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Surgical Technique of Total Gastrectomy with Roux-en-Y Esophagojejunostomy

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ABSTRACT

Gastrectomy and Roux-en-Y esophagojejunostomy have long represented a cornerstone in the surgical management of advanced gastric diseases, particularly gastric cancer and benign conditions requiring total gastrectomy. This technique provides a reliable method for restoring gastrointestinal continuity after total or proximal gastrectomy. The Roux-en-Y configuration minimizes bile reflux, reduces postoperative gastritis, and improves nutritional outcomes compared with earlier reconstruction techniques. Despite the emergence of minimally invasive approaches, Roux-en-Y reconstruction remains an essential option in complex or extensive disease, allowing direct visualization, precise anastomosis, and effective lymphadenectomy. Its enduring role in surgical practice reflects both its technical reliability and its favorable long-term functional results. In this study we aimed to introduce gastrectomy and Roux-en-Y esophagojejunostomy as a video instruction.

Keywords: Surgery; Total Gastrectomy; Roux en y anastomosis; Cancer

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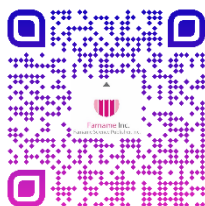
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**Highlights:**

This video article presents the step-by-step technique of open total gastrectomy with *Roux-en-Y esophagojejunostomy*, highlighting essential operative principles, reconstructive strategy, and technical considerations. The accompanying review summarizes current evidence supporting its safety, functional outcomes, and role as the preferred reconstructive approach.

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Total gastrectomy has long been a cornerstone in the surgical management of advanced gastric malignancies. The first descriptions of gastric resection date back to the late 19th century, with early attempts made by Jules-Émile Péan and Theodor Billroth. Over the years, refinements in technique, anesthesia, and perioperative care have made total gastrectomy a safe and standardized operation.

Reconstruction of the alimentary tract after complete stomach removal is critical for restoring gastrointestinal continuity. Among several reconstruction techniques, Roux-en-Y esophagojejunostomy has become the most widely accepted approach (1). It minimizes biliary and pancreatic reflux into the esophagus, reduces the risk of reflux esophagitis, and offers a more physiologic transit of food (1, 2). To enhance the safety of the anastomosis and ensure adequate postoperative nutrition, placement of a feeding jejunostomy is often recommended, especially in oncologic patients or those at high risk of leakage (3).

In this study we aimed to introduce gastrectomy and Roux-en-Y esophagojejunostomy as a video instruction.

2. Protocol

Operative Description- Patient Positioning and Preparation

The patient is placed in a supine position, usually with the legs apart (French position). A midline laparotomy is performed, and the abdominal cavity is explored to rule out peritoneal or hepatic metastases. A self-retaining retractor is applied to expose the upper abdomen.

Step 1- Mobilization of the stomach and lower esophagus

The greater omentum is divided beginning from the transverse colon toward the spleen, entering the lesser sac. The short gastric vessels are ligated and divided. The left gastric artery is identified at its origin and divided after lymphadenectomy of station 7 and 9 nodes. Dissection continues along the lesser curvature to the right crus of the diaphragm, mobilizing the distal esophagus.

Step 2- Duodenal Division

The duodenum is kocherized and transected about 2 cm distal to the pylorus using a linear stapler. The duodenal stump is oversewn for security.

Step 3- Completion of the total gastrectomy and lymph node dissection

The stomach is removed en bloc along with the associated omenta and regional lymph nodes (D2 dissection when indicated). The esophagus is divided above the gastroesophageal junction with adequate proximal margin. To prevent mucosal eversion of the esophageal edge, which may lead to mucosal folding within the esophagojejunal anastomosis and result in anastomotic failure, four stay sutures are placed at the quadrants of the transected esophageal stump using 2-0 silk, taking full-thickness bites.

Step 4- Preparation of the Roux limb

A jejunal loop is identified approximately 25 to 30 cm distal to the ligament of Treitz. The jejunum is divided with a linear stapler, and the distal limb (Roux limb) is measured to about 40 cm in length to prevent bile reflux. The mesenteric defect is closed to avoid internal herniation.

Step 5- Esophagojejunostomy

An end-to-side esophagojejunostomy is fashioned between the esophageal stump and the Roux limb. Depending on surgeon preference, this can be performed using a circular stapler or hand-sewn technique. The anastomosis is checked for tension and perfusion, ensuring a well-vascularized and tension-free join.

Step 6- Jejunojunctionostomy (Roux-en-Y reconstruction)

The biliopancreatic limb is anastomosed side-to-side to the Roux limb approximately 40 cm distal to the esophagojejunostomy, restoring continuity of the small bowel (Figure 1.A).

Step 7- Feeding jejunostomy

A separate feeding jejunostomy tube is inserted into the jejunum about 20–30 cm distal to the jejunojunctionostomy. This allows early enteral nutrition and decompression, especially in patients at risk of delayed gastric emptying or anastomotic leak (Figure 1.B).

Step 8- Final inspection and closure

All anastomoses are inspected for hemostasis and leakage. The operative field is irrigated, and drains

may be placed near the esophagojejunostomy. The abdominal wall is closed in layers.

