Presentation #10 | Clinical Science | Cardiothoracic

ESOPHAGEAL PERFORATION AFTER ANTERIOR CERVICAL SPINE SURGERY: EVOLUTION OF AN APPROACH

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Presenter: Ranjan Gupta MD University of Minnesota

Background: Esophageal perforation is a rare and potentially catastrophic complication of anterior cervical spine surgery that may present many years after surgery. All patients with this problem have osteomyelitis and require hardware removal as well as management of the perforation. Previous series have emphasized removal of the spinal hardware and repair of the esophageal defect, yet there is no uniform guidance on how to manage the neck wound.

Objective: We report our single-center experience with esophageal perforation related to anterior cervical spine surgery and suggest an approach to neck wound management based on our results. We expand on our previously published experience with 6 cases (Rueth).

Method: This is a retrospective Institutional Review Board-approved review of esophageal injuries resulting from anterior cervical spine (ACS) surgery from January 2007 through July 2020. The operative approach was surgical neck drainage, primary repair if possible, hardware removal, and enteral nutritional support. Our approach to wound management evolved over time. Before 2012, we closed the neck incision over a drain (closed approach); since 2012, we packed the neck wound open to heal by secondary intention (open approach). We collected demographics, operative management, time to resolution (resumption of oral intake), number of procedures needed for resolution, and latest follow-up.

Results: Of 14 patients with esophageal perforation following ACS, 13 patients (93%) presented with esophageal leaks, neck abscesses, and osteomyelitis; 1 patient presented with chronic perforation. All patients underwent surgical drainage, repair or attempted repair, and hardware removal. Seven patients had neck closure over a drain (before 2012) and 7 patients were left to heal by secondary intention. Overall resolution was 91% (10/11) within a median of 21 days (4-480); 1 closed-approach patient never resolved. Median follow-up was 83 months (1-144) with 1 radiographic, asymptomatic recurrence. Two open-approach patients died of respiratory complications, one due to ARDS and the other from aspiration post-operatively. One closed-approach patient was lost to follow-up. For the remaining 11 patients, table 1 summarizes resolution, time to resolution, and number of procedures required by approach. All of the patients managed with an open approach had resolution and resumed oral intake in less than or equal to 30 days, compared to only one out of 5 patients in the closed approach. Further, no patient treated with the open approach required additional procedures.

Conclusion: Esophageal perforation after anterior cervical spine surgery is a complex and rare problem which should be managed in a multidisciplinary fashion with hardware removal, surgical neck drainage and primary repair of the esophageal injury if possible. We advocate open neck wound management to reduce time-to-resolution and number of procedures required to achieve resolution. We have now implemented a multidisciplinary approach to these patients, including spine surgeons, ENT surgeons and thoracic surgeons.

Table 1. Patient characteristics

Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age	49	24	46	55	30	17	30	60	69	61	52	72	47	74
Indication for ACS Surgery	DDD	TQ	TQ	TQ	TQ	TQ	TQ	DDD	TQ	DDD	Q	DDD	DDD	DDD
Time from initial surgery to diagnosis	5 months	2 years	3 years	3 days	1 month	7 days	7 years	12 months	10 months	7 years	10 years	3 years	6 months	3 years
Operations prior to referral	0	3	1	1	4	2	1	1	2	0	0	1	0	0
Number of operations at UM (including first debridement)	3	1	9	2	8	1	1	1	1	1	1	1	1	1
Wound management	Closed	Closed	Closed (converted to open)	Closed (converted to open)	Closed	Closed	Opend	Open	Open	Open	Open	Open	Closed	Open
Time to resolution	97 days	12 days	16 months	70 days	No resolution	63 days	Died postop (ARDS)	12 days	10 days	5 days	4 days	28 days	lost to follow-up	Died postop (aspiration)

DDD: Degenerative disk disease
TQ: Trauma quadriplegia
Q: Quadriplegia

Table 2. Resolution, time to resolution, and number of procedures required by approach

Approach (n)	Resolution (n, %)	Time to resolution ≤30 days	Number of additional procedures required
Closed (6)	5/6 (83%)	1/5 (20%)	3 (1-9)
Open (5)	5 (100%)	5 (100%)	0

Presentation #11 | Clinical Science | Cardiothoracic

SUBXIPHOID-SUBCOSTAL VERSUS TRANSTHORACIC THORACOSCOPIC THYMECTOMY: A SAFE AND FEASIBLE APPROACH

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Presenter: Jamee Schoephoerster BS University of Minnesota

Background: Minimally invasive thymectomy is now a well-accepted surgery to manage myasthenia gravis and other thymic tumors. There are still opportunities for improvement and expansion of the technique.

