

Comparison of postoperative results of laparoscopic nissen and nissen-rossetti fundoplication

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Sibel Özkara¹, Hüseyin Sinan², Murat Özkara³

¹ Department of General Surgery, University of Health Sciences, Atatürk Sanatoryum Training and Research Hospital, Ankara

² General Surgery Clinic, Private Clinician, Istanbul

³ Department of General Surgery, University of Health Sciences, Gülhane Training and Research Hospital, Ankara, Turkey

Abstract

Aim: Nissen fundoplication, which is performed laparoscopically, is the most frequently preferred surgical technique worldwide in the treatment of gastroesophageal reflux disease (GERD). This technique has subtypes such as Nissen and Nissen-Rossetti. This study aimed to investigate and compare the effects of Nissen and Nissen-Rossetti techniques of Nissen fundoplication, which is the most preferred technique by surgeons in the surgical treatment of GERD, on patients in the postoperative period.

Material and Methods: Patients, who were operated on for GERD with laparoscopic Nissen fundoplication (LNF) and laparoscopic Nissen-Rossetti fundoplication (LNRF) techniques in the general surgery clinic of a tertiary care hospital between January 2011 and May 2016 were divided into two groups, and preoperative, intraoperative, and postoperative findings were examined in detail, and these patients were contacted.

Results: In this study, 44 (47%) patients underwent LNF surgery, and 49 (53%) patients underwent LNRF surgery. When dyspepsia and other reflux symptoms in patients in the postoperative period were investigated, in the postoperative 4th week and postoperative 6th month, there was no significant difference between the LNF and LNRF groups.

Discussion: Although there is no obvious superiority of the two techniques over each other, the determining factor regarding the method to be chosen should be the opinion of the surgeon and the perioperative findings as a result of the evaluation made by the surgeon on the patient. It would be appropriate for the surgeon to choose the most suitable technique according to the patient.

Keywords

Gastroesophageal Reflux Disease, Nissen Fundoplication, Nissen-Rossetti Fundoplication, Dyspepsia

DOI: 10.4328/ACAM.21726 Received: 2023-04-13 Accepted: 2023-06-09 Published Online: 2023-07-31 Printed: 2023-10-15 Ann Clin Anal Med 2023;14(Suppl 3):S215-219

Corresponding Author: Murat Özkara, Department of General Surgery, University of Health Sciences, Gülhane Training and Research Hospital, 06010, Ankara, Turkey.

E-mail: opdrmozkara@gmail.com P: +90 312 304 51 24

Corresponding Author ORCID ID: <https://orcid.org/0000-0003-3547-3951>

This study was approved by the Ethics Committee of Department of General Surgery of the Health Sciences University, Gullhane Training and Research Hospital (Date: 2016-06-08, No: 2016/338)

Introduction

Gastroesophageal reflux (GER) is the backflow of stomach contents into the esophagus. It is a physiological condition that occurs, especially after eating [1]. When the amount of regurgitation exceeds the physiological threshold, inflammatory changes in the esophageal mucosa cause macroscopic lesions such as esophageal and extra-esophageal symptoms, erosive esophagitis, or atypical symptoms (such as laryngitis, pharyngitis, and dental erosions) [2]. Gastroesophageal reflux disease (GERD) is a very common entity in society. Hiatal hernia, on the other hand, describes the herniation of any intraabdominal organ into the thoracic cavity, except for the esophagus, from a defect in the diaphragm. Hiatal hernia is a risk factor for exposure of the esophagus to acidic stomach contents and is associated with GERD [3, 4].

Anti-reflux surgical interventions are preferred in patients who do not benefit from medical treatment in the treatment of GERD. Barrett's esophagus due to GERD may develop as a result of a delay in treatment. The risk of esophageal adenocarcinoma due to Barrett's esophagus increases in patients [5, 6]. In addition, GERD significantly affects the quality of life of patients in a negative way. For these reasons, GERD treatment is an essential entity. The most preferred surgical technique in the surgical treatment of GERD worldwide is the Nissen fundoplication performed laparoscopically. Since there are varieties of fundoplication such as Nissen, Toupet, Dor, etc., Nissen fundoplication has varieties such as classical Nissen fundoplication and Nissen-Rossetti [7, 8].

In this study, it was aimed to investigate, compare, and evaluate the effects of the classical Nissen fundoplication, which is the most preferred technique by surgeons in the surgical treatment of GERD, and Nissen-Rossetti techniques on patients in the postoperative period.

