cancer specific survival when compared to their female counterparts despite later age at diagnosis and higher overall stage.

NOTES

#52

IMPACT OF AREA OF DEPRIVATION INDEX AND AGE ON RATES OF COMPLETION OF NEOADJUVANT THERAPY AND SURGERY AMONG PATIENTS WITH PANCREATIC CANCER

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Introduction: Area of deprivation index (ADI) is a validated metric of socioeconomic adversity calculated from the American Community Survey and US Census Long Form. Higher ADI values signify greater socioeconomic disadvantage. We sought to identify the impact of ADI on rates of completion of neoadjuvant therapy and surgery for patients with pancreatic cancer (PC).

Methods: 2015 National ADI percentiles were obtained from the Neighborhood Atlas based on 9-digit zip code among patients with localized PC who received neoadjuvant therapy. Patients were dichotomized as low versus high ADI at the 40th percentile. Age was classified as 75. The failure to complete neoadjuvant therapy and surgery was due to cancer progression (local or metastatic) or non-cancer related factors (patient refusal or poor performance status).

Results: Of 525 patients who underwent neoadjuvant therapy, 273 (52%) had a low ADI and 252 (48%) had a high ADI. The median age for all patients was 66 (IQR 13) and was not different among low versus high ADI groups. Of 525 patients, 157 (30%) did not complete neoadjuvant therapy and surgery; 74 (27%) of the 273 with a low ADI and 83 (33%) of the 252 with a high ADI (p=0.15). Of the 273 patients with a low ADI, cancer progression occurred in 57 (21%) and non-cancer related factors were responsible in 17 (6%). Of the 252 patients with a high ADI, cancer progression occurred in 52 (21%) and non-cancer related factors in 31 (12%). Patients with a high ADI were more likely to not complete neoadjuvant therapy and surgery due to non-cancer related factors (12% vs. 6%; p=0.05). The median age of patients with cancer progression was 65 (IQR: 13) versus 75 (IQR: 15) for patients with non-cancer related factors (p= < 0.001).

In an adjusted logistic regression, non-cancer related factors were associated with decreased odds of completion of neoadjuvant therapy and surgery among older patients [age 65-74 (OR: 0.26; 95%CI:0.08-0.85); older than 75 (OR: 0.05; 95%CI: 0.01-0.16)] and those with an ADI > 40th percentile (OR: 0.30; 95%CI: 0.12-0.75).

Conclusion: Among patients who were treated with neoadjuvant therapy for PC, a higher ADI and older age were associated with an increased risk for treatment failure. Goals of therapy to include multimodality neoadjuvant therapy and surgery may not be achievable in all patients and a high ADI may accurately identify an at-risk group. This is a critically important aspect of health disparities distinct from access to care.

Notes

#53

PERCEIVED SOCIAL SUPPORT IS STRONGLY ASSOCIATED WITH RECOVERY AFTER INJURY

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Introduction: Social support involves having a network of family and friends that you can turn to in times of need. One's social support network can play an important role in recovery after traumatic injury by providing emotional, instrumental and/or informational assistance. However, the extent to which the strength of one's social support network impacts post-injury recovery is not well understood. We sought to assess the association between one's perceived social support (PSS) and functional and mental health outcomes 6-12 months post-injury.

Methods: Adult trauma patients with moderate to severe injuries (ISS9) admitted to one of three Level-I Trauma Centers between 2018 and 2019 were contacted 6-12 months post-injury and asked to complete a phone survey to evaluate functional and mental health outcomes. Patients were also asked to rate the strength of their social support network on a 5-point Likert scale. These responses were then used to categorize patients into 3 groups based on their perceived PSS: strong/very strong, average, or weak/inexistent. Multivariate linear and logistic regression models were built to determine the association between PSS and long-term outcomes.

Results: Of 728 patients included, 520 (71.4%) identified their PSS as strong/very strong, 147 (20.2%) identified their PSS as average, and 61 (8.4%) identified their PSS as weak/inexistent. Overall mean age was 59±20, 59% were male, and 30% had severe trauma (ISS>15). Patients who identified their PSS as weak/inexistent were younger, black, had a lower education, and had higher rates of motor vehicle and assault injuries. Overall, rates of physical and mental impairment post-injury were substantial and varied significantly by PSS.

After adjusting for potential confounders, we found that compared to patients with strong/very strong PSS, those with weak/inexistent PSS were more likely to have worse physical and mental health outcomes post-injury (*Table*).

Conclusion: PSS is strongly associated with long-term outcomes post-injury, especially with regards to mental health. Identifying patients with a higher risk of developing poor outcomes is critical to guide allocation of resources and develop targeted intervention programs.

			Perceived Social Support	
	All patients (n=728)	Strong/Very strong* (n=520)	Average (n=147)	Weak/Inexistent (n=61)
PTSD	46 (6%)	14 (3%)	15 (10%); OR: 4.77 (1.99-11.39)	17 (28%); OR: 20.92 (7.85-55.79)
Anxiety	102 (14%)	51 (10%)	26 (18%); OR: 2.37 (1.32-4.23)	25 (41%); OR: 6.96 (3.51-13.79)
Depression	106 (15%)	48 (9%)	27 (18%); OR: 2.33 (1.32-4.13)	31 (52%); OR: 11.41 (5.84-22.29)
No return to work	127 (36%)	81 (32%)	32 (45%); OR: 1.64 (0.89-2.99)	14 (50%); OR: 2.56 (1.04-6.31)
Pain	356 (51%)	233 (46%)	82 (56%); OR: 1.59 (1.06-2.39)	41 (69%); OR: 2.70 (1.45-5.02)
Functional outcomes	250 (34%)	171 (33%)	49 (33%); OR: 1.24 (0.81-1.91)	30 (49%); OR: 2.33 (1.27-4.26)
SF-12, Physical, mean (SD)	41 (12)	41 (12)	40 (11); COEF: -1.17 (-3.35; 1.00)	38 (12); COEF: -3.49 (-6.67; -0.31)
SF-12, Mental, mean (SD)	51 (12)	54 (11)	47 (12); COEF: -6.60 (-8.66 to -4.55)	37 (13); COEF: -16.01 (-19.02; -13.01)
*=Reference group				

NOTES

#54

SURVIVING TRAUMA: THE ASSOCIATION BETWEEN SMOKING AND DRUG OVERDOSE DEATH FOLLOWING TRAUMATIC INJURY

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Introduction: Drug overdoses have been the leading cause of injury death since 2011, resulting in a public health emergency. Identification of risk factors for overdose death would help target interventions to reduce overdose-related mortality. The objective of this study was to determine whether being a smoker at the time of traumatic injury was associated with a higher risk of drug overdose death following discharge.

Methods: We conducted a retrospective cohort study utilizing data from our trauma center registry including patient demographics, premorbid conditions, toxicology, smoking status, and injury characteristics between January 1, 1999 and October 31, 2008. Last patient admission was linked to the National Death Index Plus system to determine death status. We used Cox proportional-hazards model to estimate the risk of drug overdose death associated with smoking after adjusting for covariates. We also stratified results by alcohol/drug use disorder and/or BAC > 80 mg/dL.

Results: There were 34,801 trauma patients included in this study. Patients who smoked were more likely to be male (76.5% vs. 69.8%, $p < 0.001$) and have a known drug use disorder (17.9% vs. 6.1%, $p < 0.0001$) compared to non-smokers. Among those included, 4.1% (n=1,478) died by the end of the follow-up period, 15.6% (n=230) of whom died due to drug overdose. Current smoking status was significantly associated with subsequent fatal drug overdose (1.0% vs. 0.5%, $p < 0.001$), other external cause deaths (1.0% vs. 0.9%, $p < 0.001$) and natural cause mortality (3.1% vs. 2.1%, $p < 0.001$). Following adjustment for age, sex, race, US census tract income, premorbid mental health conditions, and substance use disorder, smokers were significantly more likely to die of a drug overdose (HR 1.66: 95% C.I. 1.25-2.21).

When stratified by the presence of an alcohol/drug use disorder and/or a BAC > 80 mg/dL, current smoking was strongly associated with a higher adjusted risk of drug overdose death (HR: 2.45: 95% C.I. 1.69-3.56) among those without an alcohol/drug use disorder and/or a BAC above 80 mg/dL.

Conclusion: Smoking was associated with a significantly higher risk of drug overdose death among trauma patients without alcohol or drug use disorders at the time of admission. Trauma patients who are smokers at the time of admission should be considered at high risk for future drug overdose. Health care providers should consider smoking status when prescribing opioids following injury, even in the absence of other substance use disorders.

Notes

#55

ACCOMPLISHMENTS OF LEADERS IN AMERICAN SURGERY AND JUSTIFICATION FOR ENHANCING DIVERSITY AND INCLUSION

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Introduction: Data on the accomplishments needed to rise to positions of national surgical leadership within organized medicine is scarce, and merit alone does not always yield such opportunities. Recognizing the shortcomings of gender and ethnic diversity within academic surgical leadership, members from the American College of Surgeon (ACS), American Surgical Association (ASA), Association of Women Surgeons (AWS), and the Society of Black Academic Surgeons (SBAS) partnered to address these challenges by performing a comprehensive assessment of accomplishments from presidents of each society over the last 16 years.

Methods: ACS, ASA, AWS, and SBAS presidents' curriculum vitae (CVs), at the time of their presidential term, were assessed for personal demographics, subspecialty training, educational degrees, institutions of medical education, residency, and faculty appointments, scholastic achievements, academic rank, and other medical society involvement. Metrics for the four societies were evaluated separately. A logistic regression analysis controlling for age was performed to determine relative differences across surgical societies.

Results: A total of 62 of the 64 presidents' CVs from the ACS, ASA, AWS, and SBAS spanning the last 16 years were received and assessed (97% response rate). There was a large discrepancy in the average age in years of ACS (70) and ASA (66) presidents compared to the AWS (51) and SBAS (52) presidents. All were fellows of the ACS, members of >15 medical societies, >33% had dual degrees, all had H-indices >20, >25% had obtained NIH funding, and the ACS and ASA cohort had >100 peer-reviewed publications. For the ACS and ASA cohort, 87% were male and 83% were Caucasian, collectively.

Over 40 different medical schools and residency programs had produced presidents of these societies. After controlling for age (52), the only statistically significant differences between the ACS and ASA cohort compared to the AWS and SBAS cohort included number of first or senior author publications, full professor status, department chair status, NIH funding, and prior presidency positions held ($p < 0.05$).

Conclusion: This is a first-of-its-kind study to evaluate the association of surgeon accomplishments and attainment of national leadership. After controlling for age, both the AWS and the SBAS presidents have levels of achievement comparable to those of the ACS and ASA and are well positioned to ascend in ACS and ASA leadership. These findings further substantiate that women and ethnic minority surgeons are deserving of additional national leadership consideration as organized medicine pursues a more diverse and reflective physician workforce.

Notes

#56

INTERSECTIONALITY IN ACADEMIC SURGERY: THE DOUBLE EDGE SWORD OF BEING BLACK AND A WOMAN IN GENERAL SURGERY RESIDENCY

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Introduction: There are few underrepresented minorities (URMs) in academic surgery, with Black/African American (AA) women representing a disproportionately small number of professors in general and surgical subspecialties in the United States (US). Although the low and unchanged application and matriculation rates of URMs to medical school over the last three decades may partially explain these low rates, it is unclear why representation further declines along the surgical career and leadership trajectory of faculty members. Thus, we sought to evaluate the demographic trend of general surgery applicants and graduates.

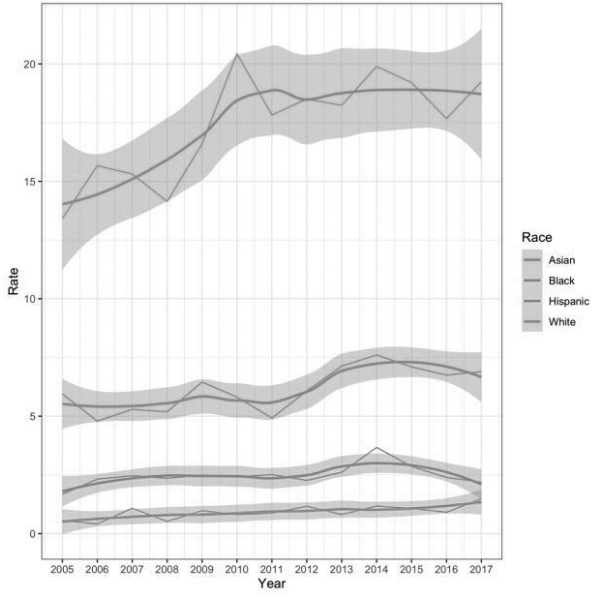
Methods: The Electronic Residency Application Service (ERAS) to general surgery residency and the Graduate Medical Education (GME) Survey of graduating general surgery residents were retrospectively reviewed (2005-2017). Data were stratified by race/ethnicity (Asian, Black/AA, Hispanic/Latino, and White) and gender. Descriptive statistics and linear regression models were performed.

Results: Over the study period, the number of ERAS applications from women doubled from 1419 to 2840, but the number of women graduating in general surgery only increased by 56% from 532 to 829. When stratified by gender and race, the average proportion of ERAS applications from White women has remained unchanged over time (n=10,107, 14.1%, p=0.365), but significantly increased for Asian women (from 6.9% to 9.8%, $p < 0.001$), Black women (from 2.2% to 3.5%, $p<0.001$) and Hispanic women (0.2% to 1.8%, $p<0.001$).

Among all US surgical graduates during the study period, there was an increase in the proportion of White women graduates from 13.4% in 2005 to 19.2% in 2017. In a simple linear regression model, there was a statistically significant yearly increase among White women graduates (0.4%, p=0.002), Asian women graduates (0.2%, p=0.004), and Hispanic/Latino women graduates (0.06%, p=0.006). However, among Black/AA women graduates, there was no statistically significant yearly increase (0.05%, p=0.14).