Objective: We describe our experience with subxiphoid-subcostal thymectomy (ST). We then compare our results to our previous experience with transthoracic thoracoscopic thymectomies (TT).

Method: We conducted an IRB-exempt retrospective review of all patients who had a minimally invasive thymectomy from August 2008 to October 2020. We excluded patients with a previous sternotomy or radiological evidence of invasion into major vasculature. The ST approach involved one subxiphoid port for initial access and two subcostal ports on each side and the TT involved unilateral or bilateral intercostal ports.

We used descriptive and comparative statistics on demographic data, operative details (operative time, blood loss and conversion to sternotomy) and postoperative data (length of stay, chest tube duration, complications, pain control and pathology).

Results: We performed ST in 32 patients and TT in 16 patients. As of August 2016, we exclusively perform the subxiphoid-subcostal approach. Indications in the two groups included myasthenia gravis, thymic nodules and ectopic parathyroid. The groups were similar demographically other than a higher co- morbidity score in the TT group (1.5 vs 1, p=0.02). Operative data showed a longer median operating time for the ST group (198 min vs. 161 min, p=0.03). Post-operative data showed no significant difference in median length of stay, tumor characteristics, final margins, major complication rate and pain control. The ST group had chest tubes removed earlier (1 vs 2, p=0.03). We had one conversion to mini-sternotomy and one conversion to sternotomy for bleeding. There has been no incidence of diaphragmatic hernia in the ST group and no phrenic nerve injuries or mortality in either group.

Conclusion: Subxiphoid-subcostal thymectomy is equally safe and practical when compared to transthoracic thoracoscopic thymectomy. We will need to further investigate its potential benefits as we move past the learning curve. We believe that gaining experience in subxiphoid-subcostal approaches to the chest will help us further our field.

Presentation #12 | Clinical Science | Cardiothoracic

UNIPORTAL VS MULTIPORTAL VATS SEGMENTECTOMY: A NORTH AMERICAN MULTICENTER RETROSPECTIVE STUDY

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Presenter: Jesse Doyle MD University of Minnesota

Background: Uniportal VATS segmentectomy (UVATS) is gaining acceptance, but experience in North America is still limited.

Objective: We report a North American multicenter comparison of UVATS segmentectomy vs. multiportal VATS segmentectomy (MVATS).

Method: We performed an IRB-exempt retrospective chart review on prospectively collected databases at two North American centers, from January 2012 to December 2020. We included all thoracoscopic segmentectomy patients and excluded emergent cases (n=1), patients with incomplete records (n=2), and segmentectomy performed in conjunction with another type of lung resection (n=1). We recorded patient demographics, perioperative data, 30-day postoperative complications and compared outcomes between cohorts. We provided descriptive statistics for each group. We used a multivariate logistic model to calculate propensity score matching, and we paired patients 1:1. We defined p values less than 0.05 as statistically significant.

Results: We performed a total of 404 VATS segmentectomies; 176 UVATS vs. 228 MVATS. Indications for surgery were primary lung cancer (n=291), carcinoid (n=32), benign disease (n=39) metastatic (n=39) and other (n=3). We staged 85.1% of patients preoperatively with PET-CT scan according to National Comprehensive Cancer Network (NCCN) guidelines. Propensity score matching generated 148 patients on each group. Operating time was significantly lower in the UVATS group compared to MVATS. We found no difference in estimated blood loss, Clavien-Dindo class III-IV complications, conversion to thoracotomy, upstaging, hospital length of stay, 30-day readmission or mortality. Table 1 summarizes comparisons between the two groups.

