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REVIEW

Management of failure after surgery for gastro-esophageal reflux disease

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Summary Surgical treatment of gastro-esophageal reflux disease (ST-GERD) is well-codified and offers an alternative to long-term medical treatment with a better efficacy for short and long-term outcomes. However, failure of ST-GERD is observed in 2—20% of patients; management is challenging and not standardized. The aim of this study is to analyze the causes of failure and to provide a treatment algorithm. The clinical aspects of ST-GERD failure are variable including persistent reflux, dysphagia or permanent discomfort leading to an important degradation of the quality of life. A morphological and functional pre-therapeutic evaluation is necessary to: (i) determine whether the symptoms are due to recurrence of reflux or to an error in initial indication and (ii) to understand the cause of the failure. The most frequent causes of failure of ST-GERD include errors in the initial indication, which often only need medical treatment, and surgical technical errors, for which surgical redo surgery can be difficult. Multidisciplinary management is necessary in order to offer the best-adapted treatment.

Introduction

Surgical treatment (ST) of gastro-esophageal reflux disease (GERD) (ST-GERD) is well-codified and leads to control of symptoms in at least 80% of patients with satisfactory short and medium term efficacy for 90% of patients [1—4]. A recently retrospective study reported satisfactory results in terms of quality of life and symptom control after more than 30 years in a small series of 24 patients [5].

ST-GERD consists in performing a fundoplication around the abdominal esophagus to reinforce the lower esophageal sphincter (LES) to prevent gastro-esophageal reflux disease (GERD). This fundoplication can be a partial posterior 270° Toupet fundoplication (TF), or a complete circumferential Nissen fundoplication (NF), or a partial anterior 180° Dor fundoplication (DF) [6]. The laparoscopic approach was described for the first time in 1991 [7]; it is currently the standard approach and is associated with a very low morbidity and mortality [8].

In a 2014 meta-analysis, Rickenbacker et al. [2] compared the outcomes of medical vs. surgical treatment for GERD in 11 studies, including seven randomized controlled trials published between 2001 and 2013 with a total of 1972 patients [1,9—17]. This analysis favored fundoplication over medical treatment in terms of quality of life, patient satis-

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faction and control of symptoms of GERD. In the five most recent studies [1,12—17], surgical treatment was performed via the laparoscopic approach and for six of seven of these studies [1,9—12,14—17], the medical treatment was proton pump inhibitors (PPI). More recently, a Cochrane library meta-analysis [18] including 1112 patients originating from four of the controlled trials that were also in the preceding meta-analysis [1,12,15,16] but with more restrictive criteria (only laparoscopy for the surgical arm, limitation of risk of bias) reached the same conclusions. Notwithstanding, the duration of follow-up was heterogeneous in these studies, ranging from one to 12 years, so no clear conclusions can be drawn with regard to long-term outcome. In addition, one other study found that surgical treatment reduced the health care related costs at five years [19], establishing ST-GERD as an unquestionable alternative to medical treatment.

However, in 2—30% of patients undergoing ST-GERD [20—23], disabling symptoms recur or persist. Moreover, management of patients with failure after ST-GERD is complex and poorly standardized. The goal of this update is to provide the reader with the battery of investigations that are necessary for workup and a management algorithm based on an analysis of the literature and our own experience for patients with failed ST-GERD.

Different clinical situation of patients with failure after ST-GERD

From a clinical point of view, there are three types of failure that will guide us through this update (Fig. 1):

- resolution of GERD symptoms followed by recurrence with or without associated dysphagia;
- appearance of secondary effects such as dysphagia or hyper-correction symptoms;
- absence of improvement of symptoms due either to an erroneous indication or a technical error.

Resolution of GERD symptoms followed by recurrence with or without dysphagia

Without dysphagia

GERD usually recurs after an interval of a few weeks to several years without any other clinical manifestation. This situation corresponds most often to patients with a disrupted fundoplication, perhaps favored by a fundoplication made under tension.

With dysphagia

This can be due to intrathoracic migration of the fundoplication (Fig. 2) or a slipped Nissen (Fig. 3) (i.e. herniation of the stomach through the fundoplication that remains in place). Most often, symptoms, dysphagia and/or epigastric pain, appear rapidly if not abruptly, after a certain interval, sometimes quite short [24]. A physical effort, such as coughing during extubation, has often been suggested as a triggering factor, leading some authors to prescribe a routine upper gastrointestinal series (UGIS) in the early postoperative period. This seems to occur more frequently when the hiatus is initially enlarged.

Appearance of secondary effects

The initial procedure can create symptoms that did not exist before the operation; the patient should be informed of this possibility before operation.

Dysphagia

This is the most prevalent symptom and more particularly after NF [25]. Dysphagia usually recedes within a few weeks; it is secondary to fundoplication under tension, an over-tight crural closure, periesophageal fibrosis (possibly secondary to intra-esophageal migration of hiatal prosthetic material), or to a motility disorder that was unrecognized before the operation [26].

Hypercorrection symptoms

These symptoms tend to persist over time and are associated in variable proportions with the gas bloat syndrome (difficulty, or even impossibility to belch or vomit, often associated with flatulence and meteorism, aggravation of dyspepsia or irritable bowel syndrome, or epigastric pain). This is less frequently observed after partial fundoplication [27] but when present, can impair and alter the quality of life [1].

Gastroparesia

This disorder is the result of a vagal injury during the operation and can manifest by postprandial abdominal pain, abdominal meteorism, and anorexia.

Failure of improvement of symptoms

Wrong indication

Campos et al. found that the three main factors of successful NF were the presence of typical symptoms (heartburn and regurgitation) that were relieved by PPI and pH-metric evidence of GERD [28]. In the absence of these indications, the results of ST-GERD are not consistently good. In the above-mentioned meta-analysis of 13 randomized trials [28], the presence of atypical symptoms (respiratory or pharyngeal symptoms) and the resistance to medical treatment were associated with failure in eight of 13 studies. Moreover, obesity with a body mass index (BMI) greater than 30 or 35 kg/m^2 was associated with a risk of failure in four of these studies. In patients with morbid obesity and GERD, a Roux-en-Y gastric bypass constitutes the procedure of choice whenever this is feasible, because it controls the GERD while simultaneously providing weight loss and correction of co-morbidities associated with obesity [29]. However, fundoplication is recommended in patients without morbid obesity who present de novo symptoms of GERD secondary to weight gain and for whom nutritional support alone is not effective [3].

The existence of psycho-emotional disorders has been described as a predictive risk factor of failure of ST-GERD [30]. Postoperative quality of life and chronic pain disorders were found to be less well-improved in patients with psycho-emotional problems compared to those who do not have any such disorders in case controlled studies [31]. Severe depression was associated with more thoracic pain, gas bloat syndrome and postoperative dysphagia in 38 patients undergoing ST-GERD compared to 38 non-depressive controls [32] notwithstanding an improved GIQLI score at 3 months and one year. These symptoms were more frequently observed

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