

Physiologic Type Reconstruction in Complicated Corrosive Strictures of Upper Gastrointestinal Segment

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Abstract

Objectives: The main steps for physiologic type reconstruction in 50 complicated corrosive strictures of upper alimentary tract are presented. **Methods:** In successive developed gastric outlet and esophageal strictures a limited Billroth I resection (in 9) or conversion a prior precolic GEA in such anastomosis (in 5) and middle or total gastrectomies (in 3) were performed. A second stage substernal by-pass with isoperistaltic transverse colon segment was done 6 - 12 weeks later. In all but one instances the graft was implanted high in the gastric stump. In extensive burned and retracted such lesion (in 3) a similar by-pass was carried out but the lower anastomosis was done with the not involved prepyloric segment. In concomitant antropyloric and esophageal strictures in 11 young, good risk patients, a limited Billroth I resection and simultaneous colonic by-pass was used. In case of accompanied respiratory fistula (in 4) exclusion by-pass was useful for both lesions. The associated pyloric stricture (in 3) was solved at the same time. Side-to-end pharyngocolostomy was used in 4 high thoracocervical strictures. In 8 previously perforated strictures the by-pass was performed 2 months later. **Results:** The overall mortality was 4%. The postoperative morbidity was low (8%). All cervical leaks closed spontaneously. Particular late complications required revisional surgery in 12, 5% of cases. **Conclusion:** In complicated corrosive strictures (esophageal, gastric, fistulas) limited Billroth I resection, isoperistaltic colon by-pass with high gastrocolic anastomosis, good gastric drainage and maintenance of the duodenum in gastrointestinal continuity are the main factors to achieve the best functional results.

Keywords

Complicated Corrosive Strictures, Gastric, Esophageal, Fistulas, Limited Billroth I Resection,

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#Unfortunately, this author was deceased.

Isoperistaltic Colonic By-Pass, Anastomosis with the Gastric stump

1. Introduction

Early and late consequences of corrosive injury may involve several segments of upper gastrointestinal tract. Although a lot of publication have been dedicated to main aspects of colonic esophageal replacemet (more than 300 up to the early 1970s) only few studies [1]-[4] are available on the surgical strategy in such multiple strictures. In the vast majority of previous [5] [6] and ulteriorly published coloesophageal series [7]-[10] the presence of associated strictures or respiratory fistula [10] are often mentioned without their therapeutic implications.

This study was undertaken to review our definitive surgical strategy in such instances.

2. Patients and Method

Among the 177 colonic substitution performed (1962-2001) for corrosive injuries (mainly by lye), 50 operation were done for complicated one, at the Surgical Department of Hospital Oradea, Romania and Thoracic Surgical Clinic at Budapest, Hungary. The type of lesions is summarised on the **Table 1**. The female/male ratio ammounted to 4:1, majority of patients were young (average 22.5 years). We were faced with pathologically and clinically 6 different patterns:

1) After chemical trauma, gastric emptying disturbance was the most common complication, which required to be managed whithin 2 month. Nine of such 17 patients underwent limited Billroth I resection with or without gastrostomy, but never earlier then 6 weeks after injury (**Figure 1**). In 3 others middle (with gastric reanastomosis) proximal or total gastrectomy were performed. The remaining 5 cases were transferred with GEA or Billroth II resection and established esophageal stricture. In these unfavorable condition for esophageal reconstruction, the first step was conversion of previous gastric operation into Billroth I one (**Figure 2**). In all 17 cases, except one, for associated and intractable esophageal sticture (**Figure 3**) a substernal by-pass with isoperistaltic transverse colon segment was done, implanted high in the gastric stump.

2) In 3 others having extensive burned and retracted gastroesophageal lesion, one-stage colonic by-pass was done in similar fashion but distally connected with the not involved prepyloric segment.

3) Combined esophageal and antro-pyloric strictures occured concomitantly in 11 young patients, on-stage limited Billroth I resection and simultaneous colonic by-pass were carried out (**Figure 4**).

4) For strictures extending to hypopharynx (4 patients), side-to-end pharyngo-colostomy was done (**Figure 5**).

5) In 7 patients onset of dysphagia was accompanied with esophagobronchial fistula symptoms, among them 3 had pyloric stricture, too. One-stage esophageal exclusion with colonic bay-pass was performed, and antrectomy for the ulteriorly mentioned cases. Only in a large respiratory fistula was necessary a second stage right sided transthoracic esophagectomy.

6) In 8 patients after unsuccessful attemps of bouginage and iatrogenic perforation, colonic by-pass was carried

Table 1. Complicated upper gastrointestinal corrosive strictures.

