Resident Research Day

June 18, 2026
7:00 - 8:30 am

Location: Foerderer Auditorium College Building 2nd Floor

Moderator: Hien Dang, PhD

Presented by the
Department of Surgery
Division of Surgical Research

Itinerary

7:00 – 7:03	Opening Remarks, **Charles J. Yeo, MD** Samuel D. Gross Professor and Chair of Surgery Senior Vice President and Chair, Enterprise Surgery
7:03 – 7:10	Factors Associated with Upstaging in Patients with Resectable Non-Small Cell Lung Cancer: A Modern Institutional Sample by **Sneha Alaparthi, MD**
7:10 – 7:12	Discussion
7:12 – 7:19	An Orthotopic Model of Cecal Tumor in Mice to Explore Regulation of p38α Signaling by Wnt/β-catenin In Vivo by **Allison Doermann, MD**
7:19 – 7:21	Discussion
7:21 – 7:28	Improved perioperative outcomes after pancreaticoduodenectomy: a 6-year follow-up study of the WARP protocol from a high-volume NCI-designated comprehensive cancer center by **George Ibrahim, MD**
7:28 – 7:30	Discussion
7:30 – 7:37	The Use of Radiographic Features for Risk Stratification of Ovarian Masses in Children and Adolescents by **Haley Kittle, MD**
7:37 – 7:39	Discussion
7:39 – 7:46	Evaluation of a Wearable Wireless Respiratory Monitoring System (RMS) for Detecting and Predicting Clinical Deterioration by **Ellius Kwok, MD**
7:46 – 7:48	Discussion
7:48 – 7:55	Screening Mammography Completion and Incidental Breast Lesions Among Women Enrolled in a Lung Cancer Screening Program by **Meghan Maceyko, MD**
7:55 – 7:57	Discussion
7:57 – 8:04	The Price of Diversion: National Trends and Perioperative Outcomes after Cervical Esophagostomy by **Khaled Noueihed Gherzeddine, MD**
8:04 – 8:06	Discussion
8:06 – 8:13	Comparative Efficacy of Analgesia Strategies after Minimally Invasive Repair of Pectus Excavatum: A Randomized Controlled Trial in Children by **Sage Vincent, MD**
8:13 – 8:15	Discussion
8:15 – 8:23	The Uptake of Segmentectomy for Non-Small Cell Lung Cancer in Adopters of Robotic Surgery by **Jacob Woodroof, MD**
8:23 – 8:30	Closing Remarks

Research Abstracts

Sneha Alaparthi, MD
Mentor:
Dr. Scott Cowan
Dr. Olugbenga Okusanya
Department of Surgery,
Thomas Jefferson University, Philadelphia, PA
Awards:
Saligman 2025

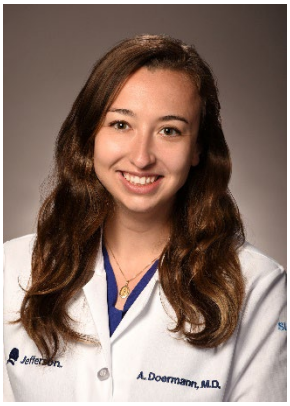
Factors Associated with Upstaging in Patients with Resectable Non-Small Cell Lung Cancer: A Modern Institutional Sample

Background: The purpose of this study is to review patients who were upstaged following resection and evaluate their clinical and demographic data to elucidate which factors portend an increased risk of pathologic upstaging at our institution.

Methods: A retrospective review of institutional data was performed between 2011 in 2023. Patients with stage I-II non-small cell lung cancer were included. Patients were excluded if they received neoadjuvant systemic therapy including chemotherapy and/ or immunotherapy, and were excluded if they received pre-operative mediastinoscopy or EBUS. Demographic, clinical data was collected. Kaplan-Meier analysis was utilized with log rank testing to examine five-year overall survival and progression free survival. A logistic regression model was built to evaluate whether certain clinical or demographic factors affect the odds of being upstaged.

