

Management of Dysphagia after Laparoscopic Antireflux Surgeries

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Abstract

Background: The complex gastro-oesophageal reflux disorder (GERD) that affects adults is linked to histologic or macroscopic oesophageal abnormalities. After the age of 40, the prevalence of GERD rises, and it is not unusual for symptomatic people to put off seeking medical attention for years.

Aim: To evaluate the incidence, aetiology, diagnosis and management strategies for dysphagia after laparoscopic antireflux surgeries.

Subjects and methods: The 40 patients who underwent laparoscopic fundoplication at Al-Hussain and Sayed Galal-Bab El-sheria, the Department of General Surgery at Al-Azhar University Hospitals, for gastro-oesophageal reflux disease and/or hiatal hernia between July 10, 2024, and April 10, 2025, were the subjects of this prospective study.

Results: There was a statistically significant difference in the incidence of dysphagia between the groups examined immediately after surgery ($P=0.004$), with group C showing the lowest proportion and group A the highest. There was no statistically significant difference in the incidence of dysphagia among the groups that were evaluated after 6 months. In terms of management, out of the total number of patients treated, 22 (70.97%) in group A, 2 (40%) in group B, and 4 (100%) in the control group experienced a marked improvement after 12 weeks of medication. Six (19.35%) patients in group A, two (40%) in group B, and none in group C underwent endoscopic dilatation, and three (9.68%) patients in group A, one (20%) in group B, and none in group C required a second round of surgery. When looking at outcomes and management, the groups that were evaluated showed no significant difference.

Conclusion: All three techniques are comparable in terms of postoperative outcomes, radiological findings, operative time and upper endoscopy findings, except for the incidence of dysphagia, as Nissen fundoplication has the highest incidence and Dor fundoplication has the lowest one. But after 6 months, all of them showed a similar incidence of dysphagia. Management varies from conservative TTT to endoscopic dilatation and surgical reintervention.

Keywords: Dysphagia; Laparoscopy; Antireflux surgeries

1. Introduction

The diaphragmatic hiatus can enlarge, the oesophagus can shorten, or increasing intra-abdominal pressure can exert a pressure effect that forces the stomach through the hiatus, all of which can lead to a hiatal hernia. Considering that a hiatus hernia is visible in as many as 80% of power athletes, this third factor could be crucial.¹

When it comes to treating pathologic GERD, the "gold standard" technique according to most surgical centres is Nissen fundoplication.² For individuals with simple reflux oesophagitis, the laparoscopic method has been a total success,

to the point where it has supplanted the open method.³

The most recent research shows that when it comes to treating gastro-oesophageal reflux illness in the short to medium term, laparoscopic fundoplication is superior to medication.⁴

The occurrence of postoperative dysphagia after Nissen fundoplication varies greatly depending on the surgeon's expertise, the technique used, and the duration of follow-up. It is the most common symptom following the procedure. Because of swelling and inflammation in the tissues, this typical symptom may only last for a short time.⁵

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In the early postoperative period, mild and transient dysphagia is common; normally, it goes away after a few weeks of a gradually progressive diet. On the other hand, severe and persistent dysphagia is typically associated with the surgical technique and necessitates, along with dietary adjustments, endoscopic intervention, and/or surgical reintervention.⁴

The purpose of this research was to examine dysphagia following laparoscopic antireflux procedures in terms of frequency, causes, diagnostic criteria, and treatment options.

2. Patients and methods

The Research Ethics Committee of Al-Azhar University in Egypt approved this prospective study that lasted from July 10, 2024, to April 10, 2025, and it involved 40 patients who underwent laparoscopic fundoplication at the Al-Hussain and Sayed Galal-Bab El-sheria hospitals as part of the Department of General Surgery for gastro-oesophageal reflux disease and/or hiatal hernia. All patients were asked to sign a permission form before they could be enrolled.

There were three categories used to classify the patients in the study: In Group A, 31 patients had Nissen fundoplications, 5 patients had Toupet fundoplications, and 4 patients had Dor fundoplications.

Inclusion criteria:

Patients with GERD and hiatal hernia who were submitted to laparoscopic antireflux surgeries, aged between 20 and 55 years old, both genders included, and patients fit for anaesthesia and surgery.