Conclusion: The experience from two North American centers indicates that uniportal VATS segmentectomy is non-inferior to conventional multiportal VATS segmentectomy.

Table 1. Patient demographics and clinical data, after propensity score matching; n (%) median (IQR).

Patient characteristics	**UVATS (n=148)**	**MVATS (n=148)**	**P value**
Age, years	66 (59-71)	66 (61-70)	p=0.85
FEV1, %	85 (73-98)	85 (73-98)	p=0.84
Operating time, min	130 (106-171)	160 (130-216)	**p=<0.0001**
EBL, ml	50 (20-250)	60 (25-150)	p=0.46
Conversion to thoracotomy	4 (2.7%)	6 (4%)	p=0.75
Upstaging	15 (11.1%)	18 (13.1%)	p=0.61
Incidence of Clavien-Dindo class III-IV	19 (12.8%)	11 (7.4%)	p=0.12
Hospital LOS, days	3 (2-5)	3 (3-5)	p=0.14
30-day readmission	12 (8.1%)	5 (3.3%)	p=0.13
Mortality	1 (0.6%)	0	p=1

EBL; estimated blood loss, FEV1; forced expiratory volume at 1 second, LOS; length of stay, MVATS; multiportal thoracoscopic segmentectomy, UVATS; uniportal thoracoscopic segmentectomy.

Presentation #13 | Clinical Science | Pediatric Surgery

THE IMPACT OF THE COVID-19 PANDEMIC ON URGENT PEDIATRIC GENERAL SURGERY CASE VOLUME AT A TERTIARY MEDICAL CENTER

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Presenter: Taleen MacArthur MD Mayo Clinic

Background: The COVID-19 pandemic has changed the way that many patients interact with the healthcare system. The impact of the pandemic on urgent pediatric general surgery practice has not yet been elucidated.

Objective: This study aims to examine the impact of the COVID-19 pandemic on urgent pediatric general surgery case volume and outcomes at a tertiary care hospital.We hypothesized that urgent case volume would be reduced during the COVID-19 pandemic; however, patients would have more severe pathology.

Method: In this retrospective, IRB-approved cohort study, we compared case volume, patient characteristics, disease severity, and outcomes between patients who underwent operations from March 1-August 31, 2019 ("pre-pandemic" group, n = 142) vs. the same period of 2020 ("pandemic" group, n = 106). The months most impacted by COVID-19 at our institution ("peak pandemic") based on statewide and local regulations were March 1- April 30, 2020. All patients less than 18 years old who underwent urgent or emergency general surgery during the study period were included. Trauma and elective operations were excluded. Disease severity was assessed by vital sign derangements and AAST score, which was applicable for 72 (50.7%) cases in the pre-pandemic group and 54 (50.9%) in the pandemic group. Standard statistical analyses were performed. Results are presented as means with standard deviation or median with interquartile range where specified, p-value of < 0.05 was considered significant.

Results: During the peak pandemic period, there was a significant decrease in urgent pediatric general surgery case volume (Table 1). There was no significant difference in disease severity between the pre-pandemic and pandemic groups. There was additionally no difference in intra-operative complications, post-operative complications, hospital length of stay, readmissions, mortality or ICU admission.

Conclusion: Pediatric urgent general surgery case volume was found to be decreased during the peak of the COVID-19 pandemic. However, there was no increase in disease severity or complications which suggests patients did not delay in seeking care due to the COVID-19 pandemic in our community.

Table 1: Urgent pediatric surgery case volume, patient demographics, disease severity and outcomes in the pre-pandemic vs. pandemic groups. Results are presented as mean (standard deviation) or median (interquartile range [IQR]), where specified.

