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Laparoscopic Posterior Partial Fundoplication Versus Total Fundoplication in Anti-Reflux Surgery: A Comparative Study

T.Ayesha[1], Saravanan PS[2]

[1]*Post Graduate, Department Of General Surgery, Meenakshi Medical College &Research Institute, Enathur, Kanchipuram*

[2]*Professor, Department Of General Surgery, Meenakshi Medical College &Research Institute, Enathur, Kanchipuram*

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Abstract

The present investigation set out to compare the benefits of partial posterior fundoplication (PPF) to those of standard total fundoplication (TF). Ninety GERD patients from El-Minia University Hospital between January 2019 and January 2023 were enrolled in the research. They were randomly assigned to two groups: group A, consisting of forty-five PPF patients, and group B, consisting of forty-five TF patients. Each of the patients in the group had an endoscopic hiatal hernia and varied degrees of esophagitis. Postoperative follow-up comprised endoscopic examinations, a satisfaction survey responses a heartburn severity questionnaire, bloating, diarrhoea, vomiting, stomach pain, and the ability or inability to belch frequently. All patients' heartburn decreased (p = 0.000). Shorter operative time was observed in group B (p = 0.007). There is no significant difference in overall satisfaction level between the two groups (p = 0.5). Surgical treatment is the favorite option for the treatment of GERD. PPF has the advantage of shorter operative time and can be safely used with outcomes similar to that of TF.

Introduction

PPIs, or proton pump inhibitors, are one type of treatment for GERD sufferers. On the other hand, anti-reflux surgery is currently a recognised treatment choice. For the treatment of GERD, laparoscopic anti-reflux surgery has been shown to be more effective than proton pump inhibitors (PPIs) [1, 2], and it also eliminates some of the PPIs' potentially harmful long-term adverse effects [3, 4]. A laparoscopic procedure called anti-reflux surgery corrects the anatomical and functional problems in the EGJ. Nonetheless, it is thought to be highly intrusive and has a few mechanical side effects that cannot be avoided, like dysphagia and bloating [5]. The anti-reflux procedure that is most frequently carried out is total nissen fundoplication (TF) [6]. Various surgical techniques have been developed with the goal of reducing TF's mechanical issues [7]. Following the creation of Toupet's 180° posterior wrap in the 1960s, an anterior 180° wrap was created [8]. Partial fundoplication (PF) is linked to less mechanical problems (e.g., gas and bloating) than total fundoplication (TF), according to a number of randomised clinical trials [9, 10]. Nonetheless, it has been documented that TF outperforms PF in terms of reflux management, wrap durability, and recurrence rate [11, 12]. This procedure, known as a laparoscopic posterior partial fundoplication (PPF), modified PF to wrap 3/4 of the lower esophageal circumference. The goal was to preserve the benefits of reflux control of TF and lesser mechanical difficulties of the partial wrap. The aim of the present study was to evaluate the advantages of PPF compared with a traditionalTF.

Methodology

Ninety GERD patients from Department of General Surgery, Meenakshi Medical College &Research Institute, Enathur, Kanchipuram in August 2023 were included in the study. The Minia College of Medi-cine Institutional Ethics Committee gave its approval to the project. All patients who participated provided written informed consent. Two groups of patients were randomly assigned: group A consisted of 45 PPF patients, while group B consisted of 45 TF patients. Simple randomization with a 1:1 ratio was used to choose the patients; PPF was given to one patient and TF to the other, in that sequence. Participants in the study ranged in age from 18 to 75 and had symptoms of GERD, primarily acid regurgitation and heartburn. A 24-hour rise in acid exposure during ambulatory pH monitoring verified the diagnosis of GERD. Los Angeles classification (LA) was used to grade esophagitis [13]. Individuals with esophageal motility disorders, type II to IV hiatal hernias, major upper abdominal surgical procedures, and prior anti-

