

Ascension St. John Annual Resident Research Day 2023

March 29, 2023

Winners

- **First Place: Gabriella Rustia, MD.** Pain with Differing Insufflation Pressures During Robotic Sacrocolpopexy: A Randomized Controlled Trial. Obstetrics and Gynecology \$750
- **Second Place (tie): Lauren Messer, MD.** Patient Outcomes after CRS + HIPEC by Surgical Sequence: Is there a Learning Curve? General Surgery. \$500
- **Second Place (tie): Catherine Shim, MD.** Tension-Free Vaginal Tape Mesh Exposure Confers a High Risk of Persistent Stress Urinary Incontinence. Obstetrics and Gynecology. \$500
- **Third Place (tie): John Sorge, MD.** Improving Code Status Documentation in Inpatient Medicine. Internal Medicine. \$300
- **Third Place (tie): Adrienne Yun, MD.** Hospital Mortality During COVID-19 Surges: A Comparison of Non-COVID-19 Mortality Rates During COVID Surges Compared to Pre-Pandemic Periods. Internal Medicine. \$300
- **Honorable Mention: Haidy Elazzamy, MD.** Incidence/Pattern of Submucosal Involvement After Neoadjuvant Therapy for Rectal Cancer: Implications for Endoscopic Submucosal Resection. Pathology. \$200
- **Honorable Mention: Neel Sharad, MD.** Effect of an Integrated Behavioral Health Provider on PHQ-9 and GAD-7 Scores in the Primary Care Setting. Family Medicine. \$200
- **Honorable Mention: Inderpal Singh, MD.** The Association of Right Ventricular to Left Ventricular Size Ratio with Cardiac Index in Patients with Acute Pulmonary Embolism. Internal Medicine. \$200

Congratulations!

Pain with Differing Insufflation Pressures during Robotic Sacrocolpopexy: A Randomized Controlled Trial

Gabriella M. Rustia, MD; Michael G. Baracy Jr., MD, MHA; Emilee Khair, MD; Karen H. Hagglund, MS; Muhammad Faisal Aslam, MD, FRCOG. Ob/Gyn.

Introduction: Pain is an expectation following surgery; it can originate from incision sites, positioning during surgery, affected viscera, or, particularly in the case of laparoscopic or robotic-assisted surgeries, peritoneal irritation from insufflation. Post-laparoscopic referred shoulder pain may arise from peritoneal irritation and positively correlates with the radiographically measurable residual pneumoperitoneum after gynecologic laparoscopic surgery. Decreasing pneumoperitoneum is a target for reducing postoperative pain and analgesia needs.

Objective: To determine if decreasing insufflation pressure affects postoperative pain and opioid use in women undergoing robotic-assisted sacrocolpopexy.

Methods: In a single-blind randomized controlled trial, women with pelvic organ prolapse underwent robotic-assisted sacrocolpopexy at either 12mmHg (experimental) or 15mmHg (standard) insufflation pressure from 4/27/2021-5/17/2022. All procedures were performed by one surgeon (MFA). The primary outcome was pain rating on a 100-millimeter visual analogue scale (VAS) on postoperative day one within 24 hours of surgery. Data were analyzed with the chi-squared test, Pearson's correlation, Student's t-test, the Mann-Whitney U test, and multivariable linear regression.

Results: A total of 80 women were enrolled, with 41 in the experimental group and 39 in the standard group. Participants in the experimental group had less pain on postoperative day one with median VAS 17.0mm (IQR 26.0) compared to the standard group 29.0mm (IQR 32.0, $p=0.01$). No differences between groups were noted in operative time, estimated blood loss, or length of stay. Participants in the experimental group used less opioids while inpatient ($p=0.04$) and outpatient ($p=0.02$). In a multivariable analysis, lower insufflation pressure and increasing age were negatively associated with postoperative VAS scores.

Conclusion: Lowering insufflation pressure (12mmHg) during robotic-assisted sacrocolpopexy safely reduced postoperative pain and opioid use compared to standard insufflation pressure (15mmHg).

Patient Outcomes After CRS + HIPEC by Surgical Sequence: Is There a Learning Curve?