		Pre- Pandemic Group		**Pandemic Group**	**p-value**
Demographics	Age (Years)	6.5 (6.1)		6.1 (6.3)	0.61
Case Numbers	Peak Pandemic	62		50	**0.015**
Disease Severity Markers & Outcomes	AAST Score (Median [IQR])	1.0 [1, 3]		2.0 [1, 3]	0.114
	Tachycardia	36% (51)		48% (51)	0.054
	Fever or Hypothermia	10% (14)		12% (13)	0.55
	Respiratory Distress	20% (29)		22% (23)	0.81
	ICU Admission	28% (40)		32% (34)	0.51
	Length of Stay (days, Median [IQR])	All Patients	4.0 [1, 17.5]	7.0 [5, 22]	0.703
		Chronically Hospitalized Patients Excluded	2.0 [1, 5]	2. 0 [1, 4]	0.962
	Readmissions	4		5	0.962

Presentation #14 | Clinical Science | Surgical Infections

EPIDEMIOLOGY AND OUTCOMES OF FOURNIER'S GANGRENE: A POPULATION-BASED ANALYSIS BETWEEN 2008-2015.

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Presenter: Emily June Zolfaghari BS; MS University of Minnesota

Background: Fournier's gangrene is a necrotizing infection of the external genitalia, perineum, and perianal region associated with significant morbidity and mortality (Meki 2018). Fournier's gangrene is a polymicrobial complication that most commonly affects elderly individuals and those with chronic medical conditions such as diabetes, chronic liver disease, chronic kidney disease, and alcoholism (Voelzke 2018). Diagnosis of Fournier's gangrene represents a urologic emergency and requires rapid aggressive surgical debridement. Despite high morbidity and mortality, there is limited population-based data on Fournier's gangrene. Therefore, the aim of this project is to characterize contemporary trends in diagnosis and clinical outcomes of Fournier's gangrene in a large population-based cohort.

Objective: There are few large epidemiologic studies reporting the incidence, complications, and outcomes related to Fournier's gangrene. We used a national database to investigate contemporary trends in the epidemiology of Fournier's gangrene.

Method: Data from the Healthcare Cost and Utilization Project's state inpatient databases was utilized from 2008 – 2015 from 12 states. Patients with a diagnosis of Fournier's gangrene were included and patient, hospital, and treatment data were used to provide descriptive information as well as estimate incidence, trends, and mortality rates.

Results: We identified a total of 10,897 (0.02%) cases of Fournier's gangrene out of a total 71,810,641 hospitalizations. Median age among of patients with Fournier's was 56 years (IQR: 46,67) and 6,555 identified as white (61.3%). Median length of stay was 8 days (IQR: 4,16) and did not vary significantly over time (p=0.4). Debridement occurred in a total of 7,549 patients (69.3%), with a range between 67.7%-70.8% per year, which was stable over time (p=0.4). A total of 582 patients (5.3%) with Fournier's gangrene died in-hospital, with a range between 4.7%-6.7% per year which was stable over time (p=0.2).

Conclusion: Fournier's gangrene is a rare but serious infection. While mortality has remained unchanged, complications related to Fournier's gangrene have increased over time.