Exclusion criteria:

Individuals who are not suitable for anaesthesia or surgery, patients with Barrett's oesophagus, peptic stricture, or related pulmonary illnesses, patients who decline surgery or participate in the study

Here is what all patients went through: medical history review, physical exam, standard laboratory testing, oesophageal manometry, ambulatory pH-metry, and upper gastrointestinal endoscopy

Methods:

Preoperative:

All patients entered the operating room, where an intravenous line, Ryle's tube, and a urinary catheter were introduced. Prophylactic antibiotics were administered to all patients. Anaesthesia was then initiated, and the abdomen was sterilised. Laparoscopic antireflux surgeries, including Nissen and Toupet fundoplication, were performed.

Operative technique:

Toupet fundoplication:

A five-port method was employed. With the use of an extensible retractor, the left lobe of the liver was raised. The liver's left triangular ligament remained intact. The electrosurgical division of the phrenoesophageal ligament was followed by the removal of adipose and connective tissue from the left and right diaphragmatic crura. The vagus nerve was left at a safe distance as the posterior oesophagus was dissected under direct view using blunt-nosed graspers and a 300 or 450 angled telescope.

The oesophagus was retracted inferiorly by passing a vessel loop, or Penrose drain, around it. A large opening was made behind the oesophagus to accommodate the posterior window. Between the angle of His and the superior pole of the spleen, there was space between the diaphragm and the stomach. No damage was done to the gastrosplenic omentum or the short gastric arteries. The well-mobilised oesophagus was handed to the left side of the operator while a section of the gastric fundus's anterior wall was pushed behind the operator.

While the first assistant pulled the fundus anteriorly to the left while holding it firm to the oesophagus, the surgeon used two interrupted silk sutures to tie the fundus to the left crus of the diaphragm and three interrupted sutures to anchor it to the right crus of the diaphragm. Every knot was securely fastened to the body. With the use of three interrupted sutures of 2-0 silk or, more recently, 2-0 braided nylon, a Maloney dilator ranging from 54 to 60 French was inserted and the fundus was secured to the anterior wall of the oesophagus on either side of the anterior vagus nerve. On either side of the oesophagus, the crura of the diaphragm were included in the two fundoplication sutures that were most superior. A fundoplication was performed around the oesophagus, extending 180° to 300°.

Dor fundoplication:

Initial steps included preparing the lower oesophagus for dissection and doing standard posterior hiatal repair with non-absorbable sutures. If a hiatus hernia was detected, the surgeon made a notation of its kind and size in the patient's medical record. A bougie was not utilised on any of the patients. The gastric fundus was partially fundoplicated posteriorly during a laparoscopic Toupet fundoplication. This was done by anchoring it to the oesophagus on three sides and to the crus posterolaterally on the right side. The procedure left the anterior oesophagus exposed. The right crus and anterior oesophagus were sutured to the ventral wall of the stomach fundus during the construction of a laparoscopic 180° anterior fundoplication.

Rosetti-Nissen fundoplication:

Other sources have provided detailed descriptions of laparoscopic Rosetti-Nissen fundoplication. Similar to the Toupet fundoplication procedure, the oesophagus and gastric fundus were mobilised. Following dissection, two or more interrupted 0-silk or braided nylon sutures were used to close the diaphragmatic crura posteriorly. A 3-stitch, 2-cm Nissen fundoplication was made over a 56- to 60-French dilator after the mobilised fundus of the stomach was moved behind the oesophagus. The standard suture size for fundoplication was 2-0. In each suture, the stomach wall was "bitten" full thickness, while the oesophageal wall was "bitten" partially. It was common for the anterior crural arch to be "bitten" into the superiormost suture.

Laparoscopic Nissen fundoplication:

This method was very similar to the two that were already described, with the exception that about 10 cm away from the angle of His, the short gastric arteries and posterior fundus attachments were removed. Clips were inserted into the short stomach vessels beginning inferiorly and working cephalad. To enable full visualisation of the left crus of the diaphragm through the smaller sac, other than mobilising the fundus from the tip of the spleen, several posterior vessels were split across the tail of the pancreas or diaphragm and the cardia of the stomach. When a large amount of undus was still hanging to the right of the oesophagus after a trial fundoplication, we knew that the larger curvature mobilisation had been successful. After a 56- to 60-French dilator was used to conduct a 2-cm fundoplication with three interrupted sutures, it was secured to the underside of the diaphragm.

Dysphagia after laparoscopic anti-reflux surgery:

It was the same surgical team that carried out the endoscopic reintervention or revisional surgery. For endoscopic procedures, radiological screening helped determine if a 30 mm diameter over-the-wire balloon should be placed over the gastro-oesophageal junction or if 17-19 mm Savary Gillard type bougies should be used for dilatation.