Conclusion: Although the gender disparity for women in general surgery residency has been improving over the past decade, this improvement is mostly attributable to gains among non-URM women, specifically White women. Despite the increase in Black women applying to general surgery residency, rates of Black women graduating from general surgery residencies remains low and unchanged. Thus, prioritizing intersectionality within academic surgery and identifying factors that contribute to the successful recruitment and retention of URM women in general surgery are both critical to understanding this disparity and achieving racial and gender equity.

Figure 1
Yearly Percent of Female Surgical Graduates by Race with Overlying Loess Trend and 95% Confidence Envelope



#57

DOES GENDER PLAY A ROLE IN THE CAREER EXPERIENCES OF BLACK/AFRICAN-AMERICAN (AA) ACADEMIC SURGEONS? A SURVEY OF THE SOCIETY OF BLACK ACADEMIC SURGEONS

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Introduction: Despite recent efforts to increase diversity and inclusion in academic surgery, Black/AA women still remain a fraction of the surgical academic faculty nationwide.

Objective: To determine if Black/AA women face challenges and experiences that differ from their Black/AA male counterparts.

Methods: A self-administered emailed questionnaire was distributed to all 201 members of the Society of Black Academic Surgeons (SBAS). Respondents were surveyed regarding demographics, family life, current job position, job satisfaction, salary, gender, d racial discrimination, perceived barriers and mentorship/support. Data was collected, stratified by gender, and descriptive statistics were performed.

Results: Of the 201 members, 50 members responded (24.8%), 29 were women (58%) and 21 were male (42%). 75.9% (22) of the women members and 95.2% (20) of the male members reported academic positions as their first job ($p<0.05$). Two (6.9%, $p<0.05$) women members reported attaining full professor, while 9 (45%) men reported the same. Eleven (37.9%, NS) of the women surgeons reported being satisfied in regard to their current position, whereas 13 (61.9%) male surgeons reported the same. Twelve (44%, $p<0.05$) of the women reported that they do not know the steps needed to reach their long term academic goals versus 8 (40%) of the men who stated they agree with this statement. The majority (96.4%, $p<.0001$) of women reported that they face barriers in their specialty of surgery due to gender, whereas only 29.6% of men report gender related barriers. Men (85.7%) and women (86.2%, NS) were fairly even in reporting racial bias in the workplace.

With regard to salary, 23 (79.3%, p<0.0001) women surgeons and 6 (28.6%) male surgeons agree that there are inequities in salary when stratified by gender among academic surgeons. Both groups have similarly participated in career development programs and have mentors.

Table 1
Self-Reported Academic Trajectory, Career Support, Gender and Racial Bias, and Salary Inequity Among Members of the Society of Black Academic Surgeons (SBAS)

Variable	Women (N=29) Number (%)	Men (N=21) Number (%)	*P value*
Age			
<29	0 (0)	0 (0)	*NS*
30-49	20 (69.0)	11 (52.3)	
50-64	8 (27.6)	10 (47.6)	
>65	1 (3.4)	0 (0)	
What was your first job?			
Academic	22(75.9)	20 (95.2)	*p < 0.05*
Private Practice/		1 (4.8)	*p < 0.05*
Clinic Physician	7 (24.1)		
Researcher		0 (0)	
Current Academic Position			
Adjunct Assistant Professor	0 (0)	1 (5)	*NS*
Assistant Professor	14 (48.3)	0 (0)	*p < 0.001*
Associate Professor	12 (41.4)	10 (50)	*NS*
Professor	2 (6.9)	9 (45)	*p < 0.05*
Research Associate	1 (3.4)	0 (0)	*NS*
Are you where you'd like to be in your current academic position?			
Yes	11 (37.9)	13 (61.9)	*NS*
No	18 (62.1)	8 (38.1)	*NS*
Do you know the steps to reach your long term goals?			
Agree	2 (7.4)	8 (40)	*p < 0.05*
Disagree	12 (44)	2 (10)	*P< 0.05*
Neutral	8 (29.6)	7 (35)	*NS*

Table 1 (cont.)
Self-Reported Academic Trajectory, Career Support, Gender and Racial Bias, and Salary Inequity Among Members of the Society of Black Academic Surgeons (SBAS)

Have you ever experienced gender bias in the work-place?			
Yes	27(96.4)	6 (28.6)	*p < 0.001*
No	1 (3.6)	15 (71.4)	*p < 0.001*
Have you ever experienced racial bias in the work-place?			
Yes	25 (86.2)	18 (85.71)	*NS*
No	4 (13.8)	3 (14.29)	*NS*
What is your perception of equity in salary amongst academic surgeons?			
Equal	1 (3.4) 0 (0)	3 (14.3)	*NS*
Somewhat equal	0 (0) 1 (3.4)	4 (19.0)	*NS*
Somewhat unequal	3 (10.3)	7 (33.3)	*NS*
Undecided	2 (6.9)	1 (4.8)	*NS*
Unequal	23 (79.3)	6 (28.6)	*p< .001*
Have you participated in a career development program?			
Yes	20 (69)	15 (71.4)	*NS*
No	9 (31)	6 (28.6)	*NS*
Do you have a mentor?			
Yes	22 (75.9)	16 (76.2)	*NS*
No	7 (24.1)	5 (23.8)	*NS*

Conclusion: In this survey of Black/AA academic surgeons, differences remain in career trajectories and experiences between Black/AA men and women. Black/AA women surgeons still face challenges in promotion, attaining high level administrative positions and most importantly, face not only racial but gender barriers. For Black/AA women academic surgeons, distinguishing between racial and gender bias can be difficult. Home life and salary inequity are additional barriers that may play a role in women attaining promotion to higher academic ranks.

#58

SELECTIVE INHIBITION OF CD38 AT THE CATALYTIC BINDING SITE AMELIORATES LIVER ISCHEMIA REPERFUSION INJURY

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Introduction: Transplantation remains the only cure for end-stage liver disease. While over 8,000 liver transplants are performed yearly, nearly 2,000 patients die waiting for a liver and another 11,000+ remain on the transplant list. The use of marginal organs has the potential decrease this need. However, marginal organs tend to be discarded, because they tolerate ischemia/reperfusion injury (IRI) poorly and have a higher rate of early graft failure or primary graft non-function. Thus, re-engineering these organs to better tolerate IRI is of great interest. Previous data from our lab indicate that CD38 expression/activity is upregulated in marginal organs (steatosis, increased age), and that CD38 expression can be reflective of disease state. CD38 is a multifunctional enzyme that drives intracellular calcium metabolism, and has been implicated in the immunometabolism of IRI in other organs. Therefore, we sought to investigate the utility of targeted CD38 inhibition to mitigate liver IRI.

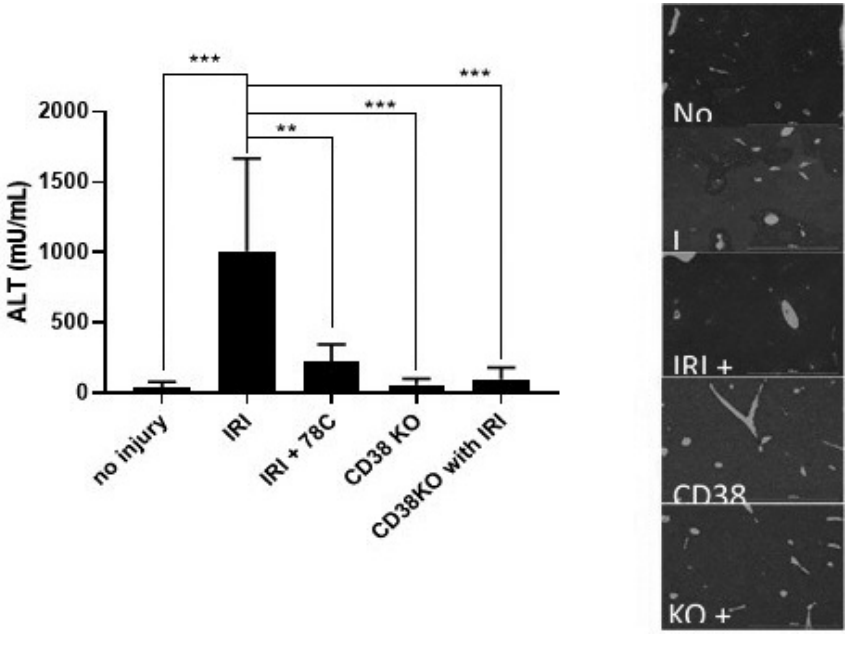
Methods: In vitro, primary liver cells were treated with CD38 inhibitor (78C), subjected to hypoxia (1.1% O2) and reoxygenation injury or oxidative stress (400 uM H2O2) injury, and measures of cell health and viability were assessed. IRI was recapitulated in vivo using a segmental (70% ischemia) hilar clamp model, where wild-type mice or CD38 knockout mice were subjected to a sham operation or 60 minutes of ischemia with or without administration of 78C, followed by 6 hours reperfusion. Liver injury was assessed using histology and plasma ALT and AST, tissue MDA, ATP, and GSH.

Results: In vitro hypoxia/reoxygenation injury caused increased CD38 expression and activity, and treatment of liver cells with 78C reduced injury as measured by cell viability and ROS formation.

In vivo, IRI resulted in increased CD38 activity in liver tissue. Administration of a CD38 inhibitor (78c) or use of CD38 knockout mice resulted in a significant reduction in markers of liver injury including ALT and AST and improved markers of cellular health: MDA, ATP and GSH. Furthermore, CD38 inhibition during liver IRI resulted in improved maintenance of tissue architecture as shown by H&E histology.

Conclusion: Our data show that increased CD38 activity contributes to IRI, and that inhibition of CD38 can result in significant protection against IRI. CD38 inhibition mitigates the deleterious effects of NAD depletion and ROS production which drive IRI. These data not only enhance our understanding of liver IRI, but establish a new therapeutic mechanism (CD38 inhibition) for the management of IRI associated with liver resection and/or transplantation.

Figure
CD38 Inhibition Ameliorates Hepatic IRI



#59

PAPILLARY MUSCLE APPROXIMATION (PMA) IMPROVES MITRAL LEAFLET COAPTATION AND RELIEVES TETHERING TO CORRECT REGURGITATION IN A BENCHTOP MODEL OF FUNCTIONAL MITRAL REGURGITATION IN DILATED VENTRICLES

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Introduction: Undersizing mitral annuloplasty (UMA), the gold standard surgical repair for functional mitral regurgitation (FMR), has poor durability and a high incidence of FMR recurrence. In UMA, the mitral annulus and leaflets are drawn into the mitral orifice, augmenting leaflet coaptation and correcting regurgitation at the time of surgery. However, this repair draws the mitral annulus and leaflets away from the papillary muscle tips, resulting in increased tethering of the posterior leaflet and unphysiological valve closure leading to poor long-term valve competence. Papillary muscle approximation (PMA), either in isolation or in combination with UMA, could improve systolic valve geometry and leaflet mobility, resulting in a more durable repair. We investigated the efficacy of PMA, in two different configurations (tip-PMA and base-PMA), to repair FMR.

Methods: Seven explanted pig hearts (n=7) were obtained and the left ventricular (LV) myocardium resected to reduce the wall thickness by 65% (*Fig. A1*) confirmed by 2D echocardiography. This induced chamber dilatation and FMR when connected to a pressure head (*Fig. A2-A3*). The hearts were mounted in a pulsatile loop at 120 mmHg peak LV-pressure, 5 L/min average cardiac output at 70 beats/min. Mitral valve tethering, geometry and kinematics were measured with echocardiography, and regurgitant volumes were measured using flow probes. Measurements were obtained at baseline, FMR, and post-repair (with tip-PMA and base-PMA) (*Fig. A4-A6*).

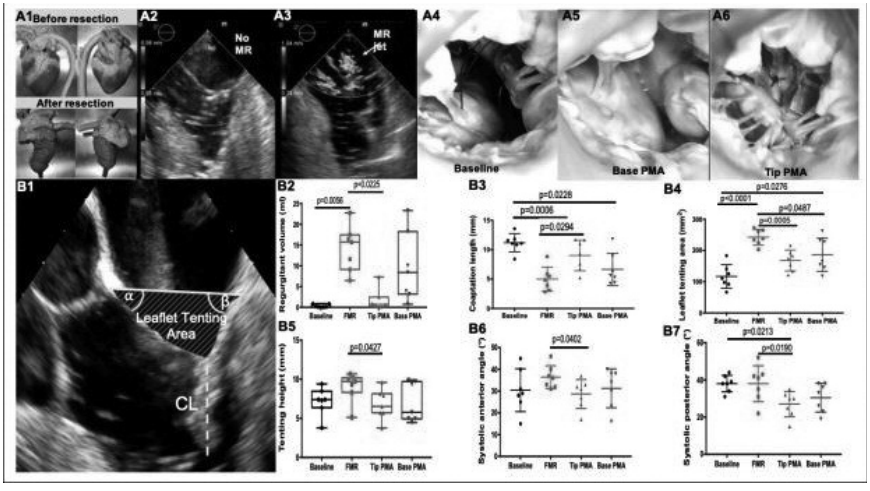

Figure 1: (A1) Representative images of hearts before and after resection; Representative color doppler echocardiography image showing no mitral regurgitation in systole before thinning (A2) and severe mitral regurgitation in systole after thinning (A3); Representative image showing papillary muscles at baseline (A4), papillary muscle approximation (PMA) at bases (A5) and at tips (A6); Mitral valve geometry and function: Representative image showing 2D echocardiography measurements (B1); Regurgitation volume showing regurgitation induced by resection and correction by papillary muscle approximation (B2); Coaptation length (B3) showing reduction by thinning in FMR and improvement by papillary muscle approximation; Leaflet tenting area (B4) and tenting height (B5) showing tethering induced in FMR and relieved by tip papillary muscle approximation; Systolic anterior angle (B6) and systolic posterior angles (B7) showing restoration of leaflet mobility by tip papillary muscle approximation.

