International Journal of Surgery 46 (2017) 47–52

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original Research

Laparoscopic redo anti-reflux surgery: Case-series of different presentations, varied management and their outcomes

Hari Nageswaran[*, 1], Ali Haque, Mohammed Zia, Ahmed Hassn

Department of Upper Gastrointestinal and General Surgery, Princess of Wales Hospital, Coity Road, Bridgend, Wales CF31 1RQ, United Kingdom

HIGHLIGHTS

- Laparoscopic revision of anti-reflux surgery is technically challenging.
- Patients' presentation and operative findings can be categorised as early, emergency or late.
- Each individual revision must be tailored according to symptoms and intra-operative findings.

ARTICLE INFO

Article history:
Received 17 April 2017
Received in revised form
13 July 2017
Accepted 2 August 2017
Available online 15 August 2017

Keywords:
Anti-reflux surgery
Hiatus hernia
Laparoscopic anti-reflux surgery
Redo surgery
Nissen's fundoplication

ABSTRACT

Background: A minority of patients undergoing surgery for refractory gastroesophageal reflux disease (GORD) will require revision antireflux surgery ("redo-ARS") for persistent symptoms or complications. Although a repeat minimally invasive procedure for revision may be technically challenging due to post-operative changes, studies are beginning to show favourable data for the laparoscopic approach.
Method: From a single institution 41 consecutive cases of laparoscopic redo-ARS performed by the same surgeon were classified by mode of presentation to analyse their intra-operative findings, management and post-operative outcomes. Cases were classified as either early, emergency or late.
Results: There were 12 early, 4 emergency and 25 late redo-ARS cases. Complete resolution of symptoms, using the criteria of less than weekly symptoms and off all anti-reflux medications, were acquired in 6 (50%), 2 (50%) and 16 (64%) patients within the early, emergency and late groups respectively. Overall morbidity following revision was 7.3% with no mortality. There were no open conversions.
Conclusion: Although fewer patients will achieve complete resolution of symptoms as compared with outcomes following primary ARS, laparoscopic revision of ARS is a safe and effective approach for the revision of anti-reflux surgery in the early, emergency and elective settings.

1. Introduction

The current prevalence of gastroesophageal reflux disease (GORD) in the Western World is estimated at 10–20% using the criteria of at least weekly heartburn and/or acid reflux [1]. When life-style changes and medical therapy do not provide sufficient relief from symptoms anti-reflux surgery (ARS) is often required. Since the introduction of laparoscopic anti-reflux surgery by Dallemagne et al in 1991 as an alternative to open surgery there has been an increase in the number of patients undergoing surgical treatment for GORD and it has since become the gold standard with significant advantages compared to open surgery [2–4].

Long-term patient satisfaction rates are high at around 90% but a significant proportion of patients will suffer recurrence of symptoms and up to 50% will eventually resume anti-reflux medications again [5–7]. Whilst most patients with mild to moderate recurrent reflux can be managed conservatively, around 3–10% will require further surgery for either reflux symptoms, dysphagia (with or without reflux) or for intolerance of the primary procedure [8–11].

Revision of anti-reflux surgery ("redo-ARS") is technically more challenging than primary ARS with a higher rate of mortality, intraoperative complications and worse symptomatic outcomes [9,12–15]. Until recently the majority of redo-ARS was performed by an open approach, either through the abdomen or by performing thoracotomy [16]. In recent years however, the laparoscopic route is increasingly chosen, particularly for the first revision

* Corresponding author.
E-mail address: hnageswaran@gmail.com (H. Nageswaran).
[1] Permanent address: 47 Merryhills Drive, Enfield, EN2 7NY.

http://dx.doi.org/10.1016/j.ijsu.2017.08.553
1743-9191/

[17,18]. Despite laparoscopic techniques still maturing, evidence of safety and even superiority when compared with the open approach is becoming apparent. Although intra-operative complications are higher with the laparoscopic approach, the post-operative and overall complication rates are more favourable [11,14,19].

At our institution, a single surgeon specialising in Upper GI and laparoscopic surgery has performed all revisions of ARS via the laparoscopic route since 2003. This study analysed patients who underwent redo-ARS with an aim to discuss various presentations and their subsequent management as well as to validate the safety of laparoscopic redo-ARS.

2. Methods

This was a retrospective case series. All patients that underwent ARS at the authors' unit between 2003 and 2014 were identified from the trust's theatre database and those who were referred for revision from other hospitals in the region were identified using data prospectively maintained within the unit. Intraoperative details were obtained from the theatre operating maintenance systems (TOMS) operated by the trust. All consecutive cases of redo ARS were identified and included in this study.

The research was registered with the research registry. Ethical approval was deemed not required by the institution as it was a retrospective study that did not require further patient participation and did not publish patient identifiable data. The work is reported in line with the PROCESS criteria [20].

