

Review Article

Does anti-reflux surgery control Barrett's oesophagus progression?

Ali J. Alghazzawi^{1*}, Ali A. Khabaza², Mohammed H. Al-Hijaji¹

¹Department of Surgery, Macquarie University Hospital, Sydney, NSW, Australia

²Department of Radiology, Royal Prince Alfred Hospital, Sydney, NSW, Australia

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*Correspondence:

Dr. Ali J. Alghazzawi,

E-mail: alioliwy@gmail.com

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ABSTRACT

Controversy exists as to whether or not anti-reflux surgery can prevent the potential long-term complications of Barrett's oesophagus, in particular, dysplastic changes. Hence, literature was reviewed to find out effects of anti-reflux surgery on patients with Barrett's oesophagus. Data has been analysed using different electronic database including Ovid Medline, Scopus, Google Scholar and PubMed. Anti-reflux surgery is considered an effective option for rapid and long-term control of reflux symptoms. Most patients who were included in the studies had a satisfactory control of their symptoms after surgery. Successful procedures effectively abolished gastric reflux in the majority of patients. On the other hand, there were different patterns of Barrett's oesophagus segment progression after surgery regardless of the procedure's success. Many patients developed de novo Barrett's oesophagus, at the same time the intestinal metaplasia regressed in other patients, but the Barrett segment has remained unchanged in the majority of patients. Similarly, the pattern of dysplasia progression was different among patients. Surgery was effective in producing dysplasia regression in many patients, but it failed to prevent progression of columnar intestinal metaplasia into dysplasia in other patients. In conclusion the potential long-term complications of Barrett's oesophagus can develop after anti-reflux surgery. Therefore, long life follow-up, after surgery, is mandatory.

Keywords: Anti-reflux surgery, Barrett's oesophagus, Outcome

INTRODUCTION

In 1950, Norman Barrett depicted the presence of columnar epithelium instead of normal stratified squamous epithelium in the lower oesophagus and concluded that this condition is due to the migration of the stomach secondary to a congenital shortening of the oesophagus.¹

More recently, Barrett's oesophagus is defined as the presence of columnar epithelium in the lower segment of the oesophagus at endoscopic examinations with intestinal metaplasia during pathological evaluations.²

Barrett's oesophagus is a complication observed in a group of patients with chronic gastroesophageal reflux disease (GORD), and 5% to 15% of patients with GORD have Barrett's oesophagus by endoscopic examinations.^{3,4} The adverse outcome of Barrett's oesophagus encompasses ulcerations in the columnar-lined segment, a stricture formation, and a dysplasia-cancer sequence.^{3,4} Current therapeutic strategies to minimize these complications include medical treatments for life and anti-reflux surgery. Treatment of most patients, without dysplasia, consists of diet, postural measures, as well as antisecretory medications such as H2 blocker and proton pump inhibitors.⁵

Anti-reflux surgery aims to repair the underlying physiological defect of Barrett's oesophagus.⁵ As a result, the function of the lower oesophageal sphincter is improved, and acid or duodenal content reflux into the oesophagus is remarkably declined, in contrast, the reflux of gastric and duodenal contents persists in those who are treated by medical treatment alone.⁶

The purpose of this review will be to highlight on anti-reflux surgery for preventing Barrett's oesophagus to develop, halting the dysplasia-adenocarcinoma sequence and restoring the normal epithelium.

METHODS

Data were collected from an electronic literature search using Ovid Medline, Scopus, Google Scholar and PubMed databases. Subject headings and keywords included in the search (anti-reflux surgery, fundoplication, Barrett's oesophagus, esophageal neoplasm prevention and control, esophageal cancer prevention and control). The search was limited to papers with the English language and clinical trials. The extracted published work was reviewed manually. Grading of the literature cited was performed according to whether the study's design was a prospective randomized control trial, a case-control study or case series. Primary outcomes were Barrett's oesophagus development or regression, and prevention of dysplasia-cancer sequence while secondary outcomes are symptom control and abolishing acid and bile reflux.

The search strategy was developed in accordance with CONSORT (Consolidated Standards of Reporting Trials).⁷ Five articles were analyzed which were focused on the results of anti-reflux surgery. Clinical and histopathological findings were studied in these trials.