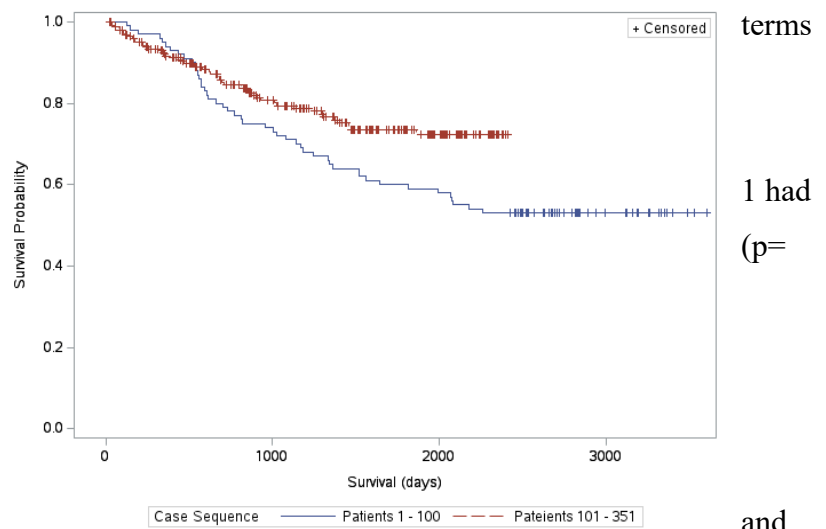
Lauren Messer, MD; Elango Edhayan, MD; Isabella Graham, MD; David Booth, BS; Richard Hayward, PhD; Richard Berri MD. General Surgery.

Introduction: Hyperthermal Intraperitoneal Chemotherapy (HIPEC) is used in conjunction with cytoreductive surgery (CRS) to treat peritoneal dissemination from various primary malignancies. Ascension St. John Hospital conducts a high volume of HIPEC procedures; yet it is unknown whether there is a learning curve for CRS + HIPEC and how this affects survival.

Objectives: 1.) To evaluate the morbidity, mortality and outcomes after approximately 350 consecutive CRS + HIPEC procedures performed at Ascension St. John Hospital by a single surgeon and 2.) To determine if a learning curve for this operation can be defined.

Methods: Using our HIPEC data registry, data were obtained from 351 consecutive CRS + HIPEC patients from 2011-2021. The cohort was divided into Group 1 (1-100 cases), Group 2 (101-200 cases), Group 3 (201-300) and Group 4 (above 301). Data were analyzed using Kaplan-Meier analysis and the log rank test to assess disease-free survival and survival by group.

Results: All groups were similar in terms of age, sex, race, Completeness of Cytoreduction (CC) score, and Peritoneal Cancer Index (PCI). Group 1 had more appendiceal carcinoma patients (p = 0.04). There were significant differences between the groups in survival (p = 0.01) and disease-free survival (p < 0.001), with Group 1 having significantly shorter survival and disease-free survival versus all other groups, with no significant differences among Groups 2-4. There were significant differences between Group 1 and all other groups combined in survival (p = 0.014) and disease-free survival (p < 0.001) (see Figure).



Conclusions: Our data indicate that oncologic survival improves after 100 cases. Improved survival was also found in groups including patients 101-350 despite lower appendiceal carcinoma rates. This is likely a result of maturation of the system in managing complex patients.

Tension-Free Vaginal Tape Mesh Exposure Confers a High Risk of Persistent Stress Urinary Incontinence

Catherine Shim, MD; Michael G. Baracy Jr., MD, MHA; Sanjana Kulkarni, MD; Karen H. Hagglund, MS; Muhammad Faisal Aslam, MD, FRCOG, FACOG. Ob/Gyn.

Introduction: Stress urinary incontinence (SUI) is the involuntary leakage of urine with increased intra-abdominal pressure. It is estimated that four to 35% of women in the U.S. are affected by SUI. A midurethral sling (MUS) is the gold standard treatment for symptomatic SUI. Mesh exposure is the most common complication associated with MUS.

Objective: To determine if there is an association between MUS mesh erosion and persistent SUI.