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reflux surgery were excluded. Each of the patients included had varying degrees of esophagitis and an endoscopic hiatal hernia. Patient information was recorded, including age, sex, esophagitis grade, length of preoperative symptoms and medical treatment, surgery date, length of functioning, postoperative problems, and need for reoperation. Upper GI endoscopy, esophageal manometry, and 24-hour pH monitoring were among the preoperative tests performed. The satisfaction questionnaire was used in the postoperative monitoring to determine whether or not patients had dysphagia with solids or liquids on a 0–4 scale (0 being no swallowing issues, 1 being difficult to swallow solid food, 2 being difficult to swallow soft food, 3 being difficult to swallow liquids, and 4 being difficult to swallow both solids and liquids). All patients were given another questionnaire measuring the severity of abdominal pain, bloating, diarrhoea, vomiting, frequent belching, failure to belch, and heartburn on a 0–4 scale (0: no symptoms, 1: mild (noticeable but not annoying every day), 2: moderate (noticeable and annoying every day), 3: often (influencing daily life), and 4: very often (limiting daily life)) [14]. Gastroesophagealreflux disease health-related quality of life (GERD-HRQoL) questionnaire was administered to patients preoperatively,2 and 12 months postoperatively together with endoscopic evaluations. Postoperative satisfaction was assessed using 0–4 scale (1: very satisfied, 2: satisfied, 3: neutral, and 4: not satisfied) [16]. All patients were followed up for 1 year.

Surgical Technique [15]

The surgeon utilised the 5-trocar approach while standing between the patient's knees while the patient was in a reversed Trendelenburg position. A sharp harmonic scalpel was employed. The left and right crus were exposed after the smaller omentum and peritoneum covering the hiatal area were cut. The upper portion of the gastric fundus was mobilised by dividing the short gastric arteries. To guarantee that the EGJ and wrap were positioned intra-abdominally, the distal oesophagus was mobilised for a minimum of 5 cm. In PPF patients, the stomach fundus was drawn afterward around the EGJ and distal portion of the oesophagus for about 3/4 of its circumference. It was then posteriorly secured to the left and right crus using three ethibond 2/0 sutures each. Subsequently, three to four sutures were placed between the oesophagus wall and the wrap's margins (Fig. 1). For TF patients, right and left edges of the wrap were sutured together 3 ethibond 2/0 sutures from EGJ and cranially for at least 2 cm. (Fig. 2).

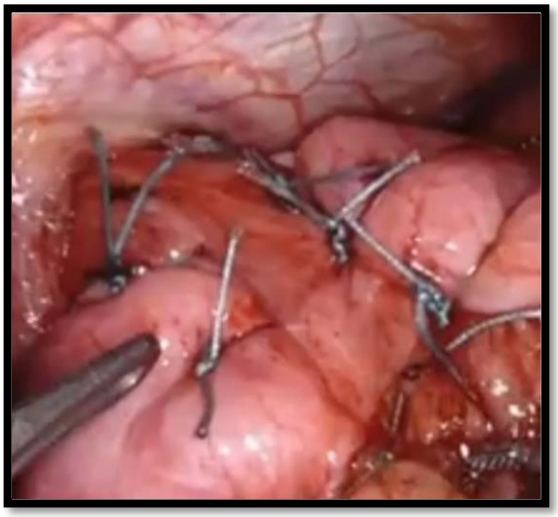

Fig. 1 Laparoscopic posterior partial fundoplication
Fig. 2 Total fundoplication

Bougies were used in all patients. All procedures were per-formed by only one surgeon.

Statistical Analysis

Values were given as *medians* ± *SD (*standard deviation) or percentage. Independent sample *T*-test was used to compareparametric data, whereas chi-square tests used to compare non-parametric data. *P* value of less than 0.05 was consideredstatistically significant.

