GER in Oesophageal Atresia: Surgical Options

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Gastro-oesophageal reflux (GER) is 1 of the main problems after oesophageal atresia (OA) repair. Early GER-associated complications include anastomosis stricture, bronchopulmonary complications, and dysphagia. Conservative options include proton pump inhibitor, antacid, and prokinetics. In cases of failure, surgical treatment becomes necessary. Fundoplication is necessary in many of these children, probably around 30% of all of the patients. There are many questions concerning this procedure: When is it necessary? What is the best time to perform this procedure (during growth), and what is the best procedure? Which is the best strategy in case of failure?

GER is typical after OA repair, and many teams use medical treatment during the first year of life, expecting amelioration after a patient takes its first steps. Approximately 20% to 35% of patients with OA need fundoplication during their life. Interestingly, some studies have found that the number of children with significant GER associated with OA has increased from 6 months to 1 year after primary repair (1).

There are some risk factors for GER in cases of OA: small birth weight, Waterson risk group (including, again, weight), delayed anastomosis (type I or III with long gap), and probable gastrostomy (performed in cases of long gap). During the first months of life, the indications for fundoplication are mostly apnoea and cyanotic spells. For these cases, correct evaluation is mandatory to exclude major tracheomalacia or arterial compression. Sometimes, appreciation of GER in these episodes is difficult and aortopexy can be performed before, after, or at the same time as fundoplication. The need for multiple balloon dilatation of the anastomosis can be an indirect sign of poor control of GER. The surgical team at Hopital Timone Enfant performs the Nissen procedure after the failure of 3 dilatations. Other rare, although less frequent, indications in newborns are stricture of the lower part of the oesophagus (associated with congenital oesophagus stenosis) and duodenal atresia or pyloric stenosis.

In infants, indication for fundoplication is also a difficult decision. Many symptoms are possible: digestive symptoms (alimentary or foreign body oesophageal obstruction, requirement to drink a great deal during meals), pulmonary symptoms, otorhinolaryngology symptoms, and failure to thrive. Often, the patient and his or her family play down the importance of symptoms. pH-metry, with and without treatment, determines the severity of GER and the efficiency of medical treatment. Two important factors must be discussed: pulmonary status and oesophagus motility. Pulmonary status must be determined during the first year. It is important to determine the number and severity of pulmonary infections, the number of weeks of hospitalisation/antibiotic therapy/physiotherapy, the aspect of lung parenchyma on the computed tomography scan, and the pulmonary function. Recurrent aspiration leads to an antireflux procedure so as to avoid pulmonary destruction. Exclusion of repermeation of the tracheoesophageal fistula by methylene blue test is often necessary. Dysmotility of the oesophagus is well known in cases of OA. Evaluation by simple manometry is insufficient to determine the risk of dysfunction after fundoplication. During the growth of a child with GER, better oesophageal function is noted, but only after OA repair. Regular x-ray contrast determines the diameter and contractions of the oesophagus.

Numerous antireflux procedure types are available, and the most commonly performed type is the Nissen procedure. Nissen is easily performed with good results by laparotomy, or with better results, by laparoscopy (3), even if there is no randomised controlled study showing the superiority of laparoscopy versus laparatomy. This procedure includes cruz closure and 360° wrap confection with or without gastrosplenic vessels section. The advantages of the laparoscopic approach include less risk of adhesions, which is particularly important in Nissen (no vomiting), less scarring, and fewer respiratory postoperative course problems.

The first postoperative complication is repair failure. The rate of OA repair failure in the last 20 years ranges from 20% to 30% (2). Recent studies are less pessimistic, with a risk of failure not correlated with OA but with open surgery at first fundoplication and neurological impairment (4). The second postoperative complication is dysphagia increased by the wrap; fundoplication creates mechanical obstruction for patients with a dyskinetic oesophagus who cannot generate the pressure to open the ''new sphincter.'' This complication requires gastrostomy and at times a repeated procedure. The third postoperative complication is dumping syndrome. The symptoms include refusal to eat, postprandial nausea, vomiting, pallor, lethargy, diaphoresis, and watery diarrhoea. Laboratory tests demonstrate abnormal glucose tolerance test, hypoglycaemia, and abnormal insulin level. The risk of dumping syndrome is probably increased with pyloroplasty, microgastria, and damage to the vagus nerve.

To decrease the risk of dysphagia, some surgical teams perform the Nissen procedure using a floppy wrap: only 3 stitches on the floppy and short wraps, with a section of short gastrosplenic vessels, abdominalisation of the lower oesophagus, cruroplasty, and calibration with a large intraoesophageal bougie. There have been no studies proving that there was less dysphagia or failure.

The Collis-Nissen procedure may be an option for OA repair because it lengthens the oesophagus (5). In fact, Collis gastroplasty creates a gastric tubular segment from the lesser curve of the stomach. Collis gastroplasty is useful for controlling GER in patients with a short oesophagus when conducted concurrently with Nissen fundoplication. For long-term follow-up, the trouble is that the Z-line ascension makes it difficult to evaluate GER and metaplasia. However, Lindahl et al (6) reported that gastric metaplasia in the cervical oesophagus occurs frequently in patients with a gastric tube and is probably caused by the acid secreted by the parietal cells of the tubular stomach.

Partial posterior and anterior wraps (7) are recommended by some surgical teams because the wraps decrease the risk of postoperative dysphagia. Some studies reported similar results in terms of GER control in Thal or Nissen procedures, although this is

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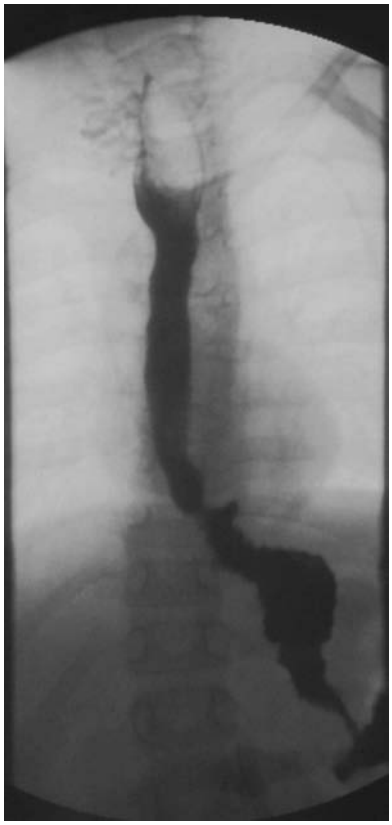

FIGURE 1. Oesophageal deconnection in a case of oesophageal atresia after failure of 3 Nissen or hemi-Nissen procedures. Improvement of pulmonary function.

difficult to establish. A randomised study is probably the only way to conduct objective evaluation.

When the Nissen procedure fails or in some difficult cases of OA (as associated with tracheoesophageal cleft), a total oesogastric disconnection (Bianchi procedure, Fig. 1) can be done (8). Its efficacy is particularly good when pulmonary function is altered by aspiration (in cases of severe persistent GER or swallowing aspiration after dysmotility post-Nissen procedure), and long-term follow-up is mandatory. Difficulties in absorption are not unusual and require accurate, long-term follow-up (9).

Few studies indicate the necessity of long-term follow-up for patients with GER after OA repair. The risk of Barrett oesophagus or oesophageal carcinoma has not been firmly established. When the risks are considered, Collis-Nissen or partial gastroplasty must not be recommended. Further studies are necessary to evaluate the problems.

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