ESOPHAGEAL ANASTOMOTIC STRICTURE ASSOCIATION WITH BARBED SUTURE Prashant Sinha MD[1], Paresh Shah MD[2], [1]Staten Island University Hospital, [2]NYU Langone Health

Introduction: Anastomotic techniques in esophageal and gastric reconstruction have been widely described in the context of evolving surgical tools. While rates of strictures have decreased overall, our experience has highlighted a surprising etiology of stricture not previously described. We hypothesize that barbed suture used in esophageal to jejunal anastomosis can be etiologic in stricture formation, with a high rate of revision.

Methods: A three-year single surgeon experience was reviewed retrospectively, selecting foregut reconstructions inherent to resections for proximal and distal gastric lesions. We assessed details of anastomotic construction, surgical revision, and postoperative endoscopy, including pathology . Outcomes included length of stay, leaks, endoscopically identified strictures, length of stay and mortality.

Results: Fifty-two foregut reconstructive cases were identified. Cancer of the esophagus, proximal or distal stomach represented 38/52 (73%) followed by ulcer disease in 7 and anastomotic stricture in 7. Types of anastomoses constructed included 28 gastrojejunostomies (GJ), 15 esophagojejunostomies(EJ), 8 esophagogastric(EG), and one esophagoileal(EI) anastomosis. Eleven cases required endoscopic intervention for obstructive symptoms. Of these, 7 cases occurred in EJ anastomoses and 4 cases required surgical revision. In 3 of 4 cases requiring revision, barbed suture was used in the anastomotic construction, and a 25mm EEA stapler was used in the other. A staple line defect was repaired in the EEA case during the index procedure. Postoperative leak or tumor recurrence was absent in these 7 EJ anastomoses. One additional EJ stricture, in which barbed suture was used, fully resolved after a single endoscopic dilation with excision of a visible bridging barbed suture. A total of 4/8 EJ anastomoses with barbed suture strictured, with 3/4 (75%) of these strictures requiring surgical revision for an overall 37.5% (3/8) surgical revision rate. The remaining 7 strictures occurred in 3 GJs, 1 EEA EJ, 2 EJ and 1 EG due to tumor recurrence, food impaction, and inflammation. Six of seven resolved with endoscopic intervention. Chi-square analysis revealed that EJ vs non-EJ anastomoses were significantly more likely to result in stricture and revision. This study did not show significance in stricture or surgical revision rates with respect to barbed suture use alone, however a trend towards significance for revision in barbed EJ anastomoses was noted.

Discussion: Knotless barbed suture anastomosis has been readily adapted for foregut reconstruction, however a few authors including this group has identified the potential for stricture. This case series finds the added risk that the strictures are less amenable to dilation, a known risk of circular staplers. It is not clear whether over or under-tensioning of the suture is responsible. Fujimoto et al report(1) a similar concern with robotic under-tensioned sutures. Endoscopic findings demonstrate a crossing luminal suture causing obstruction, resolved with suture excision. We similarly identified endoscopic suture excision resolution of an esophagojejunal stricture. The other cases in which a suture target was not identified may represent overly tensioned cases or cases in which there was an increased inflammatory response leading to stricture. It is possible that surgical revision could be avoided through enhanced endoscopic interventions such as submucosal cutting of suture or fibrosis, or steroid injection. The thicker tissue of the stomach may protect the non-esophagojejunal anastomoses in our study. It may also suggest that non-barbed suture allows bi-directional accommodation and reduces the risk of anastomotic stricture.

Conclusion: The individual cases suggest an association (barbed suture + EJ) that the authors believe warrant avoidance of barbed suture, however further study with a larger series may help answer this question definitively. The ease of use of barbed suture still warrant its use with caution, and this study with the reports of other similar reports will guide further study in anastomotic construction.

1. Fujimoto D, Taniguchi K, Miura F, Kobayashi H. Alimentary tract obstruction attributed to use of barbed suture for double tract reconstruction after robot-assisted proximal gastrectomy: a case report. BMC Surg. 2021 Nov 29;21(1):406. doi: 10.1186/s12893-021-01407-9. PMID: 34844585; PMCID: PMC8630912.