Table 1: Studies that included in the literature review.

| Study | Sample size | follow up |
|------------------------------|-------------|------------|
| James et al ⁵ | 58 | 59 months |
| Abbas et al ⁸ | 49 | 29 months |
| Csendes et al ⁹ | 115 | 135 months |
| Wayne et al ¹⁰ | 85 | 60 months |
| Parrilla et al ¹¹ | 58 | 60 months |
| Rossi et al ¹² | 35 | 18 months |

DISCUSSION

In general, the goals of management of patients with Barrett's oesophagus are to relieve symptoms of acid and bile reflux, to abolish acid and bile reflux, to restore the Barrett's Oesophagus epithelium to the normal epithelium of oesophagus (stratified squamous epithelium) and to prevent dysplasia cancer sequence.

Dysplastic changes to malignancy entail a long duration, and therefore an extended period of follow is

considerably required. The longest follow up in the studied articles was 11 years as noted in Csendes et al.⁹

The most common indication for anti-reflux surgery is refractory symptoms that are not responding to medical therapy.⁸ The relief of gastroesophageal reflux symptoms is the primary subjective outcome of antireflux surgery. In a randomized controlled prospective study by Parrilla et al, a satisfactory symptom control was seen in 58 patients (91%), fair symptoms control (i.e., improved but need additional medical therapy), was noticed in 4 patients, and inadequate response to surgery was documented in 1 patient (2%).¹¹ Similarly, Jammes et al found (95%) of the patients in their study considered the outcome to be excellent or good.⁵ On the other hand, Abbas et al showed that a complete symptom resolution was 67%.⁸ In the above studies, the investigators did not explain which type of anti-reflux surgical procedure was associated with satisfactory, fair or poor symptomatic control. Wayne et al stated that 97% of cases were satisfied with surgery, yet 21% of them experienced a recurrence of symptoms.¹⁰ Also, the last study was only one that referred to the operation done for symptom control.¹⁰ Persistent symptoms were most commonly observed in patients who underwent the Collis Belsey procedure 33% followed by laparoscopic Nissen procedure 26% and were least common after a transthoracic Nissen surgery.¹⁰ However, the above figures may not reflect the reality because among 85 patients only nine patients underwent Collis Belsey procedure while 50 patients underwent laparoscopic Nissen procedure.

The main goal of anti-reflux surgery is to correct the physiological defect in Barrett's oesophagus, reducing the injury to the oesophageal mucosa caused by gastric and duodenal content, and it can be evaluated objectively by monitoring intraesophageal PH and examining oesophageal exposure to duodenal juice (Bilitec).

Wayne et al found out only four patients had abnormal postoperative 24-hour pH monitoring, all of them were symptomatic, but only 21 from a total of 85 patients were included in the intraesophageal pH monitoring.¹⁰ All patients in Parrilla et al study had post-operative 24-hour pH monitoring, while 12 patients had post-operative Bilitec studies.¹¹

There was complete control of biliopancreatic reflux while acid reflux was persistent in 9 patients and 4 of them were clinically asymptomatic.¹¹ Among 41 patients who were included in James et al, 17 patients had abnormal postoperative pH monitoring, and three of them had significant heartburn, and the other patients considered the outcome of surgery either excellent or good.⁵ Clinical, PH monitoring and Bilitec findings are of paramount value in evaluating the success of anti-reflux surgery.

Controversies are still present regarding the progression after anti-reflux surgery. Also, there is a poor distinction in many publications between operating on patients with reflux oesophagitis without Barrett's oesophagus and those who have Barrett's oesophagus. Some authors believe that surgery prevents the development of "de novo" Barrett's oesophagus in patients who did not have Barrett's oesophagus before surgery.¹³⁻¹⁶ However, Csendes et al found that 12 patients developed de novo Barrett's oesophagus after anti-reflux surgery and four of them had no abnormal acid or bile reflux.⁹

Table 2: Symptomatic control of GORD and abnormal pH monitoring after anti-reflux surgery.

| Study | Symptomatic control | Abnormal postop pH |
|------------------------------|---------------------|--------------------|
| James et al ⁵ | 95% | 2/58 |
| Abbas et al ⁸ | 67% | 2/48 |
| Csendes et al ⁹ | 91% | 8 |
| Wayne et al ¹⁰ | 97% | 4/21 |
| Parrilla et al ¹¹ | 91 % | 9/58 |

