ORAL ABSTRACTS

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President Session | Abstract | Trauma

OPIOID EXPOSURE IN TRAUMA PATIENTS WITH A POSTIVE URINE DRUG SCREEN: A SUBGROUP ANALYSIS OF A RANDOMIZED CONTROL TRIAL

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Background: A recent randomized controlled trial of two multi-modal pain regimens (MMPR) demonstrated a new MMPR superior in opioid exposure reduction with no difference in pain scores.

Objectives: In this study, we aim to evaluate the effect of a positive admission urine drug screen (+UDS) on opioid exposure to determine if this group is high-risk and to deduce if the Multi-modal Analgesic Strategies for Trauma (MAST) MMPR reduced opioid exposure in +UDS patients. We hypothesize that patients with a +UDS are at high-risk for higher opioid exposure and that the MAST MMPR will be associated with reduced opioid exposure.

Methods: The MAST trial randomized patients to an original MMPR (IV acetaminophen, 48 hours of celecoxib and pregabalin followed by PO acetaminophen, naproxen, and gabapentin, respectively, tramadol, lidocaine patch[es], and as needed opioids) or the MAST MMPR (PO acetaminophen, naproxen, gabapentin, lidocaine patch[es], and as needed opioids). Patients without a UDS drawn at admission were excluded. First, those with a +UDS and negative UDS (-UDS) were compared for differences in baseline characteristics, injury patterns, acute pain scores, and opioid exposure. Secondly, +UDS patients were compared based on randomization to the original MMPR vs the MAST MMPR. Continuous data were presented as median (interquartile range) and categorical data as: number (percentage). Wilcoxon Rank Sum, Chi Square, and Fisher's Exact test assessed differences for continuous, binary, and sparse binary outcomes, respectively.

Results: 1,012 patients had an admission UDS (+UDS 377 and -UDS 635). +UDS patients were younger, predominately male, and suffer a penetrating injury. There were no differences in injury severity or procedures received. +UDS patients had higher morphine milligram equivalents (MME) per day (53 [31,79] vs 39 [17,63], $p<0.001$), total MME (300 [125,690] vs 214 [85,477], $p<0.001$), and opioid prescribed at discharge (67% vs 60%, $p=0.031$) vs -UDS patients. +UDS patients also reported higher pain levels (4 [3,5] vs 3 [2,5], $p<0.001$) and average normalized pain scores (0.37 [0.23, 0.50] vs 0.28 [0.13, 0.44], $p<0.001$). Of the 377 +UDS patients, 175 were randomized to the original MMPR and 202 to the MAST MMPR. There were no differences in demographics, injury severity, and procedures received. Patients randomized to the MAST MMPR had lower MME/day (46 [25,70] vs 60 [39,86], $p<0.001$), total MME (248 [99,621] vs 371 [159,792], $p=0.005$), and a clinically but not statistically significant decrease in opioids prescribed at discharge (63% vs 71%, $p=0.097$).

Conclusion: Patients with a +UDS had higher opioid exposure and reported more severe pain despite no difference in injury severity. The MAST MMPR was associated with a decreased opioid exposure compared to the original MMPR with no difference in acute pain scores. This demonstrates that the MAST MMPR remained effective in opioid-minimization without a detriment to pain control in this patient population at high risk for increased opioid exposure.

Opioid Outcomes	Negative UDS (n=635)	Positive UDS (n=377)	p-value
Opioid Outcomes			
MME/day	39 (17, 63)	53 (31, 79)	<0.001
Total MME	214 (85, 477)	300 (125, 690)	<0.001
Opioid at discharge	383 (60%)	253 (67%)	0.031
Pain scores			
Average NRS score	3 (2, 5)	4 (3, 5)	<0.001
Average normalized pain score	0.28 (0.13, 0.44)	0.37 (0.23, 0.50)	<0.001
Opioid Outcomes (UDS Positive Patients only)	MAST 1 (n=175)	MAST 2 (n=202)	p-value
Opioid Outcomes			
MME/day	60 (39, 86)	46 (25, 70)	<0.001
Total MME	371 (159, 792)	248 (99, 621)	0.005
Opioid at discharge	125 (71%)	128 (63%)	0.097
Pain scores			
Average NRS score	4 (3, 5)	4 (3, 5)	0.376
Average normalized pain score	0.38 (0.23, 0.51)	0.36 (0.24, 0.47)	0.448
Continuous data presented as: median (interquartile range) *Categorical data presented as: number (percentage)*			

LAPAROSCOPIC OPERATIVE TIME INDEPENDENTLY INCREASES MORBIDITY IN PEDIATRIC COMPLICATED APPENDICITIS

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Background: Complicated appendicitis is a common cause of morbidity in children. Studies have analyzed risk factors in the surgical treatment of this pathology, including obesity and disease severity, but not operative time (OT). We hypothesize that OT independently influences outcomes for complicated appendicitis.

Objectives: The objective of this study is to perform a multi-institutional analysis of the effect of OT on pediatric complicated laparoscopic appendectomy complications.

Methods: Data was extracted from the 2018 and 2019 National Surgical Quality Improvement Program – Pediatrics Participant Use Data Files. Patients 2 to 18 years of age that underwent laparoscopic appendectomy for complicated appendicitis were identified. Patient demographics, disease severity, and operative details were evaluated. Surgical site infections (SSI), hospital length of stay (LOS), 30-day readmissions and reoperations, interventional radiologic drain (IR-drain) placement, pneumonia, and death were analyzed. Logistic and linear regression analyses were performed.

Results: 8,168 patients were analyzed with a mean age of 9.96 ± 3.9 years and a mean weight of 41.2 ± 21.2 kg. Mean OT was 55.8 ± 24.9 minutes with a mean LOS of 5.15 ± 3.37 days. For every one-minute increase in OT, there was an independently associated increase in the likelihood of any SSI, superficial SSI, organ-space SSI, IR-drain placement, readmission within 30 days, and reoperation within 30 days (Table 1). A 15-minute difference in OT independently predicts a 1.16 fold increased likelihood for any SSI, superficial SSI, organ-space SSI, and need for IR-drain placement. A 15 minute difference in OT independently predicts a 1.34 increased likelihood for reoperation within 30 days and a 1.06 fold increased likelihood for readmission within 30 days. Covariates that are associated with a greater likelihood of infectious complications include increased weight, younger age, greater ASA class, and having at least 1 comorbidity. Longer LOS is associated with younger age, greater ASA class, and having at least 1 comorbidity. Reoperation and readmission within 30 days is associated with greater ASA class and having at least 1 comorbidity.

Conclusion: Prolonged OT is independently associated with greater likelihood of any SSI, superficial SSI, organ-space SSI, IR-drain placement, readmission and reoperation within 30 days, and longer hospital LOS. There is a need to determine modifiable factors that prolong OT to aid in the optimization of routine operations to reduce patient morbidity.

	b (SD)	*Wald χ2 (df)*	*Odds ratio (per minute)*	*95% C.I.*
Operative Time				
Any SSI	0.01 (0.001)	61.56 (1)	1.01	1.008, 1.013
Superficial SSI	0.01 (0.004)	9.70 (1)	1.01	1.004, 1.020
Organ/Space SSI	0.01 (0.001)	55.22 (1)	1.01	1.008, 1.013
IR-Drain Placement	0.01 (0.001)	57.33 (1)	1.01	1.008, 1.013
≤30-Day Readmissions	0.004 (0.002)	4.98 (1)	1.004	1.000, 1.007
≤30-Day Reoperations	0.02 (0.002)	43.42 (1)	1.02	1.011, 1.020

Effect of Hernia Mesh Weights on Postoperative Patient-Related and Clinical Outcomes After Open Ventral Hernia Repair: A Randomized Clinical Trial

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Background: Although multiple versions of polypropylene mesh devices are currently available on the market for hernia repair, few comparisons exist to guide surgeons as to which device may be preferable for certain indications. Mesh density is believed to impact patient outcomes, including rates of chronic pain and perception of mesh in the abdominal wall.

Objectives: To examine whether medium-weight polypropylene is associated with less pain at 1 year compared with heavy-weight mesh.

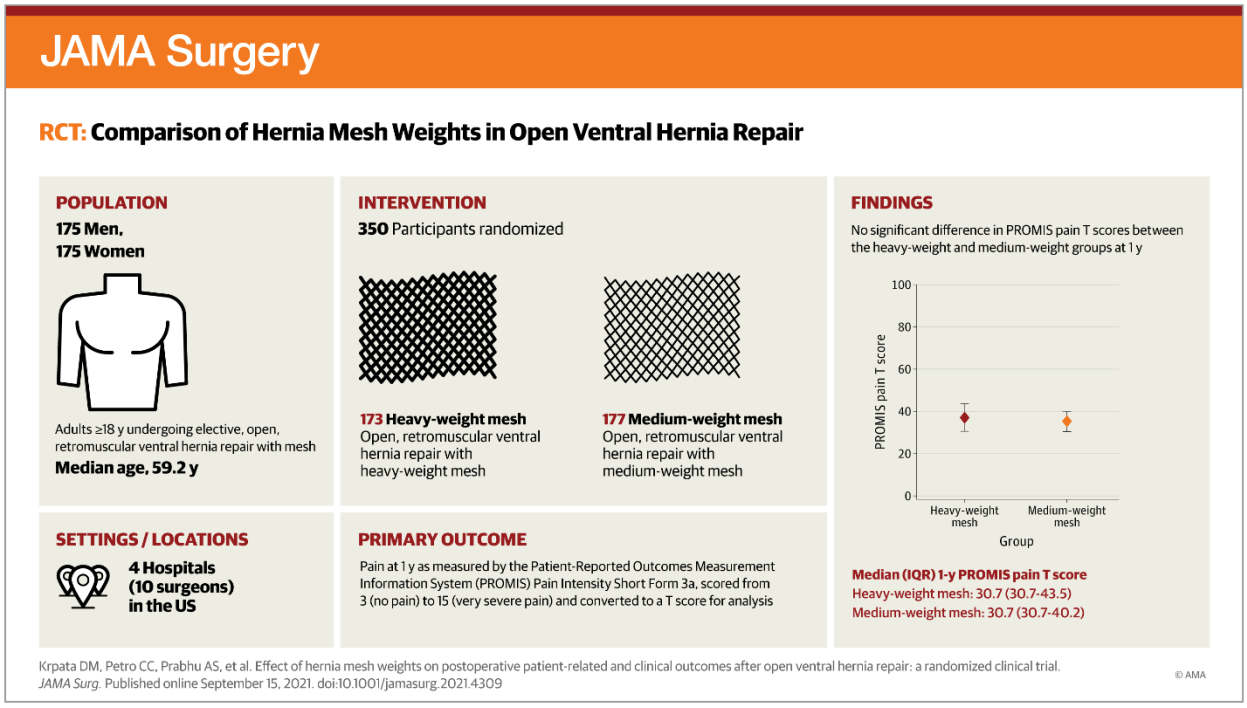
Methods: This multicenter randomized clinical trial was performed from March 14, 2017, to April 17, 2019, with 1-year follow-up. Patients undergoing clean, open ventral hernia repairs with a width 20 cm or less were studied. Patients were blinded to the intervention.

Interventions: Patients were randomized to receive medium-weight or heavy-weight polypropylene mesh during open ventral hernia repair.

Main outcomes and measures: The primary outcome was pain measured with the National Institutes of Health (NIH) Patient-Reported Outcomes Measurement Information System (PROMIS) Pain Intensity Short Form 3a. Secondary outcomes included quality of life and pain measured at 30 days, quality of life measured at 1 year, 30-day postoperative morbidity, and 1-year hernia recurrence.

Results: A total of 350 patients participated in the study, with 173 randomized to receive heavy-weight polypropylene mesh (84 [48.6%] female; mean [SD] age, 59.2 [11.4] years) and 177 randomized to receive medium-weight polypropylene mesh (91 [51.4%] female; mean [SD] age, 59.3 [11.4] years). No significant differences were found in demographic characteristics (mean [SD] body mass index of 32.0 [5.4] in both groups [calculated as weight in kilograms divided by height in meters squared] and American Society of Anesthesiologists classes of 2-4 in both groups), comorbidities (122 [70.5%] vs 93 [52.5%] with hypertension, 44 [25.4%] vs 43 [24.3%] with diabetes, 17 [9.8%] vs 12 [6.8%] with chronic obstructive pulmonary disease), or operative characteristics (modified hernia grade of 2 in 130 [75.1] vs 140 [79.1] in the heavy-weight vs medium-weight mesh groups). Pain scores for patients in the heavy-weight vs medium-weight mesh groups at 30 days (46.3 vs 46.3, P = .89) and 1 year (30.7 vs 30.7, P = .59) were identical. No significant differences in quality of life (median [interquartile range] hernia-specific quality of life score at 1 year of 90.0 [67.9-96.7] vs 86.7 [65.0-93.3]; median [interquartile range] hernia-specific quality of life score at 30 days, 45.0 [24.6-73.8] vs 43.3 [28.3-65.0]) were found for the heavy-weight mesh vs medium-weight mesh groups. Composite 1-year recurrence rates for patients in the heavy-weight vs medium-weight polypropylene groups were similar (8% vs 7%, P = .79).

Conclusion: Medium-weight polypropylene did not demonstrate any patient-perceived or clinical benefit over heavy-weight polypropylene after open retromuscular ventral hernia repair. Long-term follow-up of these comparable groups will elucidate any potential differences in durability that have yet to be identified.



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BURDEN OF UNINTENTIONAL PEDIATRIC FIREARM INJURY: AN EXAMINATION OF THE NATIONAL READMISSION DATABASE

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Background: Pediatric firearm injuries have increased over the past two decades despite attempts at mitigation with Childhood Access Prevention (CAP) laws by many states. Unintentional firearm injuries may account for almost half of firearm injuries under the age of 14 and have the second highest overall annual cost behind assault. Beyond the financial burden of firearm injuries, the long term affects from these injuries may influence quality of life in both the parent and child for years to follow.

Objectives: The aim of the study was to identify and assess factors associated with 90-day unplanned readmission following unintentional firearm injury in a national sample of pediatric hospitalizations.

Methods: The 2016-18 Nationwide Readmission Database (NRD) of the Healthcare Cost and Utilization Project (HCUP) was used to identify hospital admissions with unintentional firearm injury in patients under age 18. Patients aged 18 years were included for readmission analysis. Overnight/next-day transfers were combined to not over-report readmission events. Multivariable logistic regression assessed factors associated with 90-day unplanned readmission in those that survived their first firearm injury. Following HCUP guidelines to protect patient privacy, any N less than 10 was excluded from analysis.

Results: Over 3 years, 1,113 unintentional firearm injury admissions were identified that resulted in 52 injuries with subsequent readmissions (4.7%). There were no significant differences in age or payor, but more females had readmissions (14.7% vs 28.9%). The majority of readmissions occurred in the oldest age group (15-17 years, 70.9%), followed by 11–14-year-olds (15.1%), under age 7 (9.6%), and 7-10-year-olds (4.8%). Five of the 52 children with readmissions also had diagnosed comorbid conditions. The overall reported drug or alcohol use or abuse in the primary hospitalization was 10.5%, with slightly more in the readmission group (10.4% vs 13.5%, P=0.478). The primary hospitalization was both significantly longer (7.3 vs 13.6 days) and had a significantly higher cost ($109,564 vs 196,067) in patients with readmissions. The mortality rate in the primary hospitalization was 5.5%. Readmission diagnosis included: complications (25.3%), infection (10.7%), mental health (4%), trauma (18.7%), and chronic disease (21.3%). Drug or alcohol use or abuse was associated with 6% of readmissions. Table 1 shows patient characteristics associated with unplanned 90-day readmission. Table 2 shows risk factors associated with unplanned 90-day readmission.

Conclusion: Pediatric victims of unintentional firearm injuries requiring readmission to the hospital are more likely to be female. They are also more likely to have longer initial lengths of stay and higher costs associated with hospitalization. Understanding risk factors for readmissions will allow for a more focused approach on preventing the morbidity associated with those surviving their initial firearm injury. Continued efforts should be directed toward preventing firearm injuries through outreach and legislation at the national and local level.

Table 2. Factors associated with 90-day unplanned readmission

	OR (CI)	P value	aOR (CI)	P value
Age	1.02 (0.95, 1.10)	0.56	1.06 (0.97, 1.15)	0.199
Female	2.41 (1.28, 4.55)	0.007	2.39 (1.22, 4.64)	0.011
NCHS Urban-Rural				
Central	1		1	
Fringe	0.96 (0.43, 2.15)	0.922	1.01 (0.42, 2.42)	0.987
metro 250-999k	1.10 (0.56, 2.14)	0.786	1.02 (0.51, 2.05)	0.961
metro 250-999k	0.19 (0.03, 1.45)	0.11	0.20 (0.03, 1.59)	0.129
micropolitan	1.22 (0.50, 3.02)	0.662	1.20 (0.48, 3.04)	0.697
not metro or micro	0.98 (0.33, 2.86)	0.969	1.36 (0.47, 3.96)	0.575
Patient income quartile				
Lowest	1		1	
2	0.87 (0.43, 1.78)	0.706	0.91 (0.41, 1.99)	0.81
3	1.30 (0.63, 2.70)	0.481	1.33 (0.60, 2.95)	0.49
Highest	0.35 (0.05, 2.44)	0.288	0.41 (0.05, 3.34)	0.404
Insurance				
Private	1		1	
Medicaid/Medicare	1.16 (0.56, 2.40)	0.693	1.05 (0.50, 2.20)	0.902
Self-pay/No Charge	0.88 (0.18, 4.33)	0.875	0.82 (0.16, 4.21)	0.815
Other/Unknown	2.99 (0.87, 10.30)	0.082	4.51 (1.19, 17.10)	0.027
Severity Risk				
Minor loss of function	1		1	
Moderate loss of function	0.83 (0.31, 2.19)	0.701	0.81 (0.30, 2.18)	0.679
Major loss of function	4.00 (1.74, 9.21)	0.001	3.86 (1.62, 9.23)	0.002
Extreme loss of function	3.45 (1.48, 8.08)	0.004	3.65 (1.45, 9.21)	0.006
Charlson Comorbidity Index group				
0	1		1	
1	0.78 (0.10, 5.89)	0.809	0.43 (0.06, 3.22)	0.986
2	3.68 (1.18, 11.46)	0.024	1.08 (0.32, 3.65)	0.905
Drug or alcohol abuse diagnosis	1.27 (0.56, 2.89)	0.567	1.04 (0.43, 2.49)	0.93
Disposition				
Home	1		1	
Short-term hospital	1.66 (0.21, 13.28)	0.631	0.98 (0.13, 7.21)	0.986
Other center	2.00 (0.78, 5.13)	0.152	1.08 (0.32, 3.65)	0.905
Home healthcare	0.67 (0.16, 2.72)	0.57	0.50 (0.10, 2.53)	0.402

Table 1. Patient characteristics for pediatric firearm patients with 90-day unplanned readmissions

	Cohort	No Readmission	Readmission	P value
	1113	1061	52	
Age, mean (SD)	14.3 (4.0)	14.2 (4.0)	14.6 (3.7)	0.554
Age group, N (S)				0.502
15-17	789 (70.9)	754 (71.1)	35 (67.3)	
11-14	168 (15.1)	157 (14.8)	11 (21.2)	
7-10	53 (4.8)	52 (4.9)	<10	
≤6	103 (9.3)	98 (9.2)	<10	
Female	171 (15.4)	156 (14.7)	15 (28.9)	0.006
NCHS Urban-Rural, N (%)				0.580
Central	348 (31.4)	331 (31.3)	17 (32.7)	
Fringe	189 (17.1)	180 (17.1)	<10	
metro 250-999k	282 (25.5)	267 (25.3)	15 (28.9)	
metro 250-999k	103 (9.3)	102 (9.7)	<10	
micropolitan	102 (9.2)	96 (9.1)	<10	
not metro or micro	84 (7.6)	80 (7.6)	<10	
Patient income quartile, N (%)				0.564
Lowest	618 (56.6)	588 (56.5)	30 (57.7)	
2	253 (23.2)	242 (23.3)	11 (21.2)	
3	162 (14.8)	152 (14.6)	10 (19.2)	
Highest	59 (5.4)	58 (5.6)	<10	
Insurance, N (%)				0.317
Private	223 (20.0)	214 (20.2)	<10	
Medicaid/Medicare	795 (71.4)	758 (71.4)	37 (71.2)	
Self-pay/No Charge	58 (5.2)	56 (5.3)	<10	
Other/Unknown	37 (3.3)	33 (3.1)	<10	
Severity Risk, N (%)				<0.001
Minor loss of function	313 (28.1)	305 (28.8)	<10	
Moderate loss of function	332 (29.8)	325 (30.6)	<10	
Major loss of function	237 (21.3)	215 (20.3)	22 (42.3)	
Extreme loss of function	231 (20.8)	216 (20.4)	15 (28.9)	
ISS, N (%)				0.223
≤8	372 (39.7)	356 (40.0)	16 (34.0)	
9 - 14	198 (21.1)	187 (21.0)	11 (23.4)	
16 - 24	131 (14.0)	120 (13.5)	11 (23.4)	
≥25	236 (25.2)	227 (25.5)	<10	
AIS head ≥3, N (%)	159 (14.3)	151 (14.2)	<10	0.817
Charlson Comorbidity Index group, N (%)				0.031
0	1058 (95.1)	1011 (95.3)	47 (90.4)	
1	29 (2.6)	28 (2.6)	<10	
2	26 (2.3)	22 (2.1)	<10	
Drug or alcohol abuse diagnosis, N (%)	117 (10.5)	110 (10.4)	<10	
LOS, mean (SD)	7.6 (11.5)	7.3 (10.9)	13.6 (19.7)	<0.001
Total Charges, mean (SD)	113624 (155626)	109564 (147589)	196067 (260445)	<0.001
Readmission diagnosis, N (%)				
Complications			14 (26.9)	
Infection			<10	
Mental health or Drug/Alcohol			<10	
Trauma			11 (21.2)	
Chronic disease or cancer			10 (19.2)	
Other			10 (19.2)	
Disposition, N (%)				0.201
Home	922 (82.8)	878 (82.8)	44 (84.6)	
Short-term hospital	13 (1.2)	12 (1.1)	<10	
Other center	55 (4.9)	50 (4.7)	<10	
Home healthcare	62 (5.6)	60 (5.7)	<10	
Expired	61 (5.5)	61 (5.75)	0 (0)	

CLINICAL IMPACT OF EXTERNAL BEAM RADIOTHERAPY FOR SURGICALLY RESECTED PRIMARY RETROPERITONEAL LIPOSARCOMA

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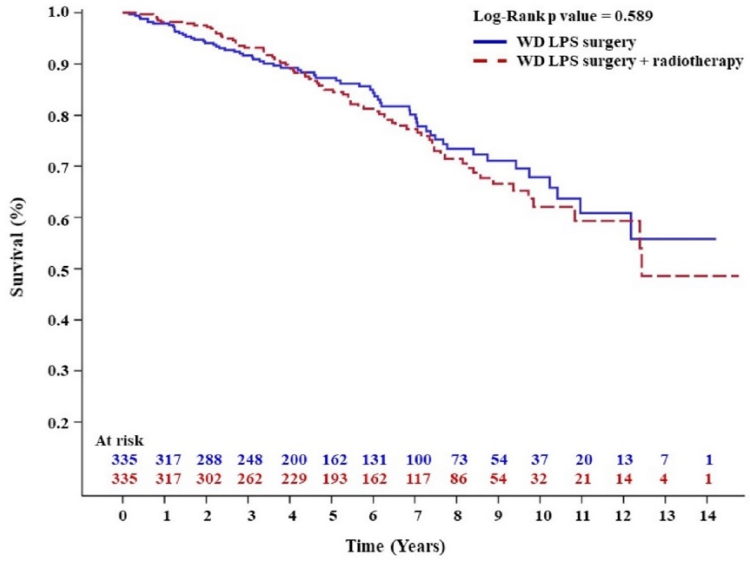
Background: The EORTC-62092 (STRASS) was a multicenter, open label, randomized, phase 3 trial comparing surgery alone versus surgery plus neoadjuvant radiotherapy (nXRT) for primary retroperitoneal sarcomas. STRASS did not show improved abdominal recurrence-free survival with nXRT. However, on subgroup analysis, there was a small associated benefit for well-differentiated (WD) liposarcoma.

