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LEARNING CURVE OF TRANSORAL INCISIONLESS FUNDOPLICATION: A SINGLE ENDOSCOPIST EXPERIENCE

ASGE

Esophageal Diseases
Endoscopy: Esophagus Other
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Transoral Incisionless Fundoplication (TIF) is a minimally invasive endoscopic technique proven to be safe and effective for treating Gastroesophageal Reflux Disease (GERD) in selected patients. The learning curve of this technique has not been studied. **Aims:** (1) To report the learning curve for TIF, by identifying a breakpoint or threshold number of procedures at which there is a significant decrease in procedure time, time taken per 2-set fastener placement and an increase in the valve circumference. **Methods:** Prospectively collected data on patients who had a TIF procedure at an academic medical center between September 2017 and November 2019 were analyzed. Routine pre-TIF work-up included upper endoscopy (EGD) with biopsies, cine-esophagram, high resolution esophageal manometry (HREM) and pH-monitoring. Patients who had prior per-oral endoscopic myotomy (POEM) were excluded. Learning curve analysis was done using STATA software v 15.1 and Power BI to calculate the threshold for learning assessed by time to reach specific endpoints of the TIF procedure. **Results:** 51 patients (71% male, mean age 56.5±13.2 yr.) had TIF after testing confirmed appropriate criteria (ph-positive test, < 2cm hiatal hernia, Hill grade <=2, BMI< 35). Indications for TIF were refractory GERD (51%), laryngopharyngeal reflux disease (9%), failed Nissen fundoplication (9%) and GERD in PPI-averse patients (31%) (**Table 1**). Six (12%) patients had prior surgical fundoplication. All TIF procedures were performed by a single endoscopist after hands-on and supervised training. TIF was successfully completed in 50/51 (1 aborted due to technical failure) with no serious adverse events. Overall, mean procedure time was 56±15 minutes. Break point analysis revealed that the threshold procedure time was reached at 23 procedures, where time declined from 67±11 to 47±13 minutes ($p<0.0001$). The mean time to deploy set of 2 fasteners was 4.3±1.9 minutes and mean valve circumference was 285±24 degrees. The breakpoint analysis revealed that a threshold was reached at 18 procedures for both fastener deployment and valve wrap, with a decrease in the mean procedure time to deploy a set of 2 fasteners from 6.5±1.4 to 3.1± 0.8 minutes ($p<0.0001$) and an improvement in the mean valve circumference from 261±20 to 297±14 degrees ($p<0.0001$). There was a significant decrease in total procedure time and time to deploy 2-set fasteners as well as an improvement of the valve circumference with increased number of procedures (**Figure 1**). **Conclusions:** Our single-center analysis showed that the number of procedures needed for an endoscopist to achieve procedure times under 1-hour is 23 procedures. Furthermore, the number of procedures needed to achieve times under 4 minutes to deploy 2-set of fasteners and to achieve tighter valves is 18 procedures. Future larger studies are needed to validate these results.

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	N=51
Mean age, SD	56.5 (SD 13.2)
% Male	36(71%)
Median hiatal hernia axial length (cm) < 2	0.5 (IQR 0-1)
Hiatal hernia = 0	17
Hiatal hernia = 1 cm	17
Hiatal hernia = 1.5 cm	2
Hiatal hernia = 2 cm	15
Median Hill grade	1 (IQR 1-2)
Prior surgical fundoplication	6(12%)
Indications for TIF	
Refractory GERD	26 (51%)
LPRD	4(9%)
Failed Nissen	5(9%)
GERD + PPI-averse	16 (31%)
NERD	37(72.6%)
Erosive esophagitis	13(25.5%)
History of Barrett's esophagus	17(33%)
Reflux chest pain syndrome	10(19.6%)
Regurgitation-predominant GERD	27(52.9%)
LPRD (extra-esophageal symptoms)	22(43.1%)
Chronic cough	9(17.6%)