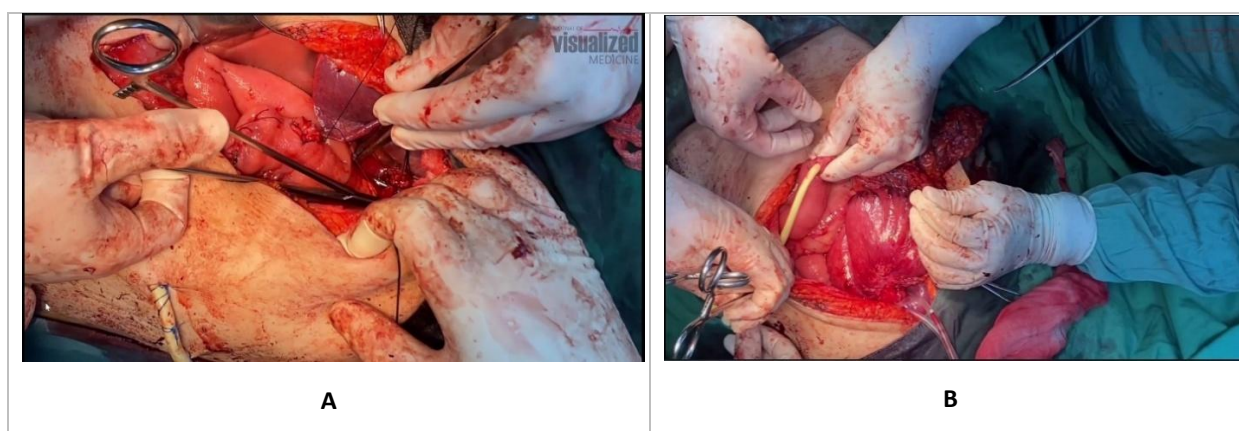


Figure 1. A: jejunojunal anastomosis . B: feeding jejunostomy placement (Prepared by Authors, 2025).

3. Results and Discussion

Reconstruction after total gastrectomy remains a critical determinant of postoperative function and long-term quality of life. Among the available techniques, Roux-en-Y (RY) esophagojejunostomy has consistently demonstrated advantages related to its physiological benefits, technical reproducibility, and favorable clinical outcomes. When compared with more complex reconstruction methods, such as jejunal interposition, jejunal pouch formation, or double-tract reconstruction, the RY configuration provides a reliable balance between operative simplicity and functional effectiveness (4-6).

One of the most consistently reported advantages of RY reconstruction is its superior control of alkaline reflux. Without a gastric reservoir, the risk of direct exposure of the esophageal mucosa to bile and pancreatic secretions becomes a major concern. The jejunal limb in RY reconstruction creates an effective barrier that reduces reflux esophagitis and associated symptoms, a benefit confirmed across several prospective and retrospective studies (5, 7, 8). This contrasts with alternative reconstructions—particularly those preserving duodenal continuity—which may permit significant reflux despite technically successful anastomoses.

Another strength of the RY method lies in its technical standardization. More than fifty reconstructive variations have been described after total gastrectomy, yet randomized studies have repeatedly demonstrated that RY esophagojejunostomy remains one of the most straightforward and reproducible options (9). Even when compared with jejunal pouch reconstructions,

which theoretically provide improved reservoir function, RY often yields comparable nutritional outcomes and similar long-term quality-of-life metrics while avoiding additional operative time and complication risk (8, 9).

Recent literature also highlights potential metabolic advantages of total gastrectomy with RY reconstruction. Meta-analytic evidence suggests higher rates of type 2 diabetes mellitus remission after total gastrectomy when reconstruction is performed using an RY technique, compared with other configurations that maintain duodenal transit (10). These findings parallel physiological mechanisms observed in bariatric procedures, emphasizing the hormonal and metabolic impact of altered intestinal flow.

Technical refinements to the classical RY anatomy have further strengthened its role as a preferred reconstruction. Modified laparoscopic approaches and optimized limb lengths have been shown to reduce operative time, blood loss, postoperative complications, and reflux symptoms (11). Additionally, patient-reported outcomes indicate that antecolic limb positioning and moderate Roux limb lengths may decrease the severity of postgastrectomy syndrome, with favorable impacts on daily function and symptom burden (12).

Although jejunal interposition and pouch reconstructions may provide selected benefits—such as improved food capacity or reduced early satiety—they often require greater technical expertise and carry risks of multiple anastomoses. Comparative studies show that while these alternatives may improve some short-term functional parameters, they

do not consistently outperform RY in long-term outcomes, and in some cases may increase postoperative morbidity (2, 8). Moreover, RY reconstruction has a well-recognized safety profile, with acceptable rates of anastomotic leakage and mortality across large series and systematic reviews (2, 8).

Nevertheless, the classical RY approach is not without potential drawbacks. Roux stasis syndrome—characterized by delayed transit and postprandial discomfort—remains a recognized complication, affecting up to 10–30% of patients in some cohorts (11). For this reason, ongoing efforts to optimize limb length, preserve neural supply, and refine technical steps remain essential.

In Conclusion, evidence from randomized trials, systematic reviews, and contemporary surgical series supports Roux-en-Y esophagojejunostomy as a robust and effective reconstructive method following total gastrectomy. Its anti-reflux properties, technical simplicity, compatibility with minimally invasive approaches, metabolic advantages, and demonstrated safety profile collectively position RY as a preferred reconstruction in most clinical scenarios. Future research should aim to refine patient selection and further individualize reconstructive choices, but current data strongly affirm the central role of RY reconstruction in modern gastric surgery.

4. Declarations

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Hospital for facilitating the clinical setting and resources required for the performance and recording of the procedure.

Patient Consent Statement

Written informed consent was obtained from the patient for surgical video recording and publication of the associated educational materials, including both the video and manuscript formats.

Patient Privacy Statement

No identifiable patient information, images, or personal data are disclosed in this manuscript or the accompanying video publication.

Ethical Considerations

Ethical approval was not required because this work presents an educational demonstration of a routine surgical procedure and does not involve human-subject research, experimental intervention, or the collection of identifiable patient data.

Conflict of Interest

The authors declare that they have no competing interests.

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