In revisional surgeries, laparoscopic reintervention was the gold standard, with preoperative solutions tailored to individual cases. Surgery often included opening up the diaphragmatic hiatus from the front and side, and then making a passageway for the oesophagus and hiatus to connect. A 52 Fr intraesophageal bougie was inserted into the stomach to examine the fundoplication's structure and the calibre of the hiatus in order to pinpoint the most probable source of the dysphagia. The gap was widened by dividing the hiatal rim anteriorly or anterolaterally

on the left side if the hiatal opening seemed narrow. When doctors suspected that a "tight" Nissen fundoplication was to blame for dysphagia, they would switch to a posterior partial or anterior partial fundoplication.

Hiatus hernias were treated by reducing the herniated tissues and repairing the hiatus if they were found. I underwent posterior hiatal dissection if any of the preceding stages were necessary to be completed. Typically, the choice to continue with reintervention for dysphagia was based on clinical considerations, and there was no regulation for the work-up. Although oesophageal manometry and barium swallow radiology were reserved for the most severe cases, most patients did undergo further endoscopies. Patients undergoing dilatation were evaluated endoscopically just prior to the procedure. There was a return to endoscopy, manometry, and pH monitoring for the majority of patients having revisional surgery.

Decisions on whether patients should undergo revision were not based on any predetermined criteria. Prospective use of a standardised structured clinical questionnaire allowed for follow-up following both the first surgery and the reintervention. On one hand, there was a 10-point analogue scale for heartburn symptoms; on the other hand, there was a 10-point scale for dysphagia with solid foods and liquids; and lastly, there was a 10-point scale for overall satisfaction with the clinical outcome. There were three categories used to group symptom scores in order to get the clinical outcome: The outcomes are rated as favourable (0-3), acceptable (4-6), or bad (7-10). We also found that the satisfaction scores fell into one of three categories: 0-3=very dissatisfied. Feeling somewhat content on a scale of 4-6, and completely satisfied on a scale of 7-10.

Postoperative:

The patients were closely observed for any signs of dysphagia in the days immediately following surgery, and they were followed up with frequent check-ups at the outpatient clinic for another six months. Patients were evaluated for dysphagia symptoms during these visits, and if needed, they were given the appropriate treatment.

Statistical Analysis:

A statistical analysis was conducted using SPSS v28, which was developed by IBM© and is located in Armonk, NY, USA. The data distribution was checked for normality using the Shapiro-Wilks test and histograms. The quantitative parametric data were analysed using an ANOVA (F) test with a Tukey post hoc test, and the results were shown as the mean and standard deviation (SD). The qualitative variables were examined using the Chi-square test and were expressed as percentages and frequencies. A statistically significant result was defined as a two-tailed P-value < 0.05.

3. Results

Table 1. baseline attributes of the groups under study.

		GROUP-A (N=31)	GROUP-B (N=5)	GROUP-C (N=4)	P- VALUE
AGE (YEARS)	Mean± SD	38.61±11.34	39.4±8.99	32.5±15.09	0.587
	Range	20-55	27-49	22-54	
SEX	Male	17(54.84%)	3(60%)	3(75%)	0.739
	Female	14(46.67%)	2(40%)	1(25%)	
WEIGHT (KG)	Mean± SD	78.16±8.91	75.6±6.69	76.25±6.18	0.776
	Range	66-96	68-83	71-85	
HEIGHT (M)	Mean± SD	1.68±0.04	1.68±Table .05	1.65±0.03	0.323
	Range	1.62-1.74	1.63-1.73	1.62-1.68	
BMI (KG/M ²)	Mean± SD	28.71±3.27	27.77±2.46	28.01±2.27	0.770
	Range	24.24-35.26	24.98- 30.49	26.08- 31.22	

BMI: body mass index.

The baseline variables (age, sex, weight, height, and BMI) did not significantly differ across the groups under study, (table 1).

Table 2. Radiological data and Upper endoscopy of the groups under study.

		GROUP-A (N=31)	GROUP-B (N=5)	GROUP-C (N=4)	P- VALUE
BARIUM STUDY	H.H	24(77.42%)	4(80%)	3(75%)	0.983
	No	7(23.33%)	1(20%)	1(25%)	
	H.H				
UPPER ENDOSCOPY	Grade A	13(41.94%)	1(20%)	1(25%)	0.707
	Grade B	16(53.33%)	4(80%)	3(75%)	
	Grade C	2(6.45%)	0(0%)	0(0%)	

H.H: hiatus hernia.

