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Full Length Research paper

Initial Outcomes of Laparoscopic Anterior 180° Partial Fundoplication: A Focus on Symptomatic Relief

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Gastroesophageal reflux disease is increasing in frequency in the Asia Pacific region, which can be attributed to increase in awareness among doctors and patients and/or true increase in the prevalence of this disease. Surgical treatment of GERD is well established in the West and in selected clinical situations, provides well recognized benefits over non-surgical treatment. In contrast, there are only a few published studies in Asia especially on the outcome of the laparoscopic anterior fundoplication within the Asian community. Our aim is to evaluate symptomatic outcome of laparoscopic anterior 180° fundoplication in our community. Prospective analyses of 25 consecutive patients were done using a standardized questionnaire post-operatively. Overall satisfaction and the symptoms of heartburn and dysphagia were assessed together with other adverse effects of the surgery. Follow up was carried at a median of 9 months after surgery. Symptoms of heartburn assessed using the VAS showed significant drop from mean 7.4 pre-operatively to mean 1.75 postoperatively. De Meester symptom score indicated that a majority (56%) of patients reported none/minimal GERD symptoms, the other 44% reported mild GERD symptoms. This showed a vast improvement compared to pre-operative scoring where 80% of the patients reported moderate to severe GERD symptoms. This directly correlates with the estimation of patient satisfaction using Visick grading system with 24 (96%) patients reported none or mild symptoms post operatively. Overall, it is reasonable to conclude that laparoscopic anterior partial fundoplication achieved a satisfactory rate of overall success in our centre at short term follow up.

Key words: Laparoscopic anterior fundoplication, GERD, symptomatic outcome.

INTRODUCTION

Gastroesophageal reflux (GERD) has long been recognized as a significant public health concern. Recent prevalence studies of GERD throughout Asia have shown generally higher figures compared to previously published studies (Goh, 2004; Wong and Kinishoita, 2006). Surgical treatment of GERD is well established, with long term maintenance studies comparing medical therapy for GERD with antireflux surgery have demonstrated either similar clinical efficacy or significantly better control of GERD symptoms post surgery (Lafullarde et al., 2001; Lundell et al., 2001). Various safe and effective surgical techniques have been developed to realize the above goals.

The choice of technique has been typically upon anatomic considerations, as well as surgeon's expertise and preference. The optimal technique for laparoscopic fundoplication is controversial. Although laparascopic Nissen fundoplication has been widely accepted procedure in relieving reflux symptoms (Gotley et al., 1996; Jamieson et al., 1994) the incidence of post operative dysphagia, bloating and flatulence remains a significant concern (De Meester et al., 1986; Lundell et al., 1996). Anterior fundoplication is claimed to produce a 'more physiological alternative' without the hypertonic lower esophageal sphincter pressure produced by a total wrap (Watson et al., 1994).

In our centre, initial efforts to establish laparoscopic anterior 180° fundoplication as one of our options for treatment of GERD have been started. As there are only a few published studies in Asia especially on the outcome of laparoscopic anterior fundoplication within the Asian community, our aim is to evaluate surgical and symptomatic outcome following laparoscopic surgery in

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Table 1. Preoperative clinical data.

Variables	Values (%)
Mean age, year (range)	38.2 (21 - 52)
Sex, male-female ratio	1.5
Mean duration of symptoms, months(range)	19.5 (6 - 48)
Mean length of hospital stay, days (range)	3.3 (3-5)
Endoscopy	
Presence of hiatus hernia; No (%)	25 (100)
Esophagitis (Los Angeles classification[14]); no (%) not detected	9 (36)
Grade A	11 (44)
Grade B	5 (20)
Grade C	0 (0)
Grade D	0 (0)
Manometry, LES pressure, mmHg (range)	12.2 (0 - 24.3)
pH study, mean percentage pH < 4	4.6

our group of patients with GERD.

METHODS

The study group consisted of 25 consecutive patients who underwent laparoscopic anterior 180° fundoplication for symptomatic gastroesophageal reflux disease between April 1, 2007 and July 31, 2009. Esophageal manometry and pH monitoring for 24 h were performed in all our patients pre-operatively. There are 2 groups of patient which were selected for surgery: the first group consists of those who were dependent on PPI for symptom control and request for surgery as they are not willing to be on life-long therapy. The second group consists of those who did not respond to medical therapy. All these patients had been diagnosed with GERD based on clinical symptoms, endoscopy, pH study and esophageal manometry