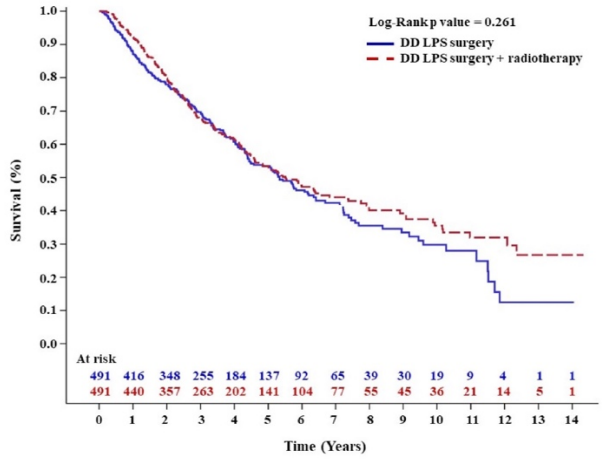
Objectives: This study aims to investigate the real-world use and outcomes of XRT in the management of retroperitoneal liposarcoma.

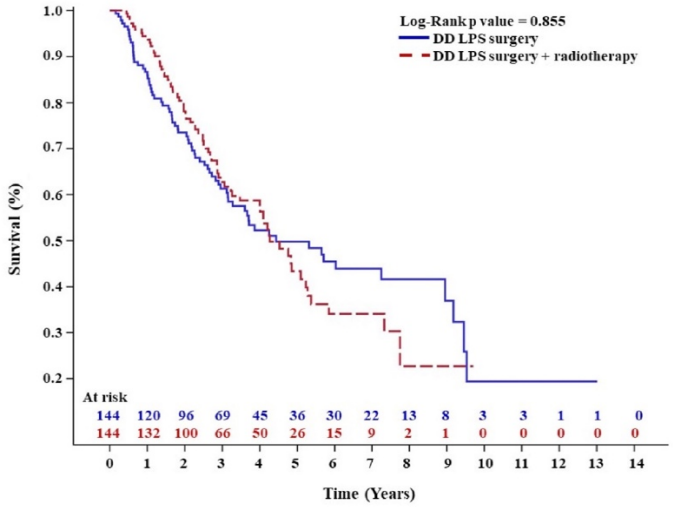
Methods: We queried the National Cancer Database (2004-2017) for patients with non-metastatic, primary retroperitoneal liposarcoma treated with resection with or without XRT (n=3911). Patients were stratified by treatment type (surgery alone, surgery plus XRT) and histologic subtype [WD (n=2,252), dedifferentiated (DD) (n=1659)]. Propensity score (PS) matching using gender, Charlson score, hospital volume, and 90-day mortality was performed, and overall survival (OS) was evaluated using the Kaplan Meier estimator function to generate unadjusted survival curves. To estimate hazard ratios (HRs) for covariates associated with an increased risk of death, the Cox proportional hazards model was used for unmatched cohorts and the frailty model for matched cohorts. Adjusted survival curves were estimated from the final survival model after adjusting for significant covariates. Overall survival was the primary outcome measure.

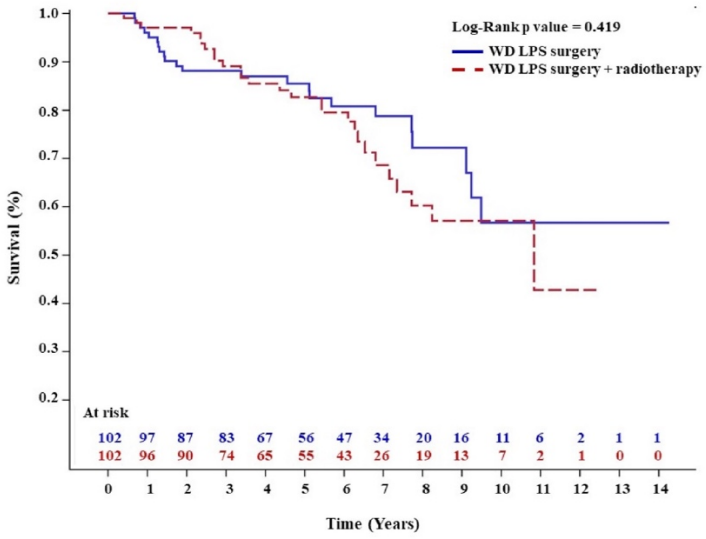
Results: The median follow-up time was 4.05 years, and the median overall survival was 10.30 years. There was no association between XRT and overall survival for either WDLPS or DDLPS cohorts. The subset of patients who received nXRT only was then analyzed, similar to the STRASS trial. For WDLPS after PS matching (n=204), only Charlson-Deyo score >0 (HR 2.88, p=0.002) and non-private insurance (HR 2.39, p=0.035) were associated with an increased risk of death on adjusted survival analysis. nXRT was not associated with overall survival (HR 1.01, p=0.0523) but was associated with longer postoperative hospital stay (p=0.008). For DDLPS after PS matching (n=288), non-private insurance (HR 2.18, p=0.001) was associated with an increased risk of death on adjusted survival analysis, while living in a zip code with higher high school graduation rate (HR 0.59, p=0.021) was associated with a reduced risk of death. nXRT was not associated with overall survival (HR 0.89, p=0.48) but was associated with older age at diagnosis (p=0.010). For both WD-LPS and DD-LPS, utilization of nXRT was associated with treatment at high-volume (≥10 cases/year) and academic/network facilities.

Conclusion: For primary retroperitoneal liposarcoma treated with curative-intent surgical resection, the addition of radiotherapy, either neoadjuvant or adjuvant, provided no survival benefit in this propensity-matched, adjusted analysis of the National Cancer Database.


Log-Rank p value = 0.589
WD LPS surgery
WD LPS surgery + radiotherapy
Survival (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
At risk
335 317 288 248 200 162 131 100 73 54 37 20 13 7 1
335 317 302 262 229 193 162 117 86 54 32 21 14 4 1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (Years)


Log-Rank p value = 0.261
DD LPS surgery
DD LPS surgery + radiotherapy
Survival (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
At risk
491 416 348 255 184 137 92 65 39 30 19 9 4 1 1
491 440 357 263 202 141 104 77 55 45 36 21 14 5 1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (Years)


Log-Rank p value = 0.855
DD LPS surgery
DD LPS surgery + radiotherapy
Survival (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
At risk
144 120 96 69 45 36 30 22 13 8 3 3 1 1 0
144 132 100 66 50 26 15 9 2 1 0 0 0 0 0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (Years)


Log-Rank p value = 0.419
WD LPS surgery
WD LPS surgery + radiotherapy
Survival (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
At risk
102 97 87 83 67 56 47 34 20 16 11 6 2 1 1
102 96 90 74 65 55 43 26 19 13 7 2 1 0 0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (Years)

COMPARISON OF HELICOPTER AND GROUND TRANSPORTATION ON PEDIATRIC MORTALITY AND DISCHARGE DISPOSITION

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Background: Both helicopter and ground emergency medical services (EMS) are utilized throughout the country for transport of pediatric patients who have sustained traumatic injuries. Especially for trauma systems in regions of the United States that service rural and austere environments, helicopter transport is of significant importance in the transportation of patients to higher level of trauma care. Other studies analyzing the pediatric outcomes data in National Trauma Data Bank (NTDB) have indicated a benefit to helicopter EMS in terms of mortality, but no studies to date have specifically demonstrated any association based on specific mechanism or likelihood of discharge with no home medical services.

Objectives: The purpose of this study is to determine if there is an association with helicopter and ground EMS transport of pediatric patients on mortality outcomes and disposition from the hospital based on the data collected within the NTDB.

Methods: A retrospective study of children (i.e., age ≤18 years) with a traumatic injury who were transported by helicopter or ground EMS transport. Data was captured from the National Trauma Data Bank between the years of 2007 to 2015. In-hospital mortality and discharge without the need for medical services were the primary outcomes. Two regression models were built using demographic information, mechanism of injury, severity of trauma, and vitals at the time of emergency department arrival. Findings from the first, all-inclusive, model were reiterated with propensity score matching. All analyses were performed in R version 4.1.0.

Results: From 348,107 individuals (median [IQR] age: 13.0 [6.0,16.0]; 66.6% males) the in-hospital mortality rate was 1.6% (n=5,572). Median injury severity score between ambulance and helicopter transport was 6 vs. 10, ($p<0.01$). Motor vehicle crashes amounted to 118,367 (34%) trauma visits. Twenty percent of patients transported by ambulance were admitted to the intensive care unit compared to 40% in the helicopter cohort. On arrival to the emergency department, 16% of patients in the ambulance group went to the operating room, while 18% of children arriving by helicopter went into surgery. Home without services was higher in the ambulance group (91% vs. 82%). On multivariable analysis, children transported by helicopter had better outcomes: odds ratio (OR) 0.77 for death and an OR of 1.30 for going home without medical services ($p<0.01$). After propensity score matching, the results showed a similar pattern of decreased odds of death and increased odds of discharge home without services. See the attached files below for tabulated results.

Conclusion: The NTDB is the largest collection of data of traumatic outcomes available to date. These results demonstrate that propensity matched models of NTDB data showed an independent association with helicopter transport for both improved odds of survival and increased likelihood of discharge to home without services, the latter of which had not been shown previously. After propensity matching we showed independent associations between individual mechanisms of injury with survival and hospital disposition outcomes in addition to associations based on general mechanism categories (i.e., blunt vs.

penetrating). Overall, it appears that helicopter transport is associated with lower odds of mortality and increased likelihood of discharge home without services when controlling for multiple variables, which could be attributed to faster transport to definitive care at a trauma center. This study had a larger cohort of patients over a longer period of time compared to prior reviews of the NTDB. This model builds on the body of literature, but further studies should be performed as the data elements within the NTDB are updated to assess for an association with specific measures relating to quality of life and cost effect analysis of transport mode.

Unmatched – Mortality			
Characteristic	**OR[1]**	**95% CI[1]**	**p-value**
Gender			
Male	---	---	
Female	0.93	0.87, 1.01	<0.001
Injury Type			
Blunt	---	---	
Burn	1.89	0.64, 4.42	0.2
Other	3.31	2.66, 4.13	<0.001
Penetrating	0.00		>0.9
Mechanism			
Other	---	---	
Fall	0.72	0.58, 0.90	0.003
D/S/S[2]	2.92	2.07, 4.12	<0.001
MVC[2]	0.92	0.76, 1.11	0.4
MVPed[2]	1.10	0.90, 1.34	0.4
Pedal Cyclist	0.29	0.18, 0.46	<0.001
ISS			
1-8	---	---	
9-15	3.22	2.67, 3.90	<0.001
16-24	10.1	8.55, 11.9	<0.001
25-75	27.8	23.6, 32.8	<0.001
Transport			
Ground	---	---	
Helicopter	0.77	0.71, 0.83	<0.001

Propensity Matched – Mortality			
Characteristic	**OR[1]**	**95% CI[1]**	**p-value**
Gender			
Male	---	---	
Female	0.95	0.87, 1.03	0.018
Injury Type			
Blunt	---	---	
Burn	2.18	0.62, 5.83	0.2
Other	3.21	2.52, 4.11	<0.001
Penetrating	0.00		>0.9
Mechanism			
Other	---	---	
Fall	0.71	0.56, 0.91	0.007
D/S/S[2]	2.70	1.87, 3.89	<0.001
MVC[2]	0.87	0.71, 1.08	0.2
MVPed[2]	1.10	0.89, 1.37	0.4
Pedal Cyclist	0.30	0.57, 1.41	<0.001
ISS			
1-8	---	---	
9-15	2.53	2.04, 3.15	<0.001
16-24	7.62	6.33, 9.23	<0.001
25-75	21.8	18.2, 26.3	<0.001
Transport			
Ground	---	---	
Helicopter	0.69	0.64, 0.75	<0.001

[1]OR = Odds Ratio, CI = Confidence Interval, 2D/S/S = Drowning, Submersion, Suffocation, MVC = Motor Vehicle Crash, MVPed = Pedestrian struck by motor vehicle

Table 2. Unmatched and Propensity Matched Regression Analysis for Mortality

Unmatched - Discharge without Services			
Characteristic	**OR[1]**	**95% CI[1]**	**p-value**
Gender			
Male	---	---	
Female	1.068	0.99, 1.15	0.073
Injury Type			
Blunt	---	---	
Burn	0.53	0.23, 1.56	0.2
Other	0.30	0.24, 0.38	<0.001
Penetrating	1161	3.77, NA	>0.9
Mechanism			
Other	---	---	
Fall	1.39	1.11, 1.74	0.003
D/S/S[2]	0.34	0.24, 0.48	<0.001
MVC[2]	1.09	0.90, 1.31	0.4
MVPed[2]	0.91	0.74, 1.11	0.4
Pedal Cyclist	3.44	2.18, 5.67	<0.001
ISS			
1-8	---	---	
9-15	0.31	0.26, 0.37	<0.001
16-24	0.10	0.08, 0.12	<0.001
25-75	0.04	0.03, 0.04	<0.001
Transport			
Ground	---	---	
Helicopter	1.30	1.21, 1.40	<0.001

Propensity Matched - Discharge without Services			
Characteristic	**OR[1]**	**95% CI[1]**	**p-value**
Gender			
Male	---	---	
Female	1.071	0.99, 1.15	0.073
Injury Type			
Blunt	---	---	
Burn	0.53	0.23, 1.56	0.2
Other	0.30	0.24, 0.38	<0.001
Penetrating	1161	3.77, NA	>0.9
Mechanism			
Other	---	---	
Fall	1.39	1.11, 1.74	0.003
D/S/S[2]	0.34	0.24, 0.48	<0.001
MVC[2]	1.09	0.90, 1.31	0.4
MVPed[2]	0.91	0.74, 1.11	0.4
Pedal Cyclist	3.44	2.18, 5.67	<0.001
ISS			
1-8	---	---	
9-15	0.31	0.26, 0.37	<0.001
16-24	0.10	0.08, 0.12	<0.001
25-75	0.04	0.03, 0.04	<0.001
Transport			
Ground	---	---	
Helicopter	1.299	1.21, 1.40	<0.001

[1]OR = Odds Ratio, CI = Confidence Interval, 2D/S/S = Drowning, Submersion, Suffocation, MVC = Motor Vehicle Crash, MVPed = Pedestrian struck by motor vehicle

Table 1. Unmatched and Propensity Matched Logistic Regression for Discharge without Services

Pitfalls and Complications of Enhanced-View Totally Extraperitoneal Approach to Abdominal Wall Reconstruction.

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Background: The enhanced-view totally extraperitoneal access technique (eTEP) to minimally invasive retromuscular abdominal wall reconstruction is a relatively novel technique that has continued to gain popularity. There is a paucity of information regarding the prevention and management of eTEP complications.

Objectives: We reviewed the literature to evaluate the complications reported with eTEP ventral hernia repair and will discuss in further detail the main complications associated with this technique.

Methods: A literature search via PubMed was performed. Inclusion criteria were: (1) publications in English; (2) keywords “eTEP” and/or “ventral hernia”; (3) report of postoperative outcomes.

Results: Forty-two studies were identified, 24 met the inclusion criteria. Data from 1132 patients were pooled. A total of 163 complications (14.4%) were reported, including superficial wound complications (52.8%), ileus (12.9%), retromuscular seroma (6.1%), retromuscular hematoma (6.1%), other technical issues (5.5%), posterior layer dehiscence (5.5%), hollow viscus injury (4.3%), posterior layer defects preventing RM insufflation (1.8%), linea alba dehiscence (1.8%), technical issues with initial eTEP access (1.2%), complete fascial dehiscence (1.2%) and adhesive SBO (0.6%).
Twenty-five patients (2.2%) were readmitted to the hospital and twenty-nine (2.6%) underwent reoperation within the follow-up period. Fifteen recurrences (1.3%) were noted, with a mean follow-up of 8.6 months.

Conclusion: As the eTEP approach continues to gain popularity, it is essential to consider its unique complications. A focus on prevention with anatomical bearings and sound surgical technique is paramount. Although most complications are minor in experienced hands, more data is needed to determine the role of eTEP on the armamentarium of the abdominal wall surgeon.

REVIEW OF SAGES GERD GUIDELINES AND RECOMMENDATIONS

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Background: The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) developed evidence-based guidelines for the management of patients with gastroesophageal reflux disease (GERD).

Objectives: The aim of this study is to evaluate guidelines lacking agreement amongst experts (grades B-D) or lacking support from randomized controlled trials (levels II-III).

Methods: Six guidelines were chosen for evaluation. A retrospective review of a multicenter database of patients undergoing fundoplication surgery for treatment of GERD between 2015-2020 was performed. Patients that underwent a concurrent gastrectomy or were diagnosed with pre-operative achalasia were excluded. Demographics, preoperative, intraoperative, and postoperative variables were collected. Postoperative outcomes were evaluated based on selected SAGES guidelines. Outcomes were assessed using multivariable regression or stratified analysis for each guideline.

Results: A total of 444 patients from four institutions underwent surgery for the management of GERD with a median (interquartile range) follow-up of 16 (13) months. Guidelines supported by our data were (1) mesh reinforcement may be beneficial in decreasing the incidence of wrap herniation, (2) robotic repair has similar short-term outcomes to laparoscopic repair, (3) following laparoscopic antireflux surgery, dysphagia has been reported to significantly improve from preoperative values, and (4) outcomes in older patients are similar to outcomes of younger patients undergoing antireflux surgery. Guidelines that were not supported were (1) the long-term effectiveness of fundoplication in obese individuals (BMI >30) has been questioned due to higher failure rates and (2) a bougie has been found to be effective.

Conclusion: Many SAGES GERD guidelines not receiving Grade A or Level I recommendation are supported by large, multicenter database findings. However, further studies at low risk for bias are needed to further refine these guidelines.

SAGES Guidelines under review	Outcome	Variable OR (95% CI), p-value
1. Mesh vs. suture reinforcement: Mesh reinforcement may be beneficial in decreasing the incidence of wrap herniation (Grade B).	Anatomic failure	Suture: ref Mesh: 0.78 (0.40-1.51), p=0.464
2. Robotic vs. laparoscopic assistance: Robotic assistance is more expensive with similar short-term outcomes (Grade B).	Dindo clavien complications	Robotic: ref Laparoscopic: 1.48 (0.16-13.66), p=0.727
3. Bougie efficacy: A 56 French bougie has been found to be effective (Grade C).	Post-operative dysphagia	Bougie: 1.10 (0.33-3.26), p=0.859
4. Patient age: >65 vs. ≤65 y: Outcomes in older patients are similar to outcomes of younger patients undergoing antireflux surgery (Grade C).	Dindo clavien complications	Age: 1.00 (0.97-1.03), p=0.950
5. Patient BMI: The long-term effectiveness of fundoplication in obese individuals (BMI >30) has been questioned due to higher failure rates (level II-III).	Wrap herniation	BMI: 1.00 (0.95-1.06), p=0.910
6. Pre-op dysphagia: Following laparoscopic antireflux surgery, dysphagia has been reported to significantly improve from preoperative values (level II-III).	Dysphagia	No dysphagia pre-operative: 14.3% developed post-operative dysphagia Dysphagia present pre-operative: 83.6% resolved dysphagia post-operative 16.4% vs 14.3%, p=0.498

Management of associated diastasis recti during hernia repair – operative details and outcomes of the Abdominal Core Health Quality Collaborative

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Background: Advancements of minimally invasive techniques leveraged routine repair of concomitant diastasis recti (DR), as those approaches facilitate fascial plication and wide mesh overlap while obviating skin incision and/or undermining. Nevertheless, evidence on the value of such intervention are lacking. Also, an optimal approach for DR repair remains to be determined.

