

# Surgery for Carcinoma of Esophagus Pyloroplasty - Is it a Boon or Bane to the Patient?

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## Abstract

**Background:** Pyloroplasty is a pyloric drainage procedure routinely done during transhiatal esophagectomy (THE) or video-assisted thoracoscopic surgery (VATS) to prevent delayed gastric emptying resulting from truncal vagotomy.

**Aim:** The ultimate aim of our study is to find out whether the pyloroplasty following THE or VATS is detrimental or beneficial to the patient by comparing the patient's symptoms and endoscopy finding after 1 month, with or without pyloroplasty.

**Methods:** It is a retrospective study comparing 40 patients with esophageal cancer who underwent THE or VATS from January 2015 to December 2017. 22 patients underwent THE or VATS without pyloroplasty, while the other 18 patients underwent THE or VATS with pyloroplasty.

**Results:** Respiratory complications are more in pyloroplasty group (6/18) compared to without pyloroplasty group. However, other symptoms are more in the pyloroplasty group compared to without pyloroplasty group, and it is statistically significant, i.e.,  $P < 0.05$ . Endoscopy at 1 month follows up confirm duodenogastric reflux, i.e., 6/18 in pyloroplasty group and 0/22 in without pyloroplasty group.

**Conclusion:** We recommend in patients with normal pyloroduodenal opening and using tubularized stomach after THE or VATS, it is better to avoid pyloroplasty.

**Key words:** Esophagectomy, Gastric emptying time, Gastric pull up, Pyloroplasty

## INTRODUCTION

The gold standard of surgery for carcinoma is the removal of the esophagus using transhiatal esophagectomy (THE) or McKeown's three-stage procedure or minimally invasive esophagectomy video-assisted thoracoscopic surgery (VATS). While replacing the excised part of the esophagus with the gastric conduit, truncal vagotomy is performed, and routinely a pyloric drainage procedure might follow. The impetus to perform a drainage procedure after esophagectomy is historically derived from experience with truncal vagotomy for peptic ulcer

disease.<sup>[1]</sup> Controversy still surrounds the need for pyloric drainage following esophageal substitution with gastric conduit after esophagectomy. Although the randomized controlled trial has addressed the need for pyloric drainage after esophageal substitution, the variability of the surgical method, choice of conduit (whole stomach or gastric tube), conduit position, and anastomotic location confound the analysis. It became apparent that pyloroplasty or pyloromyotomy could potentially alleviate the emptying delay associated with the vagotomized stomach. In contrast, after esophageal substitution with the gastric conduit, delayed gastric emptying was not influenced by either pyloroplasty or pyloromyotomy.<sup>[2]</sup> Establishing pyloric drainage after esophagectomy with complete vagotomy has not been widely accepted as the standard of therapy in high-volume esophageal centers. Previous studies documented the uselessness of pyloric drainage procedures by either pyloroplasty or pyloromyotomy following esophageal substitution with the gastric conduit. Only a few patients develop delayed gastric emptying after esophagectomy,

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and pyloroplasty patient may be predisposed to dumping and duodenal bile reflux and thus impairing post-operative functional outcome.<sup>[3]</sup> Moreover, it has been reported that gastric drainage following esophagectomy has no influence on the delayed gastric emptying, and the foregut function improves with time, regardless of a pyloric drainage procedure. Interestingly, there are data to suggest that the need for a pyloric drainage procedure may be more related to the size of the gastric conduit, in that large conduits (whole stomach) are more susceptible to gastric stasis.<sup>[4]</sup>

### Aim

The ultimate aim of our study is to find out whether the pyloroplasty following esophagectomy (THE/VATS) is detrimental or beneficial to the patient by comparing the patient's symptoms, and endoscopy findings after 1 month, with or without pyloroplasty.

## MATERIALS AND METHODS

The study population included patients who underwent THE or VATS for malignant disease in the Department of Surgical Gastroenterology, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, South India, from January 2015 to December 2017. It is a retrospective study comparing the symptoms and signs related to the delayed gastric emptying of patients who underwent THE/VATS, with or without pyloroplasty. 18 patients underwent esophagectomy (THE/VATS) with pyloroplasty, and 22 patients underwent esophagectomy (THE/VATS) without pyloroplasty. Inclusion criteria: All patients who underwent esophagectomy regardless of the type of a tumor, site of a tumor (mid/lower 1/3<sup>rd</sup>) and all the patients who underwent esophagectomy regardless of the neoadjuvant status. Exclusion criteria: Repeat esophagectomy or emergency esophagectomy is excluded from the study. Patients with the history of gastric outlet obstruction (GOO), previous gastric procedure, and other intestinal obstructions are excluded from the study. Perioperative complicated patients and post-operative death patients. The patient underwent thoracotomy was excluded from the study patients who were in ventilatory support for more than 24 h or patients who needed reintubation, are excluded from the study. Signs and symptoms pertaining to delayed gastric emptying are analyzed postoperatively in all patients, namely vomiting, retching, heartburn, and regurgitation. All patients underwent upper gastrointestinal endoscopy after 1 month to find out whether the patient is having stasis or biliary gastritis. Operative techniques were standardized among surgeons. All conduits are placed in the posterior mediastinum. Esophagogastric anastomosis was done in end-to-side or end-to-end fashion with interrupted hand sewn technique. All patients underwent gastric tube

**Table 1: Distribution of complication in both study groups**

Complications	With pyloroplasty	Without pyloroplasty	P value
Respiratory complication	4	3	0.247
Vomiting	6	0	0.003
Retching	6	1	0.017
Heartburn	6	0	0.003
Regurgitation	6	0	0.003

**Table 2: Endoscopy at 1 month**

Gastroduodenoscopy	With pyloroplasty	Without pyloroplasty	P value
Biliary gastritis	6	0	0.000

pull up with the diameter ranging from 4 cm to 6 cm. The use of pyloric drainage procedure was surgeon dependent. A jejunal feeding tube was placed in all patients, and enteral nutrition was instituted usually in the second post-operative day and advanced as tolerated.

