Abstract The main considerations in replacing the esophagus are to avoid postoperative necrosis of all or part of the graft, leakage or stenosis of the anastomoses, and complications related to acid-peptic or alkaline reflux. A 5-year-old boy, after two unsuccessful thoracic operations for atresia and then stenosis of the esophagus, underwent resection of the esophagus because of duodeno-gastroesophageal reflux. The continuity of the alimentary tract was restored by gastrojejunal interposition. We recommend this method of reconstruction when the esophagogastrostoma is created in the chest, and the possibility of alkaline reflux must be considered.

Key words Esophageal stricture · Alkaline reflux · Esophageal replacement · Gastrojejunal interposition

Introduction

For many years methods for the replacement of all or part of the esophagus have been pursued, but no completely satisfactory substitute has yet been developed. All authors agree that the esophagus itself is the best organ for joining the pharynx and stomach. In adults, the procedure of first choice for esophageal replacement is gastric interposition [1]. However, in the pediatric age group gastric transposition has not been used until relatively recently [10]. Using the stomach as an esophageal substitute has effects on gastric secretion, motility, emptying, and gastroesophageal (GER) and duodenogastric reflux [4, 6]. Knowledge of these changes induced us to perform a gastrojejunal interposition in a boy aged 5 years undergoing resection of an esophageal stricture. We have not found a similar report in the literature.

Case report

A male infant born with 8/10 Apgar scores weighed 2,200 g and had hydramnios. Cranosynostosis was suspected. Because of Vogt 3/B-type esophageal atresia and stenosis of the trachea, an end-to-end esophageal anastomosis and fistula ligation were done and a tracheostoma was created at 1 day of age. Because of postoperative esophageal stenosis, dilatations were done and a gastrostoma was created.

At the age of 2 years resection of a ringlike esophageal stricture and end-to-end anastomosis were performed. In the postoperative period suture failure with contrast-medium leakage developed and was managed by conservative treatment. In spite of repeated dilatations, dysphagia recurred 2 months after the second operation.

When dilating the esophagus marked reflux esophagitis and regurgitation of bile were invariably noted. Recurrent pneumonias occurred, and tracheal cultures were persistently positive for Candida, Enterobacter, Klebsiella, and Pseudomonas. The patient was referred again to surgery in an anergic, severely deteriorated condition. A contrast swallow showed a stricture of the middle third of the esophagus, brachyesophagus, secondary hiatus hernia, and severe duodenogastroesophageal reflux (DGER) (Fig. 1).

Following brief preparation, subtotal resection of the esophagus and gastric substitution was performed in one sitting. The stomach was pulled up into the posterior mediastinum. The esophago-gastrostoma was created over the azygos vein in the thoracic dome, a cervical anastomosis being unfeasible because of the tracheostoma, fungal sepsis, and peritracheostomal skin lesions. To prevent DGER and at the same time maintain the duodenal passage, a 25-cm-long, isoperistaltic jejunal segment was interposed between the antrum and duodenum (Fig. 2). This is the most difficult part of the operation, because the right gastroepiploic and gastric arteries must remain intact.

The postoperative period was uneventful. A contrast swallow 6 months after the operation showed well-dilated anastomoses and free passage (Fig. 3). The patient had gained 6 kg and could eat a normal diet with neither regurgitation nor vomiting. No dilatation was needed; no residual food was found in the stomach after an overnight fast.

Discussion

Preparation of the stomach as an esophageal substitute is associated with substantial alterations. The blood supply is decreased by 10%–20% due to the ligation of the left
gastric and gastroepiploic arteries [11]; the gastric capacity and parietal-cell mass are reduced because of partial resection of the fundus and corpus; the innervation is changed as a result of complete vagotomy; the form is altered due to stretching; and the organ is relocated to an intrathoracic position. It should be recognized that the vagotomized intrathoracic stomach could also have persistent acid secretion [4, 7].

In comparison to the transit of a meal through the normal esophagus, emptying of the intrathoracic stomach is markedly delayed, but at the same time shows marked acceleration of emptying in comparison to the normal stomach [3].

Regarding the question of pyloroplasty in cases of esophageal substitution with stomach, views are sometimes conflicting. While according to Mannell et al. [6] the vagotomized intrathoracic stomach may need a drainage procedure to facilitate emptying of solids, according to Hölscper et al. it does not need a drainage procedure to promote semisolid emptying [4]. The only randomized, prospective clinical trials concerning this question, reported by Huang et al. [5] and Cheung et al. [2], showed no significant differences in gastric emptying and clinical progress between the groups with and without pyloroplasty.

GER has been reported to be a significant problem after esophagogastric anastomoses [8, 9]. Low thoracic anastomoses are more likely to be followed by reflux and esophagitis than high thoracic or cervical ones. This may result from pressure differentials. If a part of the stomach remains in the higher abdominal pressure zone, reflux is more likely to occur than when the stomach is entirely in the thorax. We agree with Hölscper et al. [4] that the occurrence of pathological reflux after esophagogastric connections is related more to the topography of the stomach than to the technique of anastomosis.

In our case no cervical anastomosis could be done, and it had been confirmed preoperatively that there was severe DGER in the presence of an intact pylorus. Therefore, after removal of the thoracic segment of the esophagus simultaneous interposition of the stomach and jejunum between the esophagus and duodenum was done to restore the continuity of the alimentary tract, accepting the responsibility for the major risk of four anastomoses to achieve the most physiological reconstruction.

We consider gastrojejunal interposition to be a 'viable' variant of the esophageal substitutions using stomach when the esophagogastronomy is done in the thorax or can be done exclusively therein and when alkaline reflux is confirmed preoperatively, since even a denervated pylorus, paradoxically, cannot prevent biliary reflux into the intrathoracic stomach [6].

References