Objectives: We aimed to investigate the management and outcomes of concomitant DR during ventral hernia repair (VHR+DR) from surgeons participating on the Abdominal Core Health Quality Collaborative (ACHQC).

Methods: Patients who have undergone VHR+DR with minimum 30-day follow-up complete were identified. Outcomes of interest included operative details, surgical site occurrences (SSO), medical complications, readmissions, recurrence. Quality of life scores were reported if available.

Results: 150 patients (51% female, median age 46, median body mass index 31kg/m2) were identified. Most hernias were primary (63% umbilical, 28% epigastric). Median hernia width was 3cm (IQR 2-5) and median diastasis width and length were 4cm (IQR 3-6) and 15cm (IQR 10-20) respectively. Most operations were robotic-assisted (78%), with synthetic mesh (90%) placed as a sublay (91%; 64% retromuscular, 28% preperitoneal). DR was repaired with absorbable (91%), running suture (93%). A transversus abdominis release was performed in 22 patients. 75% were discharged same day and 30-day readmission rate was 2% (2 ileus, 1 pneumonia). SSO rate was 5% (6 seromas, 1 skin necrosis) and none required a procedural intervention. No recurrences at 30-days were reported. Quality of life scores improved (n=44, baseline HerQLes 58, 30-day 63, 1-year 87).

Conclusion: ACHQC participating surgeons usually perform VHR+DR robotically with synthetic mesh as a sublay closing the DR with running absorbable suture. Short-term complications are rare and managed without intervention. Larger studies with longer-term follow-up are needed to determine the value of VHR+DR.

EVALUATION OF MANAGEMENT STRATEGIES AND PREOPERATIVE PREDICTORS OF CHOLEDOCHOLITHIASIS IN INTERMEDIATE-RISK PATIENTS

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Background: The optimal management strategy for intermediate risk choledocholithiasis (IR-CDL) has yet to be defined. Accepted algorithms include magnetic resonance cholangiopancreatography (MRCP) prior to laparoscopic cholecystectomy (LC) and LC with or without intra-operative cholangiogram (LC±IOC). At our safety-net hospital, patients with IR-CDL often proceed directly to LC±IOC, however variation from this practice exists to an unknown extent.

Objectives: We sought to 1) evaluate our management strategies for IR-CDL and 2) identify preoperative predictors of positive IOC in IR-CDL.

Methods: Patients ≥16 years of age with IR-CDL who had a LC during their index hospitalization between March 2018 and March 2020 were included. In accordance with established criteria, IR-CDL was defined as having a total bilirubin of 1.8-4.0 mg/dL, a common bile duct (CBD) ≥0.6cm, or gallstone pancreatitis (GP). To assess management strategies for IR-CDL, we examined the use of initial LC+IOC, initial LC alone, and MRCP followed by LC±IOC. Univariate and multivariate logistic regression were performed to identify predictors of positive IOC.

Results: Of 426 patients who met inclusion criteria, 60% (n=254) had initial LC+IOC, 35% (n=151) had initial LC alone, and 3% (n=13) had MRCP followed by LC±IOC. Among those undergoing initial LC+IOC, 33% (n=86) of had a positive IOC, 58% (n=147) had a negative IOC, and 9% (n=22) were unsuccessful. No differences in age, sex, race, BMI, or presenting vital signs were found between those with positive and negative IOCs. Of patients with positive IOC, all were managed successfully with postoperative ERCP, CBD exploration, or observation at time of hospitalization. Of patients with initial MRCP, 31% (n=4) were positive for CDL. Univariate analysis identified elevated alkaline phosphatase (AP) and total bilirubin (TB) to be predictive of positive IOC (Table 1). Multivariate analysis showed that elevated AP was the strongest predictor of positive IOC (OR 2.3, 95% CI 1.3-4.3). There was no difference in elevated TB (OR 1.5, 95% CI 0.8-2.9), CBD diameter (OR 1.4, 95% CI 0.4-4.7), or presence of GP (OR 1.2, 95% CI 0.6-2.2).

Conclusion: Initial LC+IOC was the predominant choice for initial management of IR-CDL at our safety-net hospital. Within the narrow cohort of patients who had an IOC, the only significant predictor of a positive IOC in IR-CDL preoperatively was elevated AP. In the absence of strong clinical predictors of CDL among this patient cohort, initial LC+IOC is a viable management strategy. Further investigation into the optimal management algorithm for IR-CDL is warranted.

	Positive IOC (n=86)	Negative IOC (n=147)	p-value
Age (y), median (IQR)	36.5 (26.3-49.0)	39.0 (29.0-51.0)	0.63
AP (U/L), median (IQR)	130 (99-186)	105 (79-147)	< 0.01
TB (mg/dL), median (IQR)	0.8 (0.5-1.5)	0.7 (0.4-1.1)	0.02
CBD Diameter (cm), median (IQR)	0.7 (0.5-0.9)	0.7 (0.5-0.8)	0.85
Gallstone Pancreatitis, n (%)	28 (33%)	42 (29%)	0.69

Table 1: Unadjusted preoperative predictors of positive intraoperative cholangiogram.
AP = alkaline phosphatase; TB = total bilirubin; CBD = common bile duct

FINDING RELIEF FOR THE SELF-CONSCIOUS ESOPHAGUS: LARS AND EHAS

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Background: Measures of mood and effective coping strategies have notable correlations with quality of life and treatment responses. There is evidence that patients with previously diagnosed anxiety disorders have less improvement in patient-reported outcome measures (PROMs) after laparoscopic anti-reflux surgery (LARS) and that objective pathology does not correlate well with symptom severity.

Objectives: We were interested in investigating whether anxiety and hypervigilance, as measured preoperatively with the Esophageal Hypervigilance Anxiety Scale (EHAS), is associated with the improvement in GERD-specific PROMs and EHAS scores 6 months after LARS.

Methods: We performed a retrospective cohort study of 102 adult patients (31% men, average age 64) who underwent LARS. In the preoperative evaluation, baseline Gastroesophageal Reflux Disease-Health Related Quality of Life (GERD-HRQL), Laryngopharyngeal Reflux Symptom Index (LPR-RSI) and EHAS scores were collected in addition to the standard reflux workup, including endoscopy, manometry, barium swallow, and pH study. At 6 months postoperatively, patients completed repeat GERD-HRQL, LPR-RSI, and EHAS surveys. We then analyzed for surgical and patient-related factors associated with improvement in the 6-month postoperative GERD-HRQL and LPR-RSI scores.

Results: There was a statistically significant decrease in the GERD-HRQL (25 vs 2, $p < 0.001$), LPR-RSI (17 vs 3, $p < 0.001$) and EHAS (34 vs 15, $p < 0.001$) 6 months after LARS. On multivariable linear regression, a higher baseline EHAS score was independently associated with a greater improvement in GERD-HRQL (β 0.35, $p < 0.001$) and LPR-RSI (β 0.19, $p = 0.03$) 6-months after LARS. Additionally, the degree of improvement in EHAS, GERD-HRQL, and LPR-RSI was not influenced by the type of LARS performed or by the severity of disease.

Conclusion: These findings are consistent with literature suggesting that measures of psychoemotional health correlate better with symptom intensity than objective pathology. Our previous findings with this cohort showed that patients with a higher EHAS score have greater symptom severity and lower quality of life at baseline. Novel findings to this study are that patients with a higher preoperative EHAS, a measure of psychoemotional health, actually benefitted more from surgery and not less, which has been the traditional view in the literature. Future studies are warranted to establish directionality and explore the role of preoperative cognitive behavioral therapy with LARS for patients with significant symptoms of hypervigilance and anxiety.

OUTCOMES OF THORACIC AORTIC INTERVENTIONS IN MARFAN SYNDROME PATIENTS IN THE STATE OF TEXAS FROM 2009-2019

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Background: Marfan Syndrome (MFS) is an inheritable connective tissue disorder associated with significant cardiothoracic morbidity often requiring thoracic aortic interventions (TAI).

Objectives: To evaluate outcomes of TAIs amongst MFS discharges.

Methods: Retrospective review of the Texas Inpatient Discharge Dataset Public Use File from 1/1/2009 to 12/31/2019. Discharges from acute care hospitals with a diagnosis of MFS by International Classification of Diseases 9/10 code were identified. Demographics, procedures, principal diagnoses (PDx), and outcomes were analyzed. Descriptive, univariate, multivariable logistic and linear regression statistics were utilized.

Results: A total of 4,641 MFS discharges were identified during the study period, 644 (13.9%) of whom included an invasive TAI. Among those, 248 (38.5%) were female, 421 (65.4%) White, 141 (21.9%) Hispanic, and 209 (32.5%) were 35-49 years of age. Cardiovascular risk factors (RFs) included hypertension (n=416, 64.6%), atherosclerosis (n=11, 1.7%), hyperlipidemia (n=78, 12.1%), diabetes mellitus (n=30, 4.7%), tobacco use (n=100, 15.5%), and bicuspid aortic valve (BAV) (n=16, 2.5%). Private insurance was listed in 437 (67.9%) discharges. PDx of thoracic or thoracoabdominal aortic dissection or rupture (TADR) was noted in 223 (34.6%). In addition to the TAIs, simultaneous procedures included: mitral valve (n=88, 13.7%), aortic valve (n=119, 18.5%), and coronary artery (CAP) (n=33, 5.1%) interventions. TAI approach was percutaneous in 42 (6.5%). Postprocedural outcomes included: 30 (4.7%) in-hospital mortalities, 126 (19.6%) diagnoses of acute renal failure (ARF), 17 (2.6%) with temporary mechanical circulatory support (TMCS), 52 (8.1%) mechanically ventilated >96 hours (MV96), and median length of stay (LOS) was 10[7-16] days. Mitral and aortic valve procedures were not associated with outcomes. CAP was associated with increased mortality (12.1% vs 4.3% p=0.037), ARF (36.4% vs 18.7% p=0.013), and TMCS (9.1% vs 2.3% p=0.018). TADR was associated with increased ARF (26.5% vs 15.9% p=0.001), TMCS (4.5% vs 1.7% p=0.034), MV96 (12.1% vs 5.9% p=0.006), and longer LOS (11[8-18] vs 9[6-15] p<0.001). After adjustment (Table), CAP remained associated with increased odds of mortality (3.69[1.15-11.90] p=0.029) and ARF (2.66[1.19-5.94] p=0.017). TADR was associated with increased odds of MV96 (2.19[1.21-3.97] p=0.010), ARF (1.73[1.14-2.63] p=0.010), and percent difference in LOS (14.9%[2.2-29.3%] p=0.021).

Conclusion: TAI in the MFS population continues to confer significant morbidity, especially if performed for TADR or requiring simultaneous CAP. Conventional cardiovascular RFs were not associated with adverse outcomes, nor were additional procedures (aside for CAP). The high prevalence (34.6%) of TADR may point to the need of more strict surveillance in the MFS population.

Table: Multivariable Logistic and Linear Regressions of TAI Outcomes

Factor	OR of Mortality (95% CI)	Sig.	OR of MV96 (95% CI)	Sig.	OR of ARF (95% CI)	Sig.	% Difference in LOS (95% CI)*	Sig.
Demographics								
Female					0.57 [0.36 – 0.88]	**0.011**	4.7% (-6.2, 16.9)	0.413
White					0.79 [0.51 – 1.24]	0.306	-6.0% (-16.6, 6.1)	0.319
Hispanic							-2.7% (-15.3, 11.9)	0.702
Age (years)								
0-9			6.45 [0.64 – 65.61]	0.115	0.00 [0 – inf]	0.983	117.7% (15.7, 309.8)	**0.016**
10-19			0.00 [0 – inf]	0.987	0.56 [0.18 – 1.78]	0.328	-30.9% (-45.2, -12.9)	**0.002**
20-34			Ref	-	Ref	-	Ref	-
35-49			1.92 [0.87 – 4.24]	0.108	1.78 [1.03 – 3.07]	**0.038**	20.1% (4.4, 38.2)	**0.011**
50-64			2.63 [1.17 – 5.94]	**0.020**	1.99 [1.09 – 3.62]	**0.025**	26.9% (8.4, 48.6)	**0.003**
65+			1.15 [0.24 – 5.53]	0.864	1.76 [0.67 – 4.64]	0.250	25.3% (-3.2, 62.2)	0.087
Insurance								
Private					Ref	-	Ref	-
Uninsured					1.19 [0.57 – 2.48]	0.639	-1.7% (-19.7, 20.2)	0.866
Medicare					1.53 [0.65 – 3.60]	0.331	20.0% (-3.9, 49.9)	0.108
Medicaid					1.10 [0.60 – 2.03]	0.752	20.9% (1.9, 43.4)	**0.030**
Other					1.03 [0.36 – 2.97]	0.950	5.6% (-19.9, 39.1)	0.699
Risk Factors								
Hypertension					1.04 [0.67 – 1.62]	0.861	-4.5% (-15.1, 7.4)	0.441
Atherosclerosis							24.9% (-17.3, 88.7)	0.291
Lipid disorders					1.21 [0.67 – 2.18]	0.536	-13.6% (-27.4, 2.7)	0.098
Diabetes mellitus					0.82 [0.31 – 2.16]	0.691	9.0% (-15.9, 41.3)	0.515
Tobacco					1.26 [0.75 – 2.14]	0.380	-0.007% (-14.3, 16.6)	0.999
BAV							-27.9% (-49.1, 2.1)	0.067
Diagnoses and Procedures								
Mitral valve	0.59 [0.24 – 1.47]	0.256	1.54 [0.68 – 3.51]	0.300	0.80 [0.41 – 1.55]	0.510	13.8% (-3.1, 33.7)	0.116
Aortic valve			1.15 [0.52 – 2.55]	0.722	0.91 [0.52 – 1.59]	0.741	4.5% (-9.7, 20.8)	0.554
CAP	3.69 [1.15 – 11.90]	**0.029**	0.93 [0.26 – 3.34]	0.911	2.66 [1.19 – 5.94]	**0.017**	-19.9% (-37.6, 2.8)	0.082
Percutaneous							-9.0% (-27.6, 14.5)	0.421
TADR	1.36 [0.65 – 2.88]	0.417	2.19 [1.21 – 3.97]	**0.010**	1.73 [1.14 – 2.63]	**0.010**	14.9% (2.2, 29.3)	**0.021**
Mortality							-44.4% (-56.9, -28.1)	**<0.001**

*Additionally adjusted for Year of discharge

A 30-YEAR ANALYSIS OF GENERAL SURGERY RESIDENCY PROGRAMS USING A NORMALIZED COMPETITIVE INDEX

Rebecca N. Treffalls, BS; John A. Treffalls, BS; Jennie H. Luu, MBS; Mark G. Davies, MD, PhD,

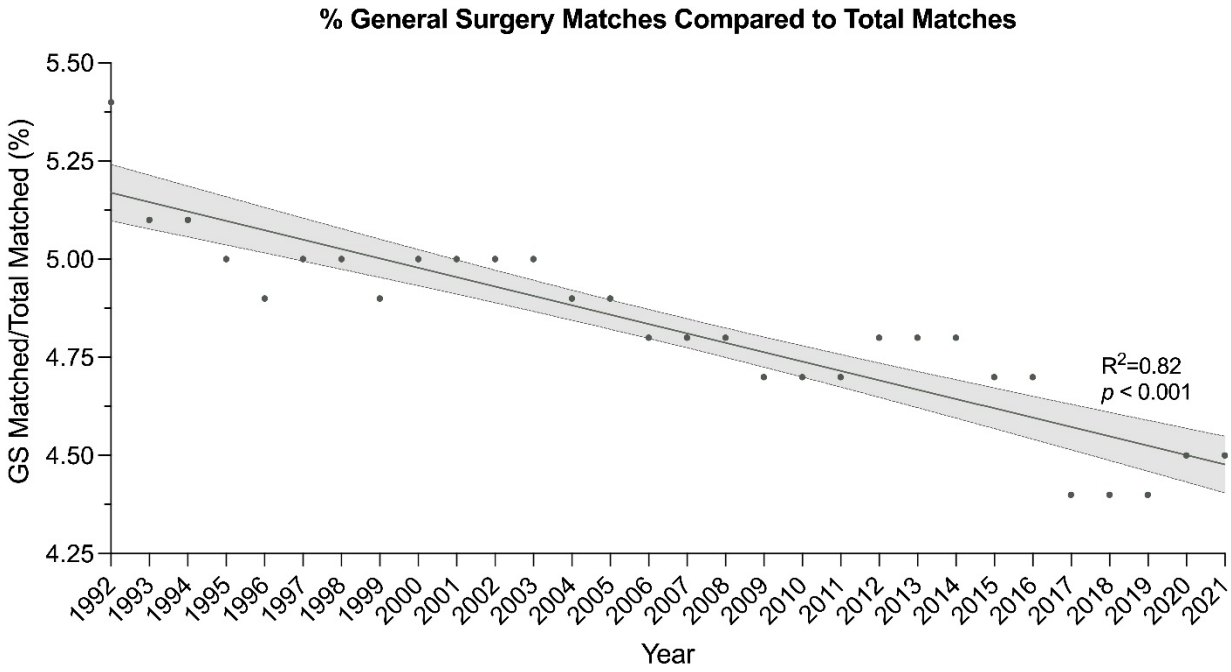
Background: General surgery remains the predominant surgical residency training pathway and is the gateway to specializing through fellowship training. A long-term analysis of general surgery residency competitiveness has not been performed.

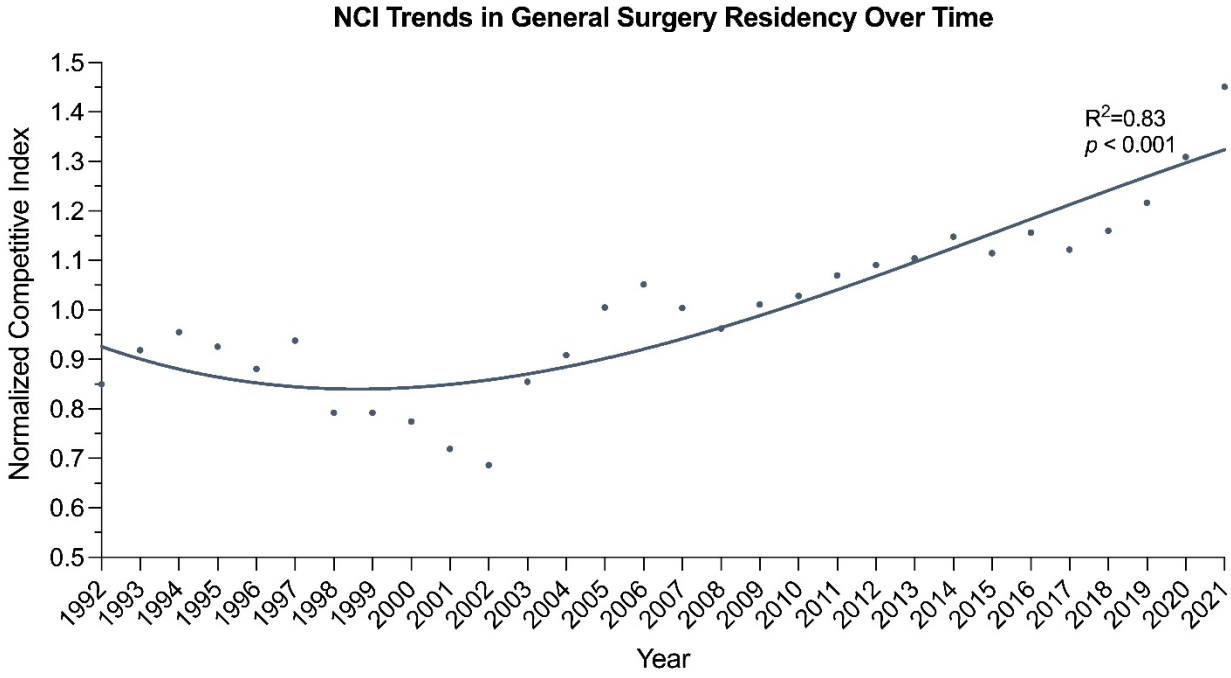
Objectives: The aim of this study was to apply a normalized competitive index over a 30-year period to analyze trends in general surgery training.

Methods: Data for general surgery programs were collected using the National Resident Matching Program (NRMP) Main Residency Match data from 1992-2021. Applicant metrics from 2007-2019 were collected via NRMP Charting Outcomes data that is reported every 2-3 years. Due to inconsistent reporting over the last 30 years, only U.S. senior data were included. The metrics collected included contiguous ranks, USMLE Step 1 and Step 2 scores, research experiences and output, work experiences, and volunteer experiences. A competitive index was created by dividing the number of programs ranked per applicant over the match rate each year. The index was normalized to a value of 1 thereby creating a normalized competitive index (NCI). A nonlinear regression was performed on the NCI across time. A linear regression was performed on the percent of applicants entering general surgery and applicant metrics across time.