Results

Two distinct groups, consisting of 45 PPF patients in group A and 45 TF patients in group B, were randomly assigned to the 90 patients involved. Age, sex, BMI, incidence of esophagitis, and Barrett's oesophagus did not significantly differ amongst the two groups. Additionally, there was no statistically significant difference between

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the two groups' preoperative clinical data regarding the length of symptoms or the duration of medical therapy (p = 0.4 and 0.6, respectively). The most prevalent condition in both groups was preoperative Grade A esophagitis (64% vs. 60%), and there was no statistically significant difference between them (p = 0.5) (Table 1). Group B (PPF) experienced a considerably shorter operational time (p = 0.007). For both groups, the length of hospital stay was nearly equal (mean = 1.86, 1.73 days, respectively) (p = 0.3). Two of the patients in group A experienced complications: one patient experienced port site bleeding, which was managed laparoscopically, and the other patient had an infected hematoma that was managed conservatively. Only one patient in group B, though, experienced DVT, and they received conservative care. The incidence of complications did not significantly differ between the two groups (p = 0.5). One patient in group A required reoperation because their difficulty swallowing did not improve over the course of the follow-up year (p = 0.3), but there was no statistically significant difference between the two groups. Additionally, there was no discernible difference between the two groups' conservative management of postoperative complaints. In 11 patients (12%), endoscopy in the second postoperative month indicated no esophagitis, whereas endoscopy in the twelfth postoperative month demonstrated complete improvement of esophagitis in 78 patients (86.7%). There was no significant difference between the two groups as regards the two follow-up endoscopies (p = 0.8, 0.5; respectively). Regarding overall satisfaction, Table 2 shows that 48 patients (53.3%) were very satisfied, 35 patients (38.9%) were content, 5 patients (5.5%) were neutral, and 2 patients (2.2%) were not satisfied with their ensuing condition (p = 0.5). Every patient's heartburn improved, and there was a significant difference (p = 0.000) among each group's preoperative and postoperative periods (Table 3). All patients with grade A and B esophagitis found in the twelfth postoperative month were advised to take PPIs.

Table 1 Patients' preoperative data

Data	**Group A**	**Group B**	***p* value**
Age (*mean, SD*)	36.46 *SD* 8.17	35.35 *SD* 9.46	0.5
Sex (no., male/female)	21/24	22/23	0.8
BMI (*mean, SD*)	27.93 *SD* 2.34	27.35 *SD* 2.44	0.2
Esophagitis (no., %)	10 (22)	11 (24.5)	0.8
Barrett's esophagus (no., %)	9 (20)	8 (18)	0.8
Duration of symptoms (*mean, SD*)	103.44 *SD* 40.01	110.44 *SD* 36.82	0.4
Duration of medical treatment (*mean, SD*)	104.44 *SD* 39.29	108.78 *SD* 36.25	0.6
Grade of esophagitis: (no., %)			0.5
A	29 (64)	27 (60)	
B	11 (24.5)	13 (29)	
C	3 (7)	4 (9)	
D	2 (4.5)	1 (2)	

Table 2 Intraoperative andpostoperative data

	Group A	**Group B**	***p* value**
Operative time (*mean, SD*)	123.11 *SD* 38.95	102.55 *SD* 31.92	**0.007**
Hospital stay (*mean, SD*)	1.89 *SD* 0.86	1.73 *SD* 0.45	0.3
Postoperative complications (no., %)	2 (4.5)	1 (2)	0.5
Reoperation (no., %)	1 (2)	0	0.3
Dysphagia	2 (4.5)	4 (9)	0.4
Frequent belching	2 (4.5)	2 (4.5)	1
Inability to belch	5 (11)	2 (4.5)	0.2

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Bloating	11 (24.5)	12 (27)	0.8
Diarrhea	4 (9)	3 (6.5)	0.7
Vomiting	0	1 (2)	0.3
Abdominal pain	22 (49)	25 (55.5)	0.5
Recurrence of preoperative symptoms	3 (6.5)	2 (4.5)	0.6
Endoscopy at 2 months: (no., %)			0.8
- Normal	7 (15.5)	4 (9)	
- Grade A	31 (69)	35 (77.5)	
- Grade B	5 (11)	4 (9)	
- Grade C	2 (4.5)	2 (4.5)	
- Grade D	0	0	
Endoscopy at 12 months: (no., %)			0.5
- Normal	39 (87)	39 (87)	
- Grade A	3 (6.5)	5 (11)	
- Grade B	3 (6.5)	1 (2)	
- Grade C	0	0	
- Grade D Patient satisfaction: (no., %)	0	0	
- Very satisfied	25 (55.5)	23 (51)	
- Satisfied	17 (38)	18 (40)	
- Neutral	3 (6.5)	2 (4.5)	
- Not satisfied	0	2 (4.5)	