Results: A total of 371 patients met the inclusion criteria. Male sex, primary tumor SUV > 8, pre-operative biopsy, and having 10-13 lymph nodes explored were all associated with increased odds of being upstaged. Squamous cell histology was associated with lower odds of upstaging compared to adenocarcinoma. Patients who had their tumor detected via a screening CT scan had a trend towards a decreased odds of upstaging compared to symptomatic and incidentally found tumors.

Conclusion: Male gender, primary tumor SUV >8, having a preoperative biopsy and having 10-13 lymph nodes explored were associated with increased odds of being upstaged. This analysis provides patients and clinicians with valuable data regarding upstaging early-stage lung cancers which could be used to guide multidisciplinary teams in making more informative decisions regarding resection and the use of perioperative systemic therapy.



Allison Doermann, MD
Mentor:
Dr. Scott Waldman
Department of Pharmacology, Physiology, and Cancer Biology

An Orthotopic Model of Cecal Tumor in Mice to Explore Regulation of p38α Signaling by Wnt/β-catenin In Vivo

Background: Colon cancer is the second most common cause of cancer-related mortality in the United States. Oncogenic signaling represses uroguanylin and guanylin ligand expression, silencing the GUCY2C receptor pathway, which contributes to colorectal carcinogenesis. Indeed, previously we demonstrated that mutant Wnt/β-catenin signaling driving oncogenesis transcriptionally suppresses GUCY2C ligand expression in vitro and in vivo. Further, we have defined a novel mechanism of Wnt/β-catenin/TCF4 suppression of the p38α MAP Kinase (MAPK) signaling pathway. Importantly, p38α MAPK signaling is necessary for expression of a subset of Wnt-suppressed genes, including uroguanylin and guanylin in vitro. Here, we developed an orthotopic model to elucidate whether this applies in vivo.

Methods: Luciferase was transduced into LS174T human colorectal cancer (CRC) cells with an inducible dnTCF plasmid to silence Wnt/β-catenin signaling. 20 immunodeficient NSG mice were opened surgically, and 5 million luciferase-transduced LS174T cells were injected directly into the cecum. Tumor growth was monitored using in vivo bioluminescent imaging weekly. Surgeries were performed on two cohorts of mice. In the second cohort, mice were treated with 2mg/mL doxycycline (dox) in water with 4% sucrose for 10 days prior to tumor harvesting.

Results: In the mice injected with LS174T CRCs, 85% (17/20) mice survived surgery postoperatively. 59% (10/17) of mice had intra-abdominal tumors demonstrated via fluorescence. Specifically, 35% (6/17) of mice had cecal tumors, and 24% (4/17) of mice had intraperitoneal tumors. Of the six mice with cecal tumors, three were treated with dox. RNA data demonstrated increased expression of guanylin and TCF in the dox-treated tumors compared to non-dox tumors. Protein data showed increased TCF in dox-treated cecal tumors with no significant difference in pp38 or pHSP27.

Conclusions: These studies demonstrate the ability to grow genetically modified LS174T human colon cancer cells orthotopically implanted into the cecum of mice. Future studies will seek to improve the success rate with respect to surgical survival and the rate of establishing cecal tumor growth. Moreover, these studies offer a tractable model to explore the role of p38 MAPK in mutant Wnt/β-catenin/TCF4 regulation of oncogenic gene expression in vivo.

George Ibrahim, MD

Mentors:
Dr. Avi Nevler
Dr. Scott Cowan
Dr. Richard Zheng
Dr. George Koenig
Surgical Oncology, Trauma/ACS
Thomas Jefferson University, Philadelphia, PA

Improved perioperative outcomes after pancreaticoduodenectomy: a 6-year follow-up study of the WARP protocol from a high-volume NCI-designated comprehensive cancer center

Background: Pancreaticoduodenectomy (PD) is associated with significant risk of morbidity and mortality. We previously described the Whipple Accelerated Recovery Pathway (WARP) in a selected group of low risk patients, demonstrating lower complication rates, shortened hospital stay, and reduced. The WARP emphasizes early mobilization, conservative dietary advancement, minimizing opioids, and close interval followup. Since 2019, the WARP has been implemented for all patients undergoing PD at our institution. In this study, we analyze WARP outcomes and compare them to data from the National Surgical Quality Improvement Program (NSQIP).