Figure 1: Patient Selection Flowchart

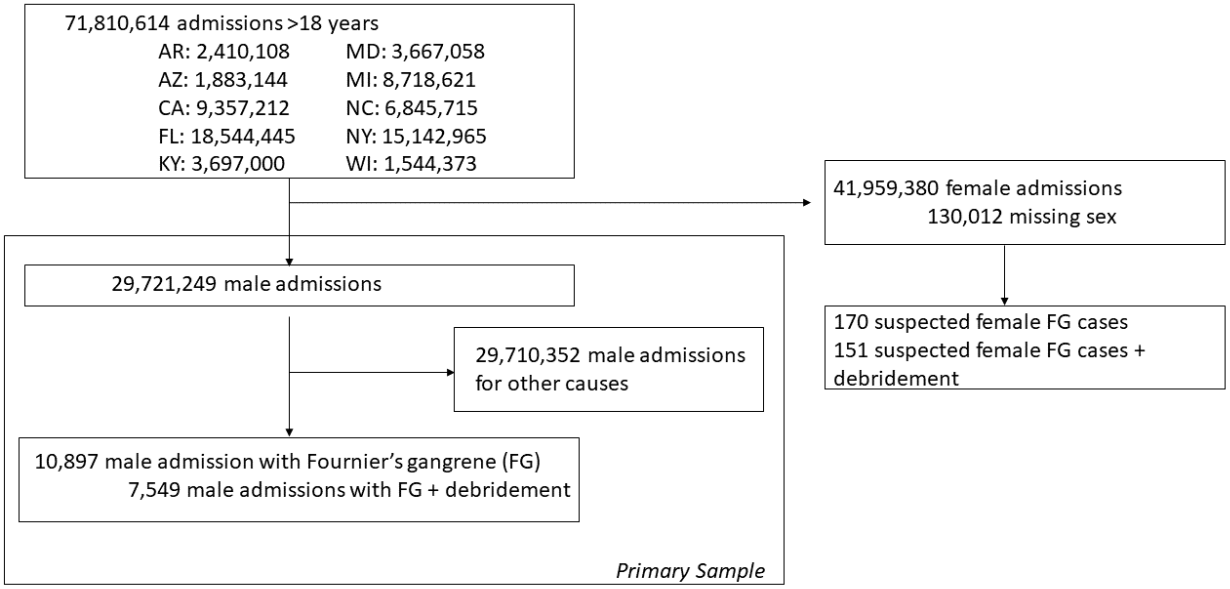

Table 1 – Temporal Trends in Fournier's Gangrene Admissions Over Time

	2008	2009	2010	2011	2012	2013	2014	2015	p-value
Admissions for Fournier's Gangrene	1,256 (11.5)	943 (8.7)	1,582 (14.5)	1,716 (15.8)	1,478 (13.6)	1,394 (12.8)	1,719 (15.8)	809 (7.4)	
In-hospital mortality	84 (6.7)	58 (6.2)	79 (5.0)	82 (4.8)	69 (4.7)	77 (5.5)	84 (4.9)	49 (6.1)	0.18
Underwent debridement	865 (68.9)	668 (70.8)	1,098 (69.4)	1,207 (70.3)	1,013 (68.5)	971 (69.7)	1,164 (67.7)	563 (69.6)	0.40
Length of stay (med [IQR])	8 [4,16]	8 [4,16]	8 [4,16]	8 [4,16]	9 [4,17]	8 [4,16]	9 [4,17]	9 [4,17]	0.38

Table 2 – Logistic Regression Examining Risk Factors for Development of Fournier's Gangrene

Variable	Odds Ratio	95% Confidence Interval
Age	0.99	0.98-0.99
Diabetes	3.50	3.36-3.65
Hypertension	1.18	1.13-1.24
Alcohol abuse	1.36	1.27-1.46
Congestive heart failure	0.86	0.81-0.91
Peripheral vascular disease	1.15	1.07-1.24
COPD	0.92	0.87-0.97
Chronic kidney disease	1.55	1.46-1.65

Table 3 – Baseline Characteristics of Males with Fournier's Gangrene vs. Females with Suspected Fournier's Gangrene

	Males with Fournier's Gangrene	Females with suspected Fournier's Gangrene	p
No. of patients	10,897	170	
Age (mean ± SD)	56.3 ± 15.5	56.3 ± 16.0	<0.001
Race (%)			<0.001
White	6,555 (61.3)	99 (58.6)	
Black	2,015 (18.8)	44 (26.0)	
Hispanic	1,180 (11.0)	15 (8.9)	
Asian/Pacific Islander	141 (1.3)	1 (0.6)	
Other	329 (3.1)	2 (1.2)	
Insurance, n(%)			<0.001
Medicare	4,483 (41.1)	77 (45.6)	
Medicaid	1,760 (16.2)	38 (22.5)	
Private	2,960 (27.2)	33 (19.5)	
Self-Pay	1,035 (9.5)	14 (8.3)	
Comorbidities			
Diabetes	5,756 (52.8)	117 (68.8)	<0.001
Hypertension	4,444 (40.8)	69 (40.6)	0.96
Sepsis	3,578 (32.8)	87 (51.2)	<0.001
CHF	1,569 (14.4)	25 (14.7)	0.91
PVD	740 (6.8)	16 (9.4)	0.18
COPD	1,443 (13.2)	24 (14.1)	0.74
CKD	2,158 (19.8)	39 (22.9)	0.31
Alcohol Abuse	820 (7.5)	3 (1.8)	0.002*
Underwent Debridement	7,549 (69.3)	151 (88.8)	<0.001
Length of stay (median [IQR])	8 [4,16]	14 [8,23]	<0.001
In-hospital death	582 (5.3)	11 (6.5)	0.52