Table 3 Preoperative andpostoperative heartburn

	No symptoms	**Mild**	**Moderate**	**Often**	**Very often**	***p* value**
Group A (no.)						
- Preoperative	0	0	18	25	2	**0.000**
- Postoperative Group B (no.)	40	5	0	0	0	
- Preoperative	0	0	16	28	1	**0.000**
- Postoperative	42	3	0	0	0	

*Chi-square test, p value <0.05 is significant

Discussion

Randomised controlled trials had demonstrated that PPF was just as effective as TF [16–18]. Although Swanstrom and Wayne [20] observed postoperative gastro-intestinal problems in 96% of patients, a research by Negre [19] revealed bothersome gastrointestinal symptoms in 26% of patients and excruciating gastrointestinal complaints in 10% of patients. The fact that multiple observers evaluated each patient after surgery and that not every patient had the same physician operating on them could account for the large variation in results reported in the literature. This problem was avoided in the current study since a single observer performed the postoperative evaluation and all patients were operated on by the same surgeon. The primary postoperative symptoms that have been mentioned in the literature are dysphagia and bloating [21, 22]. 23 patients (25.5%) in the current study reported bloating to varying degrees, with an equal proportion in both groups reporting mild bloating that did not interfere with daily activities. In the TF group, only one patient reported moderate bloating that interfered with daily functioning and might not have been caused by reflux surgery [23, 24]. There are two types of postoperative dysphagia: early and late. Denervation of the lower oesophagus, tight wrap, and undetected motility disorders are a few possible causes [25, 26]. The literature revealed varying rates of dysphagia: 25% by Beldi and Glattti [27], 34% by Frantzides et al. [28], and 10% by

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Parsak et al. The main findings dysphagia was reported in 6 patients (6.7%) which was consistent with the literature and was mainly linked to swallowing of solid food [14]. Frequent belching after surgery might point to a loose fundoplication, but late frequent belching could signify a shift in the wrap, which would be a significant symptom to watch out for. Another typical postoperative symptom among reflux patients is the inability to belch, which may result from damage to the belch reflex's afferent nerves during the dissection of small stomach arteries. While our study indicated a lower incidence of 4.4% and 7.8%, respectively, a recent study by Parsak et al. found that the rate of frequent belching and inability to belch was found to be 11.3% and 20%, respectively [14]. This difference in rate may have been caused by a greater learning curve and rigorous dissection by our subject. Heartburn that occurs after surgery is not always a sign of GERD because it can also result from esophageal irritation that occurred earlier and it may take 3 months to resolve [28, 29]. According to our study, all patients experienced heartburn to varying degrees prior to surgery. However, this rate dramatically decreases to 8.9% postoperatively ($p = 0.000$) and typically occurs once a week, which did not concern the patient. Merely 5.5% of the individuals experienced repeated symptoms and required medical attention. This was in line with findings from a research by Parsak et al. that showed 7.5% of patients experienced recurring symptoms and a postoperative drop in heartburn to 11.23% [14]. Corresponding to a prior study that reported a satisfaction rate of 92.5% [14], around 92.2% of patients expressed satisfaction with their current condition, demonstrating the effectiveness and well-tolerance of the procedure. Low morbidity laparoscopic anti-reflux procedures have been demonstrated to be effective. A number of factors, including nerve damage, tight wrapping, wrap shifting into the chest, eating patterns, postoperative adhesions, and air swallowing, may contribute to the development of various postoperative symptoms [30]. The small sample size and subjective nature of some of the data were the study's shortcomings. According to the results of our study, surgery is the most popular GERD treatment option. PPF is safer to employ and produces results comparable to TF, with the added benefit of requiring less time during surgery.

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