Material and Methods

In this study, it was planned to create a database by scanning patient files retrospectively. The sampling time for this study was determined to be between January 2011 and May 2016. It was planned to include the files of patients who were operated on in the Department of General Surgery of the Health Sciences University Gülhane Training and Research Hospital with the laparoscopic Nissen fundoplication technique and the Nissen-Rossetti technique for GERD between these dates. Ethics committee approval was obtained from Gülhane Military Medical Academy local ethics committee on June 8, 2016 with the approval number 2016/338.

A survey was administered to the patients, comparing their preoperative complaints with the postoperative period and questioning the newly developed nonspecific digestive system complaints in the postoperative period, the frequency of these complaints, and their level of satisfaction with the surgery. For this purpose, the GERD Symptom Scale, which was first developed by Velonovich in 1996 and subsequently used in many studies, was modified and used. In this form, specific GERD complaints such as bitter water in the mouth and burning, non-specific symptoms such as bloating, frequent flatulence, frequent diarrhea, abdominal pain, nausea, and vomiting; dysphagia, rapid saturation, difficulty in passing gas from the

mouth, and newly occurring digestive system complaints in the postoperative period were questioned in order to compare the preoperative and postoperative periods.

Patients who underwent classical Nissen and Nissen-Rossetti surgery, which are subtypes of laparoscopic Nissen fundoplication with the diagnosis of GERD, were included in the study. Patients with the diagnosis of GERD who underwent surgery with different fundoplication techniques or who underwent open surgery were not included in the study. The complaints of the patients in the preoperative period, the endoscopy results of the patients, and the early and late postoperative complaints were determined by the GERD health-related quality of life questionnaire and included in the study. Relapse cases were not included in the study. After determining the inclusion and exclusion criteria of the study, the patients were divided into two groups: laparoscopic classical Nissen (LNF) and Nissen-Rossetti (LNRF) fundoplication.

Statistical analysis

Study data were analyzed using the SPSS Version 14.0 (SPSS Inc. Chicago, IL, USA). The statistical techniques to be applied were preferred in accordance with the type of data available. In the comparison of the distributions of categorical data in the two groups, two-by-two or multiple sample chi-square tests and, if necessary, Fisher's exact test were applied; Spearman's rho test was applied in the correlation study between categorical data; and the Mann-Whitney U test and t-test were applied in the comparison of the numerical data of the two groups. A p-value of lower than 0.05 was considered statistically significant in the statistical analyses.

Results

Ninety-three patients were included in the study. The surgery files of the patients were screened retrospectively, and the length of hospital stay, preoperative endoscopies, and types of surgery were determined. By contacting the patients who were in the postoperative period, information was gathered using the question-answer method.

In this study, laparoscopic classical Nissen fundoplication surgery was performed in 44 (47%) patients, and laparoscopic Nissen-Rossetti fundoplication was performed in 49 (53%) patients. None of the patients needed to undergo open surgery, and none of the patients developed complications in the intraoperative period. None of the patients required reoperation. The mean age of the patients was 46.17 ± 15.92 . 57 (61%) of the patients were male and 36 (39%) were female.

In the preoperative endoscopy, "esophagitis" was detected in 34 (77.3%) patients in the LNF group and 44 (89.84%) patients in the LNRF group. In the LNF group, grade 1-2 esophagitis was detected in 29 (65.9%) of the patients with esophagitis, and grade 3-4 esophagitis was detected in 5 (11.4%) patients. In the NRF group, grade 1-2 esophagitis was found in 33 (67.3%) patients and grade 3-4 esophagitis in 5 (11.4%) patients, respectively. The rate of hiatal hernia was detected in 30 (68.2%) patients in the LNF group and in 37 (75.5%) patients in the LNRF group. Barrett's esophagus was detected in only one patient. While laryngopharyngeal reflux was present in 8 (18.2%) patients in the LNF group, it was detected in 25 (51%) patients in the LNRF group. These rates were found to be

Table 1. Comparison of LNF and LNRF groups according to esophagitis, degree of esophagitis, hiatal hernia, and laryngeal reflux.