All operations were performed by 2 consultant surgeons specialised in upper gastro-intestinal surgery and laparoscopic surgery. This operation comprises routine closure of the hiatal opening with fixation of the mobilised esophagus and anterior partial fundoplication as described by Watson et al. (1994). Operative technique; a five port technique is used in all patients. The pars flaccida is dissected to visualize the right crus of the diaphragm then preceded with the left crus. The hiatal opening is clearly visualized at this point up to the apex of the crus superiorly. The hiatal opening is repaired with non absorbable sutures, just adequately admitting the esophagus. The next step is the 180 degree fundoplication, without dissecting the short gastric vessels. This is done also with non absorbable sutures of the fundus to the left and right crus thus creating an 180 degree wrap. We do not routinely perform a gastrograffin study post operatively. Oral fluids are allowed on the evening of the operation. An intravenous infusion is left *in situ* overnight. The following day the patient resumes a normal diet. Analgesic requirements vary from patient to patient but most require no more than two or three doses of opiate after the operation. Patients are usually discharged two days after the procedure. They are warned that dysphagia for solids may become a problem in the succeeding two to three weeks due to oesophageal oedema but in most cases this will settle spontaneously.

Preoperative, operative and postoperative data for each patient were retrieved from patient's medical record. Details about adverse outcomes, including postoperative complications, hospital readmission, and surgical revision were also recorded. Phone interviews using a standardized questionnaire to assess post operative functional outcome and satisfaction were done by a medical officer who had not been involved previously in patients care. Each questionnaire includes:

1) DeMeester-Jonhson Reflux Scale to assess incidence of heartburn, regurgitation and dysphagia (DeMeester et al., 1976; DeMeester and Jonhson, 1976).

2) Visick grading system was used to assess patient satisfaction (Visick, 1948).

3) Visual Analogue Score (VAS) to assess severity of dysphagia, heartburn, bloating, increased flatus, where 0 indicates none and 10 very troublesome symptoms (Reading, 1989).

4) Visual analogue score to assess overall satisfaction with the outcome of surgery where 0 indicates dissatisfaction and 10 full satisfactions.

Outcome data were analysed to determine the clinical efficacy of the laparoscopic anterior 180° partial fundoplication procedure, as well as the incidence of adverse outcomes and overall satisfaction with the surgical outcome. Results are presented using simple descriptive statistics.

RESULTS

Between April 2007 and July 2009, 25 patients underwent laparoscopic anterior 180° partial fundoplication in our centre. These patients constituted the study group. The details of the pre-operative parameters are shown in Table 1.

Follow up was carried at a median of 9 months after surgery. Hospital stay was a median of 3.3 days (range 3 to 5). Post operative complication was noted in only one patient who developed nosocomial pneumonia, which resolved after completing a course of antibiotics. No reoperation was performed in this group of patients.

Gastroesophageal reflux symptoms were well controlled in most patients during follow up. Symptoms of heartburn assessed using the VAS showed significant

Table 2. Preoperative and postoperative VAS scores.

Variables	VAS scores (mean)
Increased flatus	
Preoperative	2.90
Post operative	2.30
Bloating	
Preoperative	4.95
Post operative	2.15
Dysphagia	
Preoperative	0.25
Post operative	0.45
Heartburn	
Preoperative	7.40
Post operative	1.75

Table 3. De Meester score.

De Meester score	Pre-Op no (%)	Post-Op no (%)
No/Minimal GERD (0 - 1)	0 (0)	14 (56)
Mild GERD (2 - 3)	5(20)	11 (44)
Moderate GERD (4 - 5)	13(52)	0 (0)
Severe GERD (6 - 9)	7(28)	0 (0)

Table 4. Post operative Visick grading.

Modified Visick grading	No (%)
Grade 1: No symptoms	9 (36)
Grade 2: Mild symptoms controlled by simple measures etc avoiding certain foods	15 (60)
Grade 3: Moderate symptoms not controlled by simple measures but not interfering with social or economic life	1 (4)
Grade 4: Moderate symptoms interfering with social or economic life	0 (0)
Grade 5: Symptoms as bad or worse than before surgery	0 (0)

drop from mean 7.4 pre-operatively to mean 1.75 postoperatively. 8 patients had a post-operative score of 0 (no heartburn); 14 had a score of 1, 2 or 3 (occasional minor episodes of heartburn); 3 reported a score of 4 to 6 (moderate heartburn symptoms); and none reported score of 7 or higher (significant troublesome symptoms). Most patients reported a moderate to severe heartburn score before surgery. 7 patients were taking acid suppressing medications (proton pump inhibitor [6], anta-acid [1]) for reflux symptoms on as needed basis after surgery. All of these patients reported symptoms of heartburn. Temporary post operative dysphagia was noted in 10 patients (40%), and it lasted on average of 21 days (range, 3 - 48 days). Persistent dysphagia was reported by 4 patients (16%) during follow up with average VAS score of only 2.2 for that particular group of patients. None of them required endoscopic dilatation.