Table 1. Patient Characteristics

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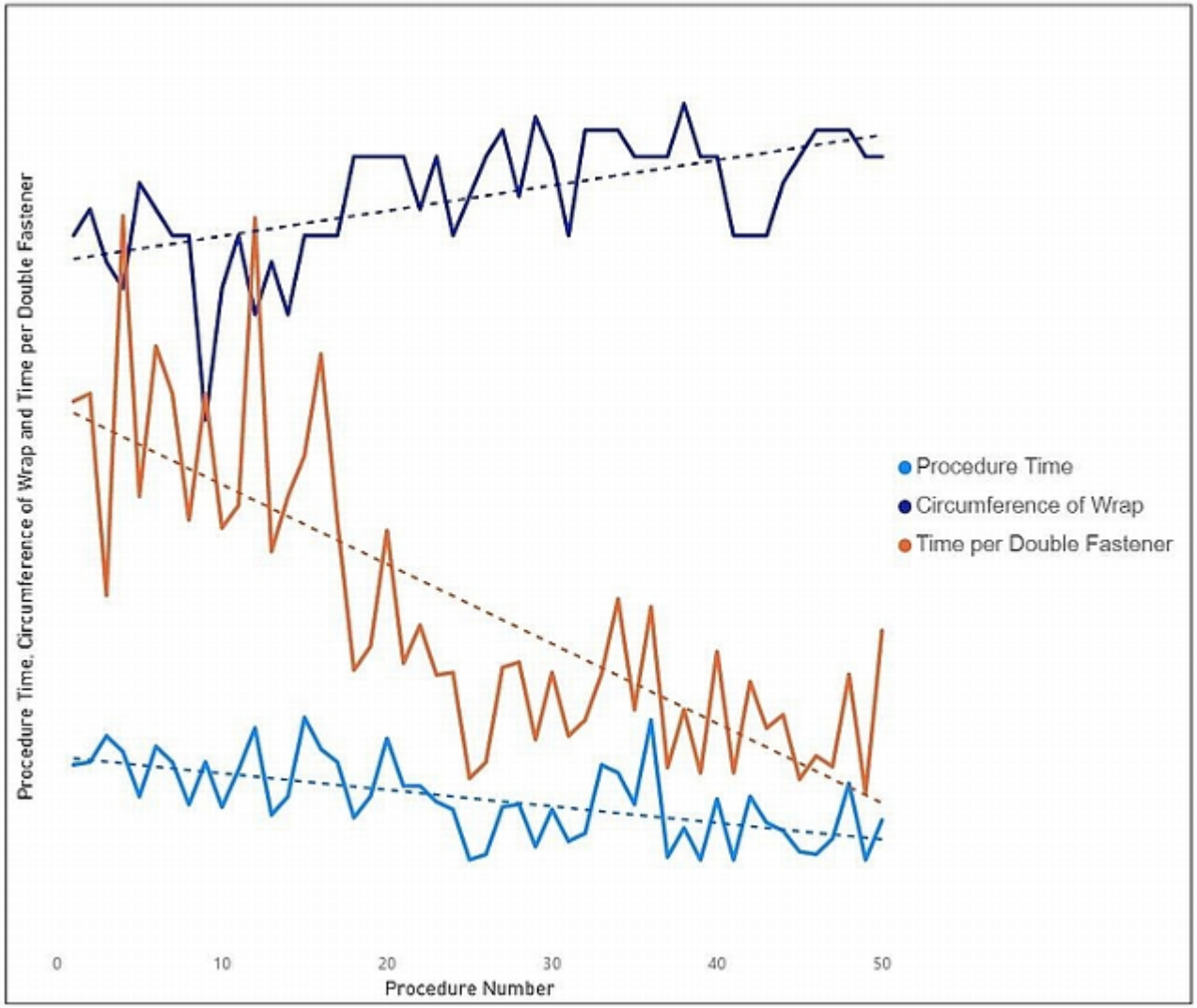

TIF learning curve breakpoint analysis

Disclosure: O. I. Brewer Gutierrez: No Conflicts; M. Dbouk: No Conflicts; B. S. Kannadath: No Conflicts; A. A. Siddiqui: No Conflicts; Z. Manuelyan: No Conflicts; D. Assis: No Conflicts; M. A. Khashab: BSCI: Consulting; Medtronic: Consulting, Consulting; N. Thosani: Abbvie: Speaking and Teaching; Boston Scientific Corp: Consulting; Endogastric Solutions: Consulting; Medtronics: Consulting; Pentax America: Consulting; M. I. Canto: Endogastric Solutions: Grant/Research Support; Pentax Medical Corporation: Grant/Research Support; UpToDate: Independent Contractor;