Esophagitis	LNF Group	LNRF Group	p- value
Yes	34 (77.3%)	44 (89.84%)	0.101
No	10 (22.7%)	5 (10.2%)	
Esophagitis degree	LNF Group	LNRF Group	p- value
No	10 (22.7%)	5 (10.2%)	0.141
Grade 1-2	29 (65.9%)	33 (67.3%)	
Grade 3-4	5 (11.4%)	5 (11.4%)	
Hiatal Hernia	LNF Group	LNRF Group	p- value
Yes	30 (68.2%)	37 (75.5%)	0.432
No	14 (31.8%)	12 (24.5%)	
Laryngeal Reflux	LNF Group	LNRF Group	p- value
Yes	8 (18.2%)	25 (51%)	<0.05
No	36 (81.8%)	24 (49%)	

*LNF; Laparoscopic Nissen fundoplication, LNRF; Laparoscopic Nissen-Rossetti fundoplication, * *Statistically significant results (p<0.05) were written in bold format.

Table 2. Comparison of LNF and LNRF groups according to dyspepsia symptoms in the preoperative and postoperative period.

Postoperative 4th Week	Dyspepsia	LNF Group	LNRF-Group	p- value
	No	16 (36.4)	25 (51)	
	Low	26 (59.1)	18 (36.7)	
	Medium	1 (2.3)	5 (10.2)	
	Frequent	1 (2.3)	1 (2)	
	Very often	0 (0)	0 (0)	
Preoperative period	Dyspepsia	LNF Group	LNRF Group	p- value
	No	5 (11.4)	9 (18.4)	
	Low	2 (4.5)	3 (6.1)	
	Medium	4 (9.1)	1 (2)	
	Frequent	15 (34.1)	22 (44.9)	
	Very often	18 (40.9)	14 (28.6)	
Postoperative 6th Month	Dyspepsia	LNF Group	LNRF Group	p- value
	No	30 (68.2)	36 (73.5)	
	Low	12 (27.3)	11 (22.4)	
	Medium	1 (2.3)	2 (4.1)	
	Frequent	1 (2.3)	0 (0)	
	Very often	0 (0)	0 (0)	

*LNF; Laparoscopic Nissen fundoplication, LNRF; Laparoscopic Nissen-Rossetti fundoplication, * *Statistically significant results (p<0.05) were written in bold format.

Table 3. Comparison of LNF and LNRF groups according to postoperative vomiting complaint.

Vomiting	LNF Group	LNRF Group	p- value
No	18 (40.9)	20 (40.8)	0.032
Low	20 (45.5)	10 (20.4)	
Medium	2 (4.5)	5 (10.2)	
Frequent	3 (6.8)	7 (14.3)	
Very often	1 (2.3)	7 (14.3)	

*LNF; Laparoscopic Nissen fundoplication, LNRF; Laparoscopic Nissen-Rossetti fundoplication, * *Statistically significant results (p<0.05) were written in bold format.

statistically significant ($\chi^2= 10.920, p<0.05$) (Table 1).

According to the hospitalization period of the patients, 39 (88.6%) patients in the LNF group stayed in the hospital for 1-3 days, 4 (9.1%) patients stayed for 4-6 days, and 1 (2.3%) patient stayed for 7 days or more. In the LNRF group, 39 (79.6%) patients stayed in the hospital for 1-3 days, 10 (20.4%) patients stayed in the hospital for 4-6 days, and there was no patient who stayed in the hospital for 7 days or more in this group. In the preoperative LNF group, the complaint of “dyspepsia” was very common in 18 (40.9%) patients and frequent in 15 (34.1%) patients, while it was very common in 14 (28.6%) patients and frequent in 22 (44.9%) patients in the LNRF group. There was no statistically significant difference ($\chi^2= 4.712, p=0.318$). In the first 4 weeks after surgery, dyspepsia complaints disappeared in 16 (36.4%) patients in the LNF group and in 30 (68.2%) patients at the end of 6 months. In the LNRF group, this complaint disappeared in 25 (51%) patients in the first 4 weeks and in 36 (73.5%) patients at the end of 6 months. There was no statistically significant difference between the two groups ($\chi^2= 1.658, p=0.646$) (Table 2).

In the preoperative LNF group, the complaints of vomiting were ‘none’ in 18 (40.9%) patients and ‘few’ in 20 (45.5%) patients, while they were ‘none’ in 20 (40.8%) patients and ‘few’ in 10 (20.4%) patients in the LNRF group. There was a statistically significant difference between both groups ($\chi^2= 10.586, p=0.032$). However, there was no complaint of vomiting in both groups in the first 4 weeks and 6 months after surgery (Table 3).