1962-2001 n = 50	
type of gastric outlet stricture + esophageal stricture	no. of patients
successive + ,, ,,	17
concomittant + ,, ,,	11
retracted gastric + ,, ,,	3
high cervical	4
respiratory fistula	4
accompanied + ,, ,,	3
after perforation	8

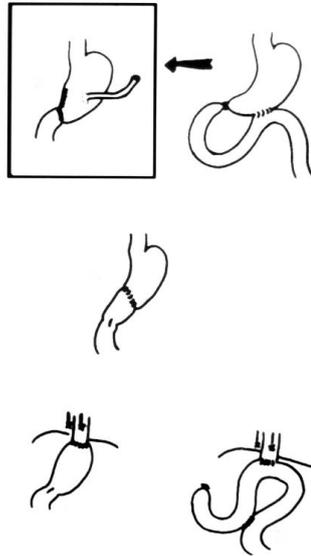


Figure 1. Types of management in corrosive gastric lesions.

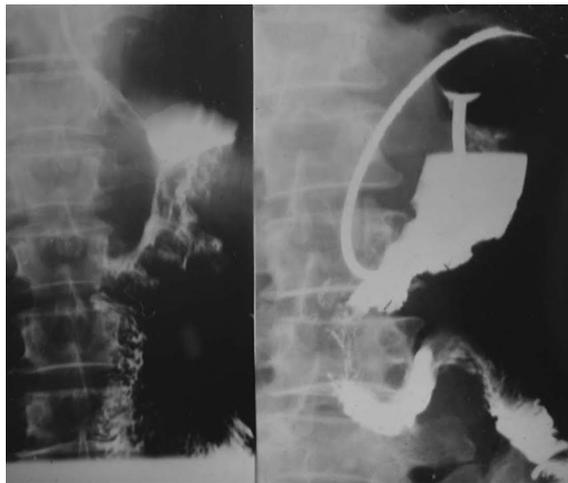


Figure 2. Aspect of antecolic GEA converted in Billroth I anastomosis.



Figure 3. Aspect of substernal colonic by-pass done for the filiform esophageal stricture.



Figure 4. Aspect of Billroth I stump connected with a colonic graft.



Figure 5. Aspect of substernal transverse colon segment with pharyngocolostomy.

out after recovery, 2 - 3 month later.

3. Main Technical Details

In all instances a long, well-tailored segment from the transverse colon with its flexures was pedicled isoperistaltically (except 3) on the left colic artery and passed behind the stomach or gastric stump and pulled to the neck through a wide substernal tunnel. Depending on the proximal level of the stricture and the quality of esophageal wall, 4 different type of proximal anastomosis have been used:

- side-to-end esophagocolostomy in case of high and severe intrathoracic strictures,
- end-to-end or side-to-end anastomosis with endoluminal occluding sutures if intact segment was above the stricture or in case of narrowed cervical esophagus,
- side-to-end pharyngocolostomy for high cervical strictures.

One-layer, interrupted suture technique was used for all type of anastomosis. Colo-colostomy was accomplished by transection of the Treitz ligament, followed by peritonisation with 2 large omental flaps. Naso-cologastric tube was used for intestinal decompression. Never was removed the damaged esophagus, except a long standing (45 years) and a fistulised esophagus.

4. Results

The overall mortality of the 50 patients was 4%. One patient for gastrocolostomy leak and other due to cardiac failure were lost. Postoperative morbidity was low (8%). Early complications (pneumothorax 1, cervical leak 3) were managed conservatively. Late complications (12.5%) required revisional surgery [11]. All patients were relieved from dysphagia and epigastric discomfort. In a normal time they have resumed a diet without restriction, expect spicy food. The transit time after swallowing the mixed barium-bread bolus was longer than that of normal subjects. The shortest transport time was noted in patients with accompanied Billroth I resection. In isoperistaltic by-pass group, gastrocolic reflux could not be produced either by the Trendelenburg position or by abdominal compression. No gastrocolic reflux have been observed except 3, having an anisoperistaltically fashioned graft. All young people from the isoperistaltic group had unimpaired growth and weight gain, among them, 3 women had complication-free pregnancies.

5. Discussion

There is a definitive correlation between the degree of corrosive burn and the incidence of the upper alimentary tract stricture formation. On the other hand patients with extensive gastric burn had also in 15% - 20% cases, esophageal stricture. Only carefully evaluated and timely indicated procedures may be useful in surgical strategy (Table 2).