According to the time and indication for revision, patients were divided into 3 groups. Those who required revision in the immediate post-operative period were defined as early redo-surgery (E-RS). These patients had severe nausea and vomiting due to *complete* dysphagia. Those with mild dysphagia or dysphagia to solids only were managed conservatively to allow any post-operative oedema to settle and only taken for revision if they progressed to complete dysphagia. Patients that required emergency surgery after the post-operative period, presenting either with complete dysphagia and/or an acute abdomen were defined as emergency redo-surgery (Em-RS). Patients that required elective revision for ongoing chronic symptoms of reflux with or without dysphagia were defined as late re-do surgery (L-RS). These patients were divided into group I (reflux with dysphagia) and group II (reflux only).

To determine outcomes of revision, patients were routinely followed up at 6 weeks post-surgery and then as required if symptoms persisted. Complete resolution was categorised as symptoms not meeting the requirement for GORD given above and not requiring *any* medical therapy for reflux. Partial resolution was categorised as more than once weekly symptoms and/or PPI use (either regular or intermittent).

2.1. Surgical technique

In general, upon entry to the abdomen adhesiolyis to some degree was performed. Any disruption to the normal hiatal anatomy and/or to fundoplication is then assessed. To repair hiatal disruption, the migrated and/or incarcerated stomach is mobilised and retrieved into the abdomen. Reinforcement of the previous crural repair is performed using sutures and/or mesh as required. The authors' preference is to use interrupted 2–0 Ethibond™ (Ethicon US, LLC) sutures. Mesh repair is reserved for those cases where the hiatus space is particularly large and the crural pillars are thin, meaning sufficient closure of the space would not be effective with sutures alone.

In general, for resolution of dysphagia (early) the wrap is loosened by either converting a complete wrap to an anterior (Watson's) wrap or simply undoing the wrap altogether. When performing an anterior Watson wrap, dissection was performed to ensure that at least 4–5 cm of tension free oesophagus was brought down into the abdomen. Crural repair was performed with 2 or 3 sutures (2–0 Ethibond™) and the angle of His recreated by suturing the supero-medial aspect of the fundus to the left anterior oesophageal hiatal rim. The mobile part of the fundus is then rolled over the anterior oesophagus and sutured to the medial aspect and right angle of the hiatal rim, creating a 180-degree anterior wrap. Three sutures are then taken securing the rolled over fundus to the right oesophageal wall and the crural repair.

For cases of reflux (late group II cases) the wrap may need to be undone and a complete fundoplication performed if the pre-existing wrap was a partial wrap or if the primary repair was already a complete wrap, then tightening and increasing of the length. The authors' preference is to perform a complete fundoplication for these patients using interrupted 2–0 Ethibond™ sutures and place an extra suture to the existing crural repair even if hiatal disruption wasn't apparent.

In those patients where both reflux and dysphagia are present (late group I cases), a release of the wrap and complete redo of the fundoplication was performed. As with a significant proportion of the late presenting patients, it may not be possible to perform a complete (360°) Nissen's wrap due to scarring and strong adhesions. In these cases only an anterior Watson's wrap will be possible, although patients may continue to experience reflux symptoms. If symptoms are severe, the authors' preference is to offer an antrectomy with roux-en-y gastrojejunostomy at a later date.

3. Results

A total of 636 primary ARS operations were performed at the authors' unit between 2003 and 2014 of which 37 (5.8%) underwent redo-ARS. In addition, 4 patients who had their initial surgery performed at a different hospital were referred to our unit and underwent redo-ARS. A total of 41 patients were therefore identified for this study: 12 E-RS, 4 Em-RS and 25 L-RS. Table 1 lists the findings and outcomes for these patients.

3.1. Early redo surgery (E-RS) (Fig. 1)

All 12 patients who underwent E-RS had their primary operation performed at the author's institution for reflux symptoms and underwent a complete (360°) wrap. The median age of patients requiring revision was 43 years old and the male to female ratio 1:1.4. The median time from primary procedure to redo surgery was 5 days (range 2–7 days).

Following the primary procedure these patients complained of dysphagia. Although conservative management was initially attempted to allow post-operative oedema to settle, when this progressed to complete dysphagia and inability to swallow enteral secretions, then surgery was instigated on the basis that the wrap was too tight or that oesophageal motility was too weak to overcome the wrap. At revision surgery, the complete (360°) wrap was converted to a 180° anterior Watson wrap.

At 2 years follow up, 6 patients had complete resolution of reflux symptoms and 5 patients had partial relief requiring recommencement of proton pump inhibitors (PPI) at a lower dose. The remaining patient had severe recurrent reflux symptoms that were initially managed by PPI but due to severity of symptoms and intolerance of medication she elected to undergo laparoscopic antrectomy and roux-en-y gastrojejunostomy. She has remained symptom free 12 months post surgery.