



Modification of the Postlethwait Method in Improvement of Esophageal Bypass: An Essential Treating Method

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Authors' contributions

This work was carried out in collaboration among all the authors. All authors read and approved the final manuscript.

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ABSTRACT

The quality of life for patients with inoperative esophageal cancer is poor due to dysphagia caused by stenosis or development of a tracheoesophageal fistula. One option for these patients is bypass surgery. These patients are often medical compromised and have a poor prognosis. Consequently, any palliative surgical intervention should be definitive and minimally invasive. We have improved upon esophageal bypass surgery as originally described by Postlethwait by using a radial stapler to form the gastric tube.

Keywords: Esophageal bypass surgery; Postlethwait method; surgical stapler.

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1. INTRODUCTION

In patients with advanced esophageal cancer, severe dysphagia and recurrent pneumonia secondary to tracheoesophageal fistula are common complications. Placement of esophageal stents and bypass surgery can be performed on these patients as palliative treatment measures. Due to its minimally invasive nature and quick alleviation of symptoms, stent treatment is the preferred option at many hospitals [1,2]. However, complications from stent placement such as perforation or creation of a fistula are common, particularly when performed following esophageal radiation therapy. On the other hand, bypass surgery can be performed with minimal complications by experienced surgeons. Isoperistaltic gastric tube creation for esophageal bypass was first described by Postlethwait in 1979 [3]. The technique involves opening a small hole in the antrum and detaching this towards the cardia side of the stomach. In 2002, a method of hollowing out a circular portion of the stomach using a stapler was first described (Fig 1a). This method was a revolutionary development as it prevents gastric contamination and does not require sutures. We have performed bypass surgery for 40 patients with advanced esophageal cancer using this technique.

2. TECHNIQUE

The greater omentum is separated in the usual way for esophageal reconstruction using a gastric tube, preserving the right gastroepiploic artery and vein. The left gastroepiploic artery and vein are divided at their origin. The short gastric vessels are divided as close to the spleen as possible. A sealing device is used for this to easily and quickly divide the vessels to the left of the esophagogastric junction, allowing for creation of an adequate length of the stomach. This is not necessary along the lesser curvature side. A gauze is placed on the back of the spleen in order to avoid vascular damage. Mobilization of the stomach begins at the cardia as follows:

- A 3 to 5 cm gastric tube along the greater curvature is developed.
- The distal tube is created 3 cm from the pylorus.

The GIA™ Radial Reload (Covidien Japan, Tokyo) stapling system is used to place 3 rows of staples, 60 mm in length-for the first stapler load (Fig. 2a). Regarding the stapler insertion

direction, two methods are used depending on the particular shape of the stomach. Careful attention is paid so that the tip of the gastric tube does not become too thin. The gastric tube is then easily mobilized out of the abdominal cavity (Fig. 2b). Sutures are placed using a linear type suturing device to complete creation of the gastric tube. (Fig. 2c,d).

The sections of the gastric tube with overlapping staple lines are reinforced with sutures. An approximately 5 cm left cervical incision is then made and the cervical esophagus is transected. We use the Radial Reload to secure even a long esophagus. With this stapler, longer esophagus can be dissected in the direction perpendicular to the long axis of the esophagus. If a Radial Reload is used for this dissection, it is easy to achieve esophageal separation at the level of the sternum horizontally. Subcutaneous tunneling of the gastric tube is used in our hospital. After tunneling from the abdomen to the neck in the subcutaneous tract, the gastric tube is brought cephalad. Finally, an end-to-side anastomosis between the cervical esophagus and the gastric tube is made using a circular stapler (Proximate Intraluminal Stapler CDH25; Ethicon Japan, Tokyo) (Fig 2e).

3. RESULTS

We performed this method on 5 patients and were able to reduce the number of staplers used as compared to the Postlethwait method. There were no operative complications. All patients could take oral intake after operation, and 4 out of 5 patients could receive post-operative therapy (Table 1).

4. DISCUSSION

Bypass surgery for advanced esophageal cancer is a palliative operation. Since these patients are so medically compromised it is preferable that the operation be as minimally invasive as possible [4]. Formation and anastomosis of the gastric tube is the critical part of the procedure. A sufficiently long gastric tube with adequate blood flow is the goal for an optimal outcome, similar to a curative operation for earlier stages of esophageal cancer. Since Postlethwait first reported this method of bypass surgery in 1979, many subsequent cases have been reported [3,5]. We have performed this operation in 40 patients with advanced esophageal cancer and have experienced several cases in which long-term survival was achieved after postoperative radiation and chemotherapy.