Results: Wall thinning increased LV volumes by 155.9% from 53.14±10.66 ml to 136.00±31.63 ml, tethering the mitral leaflets and creating FMR. Regurgitant volumes increased from 0.31±0.38 ml at baseline to 14.20±5.53 ml (p=0.0056) post-thinning. Tip-PMA decreased regurgitation to 1.74±2.59 ml (p=0.0225) and base-PMA to 9.68±8.32 ml (*Fig. B2*). Coaptation length decreased from 11.18 ± 1.53 mm at baseline to 4.98±2.05 mm (p=0.0006) in FMR and was improved to 9.01±2.60 mm (p=0.0294) by tip-PMA and 6.65±2.74 mm by base-PMA (*Fig. B3*). Leaflet tenting area and tenting height increased from 116.6±37.9 mm2 and 7.15±1.78 mm at baseline, to 242.4±25.0 mm2 and 9.03±1.88 mm in FMR (p<0.0001). After tip-PMA, tenting area and height reduced to 167.8±33.5 mm2 and 6.77±1.94 mm (p=0.0005; p=0.0427), and after base-PMA, to 186.1±53.6 mm2 and 7.01±2.50 mm (p=0.0487) (*Fig.B4-B5*).

Systolic anterior and posterior angles increased from 30.4±9.8° and 38.0±4.4° at baseline to 36.4±5.3° and 38.0±9.7° in FMR, but decreased to 28.7±6.7° and 27.0±6.8° by tip-PMA (p=0.0402; p=0.0190) and by base-PMA, to 31.3±8.9° and 30.4±7.7°, respectively (*Fig. B6-B7*).

Conclusions: PMA relieved tethering and improved leaflet coaptation, augmenting systolic valve closure and enabling complete FMR correction. Tip-PMA improved leaflet coaptation and relieved tethering to a greater extent than base-PMA which may result in better long-term outcomes.

Notes

#60

SINGLE-CELL RNA SEQUENCING REVEALS EXERCISE DECREASES LOCAL LIVER INFLAMMATION BY ALTERING MACROPHAGES IN THE MICROENVIRONMENT

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Introduction: Several epidemiologic studies have shown that physical exercise is beneficial in preventing chronic inflammatory diseases while improving cardiovascular health. Preoperative exercise has been associated with reduced postoperative complications and hospital length of stay. However, the mechanism by which exercise protects the liver from local inflammation after surgery is unknown. Therefore, we sought to investigate the mechanism by which exercise alters the immune microenvironment to protect the liver from inflammation after surgery.

Methods: Eight-week-old C57BL/6J mice were randomly divided into exercise and sedentary groups (n=13 per group). The exercise group ran on a motorized treadmill at a speed of 12.5 m/min for 1 hr/day, 5 days/week for 1 to 4 weeks. Matched sedentary mice were not exposed to running on the treadmill. Next, liver inflammation was induced by partial liver warm ischemia/reperfusion (I/R) through selective clamping of the portal vein. Serums from these mice were analyzed postoperatively for inflammatory markers. In a different cohort of exercise and sedentary mice, dissociated whole liver tissues were subjected to single-cell RNA sequencing. We investigated the difference in CD45+ immune cells between both groups to elicit the protective mechanism of exercise.

Results: After four weeks of preoperative exercise followed by one hour of I/R, the exercise group had significantly lower mean serum alanine transaminase compared to the sedentary group (mean ALT 1000 vs 2500 U/L, $p < 0.05$, *Figure 1*). Single-cell RNA analysis of the hepatic immune cells revealed a unique macrophage population that was different in both groups. These macrophages expressed higher levels of anti-inflammatory cytokines (Il1a and II10ra) in the exercise group compared to sedentary mice.

Furthermore, pro-inflammatory chemokines (CXCL-1, CXCL-2, and CCL-2) and cytokines (IL-1, IL-6, and TNF-a) were significantly elevated following liver I/R compared to sham control. However, these chemokines and cytokines were significantly decreased in the exercise group compared to sedentary controls. Anti-inflammatory cytokine IL-10 was significantly increased in exercised mice compared to sedentary mice after liver I/R.

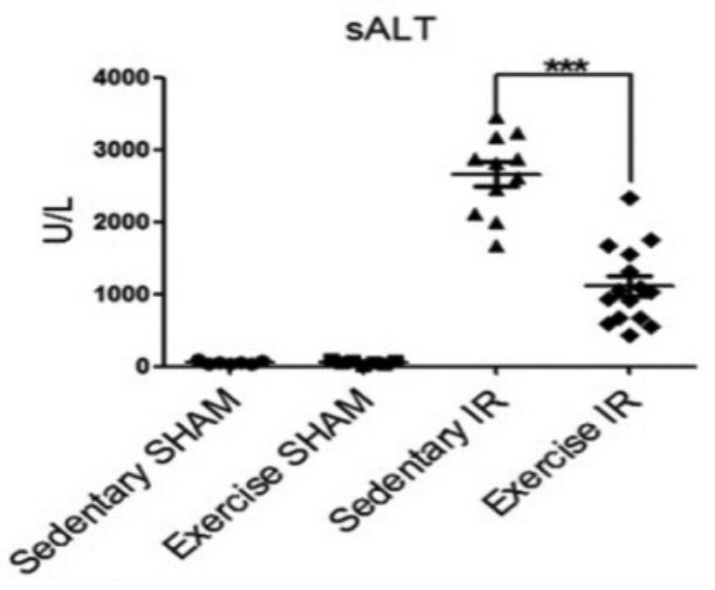

Fig.1: Four weeks of preoperative exercise significantly protected the liver from ischemia-reperfusion (IR) injury, indicated by serum alanine transaminase (sALT) level. (n=6-13; and ***, p<0.05)

Conclusion: Our work shows that exercise protects the liver from inflammation by shifting macrophages to an anti-inflammatory state. This work provides a rationale for prescribing preoperative exercise for patients planning to undergo liver surgery in hopes of decreasing inflammation, leading to better outcomes.

#61

IMPROVING PACKED RED BLOOD CELLS THROUGH A NOVEL STORAGE SOLUTION

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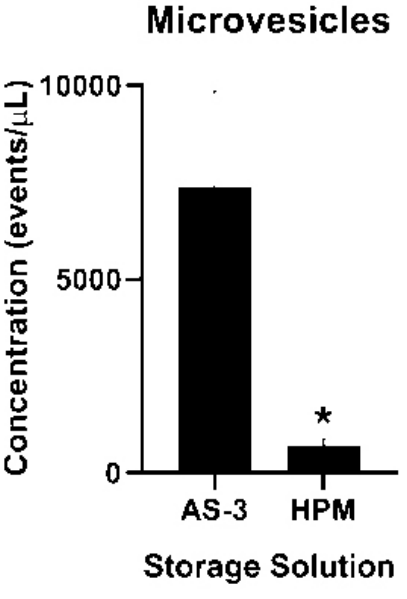
Introduction: Recent studies have shown an association between use of aged packed red blood cells (pRBCs) and increased risk of mortality in trauma patients who receive massive transfusion. As red blood cells age, they undergo a series of biochemical and structural changes, known as the red blood cell storage lesion, which may contribute to harm upon pRBC transfusion. Data from our lab suggests that stored whole blood does not accumulate the RBC storage lesion as severely as pRBCs, but the protective components of the whole blood storage environment have not previously been investigated. We hypothesized that storage of pRBCs in a solution with increased viscosity will blunt red blood cell storage lesion formation and mitigate the inflammatory response following resuscitation from hemorrhage.

Methods: Blood was obtained from 8-10-week-old, C57BL/6 male donor mice, processed, and stored as pRBC units for 14 days in either standard AS-3 storage solution or HV-AS-3, a novel pRBC storage solution with increased viscosity. At the end of the storage duration, pRBCs were analyzed for microvesicle and cell-free hemoglobin content, phosphatidylserine and band-3 erythrocyte membrane integrity protein expression (band-3), and erythrocyte osmotic fragility (EC50). Subsequently, C57BL/6 male mice underwent hemorrhagic shock followed by resuscitation with pRBCs stored in either AS-3 or HV-AS-3. After sacrifice, murine serum was analyzed for markers of inflammation.

Results: As compared to AS-3, pRBCs stored in HV-AS-3 demonstrated a significant reduction in microvesicle (7366.9 +/- 2486.6 vs. 687.8 +/- 192.9 events/microliter; *Figure 1*) and cell-free hemoglobin accumulation (197.6 +/- 15.8 vs. 101.5 +/- 12.8 g/dL). There was improved band-3 expression (18.6 +/- 0.61 vs. 96.9 +/- 0.99% gated) and a reduction in phosphatidylserine expression (24.7 +/- 1.1 vs. 12.0 +/- 1.6% gated).

The erythrocytes stored in the HV-AS-3 solution demonstrated significantly reduced susceptibility to osmotic stress (EC50 92.3 +/- 3.1 vs. 75.0 +/- 5.1%). The serum of mice resuscitated with HV-AS-3-stored pRBCs demonstrated a reduction in macrophage inflammatory protein-alpha (MIP-1a; 630.6 +/- 153.3 vs. 310.7 +/- 37.2 pg/ml).

Figure 1



Conclusions: Storage of pRBCs in a novel storage solution with increased viscosity mitigated many aspects of the red blood cell storage lesion as well as the inflammatory response to resuscitation following hemorrhage. This modification of the storage solution may foster improvement of pRBC storage and minimize harm incurred upon transfusion.

#62

INTRAOPERATIVE PARATHYROID HORMONE MEASUREMENT FACILITATES OUTPATIENT THYROIDECTOMY IN CHILDREN

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Introduction: Hypocalcemia due to hypoparathyroidism is the most common complication after thyroid surgery, and occurs more commonly in children. Consequently, most pediatric thyroidectomy patients are admitted postoperatively for monitoring and treatment of hypocalcemia. We hypothesize that intraoperative parathyroid hormone (ioPTH) measurement after thyroidectomy could predict children at risk for hypoparathyroidism and allow prophylactic treatment for those with low PTH levels. In 2015, we implemented ioPTH testing in children undergoing thyroid surgery and developed a protocol to treat patients with low PTH levels. In this report, we describe the outcomes of this new practice.

Methods: Between 2015 and 2019, 59 thyroidectomies were performed in patients less than 21 years of age by our service. All patients who had total or completion thyroidectomies underwent ioPTH measurement immediately after thyroid resection prior to waking up from anesthesia. A low PTH was defined as a PTH level < 10 pg/ml and constituted hypoparathyroidism. Based on the PTH level, the patients were treated by the following protocol: A) PTH 20 pg/ml: no treatment; B) PTH =10-19 pg/ml: 1000 mg calcium TID; C) PTH= 5-9 pg/ml: calcitriol 250 ug BID plus 1000 mg calcium TID; D) PTH < 5 pg/ml calcitriol 500 ug BID plus 1000 mg calcium TID. Surgical outcomes were reviewed.

Results: The mean age was 15±1 years (range 9-21) and 78% were female. Operations included 38 total or completion thyroidectomies and 21 thyroid lobectomies. The indications for surgery were 22% Graves' disease, 15% papillary thyroid cancer, 14% Hashimoto's thyroiditis with symptoms, 7% medullary thyroid cancer, and 7% multinodular goiter. Of the 59 operations, 57 (97%) were completed as outpatient operations. One patient was re-admitted after same-day surgery for a stable hematoma.

No patients were re-admitted for hypocalcemia only. For patients with ioPTH measurements, 25 (66%) had normal PTH levels while 13 (34%) had low PTH. Of the 13 with low PTH, 7 resolved, by normalization of the PTH, within two weeks and another 5 resolved with longer follow-up, leaving 1 (1.7%) with permanent hypoparathyroidism. No patients experienced permanent recurrent laryngeal nerve injury.

Conclusions: Transient hypoparathyroidism occurs more commonly in children. Utilizing ioPTH measurement along with an oral calcium protocol, most pediatric patients were able to safely undergo thyroidectomy as an outpatient. If a low PTH was measured, most patients experienced normalization of labs within two weeks of surgery. Therefore, we recommend this ioPTH protocol for all children undergoing thyroid surgery.

Notes

#63

THE IMPACT OF THE AFFORDABLE CARE ACTS MEDICAID EXPANSION ON PATIENTS ADMITTED FOR BURNS: AN ANALYSIS OF NATIONAL DATA

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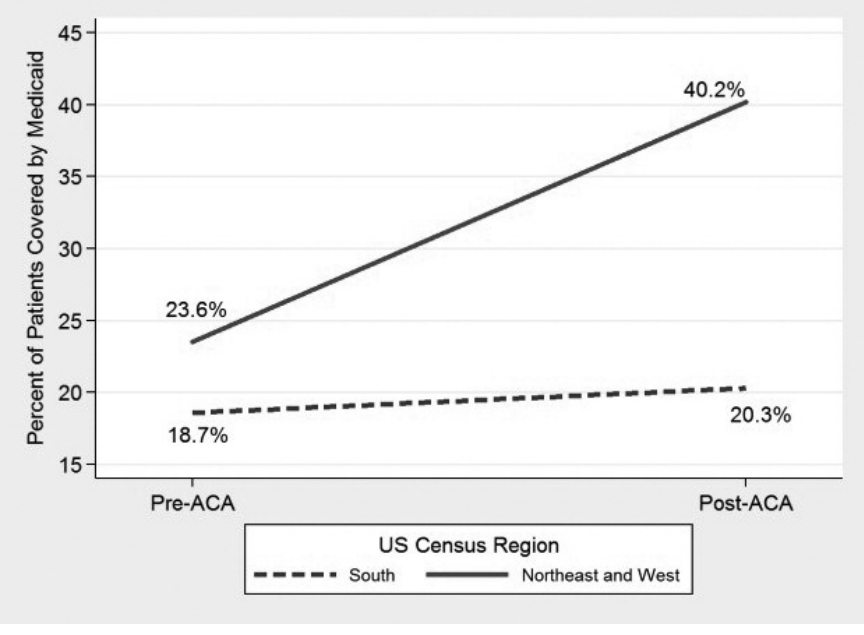
Introduction: In 2010, the Patient Protection and Affordable Care Act (ACA) was signed into law, with the first states implementing the Medicaid expansion provisions in 2014. Many studies have explored the impact of Medicaid expansion on trauma patients, but studies have yet to address its impact on burn patients.