The radiographic findings (hiatus hernia) did not significantly differ across the groups under study. The results of the upper endoscopy showed a negligible difference between the groups under study, (table 2; figures 1 & 2).

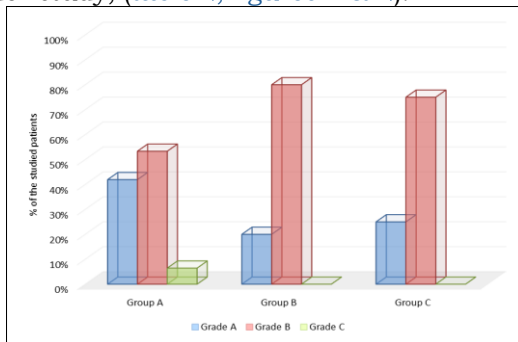


Figure 1. Upper endoscopy of the groups under study.

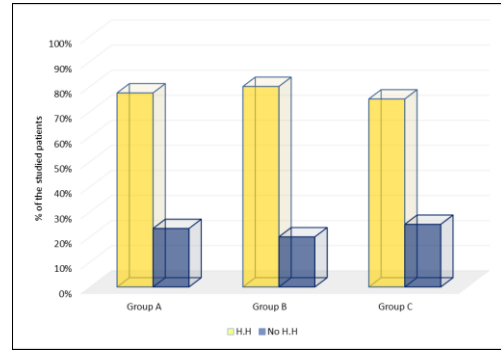


Figure 2. Barium study of the groups under study.

Table 3. Incidence of dysphagia of the groups under study.

		GROUP-A (N=31)	GROUP-B (N=5)	GROUP-C (N=4)	P- VALUE
IMMEDIATE POSTOPERATIVELY	Yes	28(90.32%)	3(60%)	1(25%)	0.004*
	No	3(10%)	2(40%)	3(75%)	
AFTER 6-MONTHS	Yes	11(35.48%)	1(20%)	0(0%)	0.301
	No	20(66.67%)	4(80%)	4(100%)	

*: p-value <0.05 indicates statistical significance.

Immediately after surgery, there was a significant difference in the incidence of dysphagia between the groups under study (P=0.004), with group-C having the lowest proportion and group-A having the lowest proportion. After six months, there was no discernible difference in the prevalence of dysphagia across the groups under study, (table 3; figure 3).

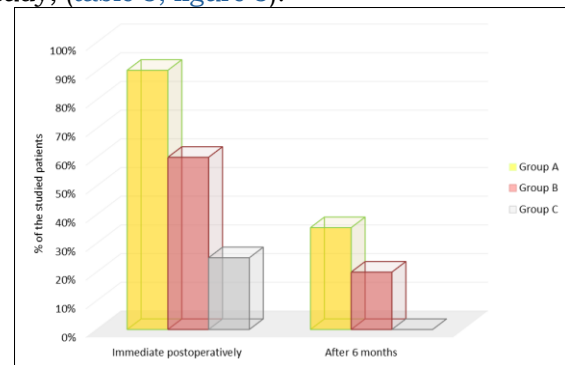


Figure 3. Incidence of dysphagia of the studied groups.

Table 4. Postoperative outcomes of the groups under study.

		GROUP-A (N=31)	GROUP-B (N=5)	GROUP-C (N=4)	P VALU E
GAS BLOAT	Immediate postoperativel y	21(67.74%)	2(40%)	1(25%)	0.161
	After 6-months	13(41.94%)	1(20%)	0 (0%)	
HEARTBURN	Immediate postoperativel y	9(29.03%)	2(40%)	1(25%)	0.860
	After 6-months	7(22.58%)	4(80%)	0 (0%)	
REFLUX	Immediate postoperativel y	11(35.48%)	4(80%)	1(25%)	0.137
	After 6-months	5(16.13%)	3(60%)	0(0%)	

*: p-value <0.05 indicates statistical significance.

Regarding gas bloat, heartburn, and reflux in the initial postoperative period, there was no discernible difference between the groups under study. After six months, heartburn and reflux were considerably different among the groups under study ($P=0.012, 0.043$), with both being higher in group-B than in the other groups, although gas bloat was not significantly different among the groups under study, (table 4; figures 4-6).