Results: The NCI was significantly different across time ($p < 0.001$, $R2=0.83$) with an upward trending NCI. The match rate increased over time (63% in 1992 vs 73% in 2021); however, the number of programs ranked per applicant doubled from 8.7 in 1992 to 17.3 in 2021. The percentage of total applicants matching into general surgery residency programs significantly decreased over time ($p < 0.001$, $R2=0.82$). The USMLE Step 1 and Step 2 scores of matched applicants increased over time (2007, 222 vs 2019, 235; 2007, 226 vs 2019, 248, $p < 0.001$). Research output has nearly tripled over the 2007-2019 period (2.2 vs 6.4, $p < 0.001$). Work and volunteer experience have both significantly increased over time ($p < 0.05$).

Conclusion: The percentage of total applicants entering general surgery residencies has been steadily decreasing over the last three decades. Despite the decrease in matriculation, general surgery residency programs have increased in competitiveness over time. The NCI may be a useful metric for applicants to determine the competitiveness of a residency program compared to match rates.


% General Surgery Matches Compared to Total Matches
GS Matched/Total Matched (%)
5.50
5.25
5.00
4.75
4.50
4.25
R2=0.82
p < 0.001
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Year


NCI Trends in General Surgery Residency Over Time
Normalized Competitive Index
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
R2=0.83
p < 0.001
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Year

COACHING LANGUAGE MATTERS: THE IMPACT OF AN AUTONOMY SUPPORTIVE VERSUS A CONTROLLING COACHING ENVIRONMENT ON SURGICAL SKILL ACQUISITION FOR NOVICE TRAINEES

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Background: The sports and psychology (S&P) literature often defines coaching environments in two ways: autonomy supportive (AS) and controlling language (CL) conditions. The AS environment involves a degree of choice while coaching, positive re-enforcement and approachability. CL coaching environment involves providing prescriptive instructions with no room for choice, neglecting positive re-enforcement, and involves physical and vocal intimidation. The S&P literature suggests that AS conditions improve motor skills learning compared to CL conditions; this has not been evaluated in surgical education.

Objectives: To compare the impact of AS and CL coaching conditions on surgical skill acquisition by novice trainees.

Methods: We recruited 46 medical students who were novices at laparoscopic surgery. The participants were randomly assigned to four groups based on the type of language (AS vs CL) and who initiated the feedback (trainee vs coach). The participants watched an instructional video in their coaching language, performed a pretest, underwent 80 minutes of coaching on the Fundamentals of Laparoscopic Surgery intra-corporeal suturing task, and then completed a posttest. A resident and senior medical student served as coaches and followed AS or CL coaching scripts. Time, errors, score, and amount of feedback for each practice trial was recorded. The coach was blinded to the score of each trial and the data were recorded by the assistant. A posttest survey was performed. Participants returned within a week to perform a retention test.

Results: Participants in the AS groups had higher post-test and retention scores than the CL group participants ($p = 0.003$ each). Of note, the AS groups had higher positive affect scores ($p = 0.02$) and reported feeling more supported ($p = 0.04$). Participants who controlled when they received feedback reported an increased sense of control ($p = 0.04$). There was no statistically significant difference in performance regardless of if the trainee or coach-initiated feedback.

Conclusion: In novice trainees, an AS coaching environment improves surgical skill acquisition and retention compared to a CL coaching environment. Participants in the AS group showed higher positive affect scores, and reported feeling more supported during their training.

	AS	CL
Trainee controlled feedback	N = 16	N = 10
Coach controlled feedback	N = 9	N = 11

FEVERS, PATHOGENS, AND ANTIBIOTICS IN SEVERELY INJURED TRAUMA PATIENTS WITH HOSPITAL ACQUIRED INFECTIONS

Simin G Roward, Tatiana Cardenas, Marc Trust, Ife Shoyombow, Mitch Daley, Ben Coopwood, Pedro Teixeira, Jason Aydelotte, Emilio Ramos, Marielle Ngoue, Carlos VR Brown, University of Texas Austin - Dell Medical School

Background: A new fever in a surgical intensive care unit (SICU) trauma patient prompts an evaluation to identify a source of hospital acquired infection, as well initiation of empiric antibiotics. This evaluation will not always result in positive cultures.

Objectives: The specific aims of this study were to identify pathogens, antibiotics, and variables associated with positive culture results in febrile trauma ICU patients and to compare outcomes between culture positive and negative patients.

Methods: We performed a retrospective study (2014-2019) of adult (18-89 years old) trauma patients admitted to the SICU at our ACS-verified, urban, academic level one trauma center. Patients were included if they had a fever of >/= 101.5 F, had cultures sent (blood, sputum, or urine), and were started on empiric antibiotics. Data collected included demographics, admission physiology, and injury pattern and severity. The primary outcomes were culture results and antibiotic management, while secondary outcomes included mortality, length of stay in the hospital and SICU, and days on the ventilator.

Results: Of the 262 patients who met inclusion criteria, 181 (69%) had a positive culture. The most common organism was Staph aureus (47%), and most patients (51%) grew multiple organisms. Patients with a positive culture more often had their antibiotics narrowed (69% vs. 24%, p<0.0001) and had a longer course of antibiotics (13 days vs. 7 days, p<0.0001). There was no difference in age, gender, race, mechanism, or admission vital signs, however patients with a positive culture result were more severely injured (ISS: 29 vs. 25, p=0.02) and more often had a severe (GCS </=8) TBI (48% vs. 31%, p=0.01). After logistic regression, severe TBI was the only variable independently associated with a positive culture result (2.2 [1.2-3.9], p=0.009). Patients with positive cultures spent more days in the hospital (26 vs. 18, p=0.005), ICU (17 vs. 11, p=0.0008), and on the ventilator (12 vs. 7, <0.0001).

Conclusion: Two-thirds of febrile trauma patients in the ICU who undergo diagnostic evaluation for hospital acquired infection have positive culture results and with severe TBI are twice as a likely to have a positive culture. The most common organism is Staph. We found opportunities for improvement in narrowing antibiotics and stopping antibiotics in culture negative patients. Patients with positive cultures have worse outcomes including prolonged hospital, ICU, and ventilator days.

ANALYSIS OF TRANSPORTATION MODE ON OUTCOME ANALYSIS IN ADULT TRAUMATIC OUTCOMES

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Background: Both helicopter and ground emergency medical services (GEMS) have been studied for their effects on traumatic outcomes. Association between helicopter transport and survival outcomes has been previously demonstrated, but no studies to date have demonstrated an association with discharge disposition and specific mechanisms of injury when transported by helicopter (HEMS) and GEMS.

Objectives: The purpose of this study is to determine if there is an association with HEMS and GEMS transport of traumatically injured adult patients on mortality and disposition from the hospital.

Methods: Analysis of patients receiving care in a Level 1 trauma center was derived from the National Trauma Data Bank (NTDB) from 2007 to 2016. The primary outcome was in-hospital death and the secondary outcome was discharge home without medical services. Four groups were created to assess the impact of race on transportation mode: White GEMS, White HEMS, Black GEMS, and Black HEMS. Wilcoxon rank sum test and Chi square analyses were used to describe the following variables: age, sex, hospital disposition, length of stay, injury type, mechanism of injury, injury severity score, vitals in the emergency department, and Glasgow coma scale. Features significant on univariate analysis were introduced into a multivariate logistic regression model. All analyses were conducted in R v.4.1.0.

Results: Approximately 6.5 million patients were reviewed. After exclusion of incomplete cases to limit the need for imputation, the total number of adult patients was 785,449. The median age of Black patients in both the GEMS (38 vs 54, $p<0.001$) and HEMS (34 v 45, $p<0.001$) was lower. Black patients had a lower median ISS compared to White patients in both the ground (9 vs. 9, $p<0.001$) and helicopter (12 vs. 13, $p<0.001$) groups (Table 1). After multivariate regression analysis, both groups had higher odd of survival in the HEMS groups compared to GEMS. Black patients in the ground transport group had higher odds of death (OR 1.12, 95% CI 1.07, 1.17) and lower odds of discharge home without services (OR 0.983, 95% CI 0.962, 0.998) compared to White patients. In the helicopter groups, Black patients had increased odds of death (OR 0.749, 95% CI 0.679, 0.826) compared to White patients (OR 0.73, 95% CI 0.70, 0.76). Black patients showed increased odds of discharge home with no services (OR 1.23, 95% CI 1.17, 1.28) compared to White patients (OR 1.05, 95% CI 1.043, 1.077).

Conclusion: This study shows that HEMS transport is associated with improved survival odds and increased likelihood of discharge home without medical services. Based on the large body of literature analyzing social determinants of health, our findings were consistent in that Black patients had a higher likelihood of dying regardless of transportation mode. In the helicopter group, it appeared that Black patients had increased odds of discharge home without medical services. This is likely attributed to their younger age and lower median ISS on arrival compared to the White patients, although this would need external validation to be confirmed. This review is unique in that it encompasses a larger cohort of patients and is analyzed over a longer period of time compared to prior studies that are similar in nature. Continued reviews of the NTDB should be carried out to assess specific measures related to quality-of-life outcomes and cost effect analysis as they relate to transportation mode.

Table 1. Univariate Analysis for Transportation Mode

Variable	Black or AA[3], Ground EMS (n = 120,522[1])	Black or AA[3], Helicopter EMS (n = 10,687[1])	White, Ground EMS (n = 545,067[1])	White, Helicopter EMS (n = 109,173[1])	p-value[2]
AGE	38 (25,53)	34 (24,49)	54 (35,73)	45 (28,60)	<0.001
GENDER					<0.001
Male	88,545 (73%)	8,419 (79%)	329,616 (60%)	77,047 (71%)	
Female	31,977 (27%)	2,268 (21%)	215,451 (40%)	32,126 (29%)	
INJURY TYPE					<0.001
Blunt	76,981 (64%)	7,017 (66%)	482,744 (89%)	94,488 (87%)	
Penetrating	35,619 (30%)	2,978 (28%)	34,173 (6.3%)	7,891 (7.2%)	
Burn	2,277 (1.9%)	250 (2.3%)	8,300 (1.5%)	2,373 (2.2%)	
Other	5,645 (2.7%)	442 (4.1%)	19,850 (3.6%)	4,421 (4.0%)	
MECHANISM					<0.001
Cut/Pierce	15,981 (13.0%)	1,258 (12.0%)	25,622 (4.7%)	4,398 (4.0%)	
D/S/S[3]	84 (<0.1%)	12 (0.1%)	407 (<0.1%)	191 (0.2%)	
Fall	29,993 (25.0%)	1,271 (12.0%)	276,748 (51.0%)	28,344 (26.0%)	
Firearm	19,635 (16.0%)	1,720 (16.0%)	8,528 (1.6%)	3,489 (3.2%)	
MVC[3]	24,189 (20.0%)	4,160 (39.0%)	127,365 (23.0%)	52,184 (48.0%)	
MVPed[3]	10,861 (9.0%)	781 (7.3%)	29,959 (5.5%)	4,741 (4.3%)	
Pedal Cyclist	1,067 (0.9%)	60 (0.6%)	13,656 (2.5%)	1,650 (1.5%)	
ED DISPO[3]					<0.001
Death	333 (0.3%)	16 (0.1%)	339 (<0.1%)	136 (0.1%)	
General Floor	56,615 (47.0%)	2,677 (25.0%)	273,625 (50.0%)	29,830 (27.0%)	
Home	1,566 (1.3%)	55 (0.5%)	2,236 (0.4%)	394 (0.4%)	
ICU[3]	24,307 (20.0%)	4,025 (38.0%)	126,511(23.0%)	46,047 (42.0%)	
Tele/SDU[3]	8,975 (7.4%)	973 (9.1%)	55,032 (10.0%)	10,064 (9.2%)	
Operating Room	23,679 (20.0%)	2,717 (25.0%)	65,485 (12.0%)	20,641 (19.0%)	
DEATH					<0.001
No	116,769 (97.0%)	9,924 (93.0%)	527,322 (97.0%)	101,063 (93.0%)	
Yes	3,753 (3.1%)	763 (7.1%)	17,745 (3.3%)	8,110 (7.4%)	
DC NO SERVICES					<0.001
Death	3,753 (3.1%)	763 (7.1%)	17,745 (3.3%)	8,110 (7.4%)	
No	29,511 (24.0%)	3,057 (29.0%)	201,586 (37.0%)	36,695 (34.0%)	
Yes	87,258 (72.0%)	6,867 (64.0%)	325,736 (60.0%)	64,368 (59.0%)	

[1]Median (IQR); n (%)
[2]Kruskal-Wallis rank sum Test; Pearson's Chi-Squared test
[3]AA = African American; D/S/S = Drowning, Submersion, Suffocation; MVC = Motor Vehicle Crash; MVPed = Motor Vehicle versus Pedestrian; ED DISPO = Emergency Department Disposition; ICU = Intensive Care Unit; Tele/SDU = Telemetry or Step-Down Unit

Table 2. Multivariable Regression Analysis - Death

Characteristic	OR[1]	95% CI[1]	p-value
GENDER			
Male	---	---	
Female	0.799	0.775, 0.824	<0.001
INJURY TYPE			
Blunt	---	---	
Penetrating	<0.001	---	0.916
MECHANISM			
Other	---	---	
Fall	0.002	N/A, 6,213	>0.9
D/S/S[2]	3.56	2.65, 4.74	<0.001
Firearm	1,918	26.1, N/A	0.815
MVC[2]	0.0015	N/A, 3,595	>0.9
MVPed[2]	0.0017	N/A, 4,181	>0.9
Pedal Cyclist	0.0015	N/A, 2,461	>0.9
INJURY CHARACTERISICS			
ISS	1.09	1.08, 1.09	<0.001
Systolic BP	0.991	0.991, 0.992	<0.001
Pulse Rate	1.00	1.00, 1.00	0.029
GCS Total	0.757	0.755, 0.760	<0.001
TRANSPORT MODE			
White, Ground EMS	---	---	
Black or AA[2], Ground EMS	1.12	1.07,1.17	<0.001
White, Helicopter EMS	0.727	0.699,0.755	<0.001
Black or AA[2], Helicopter EMS	0.749	0.679, 0.826	<0.001

[1]OR = Odds Ratio, CI = Confidence Interval, 2D/S/S = Drowning, Submersion, Suffocation, MVC = Motor Vehicle Crash, MVPed = Pedestrian struck by motor vehicle, AA = African American

Table 2. Multivariate Logistic Regression Analysis for Death based on Race and Transportation Mode

Table 3. Multivariable Regression Analysis – Discharge Without Services

Characteristic	OR[1]	95% CI[1]	p-value
GENDER			
Male	---	---	
Female	1.39	1.37, 1.40	<0.001
INJURY TYPE			
Blunt	---	---	
Burn	2.48	0.115, 26.23	0.458
Other	1.93	0.089, 20.27	0.593
Penetrating	0.871	0.030, 12.96	>0.9
MECHANISM			
Other	---	---	
Fall	3.16	0.146, 33.22	0.349
D/S/S[2]	1.31	1.09, 1.57	0.003
Firearm	2.80	0.795, 17.87	0.170
MVC[2]	2.07	0.096, 21.81	0.553
MVPed[2]	2.86	0.132, 30.09	0.392
Pedal Cyclist	2.96	0.057, 12.85	0.871
INJURY CHARACTERISICS			
ISS	1.039	1.038, 1.04	<0.001
Systolic BP	0.998	0.997, 0.998	<0.001
Pulse Rate	1.004	1.003, 1.005	<0.001
GCS Total	0.989	0.988, 0.992	<0.001
TRANSPORT MODE			
White, Ground EMS	---	---	
Black or AA[2], Ground EMS	0.983	0.966, 0.998	0.035
White, Helicopter EMS	1.06	1.043, 1.077	<0.001
Black or AA[2], Helicopter EMS	1.23	1.173, 1.287	<0.001

[1]OR = Odds Ratio, CI = Confidence Interval, 2D/S/S = Drowning, Submersion, Suffocation, MVC = Motor Vehicle Crash, MVPed = Pedestrian struck by motor vehicle, AA = African American

Table 3. Multivariate Logistic Regression Analysis for Discharge Home Without Services based on Race and Transportation Mode

CRUSH INJURIES ARE A SIGNIFICANT RISK FACTOR FOR DEVELOPING A HIGH GRADE ACUTE KIDNEY INJURY

James M. Bradford, Marc D. Trust, Pedro G. Teixeira, Brent Emigh, Tatiana Cardenas, Jayson Aydelotte, Sadia Ali, Chloe Ng, Lawrence Brown, Carlos VR. Brown, University of Texas at Austin Dell

Background: Acute kidney injury (AKI) can be a significant source of morbidity for adult trauma patients. While risk factors for development of AKI are well known, predictors of worsening AKI are not well understood.

Objectives: The aim of this study is to delineate which patients who develop a mild AKI are at risk of progression of disease.

Methods: Prospective cohort study at our urban, American College of Surgeons verified Level I trauma center from September 2017 to August 2018 to determine the incidence and risk factors for AKI in adult trauma patients admitted to the surgical intensive care unit. Analysis was done comparing patients who developed Kidney Disease: Improving Global Outcomes (KDIGO) Grade 1 AKI to those whose AKI worsened. Primary outcome evaluated was progression of AKI. Secondary outcomes were mortality, hospital and ICU length of stay (LOS), and RRT.

Results: In total, 466 patients met our inclusion criteria, and 307 (66%) developed AKI. Of these, 176 (57%) patients remained at a grade 1 AKI, while 131 (43%) worsened to more severe injury. On univariate analysis patients whose AKI worsened were more often male, more tachycardic on admission, had worse extremity Abbreviated Injury Scale scores, and more often had crush injuries compared to those whose AKI did not worsen. There were no statistically significant differences in age, race, Injury Severity Scale score, or other risk factors for AKI between the two groups. Patients with worsening AKI more often required RRT (5% vs 0%, p=0.006) but no difference was noted in mortality or LOS. On multivariate analysis, crush injury was the only variable independently associated with progression of AKI (OR 6.0, CI 1.9 - 18.4, p=0.0018).

Conclusion: Patients presenting with crush injury are at high risk for worsening AKI, and treatment should aim to mitigate this progression. These strategies include diligent hydration and avoidance of other nephrotoxic agents when possible.

DYSPHAGIA IS ASSOCIATED WITH WORSE CLINICAL OUTCOMES IN GERIATRIC TRAUMA PATIENTS

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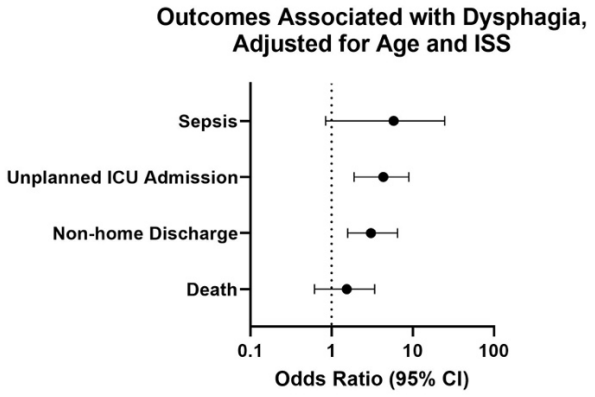
Background: Dysphagia is associated with increased morbidity, mortality, and resource utilization in hospitalized patients. Although the incidence of dysphagia has been shown to increase with age, studies on outcomes in geriatric trauma patients with dysphagia are limited.

Objectives: We hypothesized that geriatric trauma patients with dysphagia would have worse clinical outcomes.

Methods: A single center retrospective cohort study of trauma patients age ≥65 admitted in 2019 was performed. Patients with and without dysphagia were compared. Dysphagia was diagnosed based on speech therapy evaluation after provider referral with objective testing unless gross aspiration was present. The primary outcome was mortality. Secondary outcomes included ICU length of stay (LOS), hospital LOS, discharge destination, sepsis, and unplanned ICU admission. Univariate and multivariable linear and logistic regression analyses were performed to determine the association between dysphagia and clinical outcomes. All multivariable analyses were adjusted for age and injury severity score, which were selected a priori.

Results: Of 1705 total patients identified for analysis, 1689 patients (99%) had a blunt mechanism of injury, and 915 (54%) were female; 69 patients (4%) were diagnosed with dysphagia, of which 9 patients (13%) had a gastrostomy tube recommended for feeding access. Patients with dysphagia were older and had a higher Injury Severity Score. Although the associations were imprecise on adjusted analysis, dysphagia was associated with increased odds of death (OR 1.5, 95% CI 0.6-3.4, p=0.31) and sepsis (OR 5.8, 95% CI 0.9-24.9, p= 0.03). Dysphagia was also associated with increased odds of unplanned ICU admission (OR 4.4, 95% CI 1.9-9.0, p=<0.001) and non-home discharge (OR 3.1, 95% CI 1.6-6.5, p=0.002). (Figure). Additionally, dysphagia was associated with a 5.0 day increase in ICU LOS (95% CI 4.0-6.0, p=<0.001) and an 8.2 day increase in hospital LOS (95% CI 6.4-10.0, p=<0.001) on adjusted linear regression.

Conclusion: Dysphagia is more commonly seen in patients with poor outcomes, but it remains unclear if dysphagia represents a modifiable risk factor or a marker of underlying frailty, leading to poor outcomes. Future studies to further explore these relationships should focus on the impact of early recognition and treatment of dysphagia in this vulnerable population.



OPIOID USE DISORDER IN ADULT BURN PATIENTS: IMPLICATIONS FOR MENTAL HEALTH AND SUBSTANCE ABUSE PATTERNS

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Background: Opioid analgesics are a mainstay of burn pain management at all levels of care including: the intensive care unit, perioperative and outpatient settings. Despite increased awareness and scrutiny of opioid prescribing patterns, standard burn therapies continue to involve painful procedures and therapies which justify this level of pain management. Although effective, long-term opioid use is a known risk factor for eventual drug use dependence. A paucity of literature is available that investigates burn patients who develop dependence and the outcomes that may be associated with the misuse of opioids.