Materials and Methods: This was a historical cohort study, done by retrospective chart review, of all adult patients who underwent surgical treatment of SUI by tension-free vaginal tape (TVT) at Ascension St. John Hospital from 12/1/2015 – 1/1/2022. The primary outcome was persistent SUI at the 12-week postoperative visit. Mesh exposure was defined as any visible or palpable mesh in the vagina. Data collected included demographics, obstetric history, medical comorbidities, surgical history, and surgical outcomes including complications. Data were analyzed using the chi-squared test, Student's t-test, and logistic regression.

Results: A total of 456 patients were included. The incidence of persistent SUI was 6.4%. The incidence of mesh exposure was 8.8%. For patients with mesh exposure, 25% had persistent SUI, compared with 4.6% of patients without mesh exposure ($p < 0.0001$). Patients with mesh exposure were 6.97 times (95% CI 2.97, 16.31) more likely to experience persistent SUI when compared to patients without mesh exposure. Mesh exposure and postmenopausal status were associated with persistent SUI while asthma was associated with mesh exposure. From logistic regression controlling for asthma and postmenopausal status, persistent SUI was 6.5 times higher in patients with mesh exposure compared to those without mesh exposure (OR 6.46, 95% CI 2.71, 15.44, $p < 0.0001$).

Conclusions: Mesh exposure is an independent risk factor for persistent SUI. Patients with mesh exposure are approximately seven-times more likely to experience persistent SUI compared to patients without mesh exposure. Further studies are warranted to elucidate whether MUS revision results in better long-term outcomes for patients with mesh exposure compared with nonsurgical management.

Improving Code Status Documentation in Inpatient Medicine

John Sorge, MD; Susan Szpunar, PhD; Louis Saravolatz, MD. Internal Medicine.

Introduction: Code Status (CS) has been often overlooked while admitting patients to the hospital. This becomes especially important for patients with end stage disease. Bracelets, advanced directives, and electronic medical record (EMR) orders have been investigated as methods to improve documentation in the past, without significant improvement.

Objective: To determine if a CS pop-up alert in eCare®, combined with provider education, will improve compliance with addressing code status in patients admitted to the hospital.

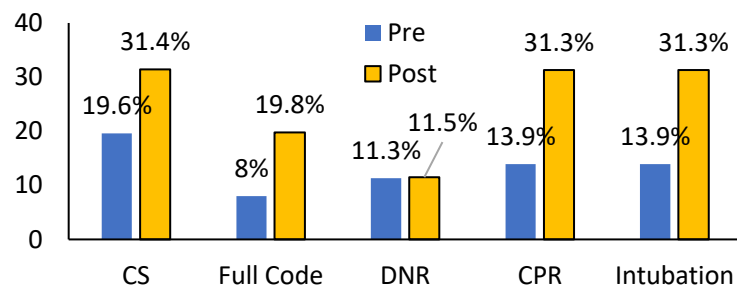
Materials and Methods: This was a pre- post-intervention quality improvement project conducted at Ascension St. John Hospital. Data on code blue status for the pre-intervention period (8/1/21-10/31/21) was collected by reviewing paper documentation. Next, CS EMR order education was provided to residents and attendings and a new pop-up alert was introduced in the EMR. Data were then collected on the post-intervention group (8/1/22-10/31/22). Data were collected on code status addressed, and demographic/clinical characteristics of the patient groups. Data were analyzed using Student's t-test, the chi-squared test and logistic regression.

Results: We reviewed 1828 charts pre-intervention and 1775 post-. The mean age at admission was slightly older for the post-group than the pre-group, 70.5 ± 11.2 vs. 69.8 ± 11.3 years,

respectively, $p=0.04$. There were no differences between period by sex or

race. There were statistically significant improvements in addressing CS, being full code, CPR, intubation, use of vasopressors and cardioversion technique categories from pre- to post-intervention (all $p<0.001$, figure). Documentation of Do Not Resuscitate (DNR) did not change between periods. From logistic regression, after controlling for race, age, liver disease, and sepsis, patients in the post-intervention period were 98% more likely to have CS addressed (OR=1.98, $p<0.001$).

Conclusion: There was a significant improvement in CS documentation between pre- and post-intervention groups, likely a result of the new pop-up alert.



Hospital Mortality During COVID-19 Surges: A Comparison of non-COVID-19 Mortality Rates During COVID Surges Compared to Pre-Pandemic Periods

Adrienne Yun, DO; Virginia Zacharias, MD; Susan Szpunar, PhD; Louis Saravolatz, MD. Internal Medicine.