Methods: This study queried the Healthcare Cost and Utilization Project National Inpatient Sample (NIS) (2012-2016) for patients admitted with burns, aged 18-64, and without non-burn traumatic injuries. Patients in 2012-2013 were classified as pre-ACA and 2015-2016 as post-ACA, with 2014 considered a washout period. Our primary outcome was payer status; secondary outcomes included total charges, inpatient length of stay, and discharge disposition. We compared changes in payer status between the Northeast (98% of the population living in an expansion state) and West (94%) census regions versus the South census region (14%).

Results: We identified a total of 21,251 discharges, which estimates 106,225 discharges using NIS standard weighting, during the study period. 51,682 (48.64%) discharges were in the pre-ACA period. The mean age was 42.7 +/- 0.17 and 66.1% were male. There was no difference in median total body surface area burned pre-ACA (< 10%) vs post-ACA (<10%) ($p=0.25$). The percent of patients covered by Medicaid increased from 10.2% pre-ACA to 15.1% post-ACA ($p < 0.001$), while the percentage of self-pay patients decreased from 8.9% to 6.1 ($p < 0.001$). There was an increase in discharges to nursing and rehabilitation facilities (3.9% pre-ACA, 4.4% post-ACA; $p=0.008$) and a decrease in hospital length of stay (mean = 7.76d pre-ACA, 7.47d post-ACA; $p=0.0133$). There were greater increases in Medicaid coverage in the Northeast/West regions (23.6% to 40.2%) compared to the South (18.7% to 20.3%).

A difference-in-differences estimate between the Northeast/West and South was 0.150 (95% CI: 0.133-0.167, $p < 0.001$). In a logistic regression model, living in the Northeast/West regions (OR: 1.54; 95%CI 1.31-1.80, p=0.003), female sex (OR 1.55; 1.07-2.26, p=0.034), Black (OR 1.23; 1.15-1.34, p=0.003) and Hispanic race (OR 1.31; 1.14-1.51, p=0.008) were associated with increased likelihood of Medicaid coverage, while higher zip code median income (OR 0.42; 0.33-0.54, p=0.002) was associated with decreased Medicaid coverage.

Figure 1
Percent of Patients with Medicaid Coverage in Northeast/West vs. South Regions Before and After ACA Implementation



Conclusions: The Medicaid expansion provision of the ACA led to increased Medicaid coverage among burn patients which was significantly higher in areas with widespread implementation of the expansion. Further studies are needed to elucidate the individual financial impact of these changes on affected patients.

#64

EXPLAINING THE HISPANIC PARADOX IN EMERGENCY GENERAL SURGERY: A MEDIATION ANALYSIS STUDY

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Introduction: Racial/ethnic disparities between white and black patients exist in outcomes after Emergency General Surgery (EGS). However, a Hispanic paradox has been recently shown, where Hispanics are less likely to die after EGS when compared to white patients. Our goal was to identify mediators of the relationship between Hispanic ethnicity and EGS-related mortality.

Methods: This was a retrospective analysis of the Florida State Inpatient Database (2010-2014). All patients that underwent one of 7 EGS procedures shown to represent most EGS volume, complications, and mortality nationally were identified. Potential mediators of the relationship between Hispanic ethnicity and in-hospital mortality were identified through exploratory analyses. Multivariate mediation models were used to estimate total, direct and indirect effects of Hispanic ethnicity.

Results: A total of 456,987 EGS admissions were identified; 19.75% were Hispanic and the overall mortality rate was 2.3%. Mortality was lower in Hispanics when compared with white patients (1.35 vs. 2.59%, $p < 0.001$). After mediation analysis, Hispanic ethnicity was associated with an estimated 8.6% total decrease (95% Confidence Interval [CI]: 11.2%, 5.8%) in odds of death. After accounting for mediators, Hispanic ethnicity alone was associated with an estimated 4.5% direct decrease (95% CI: 7.5%, 2.1%) in odds of death. Thus, 48% of the total effect of ethnicity was attributed to the following mediators: age, insurance status, Charlson Comorbidity Index (CCI), median household income, weekend admission, and hospital characteristics (bed size and teaching status).

Conclusion: Hispanic ethnicity is associated with lower mortality following EGS when compared with white patients. This paradox was partially mediated by identifiable patient- and hospital-level characteristics. Future research should focus on identifying novel unmeasured factors in this causal pathway.

Notes

#65

SURGICAL OUTCOMES AND SURVIVAL RATES OF COLORECTAL CANCER IN CHILDREN AND YOUNG ADULTS

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Introduction: Colorectal cancer in children and young adults is rare. We sought to compare post-operative outcomes and survival between children and young adults (age 25 years) and older adults (age >25 years) with colorectal cancer.

Methods: Using the National Cancer Database (NCDB), patients with colorectal cancer between 2004-2016 were identified. Patients with histological codes consistent with adenocarcinoma were included, while those with missing data about treatment and those with in situ disease and appendiceal primary lesions were excluded. We compared outcomes including time to surgery, hospital length of stay, 90-mortality and survival at 5 and 10 years.

Results: A total of 1,295,382 patients were identified during this time period and 456,192 were excluded. Of patients included, 1,688 were 25 years and 837,502 were >25 years. The 25 years cohort were less white (75.3% vs. 83.9%), had more advanced disease (stage III 39.9% vs. 30.5%, stage IV 34.4% vs. 22.0%), and waited longer for surgery after diagnosis (44.3 days vs. 35.2 days) compared to those >25 years. A higher proportion of patients >25 years had no systemic therapy and/or no surgery (48.8% vs. 27.4%) compared to those 25 years of age. Patients 25 years of age had higher rates of total colectomy (5.3% vs. 1.9%) and total proctocolectomy (5.2% vs. 0.8%), more positive surgical margins (negative microscopic and macroscopic of 65.8% vs. 78.1%), regional lymph node surgery (79.6% vs. 82.8%), and had significantly lower 30- and 90-day mortality (0.6% vs. 3.6%, $p < 0.001$ and 2.2% vs. 6.5%, $p < 0.001$) compared to those >25years of age. Patients 25 years of age had better survival compared to those >25 years of age when stratified by stage (*see Table*).

Table
5-Year and 10-Year Survival of
Colorectal Patients 25 and >25 Years of Age

Stage	Age ≤ 25yrs	Age > 25yrs
I		
5yr	94.0% (87.7-97.1%)	71.7% (71.4-72.0%)
10yr	82.5% (69.9-90.2%)	49.0% (48.6-49.3%)
II		
5yr	78.9% (72.7-83.8%)	62.9% (62.7-63.2%)
10yr	76.9% (70.5-82.2%)	40.5% (40.2- 40.8%)
III		
5yr	61.9% (57.4-66.0%)	54.2% (54.0-54.4%)
10yr	50.6% (45.1-55.9%)	36.1 % (35.8-36.4%)
IV		
5yr	11.0% (8.2-14.3%)	11.0% (10.9-11.2%)
10yr	2.7% (1.1-5.8%)	5.0% (4.8-5.1%)

Conclusion: Although patients 25 years of age with colorectal cancer presented at later stage and had a longer time to definitive surgery, survival at 5- and 10-years was higher when compared to those >25 years of age. This finding is in contrast to previous studies demonstrating worse survival in younger patients with colorectal cancer and warrants further investigation.

NOTES

#66

CHARACTERIZING MORTALITY IN A PEDIATRIC POPULATION ON PARENTERAL NUTRITION

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Introduction: Parenteral nutrition continues to be the mainstay of nutritional support in patients with intestinal failure. Although advances in surgical and nutritional management have significantly reduced mortality in patients with intestinal failure, other attributes surrounding their condition may impact their survival.

Objective: To characterize the risk factors associated with mortality in pediatric intestinal failure.

Methods: A retrospective review was performed on all patients on parenteral nutrition in the Children's Hospital of Alabama/University of Alabama at Birmingham Center for Advanced Intestinal Rehabilitation database between 2015 and 2019 to identify patients within our database that died. A control cohort was also queried which consisted of patients within our database who were on chronic parental nutrition. Information regarding basic demographics, cause of intestinal failure, comorbidities, number of central venous line infections, gestational age, length of bowel remaining after surgery, and small bowel transplantation status were collected. Univariate analysis was performed to characterize outcomes (*see Table*).

Results: Sixty-three total patients were identified for review, 17 of which were deceased. With respect to the presence of comorbidities, 82.4% of the patients who died had significant comorbidities compared to 47.8% of the patients still alive (p=0.014). Additionally, gestational age was associated with mortality, with a lower mean gestational age found in patients who died versus those still alive (27.93 vs. 32.84 weeks, p=0.02).

Univariable Analysis of Mortality of PN Dependent Patients			
	Alive (n=46)	Dead (n=17)	
	n (%)	n (%)	p value
Race			0.438
African American	22 (47.8)	10 (58.8)	
White	24 (52.2)	7 (41.2)	
Gender			0.179
Female	25 (54.3)	6 (35.3)	
Male	21 (45.7)	11 (64.7)	
Diagnosis causing PN dependence			0.18
NEC	15 (32.6)	11 (64.7)	
Gastroschisis and/or Malrotation	11 (23.9)	2 (11.8)	
Volvulus and/or Atresia	11 (23.9)	1 (5.9)	
Pseudo-obstruction and/or Intestinal Dysmotility	7 (15.2)	2 (11.8)	
Hirschprung's Disease	2 (4.3)	1 (5.9)	
Comorbidities (IVH, BPD, CHD, chromosome deletions, other)			0.014*
Yes	22 (47.8)	14 (82.4)	
No	24 (52.2)	3 (17.6)	
Frequent CLABSIs (more than 4/1000 catheter days)			0.193
Yes	19 (41.3)	4 (23.5)	
No	27 (58.7)	13 (76.5)	
Length of Small Bowel Remaining			0.602
<10%	14 (30.4)	5 (31.3)	
10-50%	21 (45.7)	9 (56.3)	
>50%	11 (23.9)	2 (12.5)	
Intestinal Transplant			0.284
Yes	2 (4.3)	2 (11.8)	
No	44 (95.7)	15 (88.2)	
Gestational Age at Birth (weeks)			
Mean ± SD	32.84 ± 4.71	27.93 ± 4.91	0.002*
*p value considered statistically significant if less than 0.05			

Conclusion: The presence of comorbidities and a lower gestational age were found to significantly impact mortality in our cohort of pediatric patients with intestinal failure. This information will be utilized to drive modifications in care management for pediatric intestinal failure patients with significant comorbidities and more premature birth. Additional research is needed to further investigate these and other variables on a larger scale.

#67

USER ACCEPTANCE OF ELECTRONIC CLINICAL DECISION-MAKING SUPPORT SYSTEMS LAGS BEHIND CLINICAL PRACTICE CHANGE IN PEDIATRIC APPENDICITIS

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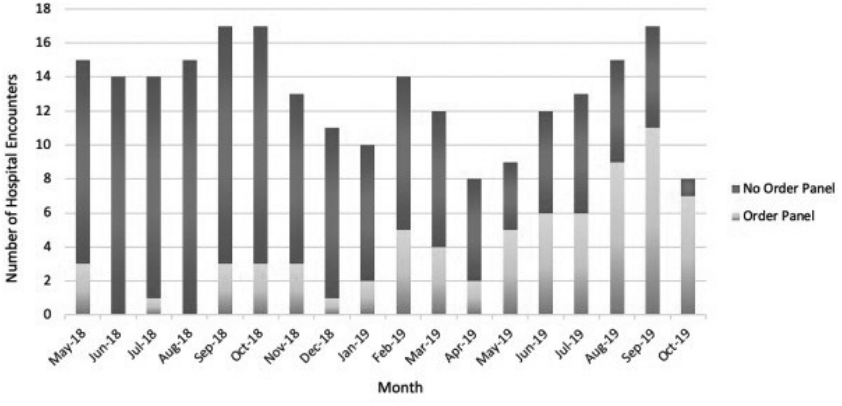
Introduction: Studies show that research evidence can take up to 17 years to reach clinical practice. Electronic clinical decision support systems (CDSS) are tools that can be used to expedite adoption and standardization of best practices. However, little data exist regarding the effectiveness of CDSS tools in pediatric surgery to establish measurable change in clinical practice. We evaluate CDSS utilization as a surrogate for user acceptance in antibiotic stewardship for pediatric appendicitis.

Methods: Patients (18 years old) admitted for appendicitis between May 2018 to October 2019 at a single, academic institution were included. An electronic CDSS tool, an order panel (OP), was created by a multi-disciplinary antibiotic stewardship team to narrow antibiotic coverage for acute appendicitis (AP) (*see Figure*). The OP recommended Ceftriaxone and Metronidazole for standard patients and Ciprofloxacin and Metronidazole for penicillin allergic patients. A time course for simple (single pre-operative dose) and complicated (7 day post-operative course) appendicitis was also recommended. In November 2018, the pathway was implemented as a quality improvement (QI) project including plan-do-study-act cycles based on antibiotic stewardship. Antibiotics were categorized into 2 groups: preferred (narrower coverage) and nonpreferred (extended spectrum beta lactam) antibiotics. Hospital encounters that received 1 dose of preferred and/or nonpreferred antibiotics were categorized into a pre-implementation cohort (PIC) and post-implementation stewardship cohort (PISC). OP utilization was assessed and outcome variables were analyzed with a chi-square test ($p < 0.05$).

Figure
Utilization of Antibiotic Order Panel to Treat Pediatric Appendicitis



Results: A total of 234 hospital encounters were included, in which 170 (73%) and/or 106 (45%) received preferred and nonpreferred antibiotics, respectively. In the PIC, 42% (n=39) of encounters received preferred antibiotics, while 80% (n=74) received nonpreferred antibiotics. The PISC had a steep and sustained increase in preferred antibiotic use [92% (n=131) of encounters] compared to the PIC (p=0.014). Simultaneously, there was a stable reduction in the number of encounters receiving non-preferred antibiotics in the PISC [23% (n=32)] compared to before implementation ($p < 0.00001$). Overall OP utilization was 43% and it did not reach >80% utilization until 11 months after QI implementation, indicating poor acceptance.