Objectives: We present here an analysis of 10 years of retrospective data across a national network of healthcare systems (TriNetX) on burned patients with diagnosed opioid use disorder. This data will allow burn care providers to identify and minimize at risk patients in all patient care settings.

Methods: We examined a de-identified database of patient electronic medical records across 55 health care associations comprising over 75 millions patients. ICD-10 codes were used to identify 70,090 patients, greater than 18 years of age, who sustained thermal or chemical burns from January 1, 2000 to December 31, 2010. Of these, 1752 patients (2.5%) had developed 'opioid use disorder' only after their injury. Patients in these two cohorts were balanced by propensity score matching and mental health outcomes were subsequently compared using CPT and ICD-10 codes.

Results: Risk of developing recurrent major depressive disorder ($p<0.001$, OR: 1.743, 95% CI: 1.287-2.189) generalized anxiety disorder ($p<0.0001$, OR: 1.899, 95% CI: 1.493-2.415) and post-traumatic stress disorder ($p<0.0001$, 1.974, 1.507-2.588) were significantly elevated in the opioid disorder cohort. Similarly, burn patients with opioid use disorder were at significantly higher risk of non-opioid substance abuse (alcohol: $p=0.003$, cannabis: $p=0.003$, cocaine: $p<0.0001$). Most importantly, these patients had higher rates of incarceration ($p=0.0015$), suicidal and/or homicidal ideation ($p<0.0001$), as well as suicide attempts ($p=0.001$). Finally, the opioid disorder cohort had significantly higher rates of visits with psychiatric services ($p<0.0001$, OR 2.236, 95% CI: 1.772-2.822) and underwent psychotherapy more often ($p<0.001$, OR 2.367, 95% CI: 1.807-3.1).

Conclusion: Opioid medications are a necessary component of burn care, however data and literature investigating opioid use disorder in burned patients is scarce. This is a large-scale analysis demonstrating the propensity of this cohort to also develop significant mental health, behavioral, and substance abuse disorders. While opioid analgesia will likely continue as an integral part of burn care, it is crucial for burn surgeons and other physicians to be cognizant of potential long-term implications for their patients.

PATIENT REPORTED OUTCOMES FOLLOWING DAMAGE CONTROL VERSUS DEFINITIVE LAPAROTOMY IN TRAUMA PATIENTS: A SECONDARY ANALYSIS OF THE DCL TRIAL

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Background: Damage control laparotomy (DCL) is often used in the management of severely injured trauma patients. Information regarding patient reported outcomes (PROs) following DCL versus definitive laparotomy (DEF) is scarce.

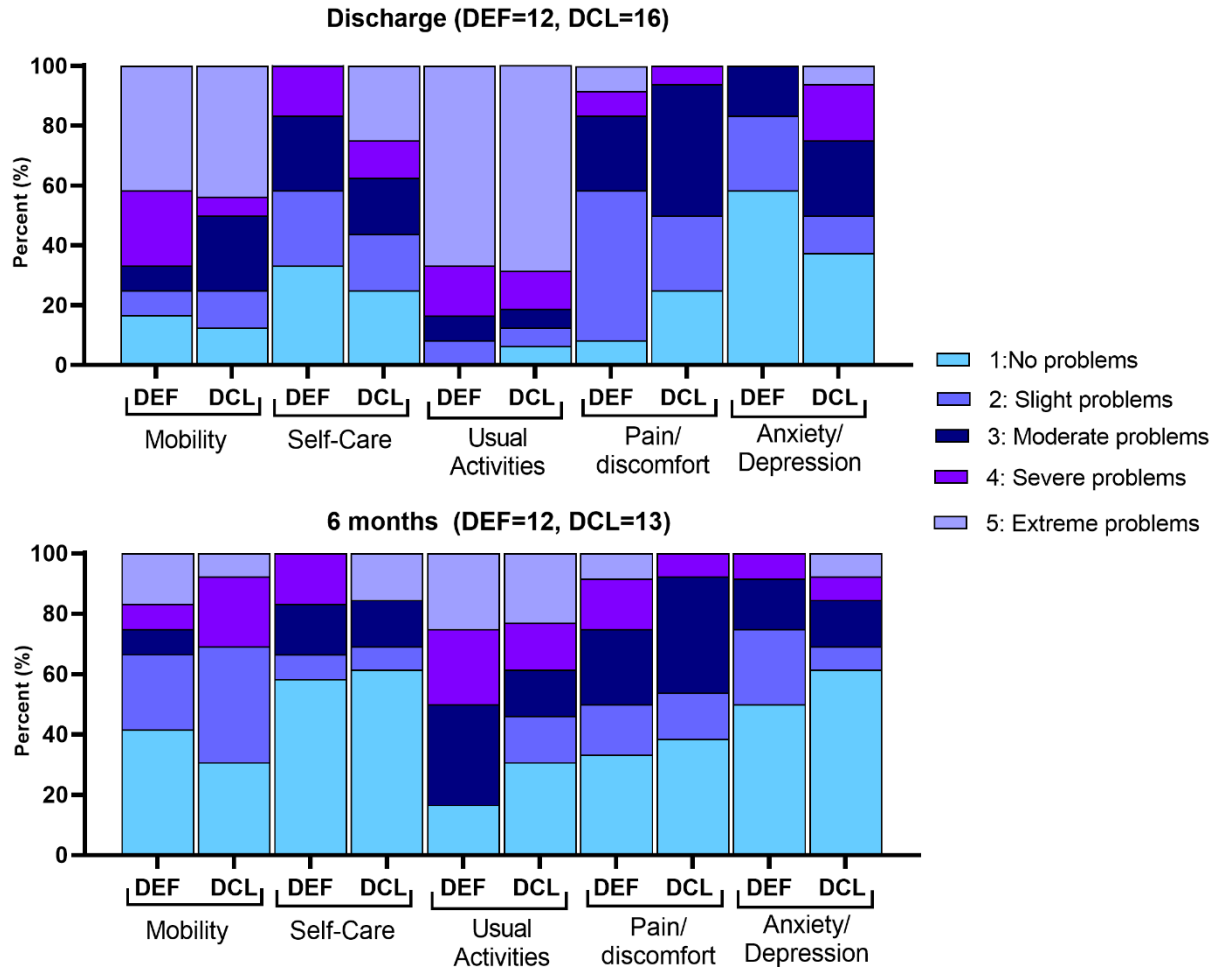
Objectives: We hypothesized that patients undergoing DEF would have improved PROs compared to those treated with DCL.

Methods: This was a secondary analysis of the DCL Trial, a pilot randomized controlled trial assessing DEF versus DCL in trauma. PROs were measured using the European Quality of Life-5 Dimensions-5 Levels (EQ-5D) questionnaire at discharge and 6 months post-discharge (score of 1 = perfect health, 0 = death, and < 0 = worse than death; minimally clinically important difference [MCID] = 0.05). Unadjusted Bayesian analysis with a neutral prior was performed to assess the posterior probability of achieving the MCID.

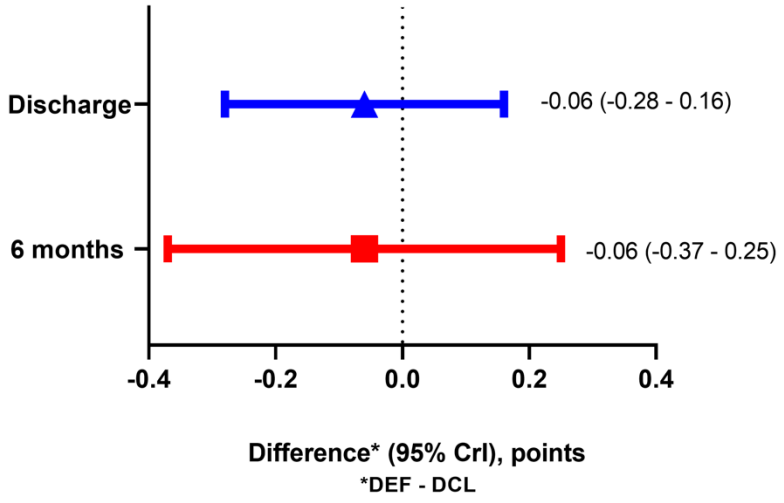
Results: Of 39 patients enrolled, 21 were randomized to DEF and 18 to DCL . Eight patients died (7 DEF vs 1 DCL) and were assigned a value of 0. Of those who survived, 28 completed the EQ-5D at discharge (12 DEF vs 16 DCL) and 25 at 6 months (12 DEF vs 13 DCL). Most patients were male (79%) with a median age of 30 (IQR 21-42), suffered blunt injury (56%), and were severely injured (median injury severity score 33, IQR 21 – 42). Levels reported by each treatment group are shown in Figure 1. Median EQ-5D value at discharge was 0.20 (IQR 0.06 – 0.52) DEF vs. 0.31 (IQR -0.03 – 0.43) DCL, and at 6 months 0.51 (IQR 0.30 – 0.74) DEF vs. 0.50 (IQR 0.28 – 0.84) DCL. Differences between treatment groups at discharge and 6 months are shown in Figure 2. The posterior probability of a MCID in EQ-5D in DEF vs DCL at discharge and 6 months, was 16% and 23%, respectively.

Conclusion: Though limited by small sample size, we find no evidence to support our hypothesis that PROs are improved in patients managed with DEF compared to DCL.

Percentage of patients reporting levels within EQ-5D dimensions, DEF vs DCL



Relationship between EQ-5D scores for DEF vs. DCL



HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS: A MODEL FOR EXAMINING SEX-BASED DIFFERENCES IN CDH

Oluyinka Olutoye II, MD, MPH; Walker Short, MD; Jamie Gilley, APRN, NNP-BC; Jason Gleghorn, PhD; Swathi Balaji, PhD; Krithika Lingappan, MD, PhD; Sundeep G. Keswani, MD, Baylor College of Medicine

Background: The main sources of morbidity and mortality in congenital diaphragmatic hernia (CDH) are pulmonary hypoplasia and hypertension (PH) mediated by endothelial dysfunction, fibrosis, and mesenchymal differentiation. Preliminary data suggests that males have a predisposition toward CDH-PH; however, there are no human models to study the pathogenesis of CDH. Human umbilical vein endothelial cells (HUVECs) have been used in other disease models to represent disease-based vascular changes.

Objectives: The purpose of this study is to examine the propensity of HUVECs from CDH patients to display pathologic features of CDH-PH and to further explore sex as a biological variable in CDH.

Methods: HUVECs were harvested from umbilical cords of 10 CDH patients (7 male, 3 female) and 5 human age- and sex-matched controls (3 male, 2 female). CDH HUVECs and control HUVECs were treated with recombinant TGF-β1 for 48 hours. Expression of α-SMA and Col-1a1 was measured using RT-qPCR. RNA sequencing was performed to determine the differential regulation of genes and biological pathways between CDH HUVECs and HUVEC controls and HUVECs of different sexes. These data were then compared to a published CDH lung organoid database. Continuous data were analyzed with paired t-tests.

Results: Following TGF-ß1 treatment, CDH HUVECs demonstrated higher expression of α-SMA (4.9 ± 1.1 vs. 0.9± 0.1, $p<0.05$) and Col-1a1 (6.1±1.0 vs. 0.8± 0.2, $p <0.01$) than controls. RNA sequencing on CDH HUVECs and CDH lung organoids highlighted overlapping pathways consistent with endothelial dysfunction, fibrosis, and mesenchymal development and differentiation (Figure 1A). Male and female CDH HUVECs shared only 5 of 166 upregulated and 2 of 251 downregulated genes (Figure 1B).

Conclusion: CDH HUVECs demonstrated sex-based gene expression differences, which may suggest an underlying cause for the sex discrepancy in CDH-PH. Our data confirms that CDH HUVECs demonstrate gene expression and pathway regulation changes consistent with other known models of CDH. Furthermore, males show upregulation of the ECM organization and mesenchymal cell development pathways that may explain the elevated incidence of CDH-PH in males versus females. These findings have the potential to alter the way we manage sex-specific differences in CDH-PH.

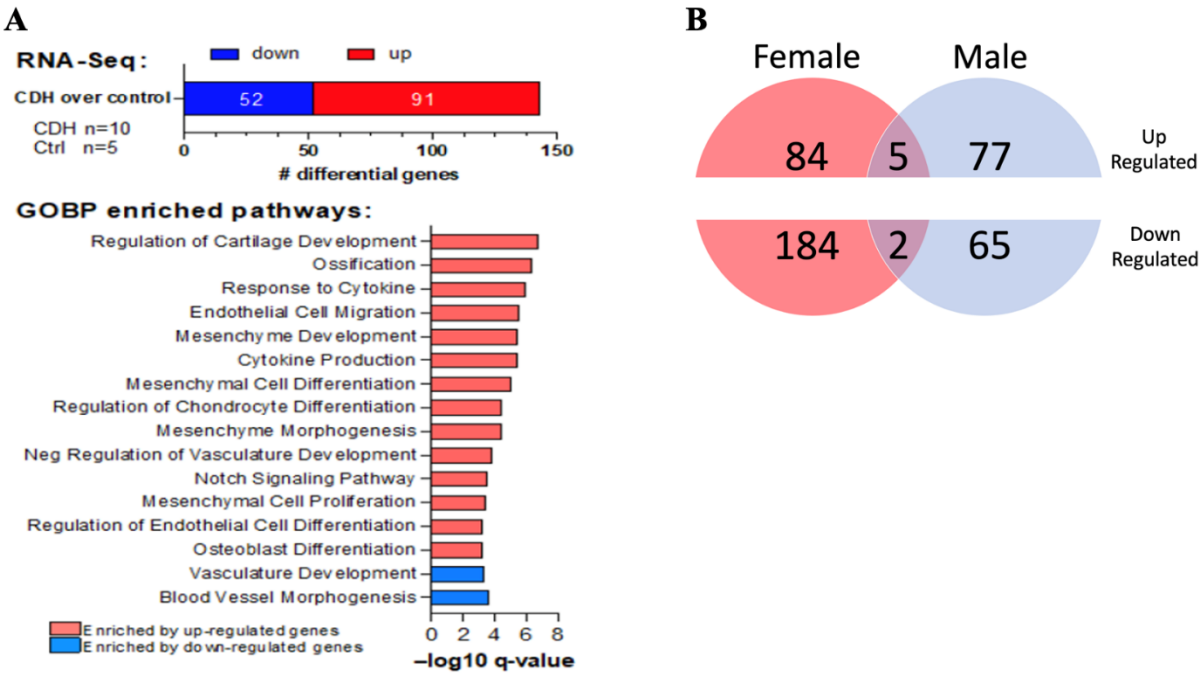


Figure 1: A: RNA Sequencing Results of All CDH HUVECs. B: RNA Sequencing Differential Gene Comparison of CDH HUVEC Male vs. Female

Evaluating Nutritional Support in Necrotizing Enterocolitis

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Background: Necrotizing Enterocolitis (NEC) is a gastrointestinal disease of infants that is treated with bowel rest, antibiotics, and, in severe cases, surgery. Treatment often leads to delayed enteral nutrition (EN) and prolonged need for parenteral nutrition (PN) support in affected patients. Breastmilk has been shown to be protective against the development of NEC; however, there is limited understanding of the use of lipid PN formulations in high risk patients and their associated outcomes. This study aimed to evaluate nutritional trends in patients with NEC and their potential effect on patient outcomes.

Objectives: This study aimed to evaluate nutritional trends in patients with NEC and their potential effect on patient outcomes.

Methods: A retrospective review was conducted of pediatric NEC cases at a tertiary-care pediatric hospital from January 2018 to December 2020. Patients less than 1 year with a diagnosis of NEC or suspected NEC were included. Demographics, NEC treatment details, nutritional data, and post-operative outcomes within 90 days were abstracted from the electronic medical record (EMR). Descriptive and univariate analysis were performed.

Results: Ninety-Nine patients were reviewed, of which 73 (73.7%) had a confirmed NEC diagnosis, while 26 (26.3%) were diagnosed with suspected NEC. The majority were female (50.5%), and had a median age of 20 (10,41) days and median weight of 1.25 (0.91,1.92) kilograms (kg). Most patients (56.6%) were managed non-operatively with antibiotics; however, 43 (43.4%) did require surgery. PN with intravenous lipids (IL) was given in equal frequency as SMOFlipids (36.4%); however, 20 (20.2%) patients were given both during their hospital course. EN was variable with 88 (88.9%) receiving a combination of maternal (MBM)/donor (DBM) breastmilk and formula, 48 (48.5%) solely MBM or DBM, and 11 (11.1%) exclusively formula. Median time from being placed on bowel rest to reaching full feeds (>120cc/kg/day) was 16 days (12,26). There was no difference in complications, length of stay (LOS), and time to full feeds in patients who received only IL or only SMOFlipids (Table). However, patients treated with both IL and SMOFlipids were found to have longer LOS, time to full feeds and more complications (Table). Enteral nutrition with MBM/DBM, formula, or combination showed no difference in complication rates or LOS(Table). However, patients given a combination of MBM/DBM and formula did have longer time to full feeds ((20 (11,72) vs 15 (13,18) ($p=0.023$)).

Conclusion: Nutritional support for patients being treated for NEC is highly variable; however, patients given singular formulations for PN (IL only or SMOFlipids only) appear to have better outcomes. Further research is needed to develop nutritional protocols for high-risk infants that allow for both ease of use and implementation and optimize patient outcomes.

Table: Patient Outcomes by Nutrition Type Administered*

Nutrition Type	Length of Stay (Days)		Time To Full Feeds (Days)		Complication Rate	
Intravenous Lipids Only (n=36)	66 (25, 135)	p = 0.49	15 (12, 23)	p = 0.42	6 (17%)	p = 0.61
SMOFlipids Only (n=36)	82 (34, 119)	p = 0.55	14 (12, 19)	p = 0.12	3 (8%)	p = 0.03
Intravenous Lipids and SMOFlipids (n=20)	107 (85, 164)	p = 0.035	45 (19, 77)	p < 0.001	10 (50%)	p < 0.001
Maternal or Donor Breastmilk Only (n=48)	73 (25, 129)	p = 0.72	15 (13, 18)	p = 0.14	10 (21%)	p = 0.88
Formula Only (n=11)	82 (33, 133)	p = 0.39	14 (13,16)	p = 0.21	0	p = 0.077
Maternal or Donor Breastmilk and Formula (n=36)	73 (25, 133)	p = 0.19	20 (11, 72)	p = 0.023	10 (28%)	p = 0.16

* Continuous data presented as median (interquartile range) and discrete data presented as number (percentage)

Characteristics and Risk Factors of Relapsed Hepatoblastoma

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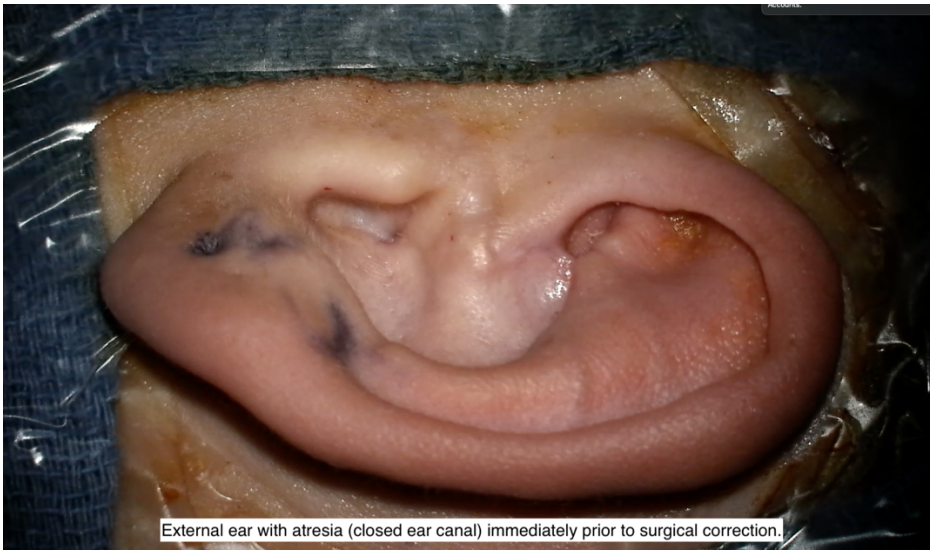
Background: Hepatoblastoma (HB) is the most common primary hepatic malignancy in childhood with survival approaching 80-90% in children with low and intermediate risk disease. Relapse occurs in more than 50% of high-risk patients with a high mortality due to ineffective salvage therapies.

Objectives: The purpose of this study is to identify risk factors for relapse in a single center tertiary referral center.

