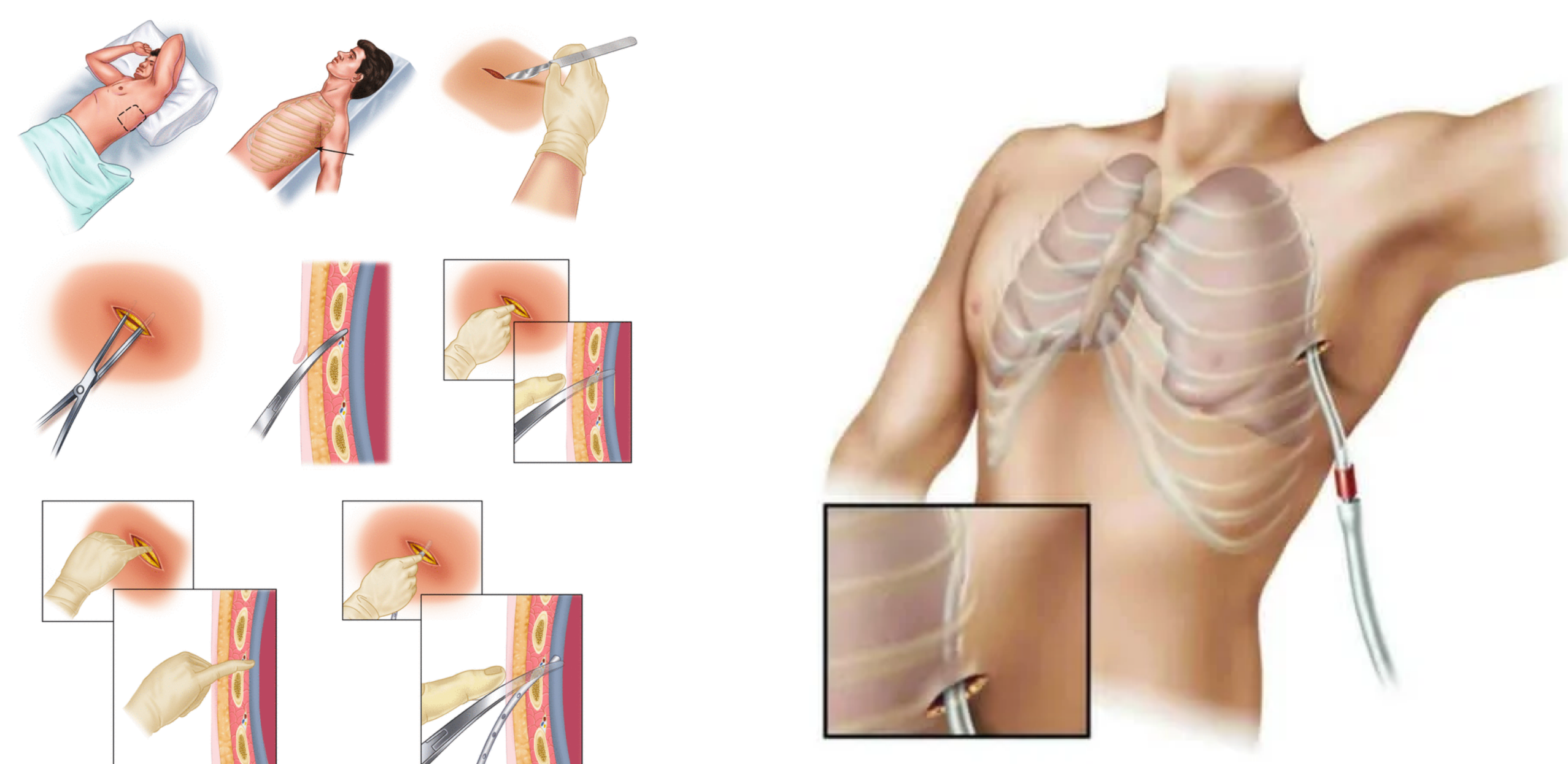


Problem Definition

Thoracostomy tubes (TT) are most often placed by general surgery (GS), emergency medicine (EM) residents for the treatment of various pathologies, including pneumothorax, hemothorax, or pleural effusions. Complications are as high as 10%, and include dislodgement, injury to critical structures, and hemorrhage. There are few studies to-date that examine the complications associated with TT placement by housestaff and the factors associated with these complications.

The goal of this study was to investigate TT placement patterns and resident confidence at one academic medical center. In addition, our second objective was to gather quantitative data on the frequency and context of TT placement, rates of complications, and factors associated with complications among residents at TJUH.



Aims For Improvement

- **WHAT WILL IMPROVE:** Outcomes of TT placement at TJUH.
- **BY HOW MUCH:** The ultimate goal is a complication rate of zero.
- **WHEN:** We aim to reduce complication rates over the time frame of 1-2 years.

Intervention

Our intervention consisted of a combined EM/GS teaching session led by Thoracic Surgery and Emergency Medicine attendings on safe placement of TT for various indications.

We plan to implement this session yearly. Furthermore, we plan to implement a multi-department TT placement tracking system to better measure outcomes associated with this procedure.