Conclusion: Quality improvement projects for antibiotic stewardship in pediatric surgery are effective at changing clinical practice. However, rate of OP adoption, a surrogate for user acceptance, was low in this study and did not correspond to change in practice. Additional research is needed to prospectively identify the most effective CDSS tools to rapidly change clinical practice.

#68

DIFFERENTIAL EXPRESSION OF CELL ADHESION MOLECULES CONTRIBUTES TO SURVIVAL ADVANTAGE IN EXTRA-ADRENAL NEUROBLASTOMA

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Introduction: Neuroblastomas arise from neural crest cells of the paraspinal ganglia and the adrenal medulla, leading to heterogeneity in tumor presentation and location. Outcomes remain poor despite intensified multimodality treatment strategies. Of the many gene aberrations in neuroblastoma, amplification of the oncogene MYCN is most strongly correlated with poor outcomes and affects clinical stage. Because fewer than 30% of neuroblastomas are MYCN amplified, identification of novel targetable oncogenic drivers is critical to improvement in outcomes. Primary tumor site is an independent predictor of survival in all risk groups independent of MYCN amplification status. Adrenal tumors have the worst outcomes; thoracic and cervical tumors carry a more favorable prognosis. We hypothesized that factors specific to the adrenal microenvironment enhance tumor invasion and metastasis.

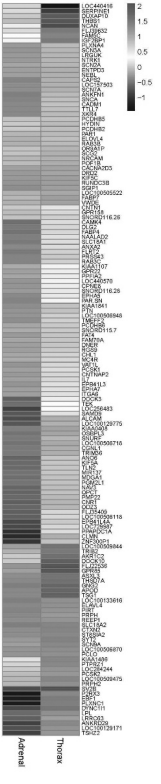
Methods: To identify factors that account for the survival differential of neuroblastoma based on primary tumor site, we queried a publicly available national database (TARGET) of human neuroblastoma tumors.

Results: 1076 tumors were categorized by primary tumor site. Children with thoracic tumors had a much more favorable outcome than adrenal primary tumors. Gene expression patterns were significantly different between tumor sites for the 229 patients with available microarray data. There were 8 upregulated genes in the adrenal tumors relative to thoracic, 5 of which were associated with decreased overall survival. 138 genes were upregulated in thoracic tumors, 78 of which conferred a survival advantage ($p<0.005$). Enrichment clustering revealed that most of the differentially expressed genes were cell-cell junction related. To further validate these candidate genes and determine their effect in vivo, we developed the first model system for the study of extra-adrenal neuroblastoma.

Luciferin tagged 9464D murine neuroblastoma cells suspended in matrigel are injected into the subpleural space in the left chest of C57/Bl6 mice after thoracotomy. In the comparison group, 9464D cells are injected into the left adrenal gland as previously described in the literature. Solid tumors developed in the thoracic cavity at the same rate and efficiency as adrenal implants as early as one week following surgery. Surgery survival rate is equivalent, though the physiologic tolerance for large tumors after three weeks was lower in the thorax group.

Figure

Gene Microarray Demonstrates Differential Expression of 146 Genes when Thoracic Neuroblastomas are Compared to Adrenal Tumors



Conclusion: Future studies will investigate the role of the candidate genes related to the cytoskeleton and cell-cell adhesion in tumorigenesis using our innovative mouse model. Identification of the mechanisms by which the expression of each gene influences clinical outcomes will open innovative new avenues for therapeutic targeting of neuroblastoma.

#69

AN EVALUATION OF FALLS FROM HEIGHTS IN CHILDREN VS. ADULTS: A REVIEW OF THE NATIONAL TRAUMA DATABANK

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Introduction: Fall from a height is a common injury mechanism that generally leads to severe injuries and poor outcomes in adults, but this has not been extensively studied in children. The purpose of this study was to evaluate differences in injury patterns and outcomes following falls from heights among adult and pediatric patients, as well as to elucidate age-based differences within injured children.

Methods: We performed a cross-sectional analysis of patients with the mechanism of fall from a height who were included in the National Trauma Databank research datasets from 2007-2011. Variables included patient demographics, injury patterns, management and outcomes. Descriptive statistics, Chi square tests and Wilcoxon rank-sum tests were performed. Data was stratified by children (ages 0-18) and adults, and children were further stratified by age groups.

Results: Of 148,092 patients identified, 37,694 occurred in children under 18 years (25%) and 110,398 in adults (75%). The mean age was 37.9 ± 23.4 (6.37 ± 3.81 years in children and 48.7 ± 16.4 in adults). Males represented 59% of children and 87% of adults. Adults had significantly more skeletal, brain, and solid organ injuries compared to children. Intensive care unit (ICU) admission was higher in adults than in children (20% vs. 9.3%, $p < 0.001$), but children had shorter ICU length of stay (2.48 ± 3.4 vs. 5.36 ± 7.77, $p < 0.001$) and shorter length of hospital stay than adults (1.93 ± 3.25 vs. 5.75 ± 7.87, $p < 0.001$). Mortality was significantly lower in children than adults, (0.2% vs. 2.3%, $p < 0.001$). Adolescents had significantly higher spinal, pelvic, rib fractures and solid abdominal organ injuries than younger children while femur fractures and brain injuries were more common in infants.

Conclusion: Compared to adults, children incur fewer and less severe injuries, require less operations, and have better survival following falls from heights. There are also age-related differences in injury types among children. This information can be taken into consideration when evaluating injuries during the initial evaluation of children following falls and when counseling parents regarding outcome expectations.

Notes

#70

INCIDENCE AND IMPACT ON HEALTHCARE RESOURCE UTILIZATION OF DROWNING AND NEAR-DROWNING IN CHILDREN

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Introduction: Drowning is the third leading cause of death in children worldwide.

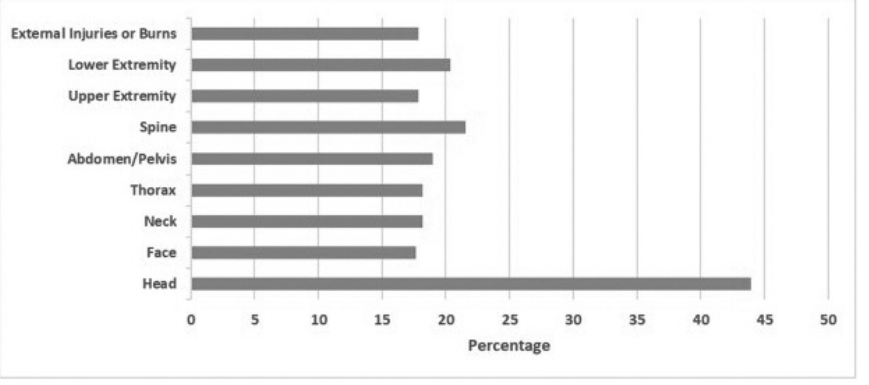
Objective: To determine the prevalence of drowning or near-drowning incidents managed at US trauma centers and to determine their impact on healthcare resource utilization.

Methods: The 2010-2015 National Trauma Data Bank (NTDB) was queried for children (18y) that had suffered a drowning or near-drowning episode. Information on demographic parameters, hospital-level characteristics, injury severity scores (ISS), and outcomes were collected. Body regions with an Abbreviated Injury Scale (AIS) score of 3 were categorized as severely injured. Intent of injury was obtained using the Center for Disease Controls (CDCs) Injury Intentionality Matrix. Multivariable analysis adjusted for demographic and hospital level characteristics.

Results (*see Figure)*: A total of 890 records were analyzed. Forty (4.4%) of these were pronounced dead on arrival. Median age was 14y (IQR:3-14) with a male preponderance (63.8%). 31.6% were related to recreational activities, whereas bathtub incidents comprised 7.1% of such events. Mean ISS was 13.6(±12.1). Severe associated injuries (AIS3) involved the head (43.9%), spine (21.6%), and lower-extremity (20.3%). 53.6% required admission to the ICU with mean length of ICU stay being 5.9(±7.4) days. 38.5% required ventilator support. Mean days on the ventilator were 2.1(±4.7). 90% of incidents were unintentional. 3.1% of incidents involved alcohol. In hospital mortality rate was 7.7%.

Conclusion: The prevalence of drowning incidents in children remains low; however, a significant proportion of these patients require ICU care and ventilator support. Effective preventive strategies can aid in reducing such incidents.

Figure: Proportion of severely injured body systems [Abbreviated Injury Scale (AIS) score of ≥3] associated with drowning or near drowning incidents.



NOTES

#71

PEDIATRIC RESIDENT ATTITUDES AND PRACTICES REGARDING FIREARM SAFETY GUIDANCE

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Introduction: There are 1.6 million children living with an unlocked and loaded firearm. Given that unintentional injuries are one of the most common causes of injury in those 24 and younger, such wide access to loaded firearms is concerning. Pediatricians routinely provide anticipatory guidance regarding injury prevention; however, firearm safety guidance (FSG) is infrequently provided. Therefore, the purpose of this study was to assess attitudes and practices regarding delivery of FSG by pediatric residents and assess the literature for active training on this topic in pediatric residency programs.

Methods: A cross-sectional survey of pediatric resident providers training at an urban academic hospital was performed. In addition, a systematic review of the literature was performed regarding FSG provided in pediatric residency programs. We utilized PRISMA guidelines to identify papers meeting inclusion criteria for the review. Results were analyzed using descriptive statistics and chi-square analysis.

Results: Surveys were returned by 70 pediatric residents, of which 17% own firearms. Seventy-six percent of residents reported that unintentional shootings and suicides are prevalent in children in their community. While 99% of residents felt that discussing firearm safety with parents is necessary, only 29% reported regularly providing FSG. The most common barriers were insufficient time during well-child checks (67%), unfamiliarity with firearms (36%), lack of knowledge in teaching safe firearm storage methods (30%), and discomfort discussing firearms with families (27%). Four pediatric firearm knowledge questions were asked and only 12% answered all correctly. The majority (84%) of residents reported that if trained, they would incorporate this counseling into their practices. Currently, there is no formalized FSG training provided in the curriculum for our pediatric residency program.

The systematic review identified only two studies addressing firearm safety curriculums in pediatric residency programs. In both, FSG was not covered by the majority of residency programs (56% and 35%), despite program directors feeling that this topic was important. Barriers included lack of trained personnel, lack of educational resources, and time constraints.

Conclusion: Pediatric residents believe that safe firearm storage counseling is important, but do not routinely provide it due to time constraints and lack of comfort. There are few residency programs teaching this guidance. Tools for providing effective and time-efficient firearm safety counseling training should be developed and added to pediatrics residency curriculums. A FSG curriculum for the pediatric residency program at our institution is currently being developed using the results of this study.

Notes

#72

RACIAL DISPARITIES IN INCIDENCE OF TESTICULAR TORSION IN CHILDREN PRESENTING WITH ACUTE SCROTAL PAIN

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Introduction: Testicular torsion (TT) is a pediatric emergency requiring prompt diagnosis and surgical management in order to preserve testicular viability. This study retrospectively examined cases of acute scrotal pain in order to determine if demographic factors affected outcomes.

Methods: We conducted a retrospective cohort study on patients aged 3 months to 18 years who presented to a single institution pediatric ED with acute testicular pain from December of 2017 to June of 2019. Demographics, diagnosis, timing and need for ultrasound, timing of surgical consult, time to operation, and need for orchiectomy were recorded. Exclusion criteria included presentation due to acute trauma, status post hernia repair, soft tissue problems, and patients with ambiguous genitalia. All means reported ± standard deviation.

Results: Seventy-seven patients presented with acute testicular pain during the study period, and fifteen (19%) had TT. The mean age of patients was 9.24 years ± 5.24. 73% of patients with testicular torsion were Black (n=11), while 43% of the study population was Black (n=33). Black patients with acute testicular pain were more likely to have TT than White or Other patients (33%, n=11 of Black patients had TT, while 9%, n=4 of White patients or Other patients had TT, p=0.010). Orchiectomy was required in 5 patients (33%). The orchiectomy rate did not significantly differ in Black patients compared to White or Other patients (36%, n=4 vs. 25%, n=1 respectively, p=1.0). There was no significant difference in duration of symptoms (33% >24hrs vs. 27% >24hrs, p=0.67431), timing of ultrasound (58.71 +/- 23.02 min vs. 67.49 +/- 61.12 min, p=0.5823), or time to operation (201.85 +/- 42.06 min vs. 195.5 +/- 47.0 min, p=0.7715) between Black and White or Other patient groups.

Conclusion: Black patients presenting with acute testicular pain may have a higher likelihood of having TT than Non-Black patients; however, there was no difference in testicular salvage rate. All patients requiring an orchiectomy had over 24 hours of symptoms which may suggest a need for community outreach and education to maximize testicular salvage in cases of TT.

Notes

#73

LOW SOCIOECONOMIC STATUS AND RESIDENTIAL DISTANCE OF LESS THAN 10 MILES TO A FRONTIER-STATE NCI-DESIGNATED CANCER CENTER IS ASSOCIATED WITH WORSE OVARIAN CANCER SURVIVAL

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Introduction: Ovarian cancer is the fifth most deadly cancer among women and the deadliest gynecologic cancer in the United States. Although it is a relatively rare form of cancer, its toll on morbidity and mortality is not equally distributed. In Maryland, women who reside at distance extremes (< 10 miles and > 50 miles) to an urban NCI-designated cancer center (NCI-CC) are less likely to complete treatment for gynecologic malignancies. In California, women with low socioeconomic status and those who live more than 50 miles from an NCI-CC are less likely to receive guideline-adherent care and have worse ovarian cancer survival.

Objective: To examine the impact of residential distance and socioeconomic status on survival outcomes for patients receiving treatment for ovarian cancer at a frontier-state NCI-CC.

Methods: Patients who were treated for ovarian cancer at a single institution from 2010-2015 were identified. Age at diagnosis, insurance status, and distance from the patient's home to the institution were abstracted. Median income was estimated using 2013 American Census Survey. Clinical data including stage at diagnosis, surgical status, chemotherapy cycles, Charlson comorbidity index, dates of diagnosis, recurrence, and death were obtained. Patients treated at other institutions and those with non-epithelial pathology were excluded. Overall survival (OS) and progression free survival (PFS) were generated by Kaplan Meier survival curves and cox proportional hazard models using SAS v9.4.