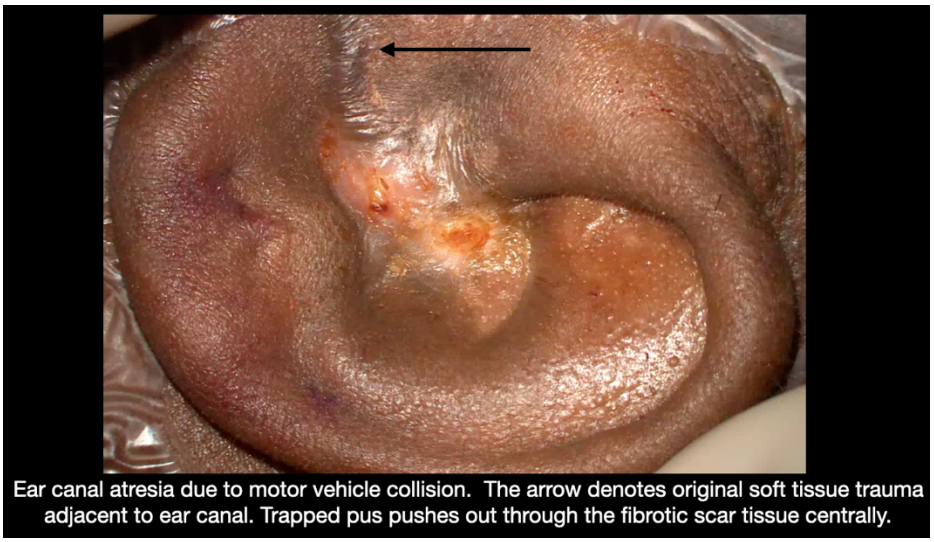
Methods: A retrospective chart review showed 22 patients that presented with relapsed HB from October 2004 to July 2020 at Texas Children's Hospital in Houston, Texas. Relapse was defined as re-appearance of malignancy after 4 weeks of normalized AFP and disappearance of all tumors.

Results: Relapsed HB was found to occur more often in males (72%) and children of Hispanic decent (57%). The patients with relapsed HB were initially diagnosed at an average age of 48 months (with interquartile range [IQR], 8 months – 138 months). Of the patients who relapsed, 27% of the patients were born prematurely. About half (45%) of the patients presented with pretreatment extent of disease stage (PRETEXT) IV disease involving all section of the liver. Relapsed HB occurred similarly in patients with multifocal disease (42%) compared to unifocal (47%). Disease involving all 3 hepatic veins or IVC (V+) or involving both portal veins or main portal vein (P+) on imaging was seen in 4% and 45%, respectively, of the initial tumors. Pathologic macro- and micro-vascular invasion were appreciated in 41% and 59%, respectively, of the initial tumors resected within the relapse group. Metastatic disease was appreciated in 32% of patients on initial presentation. The average time from resection to relapse was 6.4 months (IQR, one month – eighteen months). Relapsed tumors more commonly occurred in the lung (59%) versus liver (36%). Eighteen percent of patients had multiple relapses. After a median follow-up time of thirty months, 40% of patients were salvaged with surgery and/or chemotherapy.

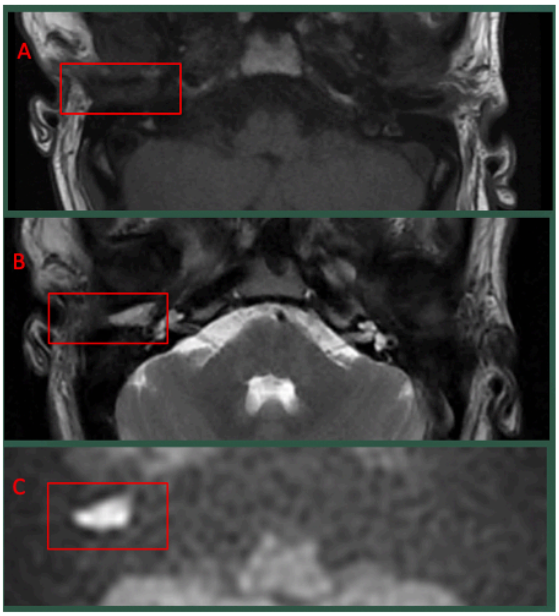
Conclusion: This study revealed prevalent characteristics of the relapse HB population including PRETEXT IV disease, portal vein (P+) involvement, pathologic microvascular invasion, and occurrence of disease in the lung. Salvage rates of relapse HB remains below 50% at a tertiary referral center emphasizing the need for further study of this high-risk population to improve outcomes.



External ear with atresia (closed ear canal) immediately prior to surgical correction.



Ear canal atresia due to motor vehicle collision. The arrow denotes original soft tissue trauma adjacent to ear canal. Trapped pus pushes out through the fibrotic scar tissue centrally.



Axial MR scans of the right ear canal acquired atresia. A. T1 MRI without contrast shows soft tissue density filling the ear canal space. B. T2 MRI shows infected fluid trapped between the skin and ear drum. C. Diffusion weighted imaging (DWI) shows restricted diffusion consistent with cholesteatoma formation from the trapped skin medially.

EVIDENCE-BASED SCREENING TO OPTIMIZE THE YIELD OF POSITIVE OPHTHALMOLOGIC EXAMINATIONS IN CHILDREN EVALUATED FOR NON-ACCIDENTAL TRAUMA

Maxwell Su MD, Kirby Taylor MS, Jaqueline Stoutin BA, Courtney Shaver MS, Matthew Recko MD, Texas A&M Scott and White

Background: Nonaccidental trauma (NAT) examinations in children are not entirely harmless, especially in situations where the patients and families have already experienced significant physical or emotional trauma. Additionally, a dilated fundus exam precludes serial neurological pupil examinations, requires hospital resources and personnel, and may incite additional burdens on the family and healthcare system (i.e. transfer to tertiary institutions if ophthalmology is unavailable). At many institutions, ophthalmic exams are routinely ordered for patients with suspected NAT. However, the majority of ophthalmic NAT evaluations are negative. Our study elucidates clinical and imaging factors that correlate to retinal findings to increase the yield of positive exams and decrease the burden of potentially unnecessary NAT ophthalmologic exams and assist first contact physicians with ensuring high-risk patients are adequately examined.

Objectives: To determine nonocular findings associated with retinal hemorrhages on dilated fundus exam in cases of suspected nonaccidental trauma. Previous studies have hypothesized that patients without neuroimaging abnormalities are unlikely to have retinal hemorrhage. It is also well reported that subdural hemorrhage is associated with retinal hemorrhage. Our study validates this proposed hypothesis while expanding upon clinical and neuroimaging findings associated with retinal hemorrhages. In doing so, our study was able to generate a multivariate logistic regression model for predicting significant retinal hemorrhage as the outcome. Using univariate and multivariate analysis of different clinical and radiologic variables and their association with retinal hemorrhage, a proposed screening algorithm was created for ophthalmologic examination of children 36 months of age or younger with suspected nonaccidental trauma.

Methods: The study was a retrospective chart review of the electronic health record (Epic) from May 1, 2014, to August 31, 2021, at Baylor Scott & White Medical Center—Temple, Texas. Patients underwent investigation by an ophthalmologist for retinal hemorrhage, a fundus pathology associated with nonaccidental trauma. Of the charts reviewed, 274 met inclusion criteria: 1) children ≤ 36-months-old, 2) concern for nonaccidental trauma, 3) ophthalmology consult placed. Through univariate and multivariate logistic regression, our study produces a screening algorithm for ophthalmic workup in NAT.

Results: ≥ 1 abnormal neuroimaging findings had a statistically significant association with retinal hemorrhages and produced the strongest association with a univariate odds ratio of 170 (confidence interval 10.245, >999.999). The multivariate model (p-value<0.0001 with a c-statistic of 0.980) proposes using the following variables for predicting retinal hemorrhage on exam: Abnormal neuroimaging, Glasgow coma score (GSC) < 15, altered mental status on examination, seizure activity, vomiting, bruising, scalp hematoma/swelling, and skull fractures.

Conclusion: Our study elucidates clinical and imaging factors that correlate to retinal findings, validating previously studied variables and introducing new variables to be considered. We propose an evidenced based screening algorithm to increase the yield of

positive dilated exams to ensure the most at risk patients are properly addressed and decrease the burden of potentially unnecessary NAT ophthalmologic exams.

Table 1. Demographics, burn characteristics, and outcomes for children who were under child protective services (CPS) versus those who were not.

	CPS (N=8)	Non-CPS (N=31)	P=value
Male (N, %)	5 (62.5)	22 (71)	0.64
Age (years, st dev)	3±3	5±3.83	0.13
TBSA (%, st dev)	15±0.11	8±0.08	0.08
Operations	3±2.19	1±0.77	0.048
Length of stay (days)	20±17	5±5.24	0.02
Graft loss (%)	33	25	0.69

HOSPITAL VARIATION IN MORTALITY AFTER INPATIENT PEDIATRIC SURGERY: DOES IT MATTER WHERE CHILDREN ARE TREATED?

Steven Mehl, Jorge Portuondo, Mehul Raval, Sohail Shah, Adam Vogel, David Wesson, Nader Massarweh, Baylor College of Medicine

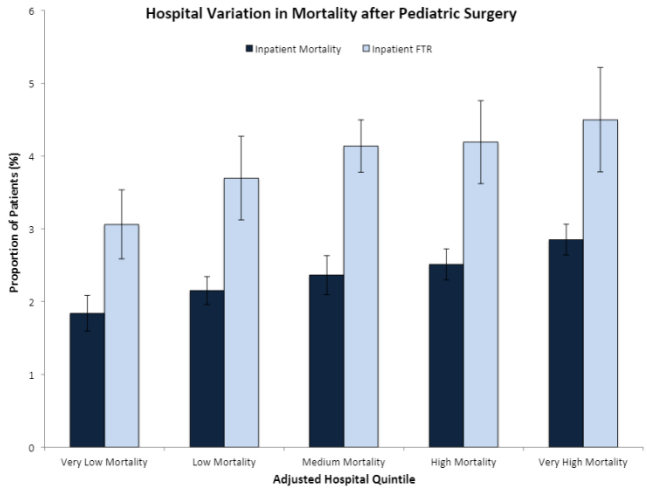
Background: Failure to rescue (FTR), or death after a postoperative complication, has been identified as a measure of surgical quality and a possible explanatory factor for hospital variation in perioperative mortality in adults. However, it is unclear if this also applies to pediatric surgery.

Objectives: The purpose of this study was to determine if variation in pediatric surgical quality could be secondary to variation in pediatric FTR.

Methods: The Pediatric Health Information System® database (2012–2020) was used to identify patients who underwent one of 95 high-risk operations associated with significant perioperative mortality. FTR was defined as inpatient mortality after a surgical complication. Mortality, complication, and FTR rates were derived for each hospital. Hospitals were stratified into quintiles based on reliability-adjusted inpatient mortality (very low mortality [quintile 1 (Q1)] to very high mortality [quintile 5 (Q5)]). Analysis of variance was used to compare mortality, complication, and FTR rates across quintiles.

Results: 377,776 patients were identified across 48 academic, pediatric hospitals. The majority (80.0%) of patients had at least one complex chronic condition. The complication, mortality, and FTR rates respectively were 25.6%, 2.3%, and 4.0%. Hospital-level mortality rates significantly varied with a dose-response relationship (Q1 [1.8%], Q5 [2.9%]; $p<0.01$) (Figure). Among patients who died after surgery, 44.1% had a preceding complication. There was no significant difference in complication rates across hospitals (Q1 [25.2%], Q2 [26.0%], Q3 [25.6%], Q4 [24.0%]; Q5 [25.1%]; $p=0.87$). However, there was a significant dose-response relationship in FTR rates across quintiles (Q1 [3.1%], Q5 [4.5%]; $p<0.01$).

Conclusion: Variation in risk- and reliability-adjusted mortality across academic, pediatric hospitals may be partially explained by differences in the recognition and management of postoperative complications. Additional work is needed to identify children at greatest risk of postoperative death from perioperative complications as opposed to those at risk from pre-existing chronic conditions.



EFFICACY OF FLUOROSCOPIC INTRAOPERATIVE NEOPLASM AND NODE DETECTION (FIND) PROCEDURE COMPARED TO STANDARD WIRE LOCALIZATION

Gabrielle C Manno, Roi Weiser, Samuel H Cass, Lu Chen, Cilia Chao, H Colleen Silva, V Suzanne Klimberg, University of Texas Medical Branch - Galveston

Background: Patients with non-palpable breast lesions opting for breast conservation require preoperative image-guided localization. Wire localization remains the standard to which novel non-wire devices are compared. It is a painful procedure accompanied by vasovagal events, risk of wire malposition, and complex scheduling issues. A novel procedure, Fluoroscopic Intraoperative Neoplasm and Node Detection (FIND) use intraoperative visual guidance to obtain margins around the standard clip placed during diagnostic biopsy without a preliminary procedure. We hypothesized FIND would improve negative margin rates.

Objectives: The objective of the study was to compare the efficacy of FIND at obtaining negative margins in partial mastectomy and identifying clipped lymph nodes to those of wire localization.

Methods: This is an IRB-approved retrospective study, from September 2016 to March 2021. Electronic chart review identified breast and axillary node procedures requiring localization. All excisions guided by either WL or FIND were included. Primary outcome was margin status, with secondary outcomes being re-excision rate, surgery time, specimen weight and axillary node localization rate.

Results: Four-hundred fifty-nine patients were identified. Of the 459, 116 (25.3%) underwent FIND and 343 (74.7%) WL. 68.1% (79/116) of FIND procedures and 72.0% (247/343) of WL were for malignant lesions. Final margin positivity was 5.1% for FIND and 16.6% for WL (p=0.0083). Mean specimen weight was 40.6±78.0 grams for FIND and 41.5±62.1 grams for WL (p=0.5025). 7.6% (6/79) of FIND cases and 14.6% (36/247) of WL cases underwent re-excision (p=0.1246), with no statistically significant difference upon multivariate logistic regression (p=0.6184). Mean surgery time was 177.5±81.7 minutes for FIND and 157.1±66.8 minutes for WL (p=0.0224). All (29/29) axillary nodes localized with FIND and 80.1% (21/26) of those localized using WL were successfully excised (p=0.0189).

Conclusion: FIND has a lower positive margin rate without the need for secondary localization procedures. It offers accurate localization of axillary nodes, valuable in the era of targeted axillary dissection. It is an additional method of visual localization for surgeons, with a skill and equipment they already have, and saves patients and medical systems an additional potentially painful procedure, especially valuable when using novel localization devices is cost-prohibitive

HOSPITAL COLORECTAL CANCER TREATMENT INTENSITY PREDICTS INCREASED CHEMOTHERAPY UTILIZATION AND OVERTREATMENT ACROSS CANCER TYPES

Elizabeth L Carpenter, MD, Katryna Thomas, MD, Daniel W Nelson, DO, Erica Hope, MD, Robert W Krell, MD, Brooke Army Medical Center

Background: Background: An important factor in assessing cancer care value is treatment intensity (TI), or the relative volume of cancer treatments for a given cancer type. An institution's TI for a particular cancer may be a more reliable predictor of care patterns for other cancers than hospital attributes such as accreditation level. We hypothesized that hospital-level TI for metastatic colorectal cancer (mCRC) predicts TI for other cancer types.

Objectives: Objective: To determine the reliability of mCRC TI as an indicator of hospital-level cancer treatment intensity for other cancer types in relation to other hospital attributes.

Methods: Methods: We used the 2004-17 National Cancer Database to compare TI for patients with biliary, colorectal (CRC), gastric, hormone-receptor positive (HR+) breast, and ovarian cancers. We first categorized hospitals into quintiles of mCRC TI, defined as adjusted proportions of patients undergoing metastatic site surgery and multi-agent chemotherapy (CT), from years 2004-9 using hierarchical logistic regression models. We then compared rates of adjusted TI for other cancers from 2010-17 across levels of hospital mCRC TI, as well as for other hospital attributes like accreditation. Specifically, we assessed rates of CT overtreatment in stage II CRC and stage I-IIIB HR+ breast cancer after neoadjuvant CT, as well as preference-sensitive treatments like CT utilization in R0 resected biliary cancer, neoadjuvant CT use in stage I gastric cancer, post-mastectomy radiation (PMRT) in T1-2N0-1 breast cancer, and multi-agent CT in stage IA/B endometrioid ovarian cancer.

Results: Results: We analyzed 1,019,045 patients treated in 1043 hospitals. Across cancer types, hospital 2004-09 mCRC TI was a reliable predictor of CT overtreatment and increased preference-sensitive CT utilization. Compared to hospitals with the lowest mCRC TI (1st quintile), patients in hospitals with the highest mCRC TI (5th quintile) were more likely to experience CT overtreatment in stage II CRC (adjusted OR [aOR] 1.42, 1.20-1.68) and HR+ breast cancer after neoadjuvant therapy (aOR 1.25, 1.05-1.49). In addition, rates of preference-sensitive CT use increased in a stepwise fashion across hospital mCRC TI quintiles (Figure 1). Hospital mCRC predicted increased rates of CT in R0 resected stage 1/2 biliary cancer (aOR 1.21, 1.01-1.44), neoadjuvant CT for stage 1 distal gastric adenocarcinoma (aOR 1.54, 1.12-2.14), PMRT for T1-2/N0-1 breast cancer (aOR 1.05, 0.92-1.20), and multi-agent CT for stage 1A/B endometrioid ovarian cancer (aOR 1.47, 1.10-1.97). In contrast, hospital accreditation level only predicted gastric cancer CT utilization.

Conclusion: Conclusions: Hospital mCRC TI is a reliable indicator of hospitals with higher CT and radiation use, which is consistent across multiple cancer types. These results suggest institutional cancer care practices may transcend surgical disciplines and underscore the importance of identifying hospitals susceptible to overtreatment for targeted intervention.

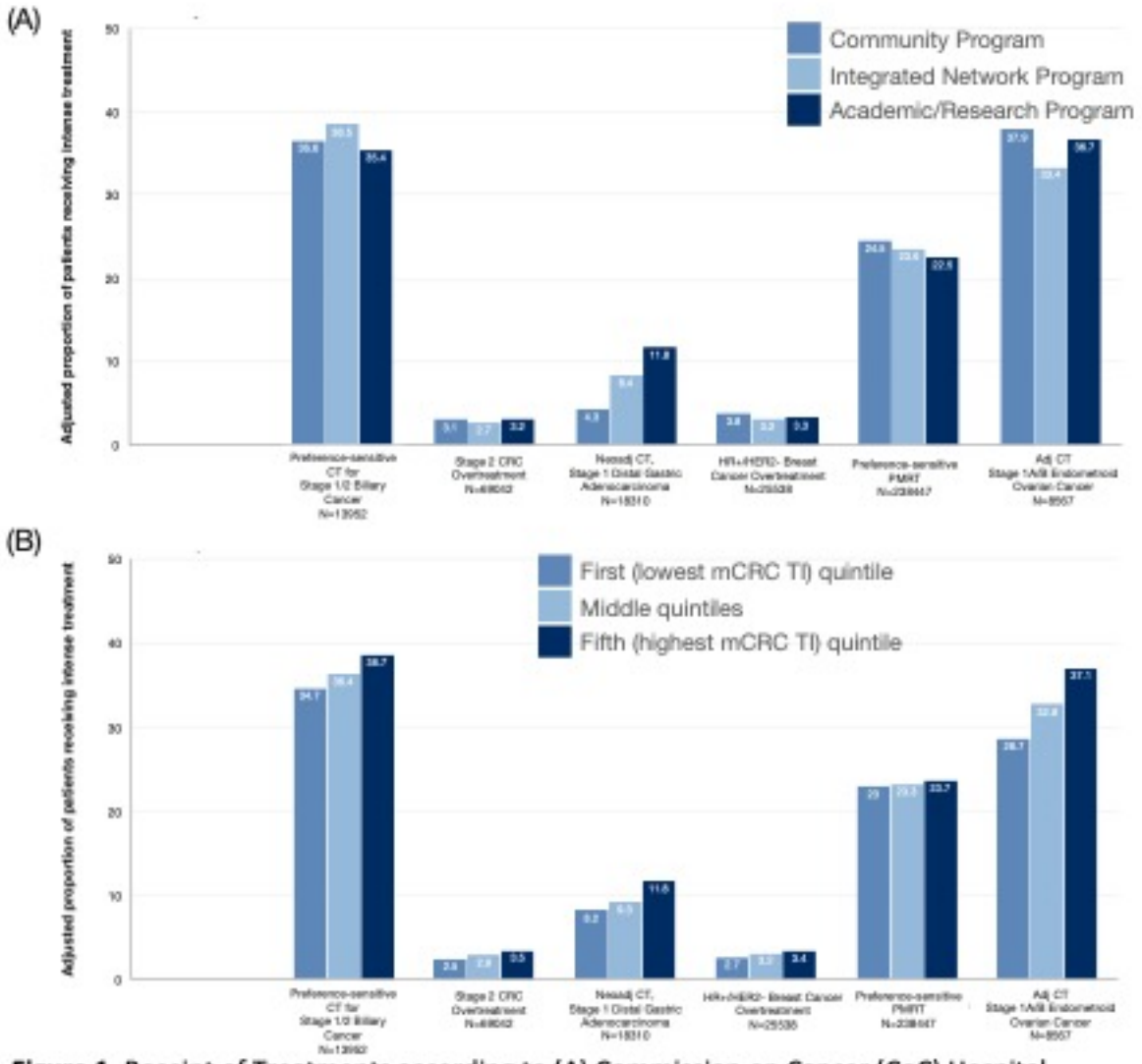


Figure 1. Receipt of Treatments according to (A) Commission on Cancer (CoC) Hospital Accreditation, or (B) Hospital mCRC Treatment Intensity by Cancer Type.

RE-EXCISION AFTER UNPLANNED EXCISION OF SOFT TISSUE SARCOMA IS ASSOCIATED WITH HIGH MORBIDITY AND LIMITED PATHOLOGIC IDENTIFICATION OF RESIDUAL DISEASE

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Background: Unplanned excision (UE) of soft tissue sarcomas (STS) accounts for up to two-thirds of new diagnoses of superficial trunk and extremity sarcomas and presents a significant management challenge for sarcoma specialists. Given the aggressive nature of STS, current management algorithms recommend re-excision following UE, often combined with external beam radiation therapy (EBRT) to improve local control. More recently, a strategy of active surveillance or "watch-and-wait" has been suggested as a safe alternative to routine re-excision, though there is little data on the efficacy of this strategy.