Introduction: During the initial phase of the COVID pandemic, there was a 22.9% increase in excess deaths, with COVID only accounting for 72.4%. The remaining excess deaths were thus related to non-COVID causes. Previous studies have demonstrated a higher mortality rate for most major diseases (Bodesin et. al.). The death rates have further been shown to have a disproportionate effect on minorities, males, and the elderly (Cronin et. al.).

Objectives: 1) To determine if there was an increase in non-COVID related death between the pre-COVID period and the COVID period; 2) To compare characteristics of patients who died during the pandemic compared to the pre-pandemic period.

Methods: We performed a retrospective chart review comparing mortality rates for the top five non-COVID related diseases (respiratory failure, heart failure, sepsis, acute kidney disease and NSTEMI/cardiac arrest) during the pandemic (3/15-6/1/2020) and pre-pandemic (3/15-6/1/2019).

Demographic/clinical characteristics and outcomes were from the electronic medical record; all patients with COVID-19 excluded. Data were analyzed using the χ^2 test, Student's t-test, analysis of variance, and logistic regression.

Cause of Death	Pre-Pandemic	Pandemic	p-value
Resp. failure	4.2%	7.0%	0.34
Heart failure	6.7%	5.8%	0.72
Sepsis	14.6%	16.2%	0.62
AKI	5.1%	1.9%	0.36
NSTEMI/ Card.Arr.	18.6%	17.1%	0.87

Results: We included 669 patients in the pre-COVID interval and 673 from the COVID time period. There were no significant differences in mean age or distribution by sex by period; there were more Black patients in the COVID period ($p=0.01$). There was no statistical difference in mortality for the top five diseases during initial COVID surge compared to pre-COVID baseline (table). There were also no differences in risk factors for death between the time periods.

Conclusions: There was no difference in case fatality rates at Ascension St. John Hospital during the initial COVID surge compared to pre-COVID baseline. This differs from previous studies and further evaluation will be done to continue to study this question.

Incidence/Pattern of Submucosal Involvement After Neoadjuvant Therapy for Rectal Cancer: Implications for Endoscopic Submucosal Resection

Haidy Elazzamy, MD; Monika Bhatt, MD; Paul Mazzara, MD; Mohammed Barawi, MD; Amer Zeni, MD; Amr Aref, MD. Pathology.

Introduction: The rectal cancer group at Ascension St. John Hospital developed a novel approach to organ preservation (limited local excision of the entire rectal wall) for locally advanced rectal cancer (LARC) patients. Prior pathology studies support this approach. We explored the possibility of further refinement of this surgical technique.

Objective: To determine if limited surgical resection of only mucosal and submucosal layers, without resection of muscle layer or perirectal fat, still accurately predicts the tumor stage (ypT) status after completion of neoadjuvant therapy for LARC.

Methods: We reviewed pathological slides of LARC patients treated by neoadjuvant therapy and total mesorectal excision at our hospital from 2006-2020. We assessed the associations of the incidence and involvement of the submucosa and ypT status. We examined the center of the tumor bed and devised new classifications to describe the tumor involvement of the submucosa (Mazzara- Elazzamy classification). We did not resort to cutting new slides.

Results: We included 82 patients. The submucosa was involved in 53 of the 54 (98%) patients with \geq ypT1 disease.

Pattern	Mazzara-Elazzamy Classification of Submucosal Involvement	No. Pts
TYPE I Focal	Residual Tumor Involvement (RTI): one 10 \times field or less	14
TYPE II Patchy	RTI: 2 areas with at least one low power field (4 \times) of separation	6
TYPE III Diffuse	RTI: an area > a 10 \times field regardless of the number of foci	33

Conclusion: This is the first investigation to report on the incidence and pattern of submucosal involvement by residual cancer when the original pathology slides were examined, and the only report providing a pathological rationale for the possible utility of endoscopic submucosal resection as a restaging tool to confirm pathological complete tumor response after completion of neoadjuvant therapy, when an organ preservation strategy is pursued. We also report on the first pathological classification created to describe the pattern of submucosal involvement by residual malignancy.