Abstract 16

Presentation #15 | Clinical Science | Surgical Oncology

THE NEW NORMAL? PATIENT SATISFACTION AND USABILITY OF TELEMEDICINE IN BREAST CANCER CARE

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Presenter: Bryan Johnson BS University of Minnesota

Background: Because of the coronavirus disease 2019 (COVID-19) pandemic, physicians and healthcare providers transitioned to telemedicine-based care delivery where possible to minimize COVID-19 exposure risks for patients and staff.

Objective: We aimed to measure patient satisfaction (primary endpoint) and usability (secondary endpoint) of telemedicine among breast cancer patients to better understand its potential role in post-pandemic breast cancer care.

Method: An anonymous survey was distributed to adult breast cancer patients who have undergone a telemedicine visit at a single academic institution (including surgical, radiation, and medical oncology) over a 12-week period from June 15 to September 04, 2020. The survey collected patient demographics, cancer history, cancer treatment to-date, and assessed satisfaction and usability using a modified Telehealth Usability Questionnaire (Parmanto et al. 2016). Positive statements toward telemedicine satisfaction and usability were scored on a 7-point Likert scale with 1 indicating strong disagreement and 7 indicating strong agreement. Satisfaction and usability responses were characterized using descriptive statistics. Associations between satisfaction, usability, and other patient characteristics were analyzed with the non-parametric Spearman correlation coefficient and Wilcoxon rank-sum and Kruskal-Wallis tests.

Results: Of 310 screened breast cancer patients, 203 consented to receive the survey and 75 responded, yielding a response rate of 37%. The median age of respondents was 63 (range 25-83). The majority of respondents lived in an urban area (61%), were white (91%), and were seeing a medical oncologist (62%). Nearly half (49%) of the patients were not planned to receive chemotherapy, while 32% had completed and 18% were actively receiving chemotherapy. The overall median patient satisfaction score was 5.5 out of 7 with an interquartile range (IQR) of 4.25-6.25. The overall median usability score was 5.6 out of 7 with an IQR of 4.4-6.2. Fitting satisfaction by usability yielded a Spearman correlation coefficient (ρ) of 0.80 ($p<0.001$), indicating a strong positive correlation between satisfaction and usability. However, we found no correlation for patient age with satisfaction (ρ=-0.09, p=0.476) or usability (ρ=-0.12, p=0.345), nor for in-person visit commute time with satisfaction (ρ=0.06, p=0.626) or usability (ρ=0.06, p=0.616). Satisfaction and usability scores did not vary significantly according to patient race, location of residence, insurance status, oncology

specialty seen, number or type of prior telemedicine visits, or whether patients were actively receiving cancer treatment (Table 1).

Conclusion: Overall, breast cancer patients were satisfied with telemedicine and found it usable, with respective scores greater than 5 out of 7. This supports the hypothesis that patient satisfaction and usability should not limit the utility of telemedicine in future breast cancer care.

Table 1. Telemedicine Satisfaction and Usability Scores by Patient and Visit Characteristics