Objectives: We sought to evaluate short-term outcomes and morbidity following re-excision to better understand the risks and benefits of systematic re-excision.

Methods: We conducted a retrospective, single institution review of patients undergoing re-excision following UE of an STS over a five-year period (2016-2021). Eligible patients included all adults with pathology-confirmed trunk or extremity STS undergoing re-excision after UE. Patients with physical exam or imaging evidence of gross residual disease, as well as tumors with histology where management is more challenging or controversial (i.e., desmoid fibromatosis, dermatofibrosarcoma protuberans, atypical lipomatous tumor/well-differentiated liposarcoma) were excluded. We evaluated all wound complications within 90 days of surgery - defining major wound complication as Clavien-Dindo Grade 3 or higher - as well as readmission rates, details of the re-excision procedure (i.e., multi-team operations, size of wound defect, details of reconstruction) and final pathologic findings.

Results: We identified 67 patients undergoing re-excision after UE of an STS. 45/67 patients (67%) were treated with a combination of EBRT and surgery. Plastic surgery was involved for reconstruction in 48/67 cases (73%). The average soft-tissue defect size following re-excision was 81 cm2. Among cases involving reconstruction, 22 patients (33%) required a rotational or free-flap based approach. The rate of wound complications following re-excision was 43% (29/67), with 11 (16%) patients having a major wound complication. The rate of reoperation for wound complication was 5/67 patients (7.5%). Importantly, 45 patients (67%) had no evidence of residual disease in the re-excision specimen, whereas 13 (19%) had microscopic disease and 9 (13%) had indeterminate pathology (e.g., "multifocal areas of hyalinization suspicious for treated residual tumor").

Conclusion: The optimal approach for definitive oncologic management of patients with soft tissue sarcoma following UE is controversial. Data from our high-volume sarcoma center demonstrate notable morbidity with re-excision resulting in a 40% rate of any wound complication. Furthermore, the benefits of this surgical strategy come into question given that a minority of patients had residual disease at the time of re-excision. Treatment plans and discussions with patients should outline the expected pathologic findings and morbidity of re-excision.

IDENTIFYING FEATURES OF SIDE BRANCH INTRADUCTAL PAPILLARY MUCINOUS NEOPLASMS ASSOCIATED WITH MALIGNANT PROGRESSION

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Background: High risk stigmata (HRS) and worrisome features (WF) were developed as factors associated with malignancy in side branch intraductal papillary mucinous neoplasms (SB-IPMNs) and are used to guide surgical management. How well various combinations of these factors indicate underlying malignancy remains poorly defined.

Objectives: We sought to identify specific, or combinations of, HRS or WFs that were associated with increased risk of malignancy.

Methods: We performed a retrospective cohort study of all resected SB-IPMN patients at one institution (January 2000 - March 2020) and compared the individual and summated association between HRS, WFs, and final surgical pathology.

Results: 63 patients with SB-IPMNs underwent resection of whom 38 were female with a median age at diagnosis of 65.3 years. 30/63 patients had non-malignant cysts and 33/63 had malignant disease (high grade dysplasia [HGD] or adenocarcinoma). Overall, 19% of patients had at least one HRS and 84.1% had at least one WF (Table 3).

No patients in the non-malignant group had jaundice, main pancreatic duct (MPD) ≥10mm, pancreatitis, change in pancreatic duct (PD) caliber with distal atrophy, or lymphadenopathy (LAD). On bivariate logistic regression, male gender (OR 2.9, p=0.05) and MPD 5-9.9mm (OR 10.3, p=0.004) were individually identified as features predictive for malignancy. On multivariate logistic regression with factors with p≤0.2 (gender, MPD 5-9.9mm), only MPD 5-9.9mm remained significant (OR 8.7, p=0.009, Table 3). A 5-point scale was assigned to each HRS and WF weighted based on its significance in predicting malignancy with 5 representing the highest importance and given to factors only occurring in malignant patients or p<0.05 on multivariate regression (Table 3). The median accumulated score was 6.5 for non-malignant cysts (range 3-13) and 10 for malignant cysts (range 3-23, p<0.001).

Conclusion: MPD dilation (5-9.9mm) in the setting of SB-IPMNs is a factor consistently associated with underlying malignancy while other solitary HRS or WFs are not strongly associated with malignancy. An accumulation index comprised HRS and WFs, weighted by association with malignancy, may better indicate the underlying presence of pancreatic cancer in SB-IPMNs.

Figure 1. Violin Plot of Accumulation Score Between Benign and Malignant Cysts

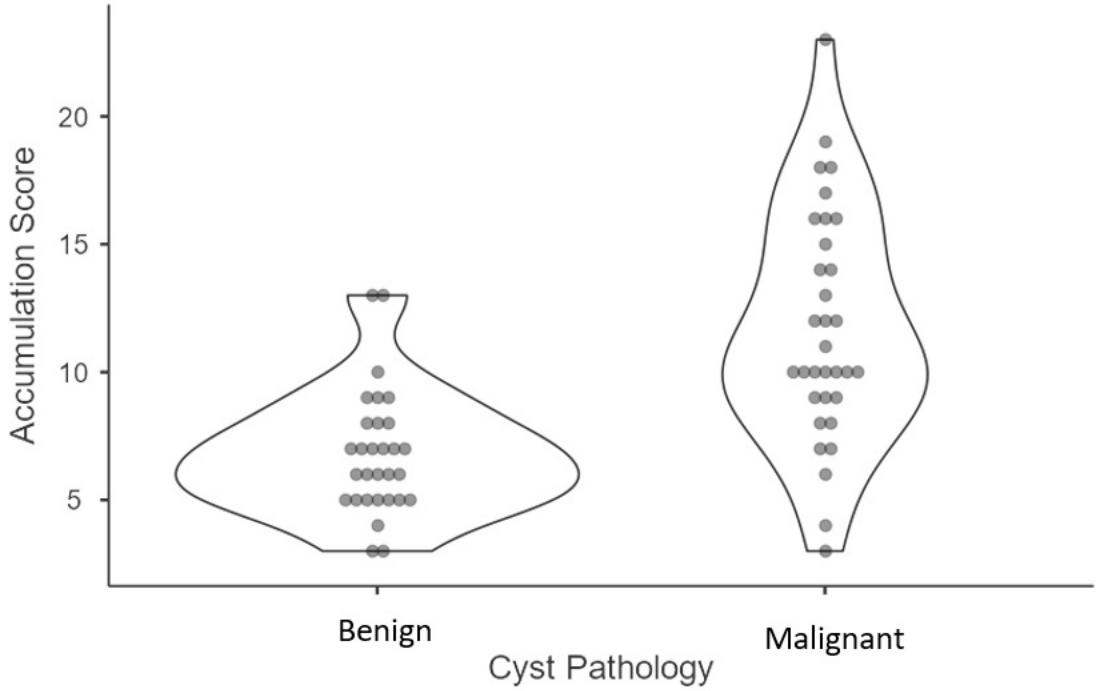

Table 1. Patient Demographics.

	All	Benign	Malignant	p-value
Number of Patients	63	30	33 (19 HGD, 14 adenocarcinoma)	n/a
Median Age at Diagnosis (Years, Range)	65.3 (39.2-89.6)	63.8 (51.1-89.6)	66.7 (39.2-82.5)	0.24
Sex	38 F/25 M	22 F/8 M	16 F/17 M	**0.001**
Size at Dx (mm, Range)	23 (6-52)	23.5 (8-52)	22 (6-40)	0.77
Pre-op Size (mm, Range)	26 (7-91)	26 (10-52)	26 (7-91)	0.92
Number Abnormal CA19-9 (>37U/mL)	20 (32.8% of 61)	10 (34.5% of 29)	10 (31.3% of 32)	0.79
Number ≥ 1 HRS	12 (19.0%)	3 (10%)	10 (30.3%)	**0.047**
Number ≥ 1 WF	53 (84.1%)	23 (76.7%)	30 (90.9%)	0.122

Table 2. Distribution of HRS and WFs.

HRS/WF	Number Benign	Number Malignant	Number All
Jaundice	0	6	6
MPD ≥ 10mm	0	1	1
Nodules ≥ 5mm	3	4	7
HRS Total	Median: 0 Range: 0-1	Median: 0 Range: 0-2	n/a
Pancreatitis	0	1	1
Cyst ≥ 30mm	11	11	22
Thickened Cyst Wall	5	8	13
MPD 5-9.9mm	2	14	16
Nodules <5mm	6	8	14
Abnormal CA19-9	8	10	18
Cyst growth ≥ 5mm in 2 years	3	5	8
Change in PD caliber with distal atrophy	0	4	4
LAD	0	4	4
WF Total	Median: 1 Range: 0-3	Median: 2 Range: 0-4	n/a

Table 3. Patient Characteristics and Bivariate and Multivariate Logistic Regression of Risk Factors in Patients.

	All	Non-Malignant	Malignant	p-value
Number of Patients	63	30	33 (19 HGD, 14 adenocarcinoma)	n/a
Median Age at Diagnosis (Years, Range)	65.3 (39.2-89.6)	63.8 (51.1-89.6)	66.7 (39.2-82.5)	0.24
Median Age at Resection (Years, Range)	67.6 (44.3-83.0)	65.4 (52.1-79.9)	71.4 (44.3-83.0)	0.24
Sex	38 F/25 M	22 F/8 M	16 F/17 M	**0.001**
Size at Dx (mm, Range)	23 (6-52)	23.5 (8-52)	22 (6-40)	0.77
Pre-op Size (mm, Range)	26 (7-91)	26 (10-52)	26 (7-91)	0.92
Number Abnormal CA19-9 (>37U/mL)	20 (32.8% of 61)	10 (34.5% of 29)	10 (31.3% of 32)	0.79
Number ≥ 1 HRS	12 (19.0%)	3 (10%)	10 (30.3%)	**0.047**
Number ≥ 1 WF	53 (84.1%)	23 (76.7%)	30 (90.9%)	0.122
Bivariate Logistic Regression				
Factor	**OR**	**CI**	**Accumulation Score****	**p-value**
Age at Diagnosis	1.03	0.97-1.09	<60 – 1 ≥60 – 3	0.37
Sex	2.9	1.0-8.4	F – 2 M – 4	**0.05**
Jaundice	n/a	n/a	5	n/a
MPD ≥ 10mm	n/a	n/a	5	n/a
Nodules ≥ 5mm	1.24	0.25-6.06	1	0.79
Pancreatitis	n/a	n/a	5	n/a
Cyst ≥ 30mm	0.86	0.31-2.44	1	0.78
Thickened Cyst Wall	1.60	0.46-5.57	2	0.46
MPD 5-9.9mm	10.3	2.1-50.7	5	**0.004**
Nodules <5mm	1.28	0.39-4.24	1	0.69
Abnormal CA19-9	1.28	0.40-3.59	1	0.75
Cyst growth ≥ 5mm in 2 years	1.61	0.35-7.39	2	0.54
Change in PD caliber with distal atrophy	n/a	n/a	5	n/a
LAD	n/a	n/a	5	n/a
Multivariate Logistic Regression				
Sex	2.12	0.67-6.71	n/a	0.2
MPD 5-9.9mm	8.7	1.73-43.78	n/a	**0.009**

**Accumulation Score Development: 5 – only occurring in malignant patients or $p<0.05$ on multivariate regression, 4 – $p<0.05$ on bivariate regression, 3 – $0.05<p\leq0.2$ on bivariate regression, 2 – $0.2<p\leq0.6$ on bivariate regression, 1 – $0.6<p\leq1$ on bivariate regression

HOSPITAL TREATMENT INTENSITY FOR METASTATIC COLORECTAL CANCER: THRESHOLD FOR SURGERY DRIVES HOSPITAL TREATMENT PATTERNS

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Background: Reliable indicators of hospital treatment intensity (TI) for metastatic colorectal cancer (mCRC) are lacking. Moreover, it remains unclear which treatments drive variation in care.

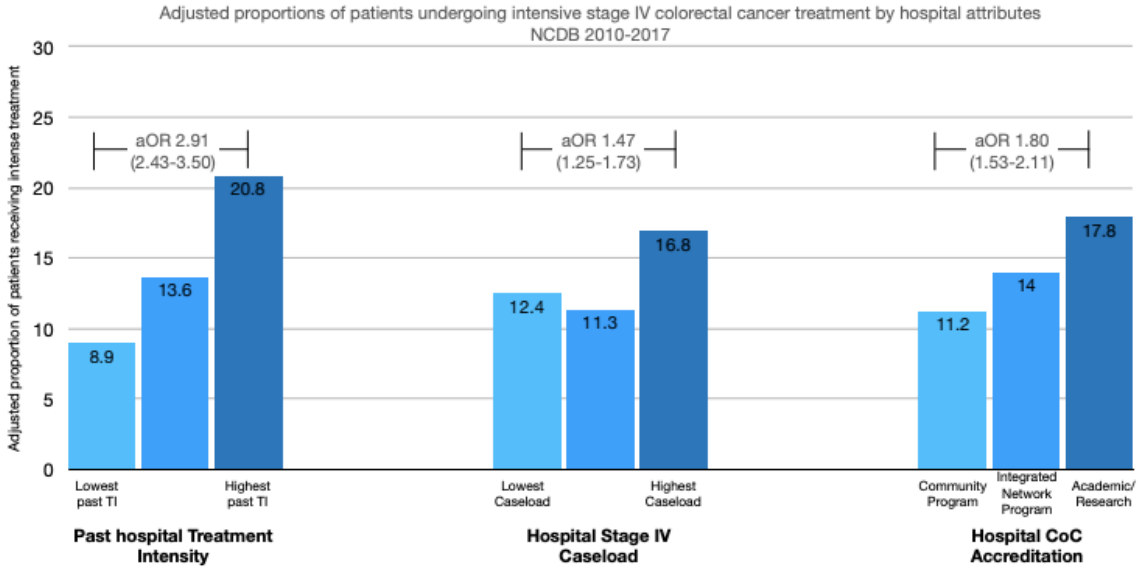
Objectives: This analysis aims to characterize the drivers for mCRC treatment variation across hospitals, and to identify reliable indicators of hospital treatment approaches for cancer.

Methods: We performed a retrospective cohort study of 127,416 mCRC patients using the 2004-17 National Cancer Data Base. Hospital approaches to mCRC were characterized according to their accreditation, caseloads, and by characterizing their adjusted TI by hierarchical modeling techniques. TI was defined as receipt of primary site surgery, multi-agent chemotherapy, and metastectomy. We then assessed the degree to which accreditation, volume, or past TI predicted future treatments using multivariable logistic regression and propensity score matching techniques. To confirm our findings, we performed a subset analysis using patients with single-site metastatic disease. Survival was then compared between matched patients treated in high vs. low prior TI hospitals and according to treatments received.

Results: We identified 127,416 patients in 1043 hospitals meeting cohort inclusion criteria. Hospitals with the highest adjusted mCRC TI were represented by all accreditation levels. Compared to hospital caseloads or accreditation status, past mCRC TI was the most reliable predictor of future patient mCRC treatments. Patients treated in hospitals with highest past TI were more likely to undergo intensive mCRC treatment (adjusted OR [aOR] 2.91, 95% CI 2.43-3.50) than hospitals with the highest compared to lowest caseloads (aOR 1.47, 1.25-1.73) or academic/research accreditations vs community (aOR 1.80, 1.53-2.11; Figure 1). Past TI remained the most reliable predictor of mCRC TI when patients were matched by demographics, socioeconomic variables, distance traveled, census region, and metastatic burden. When assessing the subgroup of 33,988 patients with single-site metastatic disease, patients treated in high vs low prior TI hospitals had nearly 3 times the odds of undergoing metastastectomy and 2.2 times the odds of undergoing multi-agent chemotherapy. Overall survival was higher for patients in high TI hospitals (median 23.8 vs 18.7m), but survival was the same for patients undergoing like treatments regardless of hospital setting.

Conclusion: Past hospital mCRC TI predicts future TI more reliably than other hospital factors and is driven predominantly by hospitals utilization of metastatectomy. Using past mCRC TI identifies hospitals where patients are more likely to experience more intense treatment, which may inform evaluations of value in cancer care. Improving patient access to high TI centers may further improve mCRC survival.

Past treatment intensity predicts future treatment intensity
better than other hospital attributes



*Adjusted for year of diagnosis, demographics, comorbidities, tumor characteristics, metastatic site locations; Cluster standard errors

SENTINEL LYMPH NODE BIOPSY AND FORMAL LYMPHADENECTOMY FOR SOFT TISSUE SARCOMA – A SINGLE CENTER EXPERIENCE OF 86 CONSECUTIVE CASES

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Background: Lymph node metastasis (LNM) is a rare occurrence in patients with soft tissue sarcoma (STS). Due to the rarity of LNM in STS, there is limited evidence to guide management. We describe our experience with and outcomes following sentinel lymph node biopsy (SLNB) and lymphadenectomy for STS.

Objectives: In this study we describe our institutional experience with sentinel lymph node biopsy (SLNB) and/or lymphadenectomy in STS patients. We also report on sarcoma-associated outcomes following regional lymph node basin surgery.

Methods: A single center retrospective review was performed for patients who underwent SLNB and/or formal lymphadenectomy for STS from 1994 to 2018. Clinical characteristics, operative course, details of the multimodality treatment, regional and/or distant recurrence-free survival (RFS) and overall survival (OS) were examined.

Results: Eighty-six patients underwent SLNB (n=34) and/or lymphadenectomy (n=60) for STS, with epithelioid sarcoma, clear cell sarcoma, and undifferentiated pleomorphic sarcoma being most common. Of SLNB patients, 8 (23.5%) had a positive sentinel lymph node (SLN). Among 26 patients with negative SLNs, 2- and 5-year OS were 95.6% and 71.9%. Of these, 8 (30.8%) patients developed lymph node recurrence and/or distant metastasis with a median RFS of 25 months (range 1-253). The 2- and 5-year OS following lymphadenectomy were 56.6% and 44.6%, respectively. Eight patients had metastatic disease prior to lymphadenectomy. Twenty (43.3%) lymphadenectomy patients developed regional recurrence and/or distant metastasis with a median RFS of 6 months (range 2-224), and 2- and 5-year OS of 53.8% and 37.6%.

Conclusion: We noted a relatively high SLN positivity rate in this STS cohort with selected histologies. RFS and OS rates were encouraging in patients without a history of previous metastatic disease. Further investigation is warranted to determine which STS patients with lymph node metastasis benefit from lymphadenectomy.

Figure 1:

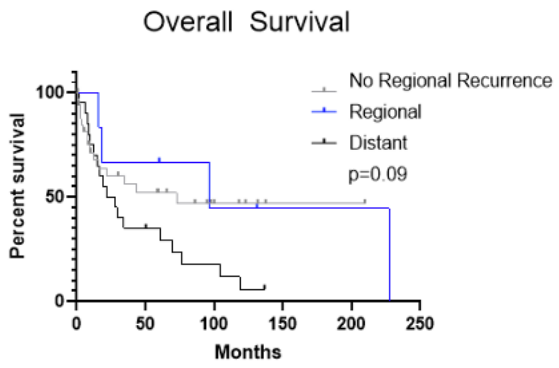

Table 1: Clinic and pathologic parameters of soft tissue sarcoma patients undergoing sentinel lymph node biopsy and formal lymphadenectomy

	Sentinel Lymph Node Biopsy n=34		Formal Lymphadenectomy n=60	
	N (%)	Median (Range)	N (%)	Median (Range)
Sex				
Female	13 (38.2%)		19 (31.7%)	
Male	21 (61.8%)		41 (68.3%)	
Race				
White	24 (70.6%)		40 (66.7%)	
Black	6 (17.6%)		7 (11.7%)	
Hispanic	3 (8.8%)		8 (13.3%)	
Asian	1 (2.9%)		4 (6.7%)	
Other	0 (0%)		1 (1.7%)	
Median BMI		27 (20.17-47.5)		27.5 (19.3-48)
Median age, years		36 (8-74)		45 (8-87)
Median follow-up from diagnosis, months		58 (3-258)		51 (6-234)
Underwent Sentinel Lymph Node Biopsy	34 (100%)		8 (13.3%)	
Location of Primary Tumor				
Trunk	4 (11.8%)		18 (30.0%)	
Upper Extremity	16 (47.1%)		10 (16.7%)	
Lower Extremity	14 (41.1%)		32 (53.3%)	
Histology				
Angiosarcoma	0 (0%)		2 (3.3%)	
Chondrosarcoma	0 (0%)		2 (3.3%)	
Clear cell sarcoma	11 (32.4%)		8 (13.3%)	
Epithelioid sarcoma	13 (38.2%)		8 (13.3%)	
Ewing Sarcoma	1 (2.9%)		0 (0%)	
Follicular Dendritic Cell Sarcoma	0 (0%)		1 (1.7%)	
Leiomyosarcoma	0 (0%)		2 (3.3%)	
Malignant peripheral nerve sheath tumor	0 (0%)		2 (3.3%)	
Myxoid liposarcoma	0 (0%)		1 (1.7%)	
Myxoid mesenchymal	0 (0%)		1 (1.7%)	
Osteosarcoma	0 (0%)		2 (3.3%)	
Phyllodes	0 (0%)		1 (1.7%)	
Rhabdomyosarcoma	1 (2.9%)		2 (3.3%)	
Spindle cell	0 (0%)		2 (3.3%)	
Synovial sarcoma	2 (5.9%)		5 (8.3%)	
Unclassified	2 (5.9%)		2 (3.3%)	
Undifferentiated pleomorphic sarcoma	4 (11.8%)		19 (31.7%)	

Table 2: Outcomes of sentinel lymph node biopsy and formal lymphadenectomy in patients with soft tissue sarcoma

	Sentinel Lymph Node Biopsy		Formal Lymphadenectomy	
Nodal Basin Dissected	N (%)	Median (Range)	N (%)	Median (Range)
Axilla	17 (50.0%)		19 (31.7%)	
Superficial Groin	16 (47.1%)		18 (30.0%)	
Pelvic only	0 (0%)		4 (6.7%)	
Superficial Groin + Pelvic	0 (0%)		19 (31.7%)	
Cervical	1 (2.9%)		0 (0%)	
Number of lymph nodes resected		2 (1-5)		16 (3-62)
Number of lymph nodes with viable tumor				
0	26 (76.5%)		22 (36.7%)	
1	6 (17.6%)		13 (21.7%)	
2 - 3	2 (5.9%)		15 (25.0%)	
>3	0 (0%)		10 (16.7%)	

Table 3 Overall Survival and Recurrence-free survival

Patient cohort	**Median OS, months**	**Median RFS, months**	**2-year OS**	**5-year OS**
Negative SLNB (n=26)	253	103	95.6%	71.9%
Recurrence after negative SLNB (n=8)	72.0	25	100%	50.0%
Formal Lymphadenectomy (n=60)	35	12	56.6%	44.6%
No regional or distant recurrence (n=34)	72	72	60.1%	52.1%
Regional only recurrence (n=6)	96	6	66.7%	66.7%
Distant recurrence (n=20)	25	6	50.0%	29.1%

SLNB, sentinel lymph node biopsy

PARATHYROID IDENTIFICATION WITH THE NOVEL PT EYE DEVICE VS. A PRACTITIONER'S TRAINED EYE, WHOSE VISION IS BEST?