Effect of an Integrated Behavioral Health Provider on PHQ-9 and GAD-7 Scores in the Primary Care Setting

Neel Sharad, MD; Chandrika Iyer, MD; Susan Szpunar, PhD. Family Medicine.

Introduction: Integrated behavioral health (IBH) is an approach where the primary physician and behavioral health (BH) team work together to provide patient-centered care. The addition of IBH into primary care can improve overall health outcomes.

Objective: To evaluate the effect of an IBH provider on Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder (GAD-7) questionnaire scores in comparison to those who were not offered and did not meet with a behavioral health specialist.

Methods: This was a historical cohort study that collected PHQ-9 and GAD-7 scores from patients via a retrospective chart review over a five-month period (between 11/5/2020 and 3/15/2021) and a six-month post-treatment period (between 3/16/2021 and 9/16/2021), who were referred to BH specialists from two family medicine clinics. Data were analyzed using Student's t-test, the χ^2 test and Friedman's test.

Results: We included 21 patients in each group. The mean age of the referral group was not significantly different than the non-referral group, 38.8 ± 13.7 vs. 32.5 ± 14.0 years, respectively ($p=0.15$). There were no significant differences in the number of comorbidities by group. There were also no differences in referral group by sex or race. The BH referral group demonstrated a significant improvement in both PHQ-9 ($p<0.001$) and GAD-7 ($p=0.003$) scores temporally over the three time periods (pre-study, during study, and post-study) whereas the control group did not show any significant change for either score, PHQ-9 ($p=0.9$) or GAD-7 ($p=0.07$).

Conclusions: Our data indicate that BH referrals are beneficial for patients in improving their mental health outcomes as evaluated by GAD-7 and PHQ-9 scores. Given the high prevalence of comorbid mental health conditions in patients with medical illnesses, healthcare providers should consider the potential benefits of IBH in the outpatient setting.

The Association of Right Ventricular to Left Ventricular Size Ratio with Cardiac Index in Patients with Acute Pulmonary Embolism

Inderpal Singh, MD; Karim Saleb, MD; Susan Szpunar, PhD; Antonious Attallah, MD. Internal Medicine.

Introduction: Patients with acute pulmonary embolism (PE) are classified into intermediate or high risk of early mortality using variables such as right ventricular (RV) to left ventricular (LV) size ratio, and systemic blood pressure. Elevated RV to LV size ratio is a baseline variable which can predict low cardiac index (CI) in patients with acute PE, although an optimal cut point must be established. In spite of this, the degree of RV to LV size ratio has been minimally studied in the literature.

Objective: To evaluate if further risk stratification of RV to LV size ratio in patients with acute PE can aid in guiding treatment by relating the degree of right heart strain to CI.

Methods: This was a historical cohort study. Eligible patients were those with the diagnosis of acute PE and who underwent right heart catheterization (RHC) during the same admission. RV to LV size ratio was measured on thoracic computed tomography angiography (CTA) and the patients were subclassified on the degree of RV to LV size ratio with groups being those with RV to LV ratio less than 1 (≤ 0.99), RV to LV ratio greater than 1 but less than 1.5 (1.0-1.49), RV to LV ratio greater than 1.5 but less than 2 (1.5-1.99), and RV to LV ratio greater than 2 (≥ 2.0). Data were analyzed using Student's t-test, analysis of variance followed by multiple pairwise comparisons using the Bonferroni correction of the p-value and the χ^2 test.

Results: We reviewed 188 patients with a mean age of 59.6 ± 13.4 years, 53.7% male (101/188) and 46.8% White (88/188). The mean CI decreased in each group as the RV to LV size ratio increased. The groups of 1.0-1.49 to 1.5-1.99 (mean difference, 0.28; $p = 0.041$) and ≥ 2.0 (mean difference, 0.43; $p < 0.023$) showed significant decreases in CI. As the RV to LV ratio increased, the total percent of patients in each group with a $CI < 2.2$ L/min/m² also increased (44.44% in RV to LV ratio group of < 1.0 , and 66.67% in RV to LV ratio group of ≥ 2.0).

Conclusions: We found a significant decrease in CI in patients with RV to LV size ratio greater than or equal to 1.5. Treating these patients with prompt catheter directed methods may decrease adverse events and improve patient outcomes.