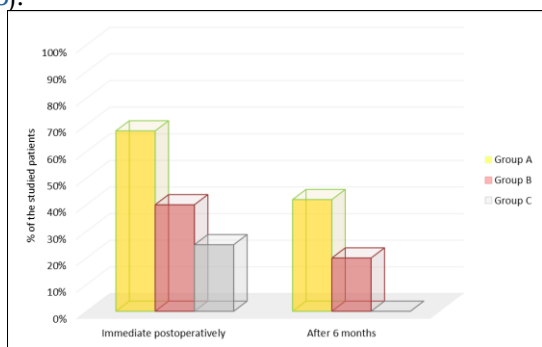


Figure 4. Gas bloat of the groups under study.

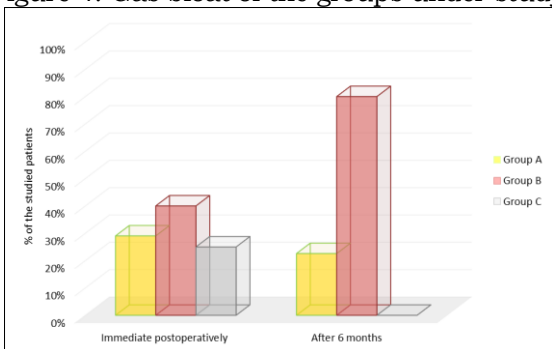


Figure 5. Heart burn of the groups under study.

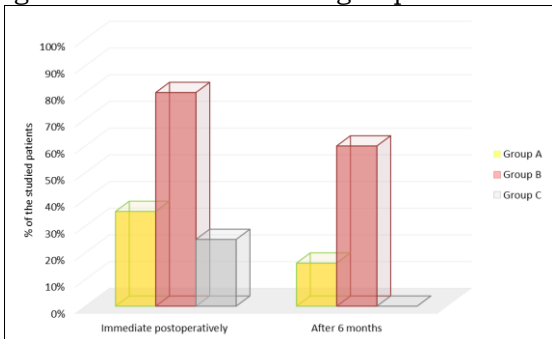


Figure 6. Reflux of the groups under study.

Table 5. Outcome and management of the groups under study.

	GROUP-A (N=31)	GROUP-B (N=5)	GROUP-C (N=4)	P-VALUE
IMPROVEMENT WITH MEDICATIONS	22(70.97%)	2(40%)	4(100%)	0.424
ENDOSCOPIC DILATAION	6(19.35%)	2(40%)	0(0%)	
RE-SURGERY	3(9.68%)	1(20%)	0(0%)	

In terms of treatment, 22 patients (70.97%) in group A, 2 patients (40%) in group B, and 4 patients (100%) in group improved with medication within 12 weeks. Six patients (19.35%) in group A, 2 patients (40%) in group B, and none in group C had endoscopic dilatation,

and 3 patients (9.68%) in group A, 1 patient (20%) in group B, and none in group C required re-surgery. The groups under study showed negligible differences in terms of management and result, (table 5; figure 7).

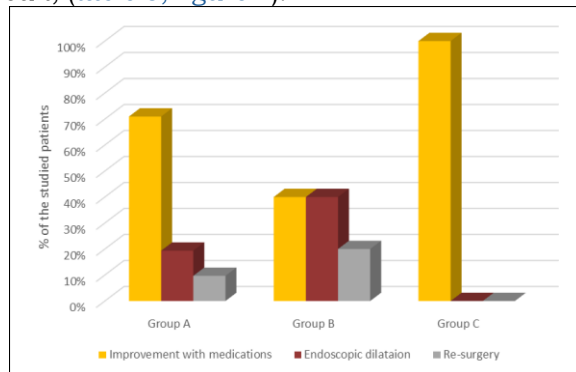


Figure 7. Outcome and management of the studied group.

4. Discussion

Laparoscopic anti-reflux surgeries, such as Nissen and Toupet funduplications, are minimally invasive procedures designed to treat GERD by reinforcing the lower oesophageal sphincter. These surgeries have demonstrated high efficacy in symptom control and patient satisfaction, with long-term studies reporting significant reductions in heartburn and regurgitation symptoms. For instance, a study noted a decrease in heartburn from 80.8% preoperatively to 21.9% postoperatively, and regurgitation between 65.7%-15.1%.⁶

The baseline parameters (age, sex, height, weight, and BMI) and related comorbidities (hypertension, diabetes mellitus, and smoking) did not significantly differ between the groups under study.