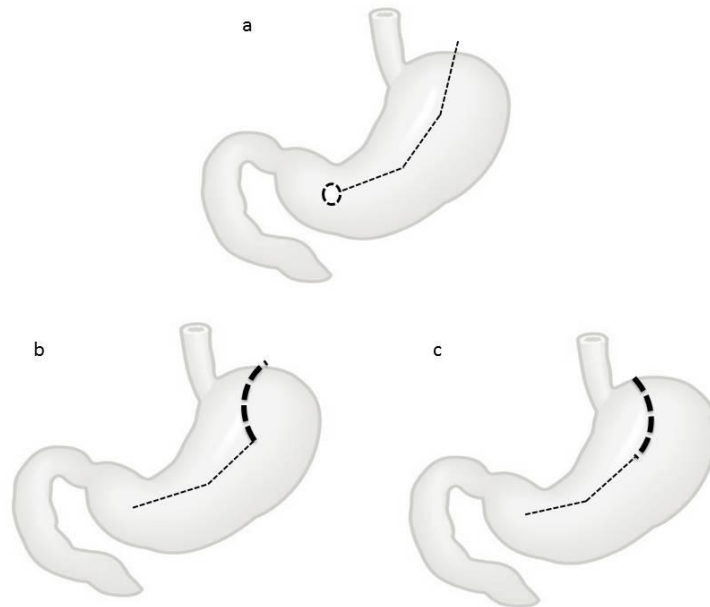


Fig. 1a. Postlethwait method; After opening a small hole in the antrum with circular stapler 3 to 4 linear staplers were used towards the cardia side of the stomach. **Fig. 1b.** Type A; The Radial Reload was used for the first stapler load. **Fig. 1c.** Type B; the direction of Radial Reload can be changed from Type A