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Background: The parathyroid eye (PT eye) device is a novel pencil-like handheld probe that emits near-infrared light to detect tissue autofluorescence. This aids in differentiation of parathyroid tissue from surrounding structures based on the principle that the parathyroid glands possess the unique ability to auto-fluoresce when exposed to light within the 800 to 2,500 nm spectrum. There are limited studies conducted that evaluate the efficacy of parathyroid preservation by utilizing this device in comparison to visual identification from an experienced endocrine surgeon alone.

Objectives: To determine if there is a significant difference in postoperative PTH and Calcium levels between patients that underwent total thyroidectomy (with or without central lymph node dissection) utilizing the PT Eye device for parathyroid identification or with visual identification alone. Differences, as well as, secondary outcomes between the two groups will be analyzed as well.

Methods: A retrospective chart review of 200 consecutive total thyroidectomies, 100 with visual identification of parathyroid glands and 100 utilizing the PT eye device performed by the same endocrine surgeon in patients aged 18-100. Collected data spans a 3-year period (10/18-10/21) and includes both benign thyroid disease (Graves' disease, multinodular goiter, Hashimoto's thyroiditis) and malignant thyroid disease (papillary thyroid cancer, surgery sometimes including level VI lymph node dissection). Post-operative calcium and parathyroid hormone (PTH) levels were compared, as well as the number of parathyroids identified visually with high confidence by the surgeon or with the PT eye device.

Results: The PT eye group versus without the PT eye group included 56 vs 68 total thyroidectomies (56% vs. 68%), and 44 vs. 32 total thyroidectomies with level VI lymph node dissection (44% vs. 32%).
Of note, there was a statistically significant difference in immediate post-operative PTH levels (mean PTH level with PT eye 21.7 pg/ml vs. without 29.0 pg/ml, P=.036) however, there was no statistical difference in calcium levels (mean Ca level with PT eye 8.7 mg/dL vs. without 8.6 mg/dL, P=.47). It was found 1 additional parathyroid gland was able to be identified only utilizing the PT eye device. However, on average the total number of parathyroids identified in surgeries was not statistically significantly higher at 2.96 with the PT eye device compared to 2.89 with visual identification alone (P= .76). An immediate postop PTH level <10 occurred in 30 surgeries (30%) with the PT eye vs 27 surgeries (27%) without the PT eye, (P= .75). One patient in the entire cohort had a persistent low PTH level at 4 months postoperatively (PT eye group). Additionally, 17 out of the 100 patients that had a thyroidectomy with the PT Eye underwent auto transplantation at that time compared to 7 in the group with visual identification alone.

Conclusion: Detection of parathyroid glands utilizing the novel PT eye autofluorescence pencil was improved, but not to a significant degree compared to presumed visual identification by an experienced endocrine surgeon. Use of the PT eye device did not significantly improve outcomes for the immediate postoperative PTH level. An increased

amount of autotransplantations was also noted in the PT eye group compared to the without group, a finding that could warrant further investigation.

Immediate Post Op PTH Levels

Group	With PT EYE	Without
Mean	21.743	29.005
SD	18.849	28.734
SEM	1.885	2.873
N	100	100

SAFETY AND FEASIBILITY OF PERFORMING BENIGN FOREGUT PROCEDURES AT A SAFETY-NET HOSPITAL

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Background: One-half of Americans have limited access to healthcare due to a variety of socioeconomic barriers. Care of these patients is often through safety-net hospitals, which are associated with worse medical outcomes.

Objectives: The aim of this study is to compare the outcomes of patients who received foregut surgery at a safety-net hospital to those at a private hospital or University hospital. We hypothesized that patients who receive surgery at a safety-net hospital will have a greater rate of radiographic recurrence and reoperations.

Methods: A retrospective study was conducted on adult patients who underwent hiatal hernia repair or fundoplication for gastroesophageal reflux disease (GERD) at an affiliated safety-net hospital, private hospital, or University hospital from June 2015 to May 2020. Any patient undergoing concomitant gastrectomy, bariatric surgery, or myotomy were excluded. The primary outcome was radiographic recurrence. Secondary outcomes included reoperation and symptom recurrence. Analysis was performed using ANOVA, chi-square, and logistic regression.

Results: A total of 499 patients were identified: 157 at a safety-net hospital, 233 at a private hospital, and 119 at a University hospital. Median (interquartile range) follow-up was 16 (13) months. Compared to the other hospitals, the safety-net hospital had more Hispanics, females, and patients with comorbid conditions. In addition, large hiatal hernias were more common at the safety-net hospital and private hospital. Robotic surgery was performed more frequently at the University hospital. There was no difference in radiographic recurrence (13.4% vs 19.7% vs 17.6%, p=0.269), reoperation (3.8% vs 7.2% vs 6.7%, p=0.389) or recurrence of dysphagia symptoms (15.3% vs 12.6% vs 15.1%, p=0.696). On logistic regression, there were no differences in outcomes among the three institutions (Table).

Conclusion: This study suggests that despite the challenges faced at safety-net hospitals, it is feasible to safely perform minimally invasive foregut surgery with similar outcomes to private and University hospitals.

Table: Multivariable Regression for Radiographic Recurrence

	Odds Ratio	95% Confidence Interval	p-value	
Institution				
Safety-Net Hospital	Ref	-	-	
Private Hospital	1.65	0.66 to 4.14	0.289	
University Hospital	1.29	0.60 to 2.79	0.511	
Age	1.01	0.99 to 1.03	0.346	
Gender, Male	1.51	0.89 to 2.56	0.125	
Race/Ethnicity				
Hispanic	Ref	-	-	
White/Caucasian	0.96	0.43 to 2.14	0.920	
Black/African-American	1.80	0.72 to 4.49	0.210	
Other	1.54	0.58 to 4.10	0.388	
ASA 3-4	1.09	0.64 to 1.87	0.346	
BMI	1.02	0.97 to 1.07	0.407	
COPD	1.43	0.41 to 4.93	0.407	
Prior Surgery	1.71	1.05 to 2.81	0.032	
Hiatal Hernia	1.01	0.51 to 2.02	0.032	
Mesh	1.98	0.97 to 4.05	0.061	
Hiatal Hernia:Mesh Interaction Term	0.35	0.13 to 0.97	0.043	

PERI-OPERATIVE TISSUE OXIMETRY DRIVEN FLUID RESUSCITATION IMPROVES FLAP PERFUSION IN AUTOLOGOUS FREE TISSUE BREAST RECONSTRUCTION: A PROSPECTIVE STUDY

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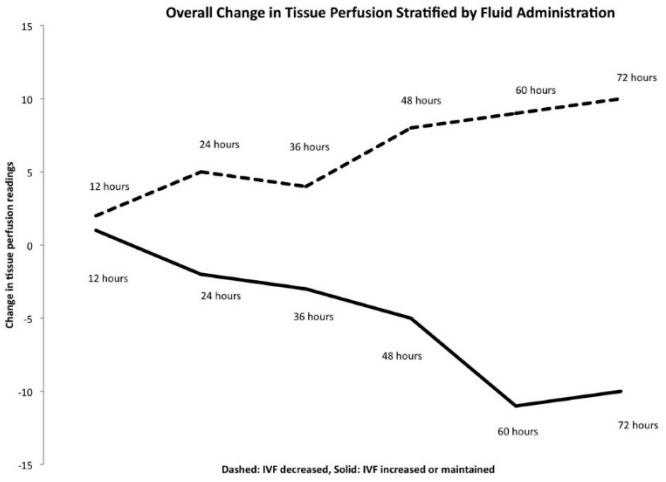
Background: The use of tissue oximetry for monitoring following free tissue transfer has become a
common practice to facilitate early detection of poor flap perfusion. We hypothesized that T stat readings may guide fluid administration in the post – operative period and improve perfusion in patients undergoing autologous breast reconstruction.

Objectives: We hypothesized that tissue oximetry readings can guide real-time fluid administration in the post – operative period and improve perfusion in patients undergoing autologous breast reconstruction.

Methods: Patients undergoing free flap breast reconstruction from 2015–2018 were reviewed. Mean percutaneous oximetry readings of the first 4 post–operative days were recorded. The mean change at 24 hours from the original reading was calculated (ΔTO). The study population was divided in two groups based on whether administration of intravenous fluids (IVF) was increased/maintained (group 1) or decreased (group 2) after POD 1.

Results: A total of 120 patients were identified. The mean age was 53, while the mean BMI was 33.
Overall, patients for whom fluid administration was decreased, experienced an increase in their tissue perfusion while patient who received a bolus or maintained the same rate of IVF experienced a decrease. Patients who had a negative ΔTO experienced a statistically significant difference between the groups 1 and 2 at 24 and 72 hours (-4 versus +3 and -11 versus +13 respectively). For patients with a
positive ΔTO, while decreasing fluids resulted in higher readings, it did not reach statistical significance at 24 or 72 hours (0 versus +2 and +4 versus +6 respectively).

Conclusion: In patients undergoing free tissue breast reconstruction, tissue oximetry readings may be used as a novel guide for post – operative fluid management.


Overall Change in Tissue Perfusion Stratified by Fluid Administration
Change in tissue perfusion readings
15
10
5
0
-5
-10
-15
12 hours
24 hours
36 hours
48 hours
60 hours
72 hours
12 hours
24 hours
36 hours
48 hours
60 hours
72 hours
Dashed: IVF decreased, Solid: IVF increased or maintained

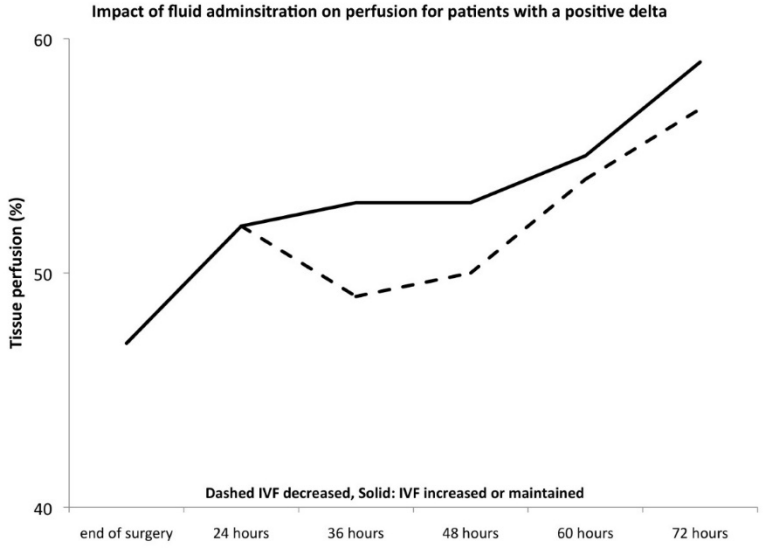
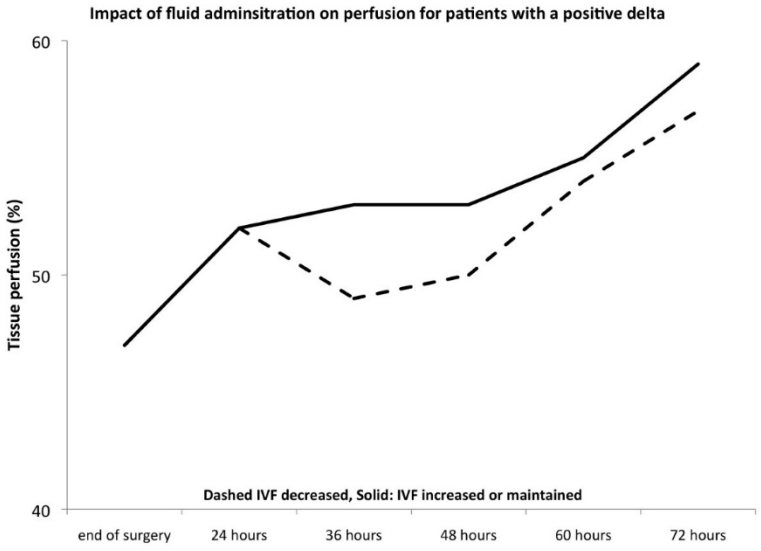

Impact of fluid adminsitration on perfusion for patients with a positive delta
Tissue perfusion (%)
60
50
40
Dashed IVF decreased, Solid: IVF increased or maintained
end of surgery
24 hours
36 hours
48 hours
60 hours
72 hours

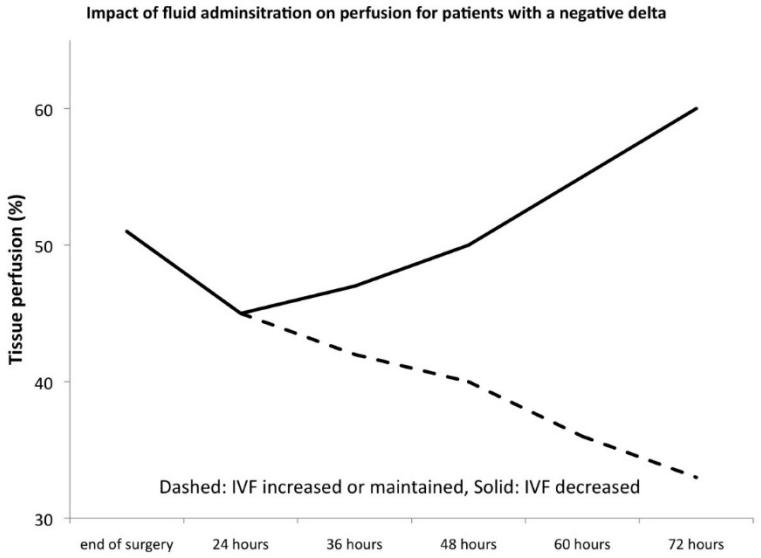
Table 1: Patients' Demographics and Clinical Characteristics

	Overall (n = 120)	Flap Complications (n = 38)	No Flap Complications (n = 82)	p value
Age (mean, SD)	53 ± 9	51 ± 9	54 ± 8	0.098
BMI (mean, SD)	33.0 ± 5.5	32.1 ± 4.9	34.3 ± 5.9	0.184
Race				
Caucasian	96 (80.0)	29 (76.3)	67 (81.7)	
Hispanic	19 (15.8)	6 (15.8)	13 (15.9)	
African American	4 (3.3)	1 (2.6)	3 (3.7)	
Asian	1 (0.8)	0 (0.0)	1 (1.2)	0.618
History of Smoking	37 (30.8)	15 (39.4)	22 (26.8)	0.061
DM	25 (20.8)	10 (26.3)	15 (18.3)	0.053
Mastectomy for Cancer	114 (95.0)	36 (95.0)	78 (95.0)	1
Prophylactic Mastectomy	6 (5.0)	2 (5.0)	4 (5.0)	1
Type of Flap				
DIEP	85 (70.8)	29 (76.3)	56 (68.2)	
MS - TRAM	35 (29.2)	9 (23.7)	26 (31.8)	0.319
Neoadjuvant Chemotherapy	49 (40.8)	15 (39.5)	34 (41.5)	0.832
Neoadjuvant Radiation	37 (30.8)	17 (44.7)	20 (24.4)	0.031
Adjuvant Chemotherapy	76 (63.3)	26 (68.4)	50 (61.0)	0.32
Adjuvant Radiation	17 (14.2)	5 (13.1)	12 (14.6)	0.627
Immediate Reconstruction	35 (29.2)	11 (28.9)	24 (29.3)	0.956
Delayed Reconstruction	85 (70.8)	27 (71.1)	58 (70.7)	0.956
History of Abdominal Surgery	17 (14.2)	5 (13.1)	12 (14.6)	0.864

Table 2: Peri - Operative Fluid Status

	Overall (n = 120)	Flap Complications (n = 38)	No Flap Complications (n = 82)	p value
Intra - op Fluid Administration (ml/kg/hr)	7.0 ± 1.2	8.7 ± 2.0	6.2 ± 1.1	0.045
Fluid Balance at End of POD 0 (FB, ml)	900 ± 320	1100 ± 200	820 ± 180	0.053
FB/BMI at End of POD 0	27 ± 10	32 ± 9	25 ± 7	0.083
Positive Delta	28 ± 10	29 ± 12	27 ± 9	0.782
Negative Delta	26 ± 8	33 ± 8	24 ± 10	0.031
UOP at End of POD 0 (ml/kg/hour)	1.2 ± 0.3	1.7 ± 0.1	0.9 ± 0.7	0.029


Impact of fluid adminsitration on perfusion for patients with a positive delta
60
50
40
Tissue perfusion (%)
Dashed IVF decreased, Solid: IVF increased or maintained
end of surgery
24 hours
36 hours
48 hours
60 hours
72 hours


Impact of fluid adminsitration on perfusion for patients with a negative delta
60
50
40
30
Tissue perfusion (%)
Dashed: IVF increased or maintained, Solid: IVF decreased
end of surgery
24 hours
36 hours
48 hours
60 hours
72 hours

INTERLEUKIN-10 PRODUCING LYMPHOCYTES ALTER FIBROTIC RESPONSE IN INFLAMMASOME-STIMULATED DERMAL FIBROBLASTS

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Background: Our lab recently demonstrated that Interleukin- (IL) 10-producing type 1 regulatory T cells (Tr1) decrease fibrosis in murine wounds. Tr1 are known to inhibit NLRP3 mediated production of pro-fibrotic interleukin (IL)-1beta by macrophages via IL-10 signaling. However, the capacity of Tr1 cells to modulate fibrotic phenotype driven by the NLRP3 inflammasome in dermal fibroblasts is unknown.

Objectives: Our aim is to demonstrate that IL-10 producing regulatory T lymphocytes reverse the fibrotic phenotype of myofibroblasts which have been stimulated by the NLRP3 inflammasome.

Methods: Adult dermal fibroblasts (AFB) and splenocytes were harvested from C57L/B6 (WT) and 10BiT mice, respectively. Splenocytes were sorted into CD4+Foxp3+ regulatory T cells (Treg), CD4+CD44HiFoxp3- Tr1 precursors, or CD4+CD44int/loCD62L+ Tnaive using fluorescence activated cell sorting and activated (anti-CD3/28 microbeads) for 6, 9, or 12 days, with phenotype and IL-10 production evaluated by flow cytometry and ELISA. NLRP3 activation of AFB was performed using sequential administration of TGF-beta, lipopolysaccharide, and adenosine triphosphate. AFB were cultured in medium alone or with conditioned medium (CM) from 9-day-activated Tr1, Treg, or Tnaive for 24 hours and 48 hours, with gene expression of alpha-SMA (aSMA) measured by RT-qPCR at 24 hours and protein by western blot at 48 hours. N=3 experimental replicates per time point.

Results: Flow cytometry evaluation revealed optimal polarization towards Tr1 (co-expression of CD49b and LAG3) following 9 days of activation (70.2% of live cells) vs 6 (41.9%) or 12 (41.7%) days of activation. Similarly, the proportion of cells staining positively for IL-10 was greatest at 9 days of activation (86.7% of live cells) compared to 6 (47.9%) or 12 (62.9%) days activation. CM was generated by culturing 1x10^6 lymphocytes in 3-ml of medium for 24 hours. IL-10 in CM generated by Tr1 was greater than Treg or Tnaive (1660.3 vs 154.3 vs 5.1 pg/ml). Expression of aSMA was significantly increased in AFB by NLRP3 activating factors compared to untreated (1.9±0.2 vs 0.9±0.3-fold expression, $p<0.05$) (Figure 1). aSMA expression was then significantly lowered by treatment with CM from Tr1 (0.6±0.03-fold expression, $p<0.01$) and Treg (0.6±0.2-fold expression, $p<0.01$). Protein content of aSMA in Tr1-treated AFB was reduced compared to inflammasome-activated AFB (0.048 vs 0.090 aSMA/beta-actin, $p<0.05$). There was no significant decrease in aSMA expression following treatment with Tnaive CM.

Conclusion: IL-10 producing T lymphocytes attenuate the fibrotic phenotype of NLRP3 inflammasome-activated AFB. Developing methods to attract T cells as anti-inflammatory and anti-fibrotic mediators to the wound may result in improved patient scarring outcomes.