Table 3: Outcome of anti-reflux surgery.

| Study | BO Development | BO regression | Dysplasia development | Dysplasia regression |
|------------------------------|----------------|---------------|-----------------------|----------------------|
| James et al ⁵ | - | 8/57 | 2/58 | 6/8 |
| Abbas et al ⁸ | - | 9/48 | 1/48 | 4/6 |
| Csendes et al ⁹ | 12 | - | - | - |
| Wayne et al ¹⁰ | - | 9/63 | 4/63 | 7/16 |
| Parrilla et al ¹¹ | - | nil | 3/53 | 5/5 |
| Rossi et al ¹² | - | - | nil | 15/19 |

*BO= Barrett's oesophagus

Regression of Barrett's oesophagus was documented in 9(14%) patients among 64 who underwent postoperative endoscopic surveillance in Wayne et al.¹⁰ There was no complete disappearance of intestinal metaplasia (Barrett's oesophagus) in all postoperative patients in Parrilla et al.¹¹

James et al illustrated a different pattern of progression in Barrett's oesophagus after anti-reflux surgery, there were 8(14%) patients, out of 57 patients who underwent postoperative endoscopic surveillance, had regression of Barrett's oesophagus into the normal stratified squamous epithelium. Six out of those eight patients who developed regression had short segment Barrett's oesophagus before their operation, in addition, there were a decrease in the length of the Barrett segment in 12(21%) patients, and this remained unaltered in the remaining patients.⁵ Similarly, Abbas et al. reported a complete absence of the Barrett segment in 9 postoperative patients and decreased the length of Barrett's oesophagus in 3 patients.⁸

The progression of intestinal metaplasia into dysplasia or adenocarcinoma is the major concern in patients with Barrett's oesophagus. Wayne et al reported 16 patients who had low-grade dysplasia before surgery. 7 (44%) of them had regressed into intestinal metaplasia. There were 4 out of the remaining patients developed low-grade dysplasia.¹⁰ The investigator did not mention whether those who developed low-grade dysplasia had unsuccessful procedures, abnormal intra-esophageal pH monitoring or abnormal Bilitec. Parrilla et al evaluated nine patients with unsuccessful anti-reflux surgery.¹¹ Dysplasia de novo developed in 3 patients, 2 of them were high-grade dysplasia which progressed later on into

adenocarcinoma. There was one patient with dysplasia de novo among 44 patients who had successful anti-reflux surgery.¹¹ There were eight patients, in James et al study, who had low-grade dysplasia before surgery.⁵ Regression into intestinal metaplasia occurred in 6 patients while two patients developed persistent low-grade dysplasia. All patients who developed dysplasia had a recurrence of reflux symptoms and abnormal postoperative pH studies.⁵ Abbas et al found out six patients with low-grade dysplasia preoperatively, 4 of them had complete regression, while one progressed into adenocarcinoma. Also, there was one patient who developed dysplasia de novo.⁸

Rossi et al concluded 93.8% regression rate of low-grade dysplasia after Nissen Fundoplication.¹² In Csendes et al, four patients developed de novo low-grade dysplasia after the antireflux procedure, and 2 of them had successful procedures with the absence of acid reflux.⁹ Based on the above results, it is clear that the intact anti-reflux surgery is crucial to control acid reflux, regress and prevent the development of dysplasia. However, successful anti-reflux surgery does not preclude dysplasia-cancer sequence.

CONCLUSION

Anti-reflux surgery is an excellent option to control most of the symptoms which are caused by acid reflux in patients with Barrett's oesophagus. Its control of gastric and duodenal reflux relies on the extent of surgery success. Although Barrett segment can be regressed partially or completely after anti-reflux procedures, a new Barrett segment can develop after surgery.

Anti-reflux surgery is an important factor in the prevention of dysplastic consequences and in the regression into intestinal metaplasia. However, this notion cannot exclude the possibility of dysplasia de novo development and progression into adenocarcinoma even with a successful procedure that leads to complete symptomatic relief without gastric and duodenal reflux. Therefore, long-life follow up after surgery is mandatory.

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