Similarly, Trepanier et al.,⁷ 87 of the 106 patients who were included were matched (Dor=48, Nissen=58), and it was discovered that the baseline characteristics of the matched groups were fairly balanced.

In line with us, Lee et al.,⁸ According to a meta-analysis, patients who underwent Nissen, Toupet, and Dor procedures experienced heartburn at rates of 30.5%, 46.1%, and 44.4%, respectively, and postoperative regurgitation at rates of 28.3% (36/127), 40.0% (24/60), and 43.8% (7/16); neither of these findings indicated any statistically significant differences for any of the comparisons between the three intervention groups.

Regarding the upper endoscopy results (Grades A, B, and C), there was a negligible difference between the groups under study. The radiographic findings (hiatus hernia) did not significantly differ across the groups under study. There was negligible variation in the operating time between the groups under study.

Also, Du et al.,⁹ Regarding operating time, a meta-analysis and comprehensive review revealed no discernible differences between anterior 180° fundoplication and Nissen fundoplication.

The incidence of dysphagia varied considerably between the groups under study immediately after surgery ($P=0.004$), with group C showing the lowest proportion and group A showing the greatest proportion. The incidence of dysphagia varied negligibly between the groups under study after six months.

Consistent with our results, Trepanier et al.,⁷ verified that, at one month, the Dor group experienced identical reflux symptoms as the Nissen group, but the incidence of severe dysphagia was lower in the Dor group ($P=0.02$). Severe reflux and dysphagia symptoms at 6 months and the most recent visit were the same.

Similarly, a systematic review and meta-analysis by Du et al.⁹ compared anterior 180° fundoplication, Nissen fundoplication and found that Nissen fundoplication was linked to a greater incidence of postoperative dysphagia.

Consistent with our findings, Hunter et al.¹⁰ found that Laparoscopic Nissen fundoplication had a greater rate of early and persistent postoperative dysphagia in the first month following surgery compared to Toupet fundoplication ($p<0.001$).

Regarding the immediate postoperative outcomes of reflux, heartburn, and gas bloat, there was no significant difference between the groups under study. After six months, there was no significant difference in gas bloat across the groups under study, but there was a significant difference in heartburn and reflux ($P=0.012$, 0.043), and both were higher in group B than in the other groups.

Also, Du et al.,⁹ The study found no discernible differences between anterior 180° fundoplication and Nissen fundoplication in terms of the duration of postoperative diarrhoea, gas bloating, heartburn, or inability to belch.

Unlike the earlier findings, Rudolph-Stringer et al.,¹¹ Anterior fundoplication caused more heartburn than Nissen fundoplication, according to the study.

However, Broeders et al.¹² compared to Nissen fundoplication, the dysphagia score, gas bloating, flatulence, inability to belch, and failure to reduce bloating were all lower following anterior fundoplication.

In terms of management, 22 patients (70.97%) in group A, 2 patients (40%) in group B, and 4 patients (100%) in group C showed improvement with medication within 12 weeks. Six patients (19.35%) in group A, 2 patients (40%) in group B, and none in group C underwent endoscopic

dilation, and 3 patients (9.68%) in group A, 1 patient (20%) in group B, and none in group C required re-surgery. There was an insignificant difference among the studied groups regarding outcome and management.

Trepanier et al.,⁷ reported one case of re-operation in both DOR and Nissen groups, also one case in the DOR group and 3-cased in the Nissen group needed endoscopic dilatation, with no significant difference between both groups.

4. Conclusion

All three techniques are comparable in terms of postoperative outcomes, radiological findings, operative time and upper endoscopy findings, except for the incidence of dysphagia, as Nissen fundoplication has the highest incidence and Dor fundoplication has the lowest one. But after 6 months, all of them showed a similar incidence of dysphagia.

Also, the Dor fundoplication has the shortest length of hospital stay, followed by the Toupet fundoplication, then the Nissen fundoplication. Additionally, the Dor fundoplication showed greater improvement with medications, followed by Nissen fundoplication and then Toupet fundoplication. The endoscopic dilatation and re-surgery were reported only in both Toupet fundoplication and Nissen fundoplication, respectively. Management varies from conservative TTT to endoscopic dilatation and surgical reintervention. The groups under study showed few differences in management and outcome.

Disclosure

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Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

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