## RESULTS

Review of the Department of Surgical Gastroenterology database at Government Mohan Kumaramangalam Medical College and Hospital revealed 40 patients underwent esophageal resection either by THE or VATS over a period of 36 months. Patients were divided into two groups based on the use of a pyloric drainage procedure. Pyloric drainage in the form of pyloroplasty was performed in 18 patients and 22 patients had no pyloric drainage. Patients' signs and symptoms pertaining to delayed gastric emptying and duodenal gastric reflux are analyzed and the results are given below, and upper gastrointestinal endoscopy was done at 1-month post-operative period for all patients and results are given below.

As per the above values even through respiratory complications are more "with pyloroplasty" group, it is not statistically significant ( $P = -0.247$ ). However, other symptoms, namely vomiting, retching, heartburn, and regurgitation, are predominant in with pyloroplasty group. The above symptoms are further confirmed by endoscopy at 1-month follow-up, and also the endoscopy reveals biliary gastritis further confirmed that the patient "with pyloroplasty" group is having duodenogastric Tables 1 and 2.

## DISCUSSION

A gastric conduit is usually used as the esophageal replacement after vagotomized THE for esophageal cancer. The gastric emptying may be impaired after this

operation, so some esophageal surgeons routinely add pyloric drainage procedures. The value of adding pyloric drainage to esophagectomy and whether the intervention is of benefit continues to be debated. Previous literature<sup>[5,6]</sup> recommended the use of pyloroplasty on every patient to prevent the potentially lethal effects of gastric stasis in the early post-operative period following retrosternal reconstruction of the esophagus, especially if the whole stomach is used for esophageal substitution. In a frequently cited prospective randomized controlled study, Wang *et al.*<sup>[5,7]</sup> reported a higher incidence (13%) of GOO and pulmonary complications in patients who did not undergo a pyloroplasty after Ivor-Lewis esophagectomy Urshel *et al.* meta-analyzed clarified that pyloric drainage during esophagectomy and gastric reconstruction might reduce the occurrence of early post-operative GOO. This meta-analysis also revealed that the presence or absence of pyloric drainage has little impact on most relevant outcomes among patients. However, the validity of this meta-analysis was restricted due to the small number of patients, different conduit sizes, routes of reconstruction, and study endpoints of the compared controlled randomized trial.<sup>[8]</sup> Lantoni *et al.* showed that pyloromyotomy did not reduce the incidence of delayed gastric emptying.<sup>[3]</sup> In another study, pyloroplasty and pyloromyotomy could be effective and stage drainage procedures, but they might increase biliary reflux esophagus.<sup>[9]</sup> Palmer *et al.* study indicated that not only pyloric drainage does not improve gastric emptying but it may also favor to bile reflux and esophagitis. Mucosal damage from acid and bile exposure in the esophageal remnant affects nearly 50% of these patients.<sup>[10,11]</sup> In Yajima's study, pyloroplasty was the only important risk factor according to univariate and multivariate analysis (R.R 2.52, 95% confidence interval 1.29–4.96,  $P = 0.007$ ). Pyloroplasty can lead to bile reflux to the cervical remnant through the gastric tube in the long term and thereby lead to reflux esophagitis in the cervical remnant.<sup>[12]</sup> Zieren *et al.* showed no need for pyloric drainage in a randomized study comparing pyloroplasty to intact pylorus with a cervical anastomosis.<sup>[13]</sup> Bemelman *et al.* reveals, delayed post-operative emptying after esophageal resection is dependent on the gastric substitute. Their study has theoretically been attributed to the more vertical position and superior gravity drainage of tubular size gastric remnant. Tabularized conduits are less distensible and achieve greater intestinal conduit pressure over a shorter period of time compared to the whole stomach which is larger and more distensible.<sup>[4,13]</sup> Since intraconduit pressure rises in proportion to intraconduit volume, filling of the tabularized conduit overcomes pyloric sphincter-intraduodenal pressure more readily.<sup>[4,15]</sup> Most of the studies<sup>[3,4,9-15]</sup> above are in favor of against pyloroplasty, as it did not prevent delayed gastric emptying and also lead to biliary gastritis and esophagitis due to duodenal gastric

reflux. Our study is a retrospective comparative study, and it also goes in coherence with above studies. From our study, it clearly shows that the patient undergoing esophagectomy by means of THE or VATS with narrow gastric tube should better avoid pyloroplasty as it is detrimental to the patient.

## CONCLUSION

In this retrospective study, we recommend in patients with the normal pyloroduodenal opening and using tabularized stomach after THE or VATS, it is better to avoid pyloroplasty as it is detrimental to the patient in the form of bile reflux gastritis.

## Limitations of the Present Study

1. This is a retrospective comparative study,
2. The study needs to be performed in large number of patients, "n" number is low here.
3. Tubularized stomach conduit was compared in our study. Thus, we could not compare the ultimate results with whole stomach conduit.

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