Results: 203 patients were identified. Patients were stratified into 3 groups based on distance from the institution: 41 patients lived within 10 miles, 116 patients lived between 11-50 miles and 46 patients lived > 50 miles away. Survival analysis based on distance demonstrated that patients who lived less than 10 miles from the institution have worse survival (p=0.0412). 5-year survival was 39.1% for patients who lived less than 10 miles from the institution, 54% for those between 11-50 miles and 66.7% for those who lived greater than 50 miles away. Lower median income (< $56,179) regardless of distance to institution was also associated with worse survival, p = 0.0283. After adjusting for stage of disease, age at diagnosis, surgery status, chemotherapy resistance, income quartile and presence of comorbid conditions, distance < 10 miles from the institution was still a significant predictor of worse overall survival, HR 2.62 95% CI (1.333-5.142), p = 0.0052.

Conclusion: Among patients who received guideline-adherent care for ovarian cancer, lower median income and residential distance less than 10 miles to a frontier state NCI-CC was associated with worse overall survival.

Notes

#74

ADDRESSING RACIAL DISPARITIES IN BREAST CANCER AND BREAST RECONSTRUCTION THROUGH COMMUNITY OUTREACH

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Introduction: Women of color receive breast reconstruction at lower rates than Caucasians. Although the etiology is multifactorial, insufficient breast health literacy in these communities is one of the contributors. We sought to improve awareness of breast cancer and breast reconstruction options through a series of Plastic Surgery Foundation funded Breast Health Awareness Symposiums in underserved communities.

Methods: Three annual Breast Health Awareness Symposiums were conducted at select churches in Philadelphia from 2017 to 2019. Educational talks were given by physicians and women that had received breast reconstruction. Surveys were administered to extract participants demographics in addition to knowledge about breast cancer and breast reconstruction at the onset and conclusion of the symposiums. Pre- and post-seminar survey scores (0-100) were assessed for potential improvements in breast health literacy using Wilcoxon signed-rank tests.

Results: A total of 169 people participated; 92% completed a pre-survey, 91% completed a post-survey, and 83% completed both surveys. The majority of respondents were women (97%), black (92%), and had at least a high-school degree (83%). Pre-symposium surveys revealed that 33% were breast cancer survivors and 75% were aware of breast reconstruction. However, only 46% were aware that breast reconstruction for breast cancer is covered by insurance. Median survey scores were significantly higher after the seminar (pre-survey score: 47, interquartile range [IQR 31-73] vs. post-survey score: 80 [IQR 60-87], $p < 0.01$). This trend persisted for both non-breast cancer survivors and breast cancer survivors (all $p < 0.01$).

Post-survey questions showed that 92% of participants thought the Breast Health Awareness Symposium was useful, 90% would recommend the symposium, 91% would pass the information along to others, and 89% learned about new resources available to them during the session.

Conclusion: Breast Health Awareness Symposiums can significantly improve knowledge on breast cancer and breast reconstruction. Further efforts are necessary to increase awareness of breast reconstruction options to empower women of color to make informed decisions about breast reconstruction after oncologic resection.

Notes

#75

RACIAL DISPARITIES EXIST IN SURGICAL OUTCOMES FOR PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD)

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Introduction: Racial disparities in surgical outcomes exist for African-American patients with IBD when compared to white patients. However, previous studies fail to include other minority populations. We therefore hypothesized that disparities in outcomes following surgery for IBD exist amongst Hispanic and Asian patients.

Methods: A retrospective cohort of patients undergoing colorectal surgery for IBD from 2005-2017 was identified using data from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. White, Hispanic, African-American, and Asian patients were included. Bivariate comparisons were performed using Wilcoxon for categorical data and Kruskal-Wallis for continuous data. Unadjusted and adjusted multivariable regressions was performed for surgical outcomes including: length-of-stay (LOS), 30-day readmissions, complications (overall and individual), and 30-day mortality.

Results: 23,901 patients were included in the cohort: 88.7% white, 7.6% African-American, 1.4% Asian and 2.4% Hispanic. The mean age was 42 (SD 15.8) and the majority of patients (56.88%) were diagnosed with Crohn's Disease. Mean LOS was 8 (SD 8.2) days and significantly varied between groups ($p < .001$). Asian patients had increased odds of longer LOS when compared to white patients (OR 1.022, $p < .001$); however, they had lower rates of comorbidities such as smoking or hypertension. Hispanic patients had increased odds of readmission (OR: 1.46, $p=0.002$) and complications after surgery (OR: 1.258; $p=0.01$). They also experienced higher odds of bleeding after surgery when compared to white patients (OR: 1.524; $p=0.002$). However, Hispanic patients had the lowest odds of mortality among all groups (OR 0.74, $p < .001$).

African-American patients had increased odds of longer LOS compared to white patients (OR: 1.035, $p < .001$) and also experienced the highest rate of overall complications (65.8%, $p < .001$). When looking at individual complications, African-American patients had increased odds of renal insufficiency (OR: 1.8; 95% CI 1.123-2.891), bleeding transfusions (OR: 1.7; 95% CI 1.43-1.92), and sepsis (OR: 1.7; 95% CI 1.4-2.02).

Conclusion: Disparities exist in outcomes after surgery for IBD patients of non-white race/ethnicities. When compared to white patients, Asians experienced disparities in LOS while Hispanic patients had higher rates of readmissions and complications. African-Americans experienced the longest LOS and highest rate of complications. Opportunities exist to address these disparities in further studies.

Notes

#76

HEALTH SYSTEM FACTORS DO NOT IMPACT CESAREAN SECTION RATES IN AFRICAN AMERICAN WOMEN

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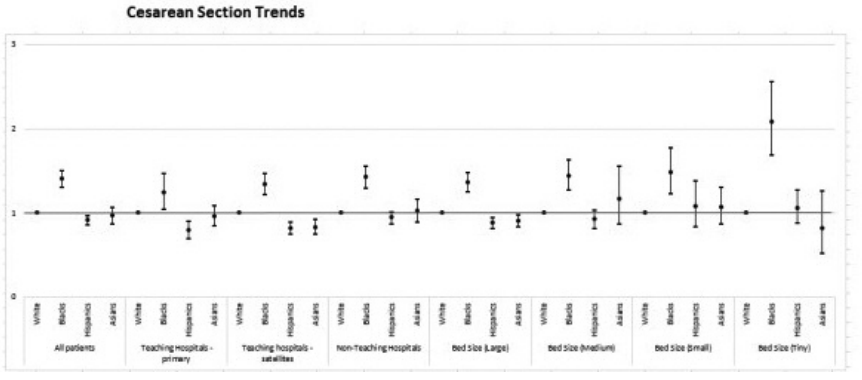
Introduction: The Cesarean section (CS) rate in the US remains higher than many other developed nations. Prior studies have demonstrated that African American women have a higher CS rate than other groups in the US. Although there are clinical indications for CS, the higher incidence of this procedure among African American women remains concerning. We hypothesize that hospital type and volume may impact the use of CS among women, particularly African American women.

Methods: An analysis of the Office of Statewide Health Planning and Development database for California from 2006 to 2010 was performed. All patients admitted to a teaching or nonteaching hospital for attempted vaginal delivery were included. Women who were considered high risk and women with prior Cesarean section were excluded. Patients who died within 24 hours of admission were also excluded. The primary outcome was CS versus vaginal delivery. Multivariable analysis was performed, adjusting for patient demographics, clinical factors, and system variables.

Results (*see Figure*): A total of 1,903,642 woman were included. The overall CS rate was 9.02%. CS rates were higher among African American women regardless of hospital type and volume status. The CS rates were 9.89%, 13.12%, 7.84%, and 9.16% for White, African American, Hispanic, and Asian women, respectively. Hispanic women had the lowest incidence of CS. There was no change in CS rates after adjusting for urbanicity and patient volume.

Conclusion: CS rates are significantly higher in African American women. The persistence of this increased rate across hospital type and volume suggests this may be driven by patient factors. Further assessment of clinical factors impacting AA women are needed to better understand the underlying reasons for this trend.


Cesarean Section Trends
3
2
1
0
White
Black
Hispanic
Asian
All patients
Teaching Hospitals - primary
Teaching hospitals - satellites
Non-Teaching Hospitals
Bed Size (Large)
Bed Size (medium)
Bed Size (small)
Bed Size (Tiny)

NOTES

#77

ILLUSTRATING DISPARITIES ON THE PATH TO RECONSTRUCTION AFTER BARIATRIC SURGERY: A POPULATION-BASED ANALYSIS OF INPATIENT AND AMBULATORY BODY CONTOURING PROCEDURES

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Introduction: We aimed to describe the utilization of body contouring procedures (BCP) after bariatric surgery and to assess disparities in access to such procedures.

Methods: Statewide Data (CA, FL, IA, NE, NY, UT) for different time periods between 2004-2014 were used to identify obese patients undergoing laparoscopic sleeve gastrectomy (LSG), laparoscopic adjustable gastric band (LAGB), and laparoscopic gastric bypass (LGBP) with 3-year follow-up. Cox regression was used to assess the association of age, race, insurance and comorbidities with inpatient/ambulatory BCP utilization.

Results: Of 222,798 patients undergoing bariatric surgery, 159,898 met criteria (24.4% LAGB, 1.1% LGS, 74.5% LGBP) and were followed-up for 5.4 years (median, IQR 1.7-3.5). The BCP rate during the study period was 5.6% at a median time of 2.3 years (IQR 1.6-3.4), which increased up to 11.3% in patients with the longest follow-up (10 years). Most BCPs occur in the ambulatory setting (57.5%), 15.6% underwent 2 BCPs, and 11.7% occurred concurrently with incisional hernia repair. Factors associated with lower BCP utilization were Black race (Hazard Ratio 0.87 [95% Confidence Interval 0.75-0.99]; p=0.04), no insurance (HR 0.8 [0.65-0.99]; p=0.049), private insurance (HR 0.76 [0.64-0.89]; $p < 0.01$), depression (HR 0.90 [0.84-0.97]; p=0.01), and surgical-site complications during bariatric surgery hospitalization (HR 0.82 [0.70-0.96], p=0.02).

Factors associated with higher BCP utilization included female gender (HR 2.07 [1.82-2.35], p < 0.01), Hispanic ethnicity (HR 1.26 [1.09-1.45]; p < 0.01), and age 17-45 years-old (HR 1.08 [1.01-1.15]; p=0.03; *Table*).

Table
Multivariate Analysis Showing Selected Factors Independently Associated with Body Contouring Procedures

Factor	Hazard Ratio	95% CI		*p*
Age 17-45 years (Ref. 46-65)	1.08	1.01	1.15	0.03
Female (Ref. male)	2.07	1.82	2.35	<0.01
Black (Ref. White)	0.87	0.75	0.99	0.04
Hispanic (Ref. White)	1.26	1.09	1.45	<0.01
Private insurance (Ref. Medicaid/Medicare)	0.76	0.64	0.89	<0.01
Uninsured (Ref. Medicaid/Medicare)	0.80	0.65	0.99	0.05
Depression	0.03	0.84	0.97	0.01
Hypertension	1.07	1.01	1.12	0.01
Surgical Site Complication	0.82	0.70	0.96	0.02

Footnote: The Cox regression model included age, gender, race, insurance, state, income, disposition, comorbidities, complications, and length of stay. Body contouring procedures included abdominoplasty, panniculectomy, mammoplasty, liposuction and others.

Conclusion: Over one in 10 patients undergo BCP after bariatric surgery and half of these occur within 2 years. Disparities exist among Black, uninsured, male, and depressed patients, as they are less likely to undergo BCP. These patients could potentially benefit from improved awareness and education of the pathway to reconstruction after bariatric surgery.

NOTES

#78

LANGUAGE PREFERENCE AND READMISSION AFTER COLECTOMY

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Introduction: Language discordance between patients and providers can limit the quality of health-related communication and place patients at risk for adverse events. We therefore hypothesized that patients with non-English language preference would face higher risk of readmission after surgery compared to those with English preference, and that this risk would be greater among those undergoing non-elective operations. The objective of this study was to determine the association between language preference and readmission after colectomy.

Methods: A retrospective cohort study of colectomy patients within one healthcare system (2013-2018). Language preference, designated as English (EP) or non-English preference (NEP), and clinical data were extracted from the electronic health record and linked to a statewide hospital readmission database. Univariate and multivariate analyses were used to assess the relationship between NEP and 30-day readmission.

Results: 3,688 patients (mean age 53.1$\pm$15.7, 55% Male) underwent colectomy and 19% (NEP:25%, EP:19% p=.02) were readmitted. NEP patients experienced 45% higher unadjusted odds of readmission (OR 1.45 95%CI 1.06-2.00), though after adjustment for covariates, no independent association was observed (OR 1.14 95%CI: .80-1.60). When stratified by acuity, however, NEP was associated with 2x higher adjusted odds of readmission (OR: 2.00 95%CI: 1.11-3.64) among those undergoing non-elective, but not elective colectomy (OR .79 95%CI: .49-1.27).

Conclusion: NEP was associated with two-fold higher risk of readmission among patients undergoing non-elective, colectomy, suggesting that language is especially important in the non-elective setting. Further exploration of the association between language and other relevant outcomes is warranted.

#79

PROTECT THE PIGMENT: ALTERNATIVE TO FREE NIPPLE GRAFTING IN WOMEN OF COLOR WITH GIGANTOMASTIA

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Introduction: Breast amputation with free nipple grafting (BA-FNG) is historically recommended for patients with gigantomastia undergoing reduction mammoplasty (RM). However, the resulting nipple-areolar complex (NAC) hypopigmentation is frequent, undesirable, and more apparent in women with more native pigment. Pedicled reductions (PR) could provide an opportunity to dramatically improve NAC aesthetic outcomes. We sought to (1) demonstrate NAC aesthetic differences in a series of non-Caucasian patients who underwent RM for gigantomastia by type of technique and (2) estimate the number of patients at a population-based level that could potentially benefit from the extended PR approach.