Methods: A retrospective observational cohort study was performed using a prospectively maintained database of patients undergoing open PD at our institution (2014-2023). Patients were assessed for preoperative, perioperative and postoperative variables. Risk-adjusted performance data from the 2014-2024 NSQIP were used to compare the institutional perioperative results between the WARP intervention period (2019-2024) and historical pre-intervention controls (2014-2018), as well as overall performance of other collaborative hospitals in NSQIP.

Results: n the institutional data cohort there were 866 patients (376 Pre-WARP, 490 WARP) with a median age of 67.9 years (IQR: 60-74), with 718 patients (83.0%) undergoing a pylorus preserving PD (84.6% Pre-WARP, 82.4% WARP), and 493 patients (57.0%) undergoing resection for pancreatic cancer (54.8% and 58.6%, respectively). Clinically relevant postoperative pancreatic fistula (Grade B/C) occurred in 137 (15.8%) patients (17.8% and 14.3%, respectively) and delayed gastric emptying (DGE, Grades A-C) occurred in 132 (15.3%) patients (21.5% and 10.4%, respectively). The 30-day mortality rate was 1.7% (1.1% and 2.2%, respectively). Comparison of results between the WARP intervention period and the overall performance of the NSQIP collaborating hospitals showed significantly lower event odds-ratios in the WARP cohort for overall morbidity, pneumonia, ventilator use greater than 48 hours, venous thromboembolism (VTE), renal failure, sepsis, Clostridium difficile colitis, unplanned reoperation, length of stay, and DGE ($P<0.05$, each) as shown in Figure 1. When compared to the pre-WARP period, improvements in the risk-adjusted performance were observed in overall morbidity ($P=0.008$), DGE ($P=0.0002$), pneumonia ($P=0.002$), ventilator use greater than 48 hours ($P=0.018$), and renal failure ($P=0.019$). Overall, during the WARP period, the median results ranked in the top decile in 9 of 17 parameters, including renal failure (ranked #5), VTE (ranked #2), DGE (ranked #2), unplanned reoperations (ranked #2), and LOS (ranked #1).

Conclusions: Our experience demonstrates that patients undergoing open PD are able to achieve improved and favorable outcomes utilizing the WARP, with first decile NSQIP results for LOS, DGE, renal failure, unplanned reoperation and VTE.

Haley Kittle, MD

Mentors:
Dr. Berman,
Dr. Minneci
Pediatric Surgery
Thomas Jefferson University, Philadelphia, PA

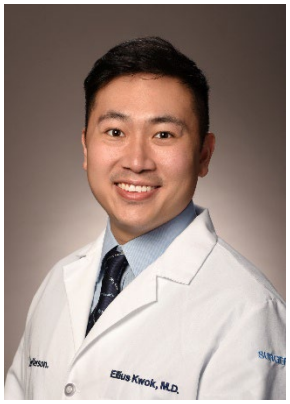
The Use of Radiographic Features for Risk Stratification of Ovarian Masses in Children and Adolescents

Background: Radiographic imaging is used to identify and characterize ovarian tumors. Radiographic features suspicious for malignancy should prompt further evaluation including a multidisciplinary discussion for consideration of ovarian sparing surgery (OSS) versus oophorectomy. This study assessed the diagnostic capability of radiographic features alone and in combination to risk stratify between benign and malignant ovarian tumors in pediatric and adolescent patients.

Methods: We performed a planned secondary analysis of a prospective multi-institutional, interventional cohort study using a consensus-based preoperative risk stratification algorithm to decrease unnecessary oophorectomies in patients 6-21 years at 11 children's hospitals between August 2018 and January 2021. All patients underwent radiographic imaging. Radiographic features were analyzed individually and in combination. A priori clinical consensus prioritized maximizing negative predictive value to minimize risk of missed malignancy.

