Does fixation of the gastric conduit reduce the incidence of gastric volvulus after esophagectomy?

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Introduction & Methods

Objective & aims

Gastric conduit volvulus is a rare complication after esophagectomy that warrants additional surgical reintervention and is associated with increased morbidity and mortality.

Aim 1: To evaluate whether fixation of the gastric conduit would reduce the incidence of postoperative volvulus following esophagectomy.

Aim 2: To assessed the morbidity and mortality associated with those who underwent fixation in comparison to those who do not.

Population & study design

Design: Retrospective chart review study

Sample: Patients (≥18 years of age) who underwent esophagectomy from September 2013 to November 2022 at UF Health in Jacksonville.

Data: Electronic health record data regarding:

- Demographic and clinical data
- Index operative characteristics
- Postoperative details (length of hospital stay, reoperations, readmissions, 30- and 90- day postoperative complications, mortality)

Outcomes: The outcomes of interest were:

- Primary outcome: Gastric conduit volvulus after esophagectomy (primary outcome)
- Secondary outcomes: Postoperative morbidity and mortality

Analysis: The analysis included:

- Differences among the fixation and non-fixation groups were analyzed using descriptive statistics.
  - Categorical variables are presented as frequencies and counts.
  - Continuous variables are presented as medians and interquartile range (IQR).
  - Pearson χ2 test or Fischer exact tests were used to analyze categorical variables.
  - A 2-sample t-test or Mann-Whitney U test was used to analyze parametric or nonparametric continuous variables, respectively.
- Statistical significance (2-sided) was defined by a P-value < 0.05.

Results

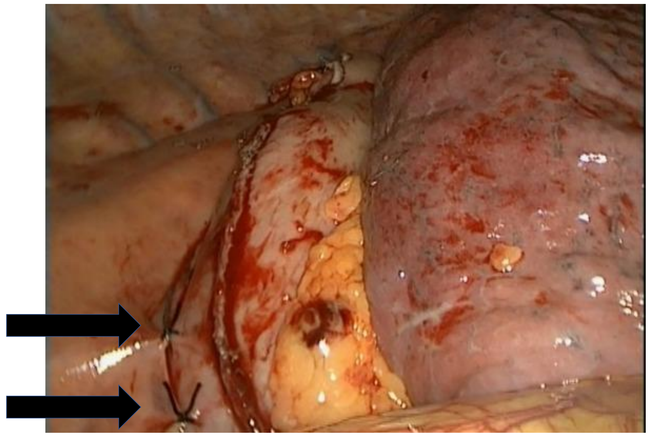
Intraoperative and postoperative outcomes overall and across fixation and non-fixation groups

Variable	Value	N (%) or median [interquartile range]			
		Overall N=242	Fixation N = 121	Non-fixation N=121	*p* Value
Immediate outcomes during index admission	Gastric volvulus	4 (2)	0	4 (2)	0.12
	Graft necrosis	2 (1)	1 (0)	1 (0)	1.00
	Conduit obstruction	11 (5)	4 (2)	7 (3)	0.36
	Leak	16 (7)	9 (4)	7 (3)	0.61
	Reoperation	18 (7)	9 (4)	9 (4)	1.00
	Length of stay	8 [4]	9 [6]	8 [4]	0.11
Intraoperative details	Operative time (minutes)	397 [127]	417 [126]	375 [110]	<0.001
	Fluid replacement (mL)	3200 [1500]	3325 [1613]	2850 [1350]	0.002
	Urine output (mL)	475 [398]	500 [350]	460 [350]	0.24
	Estimated blood loss (mL)	75 [158]	50 [80]	100 [150]	0.001
Clavien-Dindo classification	Grade IIIb-V	55 (23)	31 (13)	24 (10)	0.25
Discharge location	Home	186 (77)	84 (35)	102 (42)	0.006
	Rehabilitation facility	46 (19)	31 (13)	15 (6)	0.009
	Death	4 (2)	2 (1)	2 (1)	1.00
30-day outcomes	Reoperation	23 (10)	13 (5)	10 (4)	0.51
	Readmissions	23 (10)	13 (5)	10 (4)	0.51
	Mortality	7 (3)	4 (2)	3 (1)	1.00
90-day outcomes	Reoperation	14 (6)	5 (2)	9 (4)	0.27
	Readmissions	32 (13)	19 (8)	13 (5)	0.26
	Mortality	15 (6)	10 (4)	5 (2)	0.18

Characteristics of patients

Variable	Value	N (%)
Esophageal lesion	Benign	11 (5)
	Malignant	231 (95)
	Adenocarcinoma	184 (76)
	Squamous cell carcinoma	47 (20)
	Neuroendocrine tumor	1 (0)
ASA classification	II	20 (8)
	III	204 (84)
	IV	18 (7)
Clinical history	History of malignancy	54 (22)
	Prior abdominal surgery	188 (78)
	Neoadjuvant treatment	197 (85)
Age	< 65 years	100 (41)
	65-70 years	73 (30)
	> 70 years	69 (29)
Sex	Male	196 (81)
	Female	46 (19)
Race	African American	20 (8)
	White	217 (90)
	Other	5 (0)
Comorbidities	Diabetes	50 (21)
	Respiratory	94 (39)
	Hyperlipidemia	107 (44)
	Hypertension	156 (65)
	Cardiovascular disease	83 (34)
	Renal disease	19 (8)
	History of smoking	198 (82)

Example of fixation of the gastric conduit to the right edge of the pleura



Discussion

Incidence of gastric volvulus is **3%** in the **non-fixation** group.

Upon **implementing the change** of practice, the rate decreased to **zero**, although not statistically significant.

The rarity of gastric volvulus makes conclusions regarding fixation very difficult to interpret.

However, fixating the gastric conduit in the index procedure could **minimize this risk to almost negligible**.

Additional future studies are needed to validate this technique and the prevention of postoperative acute gastric conduit volvulus among a diverse patient population.