18 (72%) patients had postoperative bloating. It was mild in 14 patients, moderate in 2, and severe in 2 patients. 14 (56%) patients reported increased post-operative flatus. It was mild in 9 patients, moderate in 2 patients, and severe in 3 patients. Pre-operatively, 21 (84%) patients had bloating and 18 (72%) patients had increased flatus. Preoperative and postoperative VAS scores are shown in Table 2.

At the time of follow up, the De Meester symptom score indicated that a majority (56%) of patients reported none/minimal GERD symptoms, the other 44% reported

mild GERD symptoms. This showed a large improvement compared to pre-operative scoring where 80% of the patients reported moderate to severe GERD symptoms. This directly correlates with the estimation of patient satisfaction using Visick grading system with 24 (96%) patients reported none or mild symptoms post operatively (Tables 3 and 4).

Mean overall satisfaction using VAS score was 7.4 with 21 (84%) patients reported a score of 7 to 10. 24 (96%) patients expressed willingness to undergo the same operation again with the same symptoms.

DISCUSSION

It is now widely accepted that the Nissen fundoplication achieves an effective barrier to reflux in most patients at medium to long term follow up. Unfortunately, however adverse effects such as persistent dysphagia, flatulence, gas bloat and the inability to belch have been reported (O'Boyle et al., 2002; Watson and Jamieson, 1998). These indirectly would affect the overall outcome of the surgery and patients satisfaction.

With better understanding of the disease, new techniques of fundoplication have been developed with the aim of reducing the incident of adverse effects while still achieving effective control of gastroesophageal reflux symptoms. Watson at al. (1998) reported at 6 months follow up, patient undergoing anterior fundoplication were significantly less likely to experience dysphagia, increased flatulence and more likely to be able to belch normally. The same group assessed after 5 years showed reduced rate of adverse effects and high rate of satisfaction compared to Nissen fundoplication in that randomized trial (Rice et al., 2006). It was also stated that anterior fundoplication is associated with higher risk of recurrent reflux at late follow-up than Nissen fundoplication. Thus, the choice of fundoplication which offers the best outcome is still controversial.

In our centre, initial outcome following laparoscopic anterior fundoplication looks promising. Overall patient satisfactions regarding improvement in symptoms, adverse effects and success of the surgery shows positive results. Reflux remained well controlled in approximately 88% of patients at follow up, with none of them reporting an analogue score of 7 or more. The De Meester Score which assessed incidence of heartburn, regurgitation and dysphagia also showed significant improvement after surgery. Bloating and increased flatulence combined are the most common side effects and complaints after antireflux surgery and the rate of difficult and persistent bloating with increased flatus varies from 9 to 53% ; this wide range is based on different symptoms scoring (Salminen, 2009). In our study, epigastric bloating was less common after surgery, and most patients could eat a normal diet. Incidence of dysphagia and increased flatulence were also low post-operatively. These findings suggest that anterior partial fundoplication is associated with a low rate of adverse effects compared to Nissen fundoplication.

Even though 28% of patients were on acid suppressing medications as on needed basis postoperatively for their mild GERD symptoms, these group of patients rated the overall clinical outcome highly, which probably explains why 92% of patients considered the overall outcome as good or excellent. These groups of patients were satisfied with the outcome of the surgery as the symp-toms which were poorly controlled before the surgery can be controlled with acid-suppressing medication post-operatively. According to the long term results of anti-reflux surgery, patient considering surgical treatment for GERD should not be guaranteed a post- operative life without the need for anti-secretory medications, as the proportion of patient taking acid suppressive medications after laparascopic fundoplication varies between 15% and 80% (Salminen, 2009).

Overall, laparascopic anterior fundoplication provides satisfactory control of gastroesophageal reflux symptoms with minimum adverse effects as seen in this study. No major complication was encountered in our centre either intra-operatively or post-operatively. It's a reasonable surgical option to be offered to patients with severe GERD considering its safety and good clinical outcome.

These are only the initial outcome with mean follow up of 9 months herein should be interpreted with some caution. Long term follow up would provide a better assessment of the surgical outcome. Post-operative assessment using esophageal manometry and pH monitoring would be helpful in assessing the success of the surgery as both objective and subjective outcome can be analysed.

Conclusion

Overall, it's reasonable to conclude that laparoscopic anterior partial fundoplication achieved a satisfactory rate of overall success in our centre at short term follow up which is similar to outcomes in the Western countries. Larger patient cohort and longer follow-up is needed to support the contention that laparoscopic anterior partial fundoplication is an appropriate procedure for patients with gastroesophageal reflux in our community.

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