Results: Imaging was performed in 519 patients with ovarian tumors. The presence of a complex mass, solid component, or tumor size >8 cm was reported in 26 of 27 malignant tumors. All 26 malignant tumors were identified when one of these radiographic features was present, conferring a NPV of 100% with 65.1% accuracy. The combination of radiographic evidence of metastatic disease and increased β-HCG, CA-125, or Inhibin A identified all 13 malignancies in patients who received these tests with an accuracy of 87.6%.

Conclusions: The presence or absence of radiographic features including a complex mass, solid component, or size >8 cm can be used to preoperatively risk stratify masses to direct management with OSS or further evaluation including serum tumor markers and multidisciplinary discussion.



Ellius Kwok, MD
Mentor:
Jeffrey Joseph, MD
Anesthesiology
Thomas Jefferson University, Philadelphia, PA

Evaluation of a Wearable Wireless Respiratory Monitoring System (RMS) for Detecting and Predicting Clinical Deterioration

Background: TJU and RTM Vital Signs, LLC are developing a wearable wireless acoustic RMS that continuously measures respiratory rate (RR), tidal volume (TV), minute ventilation (MV), breathing pattern, apnea duration, and pulse rate (PR) with artificial intelligence algorithms designed to detect/predict clinical deterioration prior to an adverse event. Early and accurate detection of respiratory compromise often precedes clinical deterioration. The purpose of this study is to compare RMS measurements of RR to an FDA approved breathing device (ExSpiron 2xi) to obtain 510(k) clearance.

Methods: Normal breathing was recorded in 13 healthy volunteers to produce a range of RR measurements. RMS acoustic spectrogram and ExSpiron data were time-synced and split into 1-minute segments. Number of full breaths were manually counted for RR (breaths/minute) in each segment. Mean bias was calculated using Bland-Altman plot and correlation analyses between the 2 devices was performed. A 2-sided paired t-test with $p<0.05$ was used to assess for statistical significance.

Results: RR mean ±SD for ExSpiron and RTM was 13.96 ±2.46 and 13.75 ±2.61 breaths/min, respectively. The mean absolute bias ±SD was 0.49 ±0.33. The percent error was 3.61%. The RMS measurements of RR were within 1 breath/min and <5% error compared with the ExSpiron, which was not significantly different ($p=0.177$).

Conclusions: There is great clinical need for a low-cost wireless monitoring device capable of accurately detecting and predicting clinical deterioration in the hospital and outpatient setting. The RMS being developed has the potential to detect clinical deterioration earlier than current methods, improving clinical outcomes and saving lives.

Meghan Maceyko, MD
Mentors:
Dr. Julie Barta
Dr. Alliric Willis
Breast Surgery
Thomas Jefferson University, Philadelphia, PA

Screening Mammography Completion and Incidental Breast Lesions Among Women Enrolled in a Lung Cancer Screening Program

Background: We aimed to investigate breast cancer screening (BCS) completion status among women undergoing lung cancer screening (LCS) with low-dose CT (LDCT) and to describe the prevalence and management of incidental breast findings detected on LDCT.

Methods: We conducted a retrospective study of women receiving LCS through a centralized program at a single academic medical center between January 2018 and September 2025. Demographic and other baseline characteristics were extracted from the prospectively maintained LCS Registry. Mammography history and BCS outcomes were collected from the electronic medical record. Bivariate and multivariate logistic regression analyses were used to identify predictors of being overdue for BCS, defined as more than two years without screening.

Results: Among 2,118 BCS-eligible women who completed LCS, 33.3% were overdue for BCS. Hispanic ethnicity, personal history of cancer, and COPD were significantly associated with being overdue for BCS. Incidental breast findings, most commonly calcifications, were noted on LDCT reports of 141 women (6.7% of the study cohort). One breast cancer diagnosis was directly attributable to a LDCT-identified lesion, not previously seen on BCS imaging.