In case of combined gastroesophageal stricture, it seems clear that the delayed assessment of pyloric obstruction is usually possible in order to avoid a subsequent anastomotic stenosis. Care must be taken to avoid procedures which may affect integrity of the mesocolon with undesirable effect on an esophageal substitution. Well,

Table 2. Surgical strategy in complicated corrosive strictures.

type of corrosive lesion	method	no. of patients
*retracted gastric + esophageal	substernal colonic by-pass with transverse colon	3
*successive gastric + esophageal	1. limited gastric resection 2. by-pass with colon	17
*concomitant antropyloric and esophageal	one stage limited Billroth I resection with colonic by-pass	11
*hypopharygoesophageal	pharyngocologastrostomy	4
*with respiratory fistula	colonic by-pass	4
* + pyloric stricture	antropylorctomy + by-pass	3

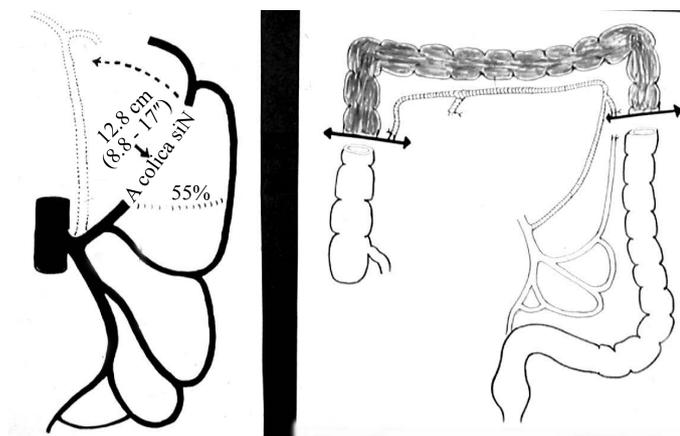


Figure 6. Illustration of the long isoperistaltic graft used in this series.

in 5 instances we were obliged to convert a previous GEA or Billroth II anastomosis into Billroth I type one. In the light of this possibility either pyloroplasty [12] or Billroth II reconstruction even antrectomy with Roux-en-Y gastrojejunostomy are unfavorable procedures. So the more appropriate repair is a limited Billroth I resection.

There is a controversy over whether anterior [10] or posterior [7] [9] gastrocolostomy is favorable against the gastrocolic reflux. We prefer a high anterior anastomosis as well as a not wide anastomosis (less exposed to law of communicating dishes).

To prevent the undesirable hormonal side effects of the gastric and especially duodenal exclusion, connection of the colonic graft with gastric stump is more physiologic than colojejunostomy with efferent loop [5] [6] [9].

A simple colonic by-pass with prepyloric connection for a retracted gastroesophageal lesion is more physiologic than colojejunostomy and is a less magnitude procedure than resection. We never used augmentation gastroduodenoplasty [13] [14].

The good risk patients having a concomitant esophago-anopyloric obstruction, may considered as a special group for gastric resection and simultaneous esophageal by-pass.

There were following reasons to use different type cervical anastomosis. First is to create the best healing condition of anastomosis, second is to obtain always a sufficient anastomotic size, and third is to avoid mucocele or pseudodiverticular degeneration of the not involved esophageal segment.

A proximally sufficient large substernal tunnel (with partial division of sternocleidomastoid muscle) prove to achieve a compression free tunnel. Partial resection of the thoracic outlet [9] [12] may have complications.

Opinion about whether resection or by-pass is justified in such benign lesion is not uniform. The hazard of one-stage esophageal resection (transhiatal or standard, too) and replacement, especially in the presence of esophagobrochial fistula is higher than of possibility of malignant transformation. Like the majority of the authors, we prefer a lower risk procedure: a simple substernal by-pass with colon. Like Dubost, we never seen malignant scar degeneration of excluded corrosive lesion in the follow-up of the 177 patients managed by this manner. On the other hand, the danger of malignancy in long-standing such lesion [15]-[17] demands resection but as a second-step procedure.

For total by-pass the graft of choice is a transverse colon segment, pedicled on the left colic artery (Figure 6) which is a more constant artery than the middle colic one [13] [14]. Its mobilized long trunk permits a high gastric anastomosis, while the multihaustral propulsive contractions of this smaller size, active isoperistaltic colonic segment, proved to be a basic factor to prevent gastrocolic reflux [11] [18] [19]. It is well none, that reflux is common after an isoperistaltically fashioned graft [2]. We never observed mediastinal compression symptoms, and also incidence of the cervical leaks is fewer [4] [10] than after ileocolic grafting [10]. The smaller diameter of the paraileal vascular arch than that of paracolic one and the disfunction of the Bauchin valve may be an explanation [20].

This experience attest that in such complex corrosive lesions, a limited Billroth I resection, maintenance of the gastric sump and duodenum in the gastrointestinal continuity, a substernal and isoperistaltic straight fashioned left colonic by-pass connected with the gastric stump and good gastric emptying condition are basic factors to

achive the best functional results.

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