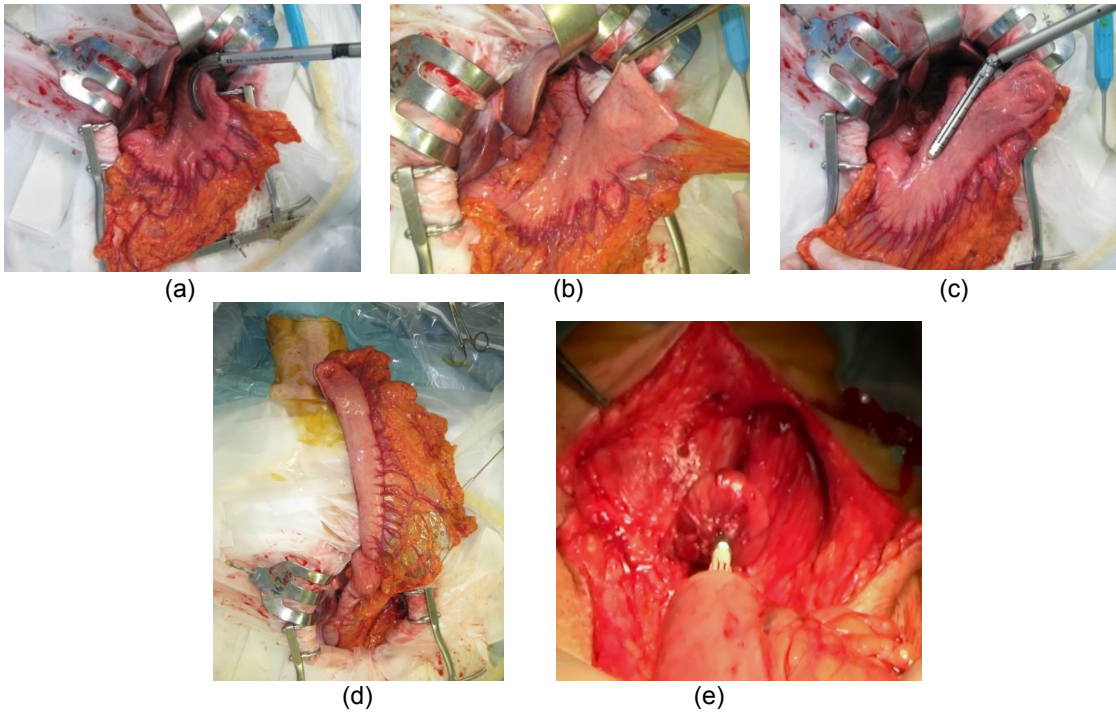


Fig. 2a. The GIA™ Radial Reload is used for the first stapler. **Fig. 2b.** After the first stapler is placed. **Fig. 2c.** Attaching the second linear stapler. **Fig. 2d.** The completed gastric tube. **Fig. 2e.** End-to-side anastomosis between the cervical esophagus and the gastric tube

Table 1. Immediate post-operative course

Case	Age	Sex	Start of oral intake after operation (Days)	Number of days in hospital after operation (Days)	Post-operative complications	Post-operative therapy
1	52	Male	8	39	-	CRT
2	70	Male	8	28	-	C
3	64	Male	7	16	-	CRT
4	78	Male	7	18	-	-
5	68	Male	7	20	-	CRT

CRT: Chemo-radiation therapy C: Chemo therapy

In 2002, an improvement to the method of Postlethwait was first reported in Japan [6]. The method involves initiating the creation of the gastric tube using a circular stapler as opposed to sutures, thus avoiding contamination and the infections that result because of this. However, the hole created by the staple is 21 mm, which is problematic, as is the potentially compromised blood flow at the staple line intersections. Another problem is the increased cost of staplers as opposed to conventional suturing.

These concerns were alleviated by the radial type suture separation device that appeared on the market in 2013 [7]. While it was developed for separation of the rectum in the pelvis in colorectal cases, it can also be used for separation of the gastric tube from the cardia. The key feature of this suture machine is that the stapler is at a right angle to the direction of the shaft of the instrument. Linear staplers can achieve at most 45 degrees of reticulation. If the left costal arch is elevated slightly, insertion of the stapler is easy using the radial stapling device. Because the intramural blood flow of the gastric tube is important as is the width of the apical portion of the gastric tube, it detaches in the direction of type A (Fig 1b). If the separation direction with the 2nd stapler needs to be different, it will detach in the direction of type B (Fig 1c). Regardless of the direction in which the stapler is oriented, the insertion point of the second stapler will easily be brought out of the abdominal cavity. This novel method is effective in creating ideal gastric tubes as it is possible to avoid the circular stapler currently used.

5. CONCLUSION

In this study, we have improved upon the esophageal bypass surgery as originally described by Postlethwait. This novel

method is effective in creating ideal gastric tubes as it avoids the circular stapler currently used.

CONSENT

The authors declared that informed consent was obtained from the participants of the study for publication of this paper.

ETHICAL APPROVAL

Authors confirmed that all necessary ethical approval from institutions were obtained.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Cantero R, Torres AJ, Hernando F, others. Palliative treatment of esophageal cancer: Self-expanding metal stents versus Postlethwait technique. *Hepato-Gastroenterol.* 1999;46:971-6.
2. Aoki T, Osaka Y, Takagi Y, others. Comparative study of self-expandable metallic stent and bypass surgery for inoperable esophageal cancer. *Dis Esophagus.* 2001;14:208-11.
3. Postlethwait RW. Technique for isoperistaltic gastric tube for esophageal bypass. *Ann Surg.* 1979; 189:673-6.
4. Hanagiri T, Morita M, Shigematsu Y, others. Esophageal bypass using a gastric tube for a malignant tracheoesophageal/ bronchoesophageal fistula: A report of 4 cases. *Int Surg.* 2011;96:189-93.
5. Mannell A, Becker PJ, Nissenbaum M. Bypass surgery for unresectable

- oesophageal cancer: Early and late results in 124 cases. Br J Surg. 1988;75:283-6.
6. Takiyama W. Esophageal bypass surgery formed using circular stapler and linear stapler. Shyujyutsu (Operation) 2002;56: 147-52.
 7. Rivadeneira DE, Verdeja JC, Sonoda T. Improvement access and visibility during stapling of the ultra-low rectum: A comparative human cadaver study between two curved staplers. Ann Surg Innov Res. 2012;13:1164-6.

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