Conclusion: Two-thirds of eligible women engaged in LCS had completed BCS within 2 years of LCS, with lower completion rates observed in those with higher cancer risk profiles. Incidental breast lesions identified on LDCT were infrequently evaluated with diagnostic mammography. LCS encounters offer an opportunity to enhance BCS engagement in a high-risk population.

Khaled Noueihed Gherzeddine, MD

Mentor:
Dr. Olugbenga Okusanya
Thoracic Surgery
Thomas Jefferson University, Philadelphia, PA

Awards:
Saligman Award 2026
STS Looking to the Future Scholarship 2026

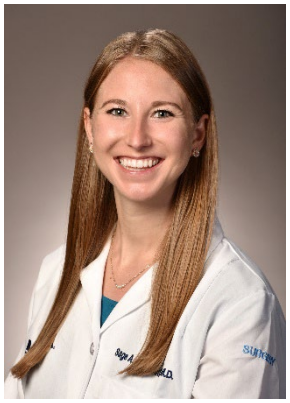
The Price of Diversion: National Trends and Perioperative Outcomes after Cervical Esophagostomy

Background: Cervical esophagostomy is an uncommon but morbid operation, typically reserved for patients with advanced malignancy or catastrophic benign disease. Yet, although performed in some of the highest-risk clinical scenarios, outcomes after cervical esophagostomy remain poorly described.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for patients undergoing cervical esophagostomy from 2012 to 2024. Patients were identified using Current Procedural Terminology (CPT) codes and stratified by indication into malignant and benign groups based on International Classification of Diseases (ICD) codes. Descriptive analysis was performed to characterize patient demographics, baseline comorbidities, and 30-day perioperative outcomes, including mortality, readmission, reoperation, and postoperative morbidity. Morbidity was defined as a composite endpoint encompassing pulmonary, infectious, cardiovascular, and bleeding complications. Perioperative outcomes were compared between patients with malignant and benign indications using Student's t-tests, Wilcoxon rank-sum tests, and Fisher's Exact tests as appropriate. A secondary subgroup analysis was performed comparing patients diverted specifically for esophageal perforation to those with malignant disease. Multivariable logistic regression with Holm-Bonferroni correction was used to identify independent predictors of morbidity in the full cohort and in the indication-stratified model.

Results: A total of 399 patients were identified, including 243 (60.9%) with malignant disease and 156 (39.1%) with benign indications; 69 patients had a diagnosis of esophageal perforation. A total of 60.9% of patients experienced at least one postoperative complication, with pulmonary complications being most frequent (33.6%), followed by bleeding (33.1%) and infectious complications (31.6%). On multivariable analysis, preoperative sepsis was significantly associated with the development of any postoperative morbidity in the full cohort (OR 4.00, 95% CI 1.74–10.5, adjusted p=0.02). Compared with malignant cases, patients with benign disease experienced higher mortality (11.5% vs. 5.7%) and higher rates of any morbidity (74.4% vs. 52.3%), including pulmonary, bleeding, and infectious complications. After multivariable adjustment, benign indication was not independently associated with morbidity. Similarly, the perforation group was associated with higher rates of any morbidity, and postoperative pulmonary, infectious, and bleeding complications, in the setting of markedly elevated rates of preoperative sepsis (65.2%) and ventilator dependence (29%).

Conclusions: Cervical esophagostomy is a procedure associated with substantial morbidity, mortality, and resource utilization. Procedures performed for benign indications were associated with higher rates of postoperative complications, highlighting the profound physiologic burden and vulnerability of this population. Preoperative sepsis was the strongest predictor of postoperative complications.



Sage Vincent, MD
Mentor:
Dr. Jose Diaz-Miron
Pediatric Surgery,
Children's Hospital Colorado, Aurora, CO

Comparative Efficacy of Analgesia Strategies after Minimally Invasive Repair of Pectus Excavatum: A Randomized Controlled Trial in Children

Background: Pectus excavatum is the most common chest wall deformity in pediatric patients. This condition is often corrected via minimally invasive repair of pectus excavatum (MIRPE). Patients frequently report significant pain after MIRPE related to pressure from the substernal bar, however the optimal analgesic modality in children is unclear. We compared the effect of three analgesia modalities on postoperative outcomes through a randomized controlled trial.