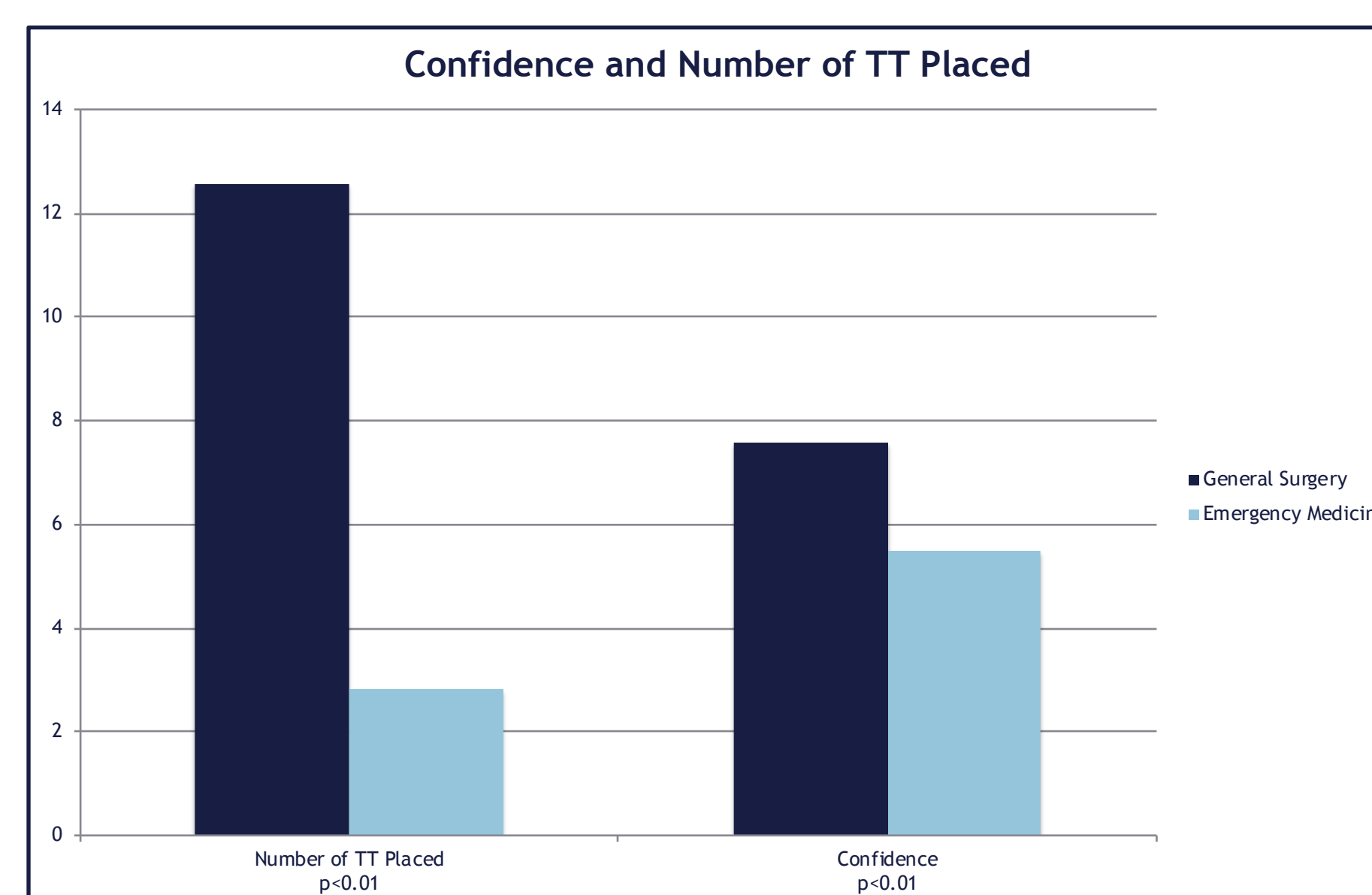
Methods

All current EM/GS residents were provided an anonymous survey on experience with TT placement, confidence (rated on a Likert scale from 1-10), and knowledge of procedural steps.

EMR data were collected for all TTs placed by residents using ICD-10 and CPT codes between 2017-2020. TTs placed by interventional radiology or in the operating room were excluded. Demographic data, context of TT placement, complications, and readmissions were quantified and compared.

Results

A total of 48 surveys were completed (20 GS, 28 EM). Compared to EM residents, GS residents placed significant more TT and reported higher confidence scores (Table 1).



Results

For the EMR portion of the study, there were 262 TTs identified in the study period placed; 146 (55.7%) were excluded, for a final N = 116. Demographic data are shown in Table 1.

Table 1. Demographic data by complication rate

	No Complication	Any Complication	P-value
Female (N,%)	37 (88.1)	5 (19.9)	0.252
Age (M, SD)	58.3 (17.8)	56.3 (18.5)	0.658
BMI (M, SD)	25.7 (6.8)	25.5 (5.1)	0.883
ICU Stay (N, %)	66 (88)	9 (12)	0.043
Trauma (N,%)	14 (93.3)	1 (6.7)	0.240
Transfer (N, %)	25 (86.2)	4 (13.8)	0.554
HLOS, days (M, SD)	20.3 (19.2)	18.8 (19.4)	0.756
30d Readmission (N, %)	27 (90.0)	3 (10.0)	0.223

Overall complication rate was 17.2%. “Need for replacement/repositioning” was most the common complication. TT practices by department are shown in Table 2.

Table 2. Types of TT placed across departments

	Surgery	EM	Medicine	p-value
Chest Tube (N, %)	48 (84.2)	13 (54.2)	1 (3.0)	<0.001
Pigtail (N, %)	7 (12.3)	11 (45.8)	30 (90.9)	<0.001
Average PGY (M, SD)	3.25 (1.9)	2.67 (0.9)	5.0 (1.7)	<0.001

Next Steps and Lessons Learned

- We continue to work toward meeting our aims for improvement and reduction of complications in TT placement at TJUH.
- This will require completion of data collection and analysis, ongoing implementation of TT education, and prospective tracking of outcomes.