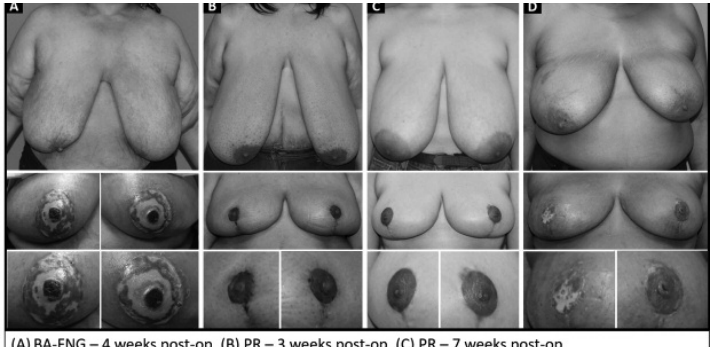
Methods: Fifteen consecutive patients with gigantomastia (sternal notch to nipple distance >40cm) that underwent RM in 2019 were identified. NAC aesthetic outcomes of BA-FNG and extended PR were photographically compared postoperatively. A patient who underwent right BA-FNG and left extended PR served as the internal control. Five statewide inpatient and ambulatory databases (2009-2014; FL, IA, NE, NY, UT) were used to ascertain the number of RM cases per year and the proportion that underwent BA-FNG in non-Caucasian patients. Breast cancer and other reconstructive procedures were excluded.

Results: NAC pigmentation was dependent upon surgical technique (*Figure 1*). The patient that underwent BA-FNG experienced the classic hypopigmentation of the NAC (*A*). The 14 patients that underwent extended PR had no nipple ischemia and retained their natural NAC pigment (*B,C*). The internal control demonstrated both NAC aesthetic outcomes (*D*), with the extended PR on the left side leading to a more desirable result.

Population-level analyses identified 43,228 RM cases during the study period; 797 patients had a concurrent nipple graft. Overall, 39% of the patients receiving nipple grafts were women of color. Focusing on women of color, *Figure 2* illustrates a downward trend of nipple graft utilization relative to RM cases per year.

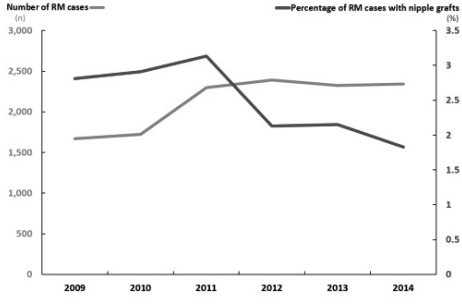
Conclusion: Women of color with gigantomastia undergoing extended PR have superior NAC aesthetic outcomes, reinforcing that one technique is not suitable for all. Although BA-FNG at a population-level is infrequent relative to the overall number of RM procedures, there is still potential for improving hundreds of patients' lives. These findings suggest it is time to revise antiquated treatment guidelines for gigantomastia to adjust for ethnic differences and ensure optimal results for all patients.

Figure 1
Pre- and Postoperative Photos of Patients Who Underwent Reduction Mammoplasty



(A) BA-FNG – 4 weeks post-op. (B) PR – 3 weeks post-op. (C) PR – 7 weeks post-op.
(D) Right-sided BA-FNG (cancer) & left-sided PR – 6 weeks post-op.

Figure 2
Number of Reduction Mammoplasty (RM) Cases and Percentage of RM with Nipple Grafts Among Women of Color in FL, IA, NE, NY, and UT from 2009-2014



#80

A COMPARISON OF ARCH INDEX, FOOT POSTURE INDEX AND SURGEON OBSERVATION FOR FOOT TYPE CLASSIFICATION

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Introduction: Over 75% of Americans report foot pain. Foot morphology is a key aspect of patient evaluation. The ability to quickly identify foot morphology is a key step in diagnosis and management of patients. Methods available to assess foot morphology include Foot Posture Index (FPI) measure and Arch index (AI) which are quantitative measures. Radiographs are the gold standard, but require radiation exposure and are more expensive than other methods. The purpose of this study was to determine the sensitivity and specificity of surgeon observation, FPI, and AI in determining foot type, with calcaneal pitch serving as the reference standard. Our hypothesis is that surgeon observation will be more sensitive and specific than FPI and AI for identifying foot type.

Methods: Following institutional review board approval and informed consent, we examined 41 adults (82 Feet) (average age 37.8±17.6 yrs; range: 20 to 68 years old; 20F/21M) without history of prior foot or ankle injury. Subject evaluation included bilateral FPI exam, lateral and hindfoot standing radiographs, pedographs, and weightbearing photographs. The radiographs and photographs were reviewed by an orthopaedic surgeon to classify a foot type. Calcaneal pitch was measured for each foot. Arch index was calculated for each foot from pedograph. Correlations among foot types were determined using Spearman's rho. Sensitivity and specificity of the surgeon classification, FPI, and AI were also determined using SPSS software.

Results: The gold standard calcaneal pitch measurements identified 12 planus, 57 normal, and 13 cavus feet. Surgeon observation was the most sensitive for identifying planus feet and most specific for identifying cavus feet. AI was the most sensitive for identifying cavus feet and most specific for identifying both planus and normal feet.

The correlation between raw scores on the FPI and AI to CP were weak to moderate, -0.387 and -0.526, respectively ($p < 0.01$).

Conclusion: A previous study reported a correlation between AI and CP of -0.59; we are reporting a correlation of -0.526. Surgeon observation is the only method that had a sensitivity over 0.50 for two different foot morphologies. A specificity of 0.844 and 0.971 for planus and cavus feet demonstrates that FPI is a suitable modality for evaluating pathologic morphology. Our AI specificity is close to a prior reported 0.932. Limitations of the study include small sample size and a single surgeon reviewing imaging.

Notes

#81

PROJECT INSPIRE: A HOSPITAL-BASED INJURY PREVENTION PROGRAM AIMED TO REDUCE RECIDIVISM FOR YOUTH DELINQUENT OF GUN CRIMES

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Introduction: Injuries from gun violence are a public health crisis in the United States. Previous attempts by national and local programs to prevent gun violence and recidivism are largely unsuccessful. Project Inspire is a 3-week, hospital-based injury-prevention program that uses exposure and mentorship to inspire each participant to be the best version of themselves.

Methods: Project Inspire aims to improve decision-making in at-risk teenagers through an individualized and structured curriculum. Each day consists of: 4 hours of shadowing, 1 hour with a featured speaker, and 2 hours of career planning. This includes ACT/GED preparation, resume development, mock interviews, and certifications in Basic Life Support and Stop The Bleed. The participants take part in two service projects including feeding the homeless and instructing Stop The Bleed for the police department. Outcome measures include arrest, violation of probation, high school graduation or GED, employment, sobriety and parental feedback.

Results: 11 teenagers (ages 14-18) found delinquent of gun crimes were selected by the Mobile County Juvenile Court System to participate in Project Inspire over 3 weeks in July of 2018 and 2019. Four participants (80%) of the inaugural class completed the program, and five participants (83%) of the second class completed the program; two did not due to personal reasons. At 6-month follow-up, none of the graduates were delinquent of further gun crimes or any violent crime. One of the nine graduates (11%) violated probation for a nonviolent offense. At 1-year follow-up, none of the graduates from the inaugural class violated probation or were negatively involved with law enforcement for any reason.

Currently, five remain enrolled in traditional high school. One graduated high school and is currently applying for nursing school. Two received their GEDs. Four remain employed, and one is active in Job Corps. One participant struggling with drug addiction remains sober. The parents of three individuals reported significant improvements in work ethic and humanism.

Conclusion: Project Inspire is successful in preventing recidivism in terms of unlawful behavior, while also improving ambition and humanism.

Notes

#82

OUTCOMES OF CANCER NEPHRECTOMIES: DOES VHL PLAY A ROLE?

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Introduction: Although patients with von Hippel Lindau (VHL) syndrome typically have multiple prior tumor resections which may potentially affect their outcomes after surgery, there are few studies comparing their outcomes to the unaffected population. This study aimed to make this comparison using cancer nephrectomy patients.

Methods: Patients with cancer nephrectomies were selected from the National Readmissions Database (2010-2014). Patients with VHL were identified. Demographic, clinical and hospital characteristics were extracted. Outcomes measured were mortality, hospital length of stay (LOS), need for hemodialysis and 30-day readmission. Multivariate regression analyses were performed.

Results: There were 484 patients in the VHL cohort and 196,623 in the non-VHL cohort. Compared to the non-VHL cohort, patients in the VHL cohort were more likely younger (44y vs. 61y), treated in teaching hospitals (93% vs. 70%) and to have undergone partial nephrectomies (73% vs. 35%) (all $P < 0.001$). There were no deaths in the VHL cohort and 1,466 (0.75%) in the non-VHL cohort (P=0.400). Hemodialysis was higher in the VHL cohort (8.9% vs. 3.3%, $P < 0.001$) but LOS (4.9d vs. 4.8d, P=0.867) and 30-day readmissions (11.0% vs. 8.2%, P=0.284) were similar. On multivariate analyses, VHL was independently associated with increased hemodialysis (Odds Ratio: 5.6; 95% Confidence Interval, CI: 2.8 11.1) and LOS (Mean difference: 0.9d, 95%CI: 0.4d 1.5d) but not readmissions. Total nephrectomy was an independent risk factor for increased hemodialysis and LOS.

Conclusion: Despite their younger age, VHL patients have higher morbidity following cancer nephrectomies when compared to their non-VHL counterparts. Continued efforts are necessary to improve outcomes among these patients.

#83

DO MALE CHAIRS OF SURGERY HAVE IMPLICIT GENDER BIAS IN THE RESIDENCY APPLICATION PROCESS?

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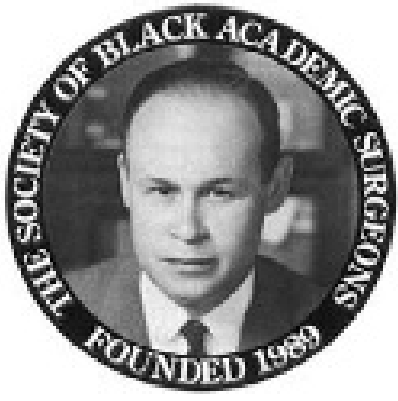
Medical College of Wisconsin, Milwaukee, WI

Introduction: Medical students applying for general surgery residencies often require a letter of recommendation (LOR) from the Surgical Chair. However, the linguistic content of LORs may reveal gender and ethnic bias. This study examines the presence of implicit bias in general surgery resident selection by evaluating chair LORs.

Methods: A retrospective study of 149 LORs for categorical general surgery residents, at an academic institution, written by surgery chairs from 1980 to 2013 was performed. Two independent reviewers scored each letter for overall quality (1-5), mention of personality (0-3), academic deficiencies (Y/N), technical skills (Y/N), and standout adjectives (Y/N). Scores were compared and statistical analysis performed using SPSS.

Results: Males comprised 85% of the applicants; racial makeup was Caucasian (90%), black (4%), Asian (4%), and Hispanic (2%). Male chairs wrote all letters. Letters for female students received higher overall scores than males (4.13±0.16, 3.59±0.08, p=0.005). There was no difference in discussion of personality across gender (1.43±0.2, 1.25±0.08, p= 0.356). Comparing ethnicity, there was no difference in overall scores for Caucasian, Black, Asian, or Hispanic applicants (3.66±0.07, 3.33±0.49, 4.33±0.33, 3.67±0.67, p=0.031). Discussion of personality was significantly less for Asian students (1.28±0.08, 1.83±0.48, 0.5±0.224, 1.67±0.67, p=0.050). No difference was present in mention of academic deficiencies, technical skills, or standout adjectives.

Conclusion: Female medical students accepted into a top academic general surgery residency had higher quality LORs than their male counterparts. Asian applicants were rated lower on the personality scale. Further examination of residency selection processes is necessary to implement changes that mitigate implicit bias in trainee selection.



Constitution

Constitution of the Society of Black Academic Surgeons

ARTICLE I: Designation

The name of the organization shall be the Society of Black Academic Surgeons (SBAS). It shall be incorporated as a non-profit organization and have no capital stock or shareholders. The address of the Society will be the address of the central office.

ARTICLE II: Objective

The paramount objectives of the Society of Black Academic Surgeons shall be supportive of and consistent with the enhancement of the academic surgical community both nationally and internationally. The specific objectives are as follows:

A. Identify and promote professional and intellectual exchange among surgeons and scientists involved in their related fields.

B. Promote the participation of minority surgeons and scientists in the activities of all academic surgical organizations.

C. Stimulate and assist government, private industry, and voluntary organizations to develop and promote programs to increase the participation of minority surgeons in the academic community.

D. Encourage and assist minority surgeons to conduct original research in both the basic and clinical sciences.

E. Support and strengthen the surgical section programs of the National Medical Association.

ARTICLE III: Members

A *member* of The Society of Black Academic Surgeons may be an academic surgeon of any surgical subspecialty recognized by the American Board of Medical Specialties (ABMS), a surgical fellow or resident-in-training of any surgical subspecialty as defined by the Accreditation Council on Graduate Medical Education (ACGME), a medical student, as defined by the Association of American Medical Colleges (AAMC) or the American Association of Colleges of

Osteopathic Medicine (AACOM), or a MD, DO, or PhD researcher. Eligibility for membership in these categories and membership certification may be further stipulated in the Bylaws of the Society. Academic surgeons certified by the American Board of Medical Specialties or its sub-boards and holding faculty appointment in a university, university affiliate, free standing department of surgery, an institution within a hospital, or an institute of the National Institutes of Health, shall be designated *"Fellows"* of the Society. All other members shall be designated as *"Associate Members."* All members will be elected to fellowship or membership, and have continued fellowship or membership, according to the Constitution and Bylaws. Termination of a member by death, resignation, failure to pay dues, failure to support the Society, or any other manner addressed in the Bylaws will end all rights and privileges in the Society. None of the assets nor privileges shall be transferable to any representative of a member's estate.