Methods: Patients age >12 and ≤21 years of age undergoing MIRPE at a single quaternary care children's hospital were randomized to one of three analgesia strategies: multimodal analgesia only (MAO), MAO + erector spinae blocks (ESB), or MAO + intercostal nerve cryoablation (INC). Operative and postoperative course including morphine milligram equivalents (MME) consumption, reported pain scores as measured by visual analogue scale (VAS), and hospital length of stay (LOS) were noted. Comparisons were made among the three groups using Kruskal-Wallis and Fisher's exact tests, as appropriate. Pre-study power calculations estimated a necessary sample size of 87 patients to achieve 80% power.

Results: Recruitment of 87 patients occurred from May 2020 - February 2026. Four patients withdrew from the study after randomization, for a final study population of 83 patients (MAO n=28, ESB n=29, INC n=26). Median Haller index was 4.3, similar among all groups (p=0.65). Operating time was longest in the INC group (median 108.5 minutes versus 71.5 and 64.0 minutes for MAO and ESB, respectively; p<0.001). Median VAS pain scores on postoperative day (POD) 0 and 1 were lower in the INC group compared to the ESB and MAO groups (p=0.008 and 0.031, respectively). Total inpatient MME consumption was less in the INC group than the ESB and MAO groups (median 72.8 MME for INC versus 144.0 and 131.6 for ESB and MAO, respectively; p=0.004). Hospital LOS was median 3.0 days in the INC group and 4.0 days for both ESB and MAO groups (p=0.07). Two patients were readmitted within one week of surgery for pain control, both of whom were in the INC group (p=0.20). Calls for opioid prescription refills occurred in 8 patients (9.6%) with no difference among groups.

Conclusion: In pediatric patients undergoing MIRPE, INC was associated with lower early postoperative pain scores and lower inpatient MME consumption compared to patients receiving MAO or ESB. There was no difference in LOS, readmission rates, or need for opioid refills among the groups. Two year follow up is ongoing to understand longitudinal implications of analgesia modality.

Jacob Woodroof, MD
Mentor:
Dr. Olugbenga Okusanya
Thoracic Surgery,
Thomas Jefferson University, Philadelphia, PA

The Uptake of Segmentectomy for Non-Small Cell Lung Cancer in Adopters of Robotic Surgery

Background: Segmentectomy has been shown to be comparable to lobectomy for small lung cancers, however, it is unclear the degree to which the expansion and adoption of robotics have affected the utilization of segmentectomy. We aim to compare the utilization of segmentectomies performed between adopters and non-adopters of robotic surgery.

Methods: A retrospective case-control analysis was conducted utilizing the National Cancer Database from 2010-2021. Sustained robotic adoption was defined as facility performance of >/= 90% of lung resections robotically for 2+ consecutive years from 2016 onwards. Time periods for facilities were categorized by pre-transition (<50% usage), transition (50-90%) and post-transition (>/= 90%). For all facilities, the proportion of segmentectomies performed for <2 cm lung nodules was quantified along with clinical outcomes.

Results: 10,045 cases of lung resection across 57 facilities met inclusion criteria. National utilization of segmentectomy increased from 5% in 2011 to 12% in 2019-2021. The proportion of segmentectomies performed for nodules meeting criteria has increased more with sustained robotic adopters (5.5% to 12.0%) compared to control facilities (4.0% to 6.3%) [Difference-in-Difference=4.3%; 95% CI: 2.6% to 6.0%]. There was an increase in mean lymph node harvest for segmentectomy with sustained adopters (5.1 to 11.4) compared to control facilities (6.02 vs. 10.2).

Conclusion: Facilities with sustained robotic adoption were more likely to have increased uptake of segmentectomy compared to control facilities. There was also an associated increase in mean lymph node sampling. With continued uptake of robotics, we expect to see higher utilization of segmentectomy for lung resection for nodules meeting criteria.