Patient or Visit Characteristic (N=75)[1]	Median Satisfaction Score[2] (IQR[3])	P-value	Median Usability Score[2] (IQR)	P-value
Race				
White (n=64)	5.42 (4.0-6.0)		5.6 (4.4-6.1)	
Black (n=0)	NA	0.112	NA	0.065
Asian (n=3)	6.25 (6.0-6.5)		6.6 (6.0-6.75)	
Other (n=3)	6.0 (5.25-7.0)		6.0 (6.0-7.0)	
Location of Residence (by population size)				
Urban: >50,000 (n=43)	5.25 (4.0-6.25)		5.6 (4.4-6.2)	
Urban cluster: 2,500 to 50,000 (n=22)	5.75 (5.0-6.25)	0.421	5.8 (5.4-6.6)	0.500
Rural: <2,500 (n=6)	5.13 (2.0-6.0)		5.4 (3.2-5.8)	
Medical Insurance Coverage				
Private health insurance (n=33)	5.5 (4.75-6.0)		5.8 (5.0-6.0)	
Medicare (n=9)	5.75 (4.0-6.25)		5.6 (5.0-6.0)	
Private and Medicare (n=16)	5.25 (3.75-6.25)	0.748	5.0 (3.6-6.4)	0.264
Medigap (n=6)	5.63 (5.0-6.25)		6.0 (5.6-7.0)	
Other (n=4)	4.88 (3.88-5.5)		5.1 (3.9-5.4)	
Oncology Specialty of Telemedicine Visit				
Surgical (n=15)	4.75 (3.75-5.75)		5.4 (3.2-5.8)	
Medical (n=44)	5.75 (5.0-6.25)	0.129	5.8 (5.0-6.6)	0.219
Radiation (n=12)	5.75 (5.0-6.13)		5.4 (4.6-6.2)	
Chemotherapy				
Completed (n=23)	5.5 (4.75-6.25)		5.8 (5.0-6.6)	
Currently receiving (n=13)	5.25 (4.75-6.0)	0.962	5.8 (4.4-6.0)	0.471
Planned, not yet started (n=0)	N/A		N/A	
Not planned/unknown (n=35)	5.5 (4.0-6.25)		5.4 (4.0-6.2)	
Radiation Therapy				
Completed (n=45)	5.25 (4.75-6.0)		5.6 (4.0-6.2)	
Currently receiving (n=2)	5.46 (4.25-6.67)	0.077	4.8 (4.4-5.2)	0.327
Planned, not yet started (n=5)	6.5 (6.0-7.0)		6.6 (5.2-6.8)	
Not planned/unknown (n=20)	5.75 (4.0-6.25)		5.8 (5.0-6.0)	
Number of Prior Telemedicine Visits				
1 (n=26)	5.25 (4.75-5.75)		5.6 (5.0-6.0)	
2 (n=16)	5.63 (3.88-6.25)	0.295	5.7 (3.1-6.8)	0.834
3+ (n=29)	5.75 (4.75-6.25)		5.6 (5.0-6.2)	
Type of Visit(s) in the Past 4 Weeks				
Video only (n=25)	5.5 (4.75-6.25)		5.8 (5.0-6.6)	
Phone only (n=28)	5.75 (5.0-6.13)	0.497	5.9 (4.7-6.4)	0.622
Video and phone only (n=7)	5.5 (5.0-6.5)		5.2 (4.4-5.8)	
Other, including In-person (n=11)	4.75 (3.5-5.75)		5.6 (4.4-6.0)	

[1]The sum of responses of each characteristic may be <75 and is due to missing survey data.
[2]Maximum score is 7.
[3]IQR = Interquartile range

Presentation #16 | Clinical Science | General Surgery

RISK FACTORS FOR GASTROINTESTINAL LEAK AFTER OPERATIVE REPAIR OF PERFORATED PEPTIC ULCER DISEASE

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Presenter: Sarah Lund MD Mayo Clinic

Background: Perforated peptic ulcer disease (PPUD) is associated with mortality rates from 10-40. Identification of risk factors which impact leak rates after PPUD repair might influence operative treatments, such as drain placement.

Objective: This study aims to identify risk factors for leak after PPUD repair to guide patient risk stratification and intra-operative drain placement.

Method: We performed a retrospective study from 2008-2019 comparing patients who developed a post-operative leak versus those who did not.

Results: 175 patients underwent PPUD operative repair, of whom 30 (17%) developed a post-operative leak. Malnutrition (albumin<3.5) (p=0.03) and duodenal ulcers (p=0.005) were associated with significantly higher leak rates. Patients with a leak had a longer hospital stay (29 v 10 days, p=0.003), higher complication rates (77% v 48%, p=0.002), and higher re-operation rates (73% v. 26%, p<0.0001).

Conclusion: Leak after operative PPUD repair is associated with significant post-operative morbidity. Malnutrition and duodenal perforation are risk factors for post-operative leak. Surgical drains can be effective at detecting leaks and these risk factors can enable drain placement in PPUD patients at highest risk for leak.