ARTICLE IV: Officers/Council

The Officers of the Society shall be President, President-Elect, Secretary, and Treasurer. The President and President-Elect shall be elected for a one-year term; the President-Elect shall automatically become President. The Secretary and the Treasurer shall be elected for three-year terms. This slate of officers, along with four Fellows (appointed by the President) will be designated as the Executive Council.

ARTICLE V: Organization Structure

A. The Society's organizational structure will consist of General Membership, Officers, Executive Council, and the following Standing Committees: Finance, Membership, Advocacy, Education/Research, Annual Program, Audit, Nominating, and Informatics. The span of authority, rights and, privileges shall be based on the Constitution and Bylaws.

B. The duties, powers, and regulations governing the Society's organizational structure shall be defined and delineated in the Society's Bylaws.

Constitution of the Society of Black Academic Surgeons

(CONTINUED)

ARTICLE VI: Meetings

The Society shall hold an annual scientific and business meeting, the time and place of which will be determined by the Executive Council at least two years in advance of the meeting. Only members of the Society may attend the business meeting.

ARTICLE VII: Rules

The conduct of all Society meetings, including those of the Executive Council, shall be governed by the Bylaws of the Society and Robert's Rules of Order.

ARTICLE VIII: Governance

Section 1 The Society shall be governed by this Constitution and Bylaws, the latter document to provide specific direction for the organization, administration, and services of the Society.

Section 2 The Society's Constitution and Bylaws shall be consistent with provisions and content of any organizational charter or certificate of incorporation the Society may propose and/or execute.

ARTICLE IX: Certificate of Incorporation

Section 1 The Society may propose and execute an organizational charter or certificate of incorporation in accordance with all local, state, and federal (U.S.) regulations, codes, and laws.

Section 2 The certificate of incorporation shall not vitiate any provision of this Constitution or the Society's Bylaws, unless a court of competent jurisdiction expressly rules, orders, or directs otherwise. If any such provision or certificate, in whole or part, is held to be unlawful, only the unlawful provision or certificate will be null and void. The remaining provisions and/or certificate, in whole or part, will continue in effect as valid.

Section 3 The certificate of incorporation shall not govern the application and administration of the Constitution or the Society's Bylaws.

Section 4 Notwithstanding any other provisions of these articles, the organization is organized exclusively for one or more of the purposes as specified in Section 501(c)(3) of the Internal Revenue Code of 1954, and shall not carry on any activities not permitted to be carried on by an organization exempt from Federal income tax under IRC 501(c)(3) or corresponding provisions of any subsequent Federal tax laws.

Section 5 No part of the net earnings of the organization shall inure to the benefit of a member or any private individual (except that reasonable compensation may be paid for services rendered to or for the organization), and no member of the organization or any private individual shall be entitled to share in the distribution of any of the organization's assets on dissolution of the organization.

Section 6 No substantial part of the activities of the organization shall be carrying on propaganda, or otherwise attempting to influence legislation [except as otherwise provided by IRC 501(h)] and does not participate in, or intervene in (including the publication or distribution of statements), any political campaign on behalf of any candidate for public office.

Section 7 In the event of dissolution, all of the remaining assets and property of the organization shall, after payment of necessary expenses, thereof be distributed to such organizations as shall qualify under section 501(c)(3) of the Internal Revenue Code of 1986 and approved by the Executive Committee.

Section 8 In any taxable year in which the corporation is a private foundation as described in IRC 509(a), the organization shall distribute its income for said period at such time and manner as not to subject it to tax under IRC 4942, and the organization shall not [a] engage in any act of self-dealing as defined in IRC 4941(d), retain any excess business holdings as defined in IRC 4943(c), [b] make any investments in such a manner as to subject the organization to tax under IRC 4944, or [c] make any taxable expenditures as defined in IRC 4945(d) or corresponding provisions of any subsequent Federal tax laws.

ARTICLE X: Funds and Expense

Funds for the Society may be raised by approved dues and/or in any manner approved initially by the Executive Committee and the organization. Funds may be appropriated by the Executive Council to defray the expense of the Society to carry out the necessary functions, and for any other purpose approved by the Council, provided that no funds or assets shall be used to inappropriately benefit one member of the unit.

ARTICLE XI: Amendments

This Society, at any annual business meeting of the Fellows, may amend any Article of this Constitution by a two-thirds majority of the voting Fellows present, provided that a copy of the proposed Amendment has been furnished to each voting Fellow at least thirty days in advance of the meeting.

ARTICLE XII: Effective Date for any Change to the Bylaws of the Constitution

These revised Bylaws shall take effect immediately upon acceptance by a simple majority of the voting Fellows and extend indefinitely, subject to alteration, amendment, or repeal in whole or part, as specifically provided in the Constitution.

BYLAWS: SOCIETY OF BLACK ACADEMIC SURGEONS

Section 1 Annual Meeting

The Society of Black Academic Surgeons shall meet annually at such time and place as designated by the Executive Council.

Section 2 Quorum

The Fellows present shall constitute a quorum for business. All questions before the Society shall be determined by the vote of the majority of Fellows present at any regular business meeting.

Section 3 Fiscal Year

The fiscal year shall begin on the first of July. The annual dues of each member shall be determined by the Executive Council with approval of the membership, payable on the first of September of each year. Each member of the Society who reaches the age of seventy shall automatically have his or her dues waived.

Section 4 Parliamentary Procedure

Robert's Rules of Order shall govern the sessions of the Society.

Constitution of the Society of Black Academic Surgeons

(CONTINUED)

Section 5 Membership

A. Eligibility for Fellowship in the Society of Black Academic Surgeons

1. An individual who occupies a faculty position in a university department of surgery, institute, or its affiliated hospitals.

2. An individual who occupies a faculty position in a free-standing surgical residency program.

3. An investigator (M.D., D.O., Ph.D., or Sc.D., as examples) or teacher (M.D., D.O., Ph.D., or Sc.D., as examples) in an academic department of surgery or an ACGME-approved surgery program.

4. An individual who meets one of the criteria above in any surgical specialty shall be eligible for membership as a Fellow.

B. Membership Certification

Membership in the Society shall include the following categories: Active Fellow, Senior Fellow, Associate Member, Honorary Fellow, and Institutional Member.

1. Active Fellow: Any person who is a Doctor of Medicine (M.D. or D.O.), Doctor of Philosophy (Ph.D.), or Doctor of Science (Sc.D.) who shares an interest in the purpose of the Society and is approved by the Membership Committee. Only active Fellows have the right to vote and hold office.

2. Senior Fellow: Any active Fellow upon reaching the age of seventy shall become a Senior Fellow. Senior Fellows are exempt from paying dues, and shall continue to vote, but shall not have the privilege of holding office.

3. Associate Member: Any medical student in good standing at an LCME approved medical school or an AOA (American Osteopathic Association) approved osteopathic school, or surgical fellow-in-training, or resident in good standing in an ACGME-approved fellowship or residency program who desires to pursue an academic surgical career.

4. Honorary Fellow: Any person who is a Doctor of Medicine (M.D. or D.O.), or Doctor of Philosophy (Ph.D.), or Doctor of Science (Sc.D.), and has distinguished himself/herself by outstanding achievement and dedication to the objectives of the Society. Honorary Fellows shall pay no dues or initiation fees and may not vote or hold elected office.

5. Institutional Member: Any ACGME approved academic institution (such as LCME), medical school, or institution sponsoring graduate medical education that wishes to pay institutional dues or otherwise financially support the mission of the Society of Black Academic Surgeons.

Section 6 Responsibilities of the Officers

A. It shall be the duty of the President to (1) preside at all meetings of the Society, (2) give the deciding vote, (3) ensure that Robert's Rules of Order and decorum are properly enforced in all deliberations of the Society, and (4) sign the approved proceedings of each meeting.

B. In the absence of the President, the President-Elect shall preside, or, in his/her absence, the Secretary.

C. It shall be the duty of the Secretary to (1) keep a true and correct record of the proceedings of the Meetings, (2) preserve all books, papers, and articles belonging to the Society, (3) keep an account of the Society with its Fellows, and (4) keep a register of the Fellows with the dates of their admission and places of residence. The Secretary shall report unfinished business at previous meetings requiring action, and attend to such other business as the Society may direct. The Secretary shall assist with the correspondence of the Society. It shall be the duty of the Treasurer to collect the dues of the Society and make disbursements for expenses. *(cont.)*

The Treasurer shall present an annual report of the financial condition of the Society. The accounts of the Treasurer shall be audited annually by a committee appointed by the President.

Section 7 Vacancies, Resignations and Removal from Membership

A. Vacancies

Vacancies occurring in the offices of the Society, other than that of the President, shall be filled by appointment by the President until the next meeting. The President shall appoint members to all Committees.

B. Resignations

Any Fellow may resign from the Society by delivering a written resignation to the President or Secretary.

C. Expulsions

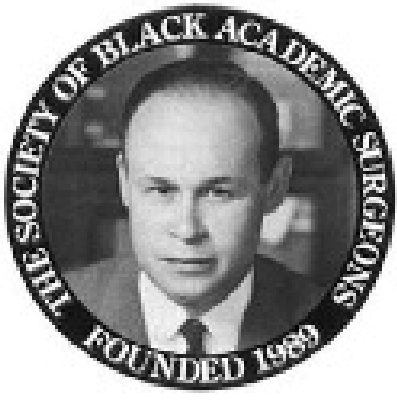
The removal of a Fellow from the Society shall be based on gross negligence or poor character as determined by the Executive Council and a majority of the full membership.

D. Suspension

Any member who is three years in arrears will be suspended for non-payment of dues. Reinstatement for membership can be accomplished with payment of past dues.

Constitution changes ratified April 11, 2015 by vote of 45:1 of eligible voting Fellows present during Business Meeting of the Society at the Carolina Inn at Chapel Hill, North Carolina. Bylaws changes ratified by vote of 46:0.

Recorded by Frederick D. Cason, MD, Fellow, historian/archivist, and at-large member of the Executive Council.



SBAS Institutional Membership

SBAS Institutional Members

Presidential Platinum Member

Medical College of Wisconsin

Platinum Members

Duke University School of Medicine

Houston Methodist — Leading Medicine

1867 Howard University

Mayo Clinic

The Ohio State University College of Medicine

Stanford Medicine

UC Davis Health — Department of Surgery

UAB Medicine — Surgery

The University of Chicago Medicine & Biological Sciences — Department of Surgery — At the Forefront of Medicine

UW Medicine — Department of Surgery

Washington University in St. Louis — School of Medicine

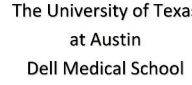
Weill Cornell Medicine — Surgery

SBAS Institutional Members

Gold Members

SBAS Institutional Members

Silver Members



Honorary Members

SBAS gives Honorary Fellowships to outstanding surgeons who have mentored minority surgeons and championed diversity in surgery.

Honorary Fellow Award Recipients (Chronologically Ordered):

Judah M. Folkman, MD

R. Scott Jones, MD

Frank R. Lewis, MD

Olga Jonasson, MD

Arthur J. Donovan, MD

Lloyd M. Nyhus, MD

Hiram C. Polk, Jr., MD

Walter J. Pories, MD

Basil A. Pruitt, Jr., MD

George F. Sheldon, MD

William Silen, MD

James C. Thompson, MD

Benard F. Ribeiro, MD

Walter Lawrence, Jr., MD

John Najarian, MD

James A. O'Neill, Jr., MD

Thomas E. Starzl, MD

Dean Warren, MD (posthumous)

Kirby I. Bland, MD

Wallace P. Ritchie, Jr., MD

Courtney M. Townsend, Jr., MD

Arnold G. Diethelm, MD

Honorary Members (Cont.)

Thomas R. Russell, MD

Richard L. Simmons, MD

Edward Copeland, MD

John Tarpley, MD

Andrew Warshaw, MD

Jeffrey Matthews, MD

Carlos Pelligrini, MD

Michael J. Zinner, MD

Raphael E. Pollock, MD, PhD

Bernard M. Jaffe, MD

J. Wayne Meredith, MD

Michael T. Longaker, MD

Timothy R. Billiar, MD

Christopher Ellison, MD

David B. Hoyt, MD

Thomas M. Scalea, MD

Timothy J. Eberlein, MD

Irving L. Kron, MD

Diana L. Farmer, MD

Mary Hawn, MD

Fabrizio Michelassi, MD

Previous SBAS Meetings

1989 Duke University, Chapel Hill, NC
1991 Harvard University, Boston, MA
1993 UC Davis-East Bay (Meeting held in Napa Valley, CA)
1994 University of Texas Medical Branch, Galveston, TX
1995 University of North Carolina, Chapel Hill, NC
1996 University of Colorado, Denver, CO
1997 State University of New York, Buffalo, NY
1998 Howard University College of Medicine, Washington, DC
1999 University of Louisville, Louisville, KY
2000 Charles R. Drew University, Los Angeles, CA
2001 Harvard University, Boston, MA
2002 Morehouse School of Medicine, Atlanta, GA
2003 University of Alabama at Birmingham, Birmingham, AL
2004 Howard University, Washington, DC
2005 University of Pittsburgh, Pittsburgh, PA
2006 University of Cincinnati, Cincinnati, OH
2007 Rush University Medical Center, Chicago, IL
2008 Cleveland Clinic, Cleveland, OH
2009 University of Washington, Seattle, WA
2010 Duke University, Chapel Hill, NC
2011 Massachusetts General Hospital, Boston, MA
2012 Johns Hopkins School of Medicine, Baltimore, MD, and Howard University, Washington, DC
2013 University of Mississippi, Jackson, MS
2014 Temple University and The University of Pennsylvania, Philadelphia, PA
2015 University of North Carolina, Chapel Hill, NC
2016 The Ohio State University, Columbus, OH
2017 University of Chicago, Chicago, IL
2018 University of Alabama at Birmingham, Birmingham, AL

Future SBAS Meetings

2020 Medical College of Wisconsin, Milwaukee, WI
2021 Washington University, St. Louis, MO
2022 Jefferson University Hospitals, Philadelphia, PA
2023 University of Michigan, Ann Arbor, MI
2024 University of California, Davis, Davis, CA

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