Discussion

The effectiveness of Nissen fundoplication, which is the most preferred anti-reflux surgery in the world for the treatment of chronic GERD complaints with a morbidity and mortality rate of less than 1%, has been demonstrated in many studies. It has been demonstrated in many studies related to the subject that Nissen fundoplication is more effective and cheaper than medical treatment. Laparoscopic fundoplication is considered the most ideal treatment for the surgical treatment of GERD [9].

Many studies have determined that bloating and dyspepsia are among the complaints that can occur preoperatively and persist to a large extent after surgery [10, 11]. In this study, although 75% of patients who underwent laparoscopic classical Nissen fundoplication and 73.5% of patients who underwent laparoscopic Nissen-Rossetti fundoplication had preoperative dyspepsia complaints, it was seen that when their complaints of dyspepsia were questioned 6 months later, it decreased to 1% in the LNF group and was found to be none in the LNRF group. It was thought that this might be due to the short follow-up period.

Postoperative dysphagia is divided into two categories as early dysphagia and late dysphagia. Postoperative dysphagia may be due to many reasons. A motility disorder such as achalasia, a narrower fundoplication than normal, or damage to the nerve conduction of the lower esophagus due to surgery can be counted among the pathologies that may cause dysphagia. Because of the nature of the surgery, this is an expected situation in the early postoperative period. However, if it continues for more

than three months, pathology is mentioned. The main problem here is what the patients make of the dysphagia. As a matter of fact, the pathology often expressed as dysphagia is actually the feeling of being stuck during swallowing. Sometimes complaint of dysphagia in patients can be confused with odynophagia. Therefore, patients should be questioned in detail. Studies that show the effect of personal characteristics have also been reported. In another study, it was indicated that postoperative dysphagia was more common in patients with GERD without endoscopic findings [12, 13].

Retrosternal burning sensation and regurgitation are the two main symptoms of GERD. Patients who state that the complaint of retrosternal burning continues should not be accepted as a recurrence immediately. This is because the continuation of these complaints may be related to the esophageal irritation in the preoperative period. Complete healing of this condition takes a few months. However, if the patient continues to consume alcohol and carbonated drinks, the complaints will not regress. In many studies, it has been reported that these complaints regressed considerably within 3 months [14-17]. While regurgitation was observed at a rate of 95.5% in the LNF group and 97.9% in the LNR group during the preoperative period, this complaint disappeared in the postoperative period with a rate of 100% in the LNF group and 95.9% in the LNR group. There was no significant difference between these two groups. While complaints of burning were 100% in the LNF group in the preoperative period, they were found to be 97.9% in the LNR group. At the end of the 6-month follow-up after surgery, this complaint disappeared at a rate of 95.5% in the LNF group and close to 100% in the LNR group. Another important point is that although similar complaints are seen postoperatively, they occur less frequently and on a scale that does not affect daily life, unlike the preoperative period. Also, it has been reported that retrosternal burning and regurgitation are observed more frequently in the postoperative period in patients with long-standing complaints in the preoperative period. Although this may lead to the feeling that the complaints are continuing as a result of chronic irritation, there is no pathology shown in reality.

Nausea and vomiting are other complaints seen in patients in the preoperative period. In this study, vomiting complaints, which were 59.1% in the LNF group and 59.2% in the LNR group in the preoperative period, completely disappeared in both groups in the postoperative period, which is consistent with the literature. There was a statistically significant difference between the groups [18, 19]. Both the regression of the patient's specific complaints and the valve mechanism due to the surgery are the factors that are considered effective in reducing the frequency of vomiting in the postoperative period. The prevalence of GERD has been increasing in recent years. Current treatments are mostly based on lifestyle changes, medical treatment, endoscopic interventions, and surgical interventions. Although endoscopic methods such as radiofrequency ablation of the gastroesophageal junction, gastroesophageal junction sutures, and the use of filling material have recently been discussed in the treatment of GER, they are not routinely used. Medication use with lifestyle changes has reached dosages and durations that are not

possible for most long-term GER patients and are not suitable for lifelong treatment. Besides, drug therapy cannot repair anatomical defects such as hiatal hernia. Laparoscopic Nissen fundoplication is the gold-standard treatment for GER. It resulted similarly in terms of postoperative symptoms in the studies for both surgical techniques and in our study [20].

Study Limitations

The fact that the surgeries and endoscopic procedures performed were not performed by a single operator may have caused heterogeneity in the results we obtained in the study. Some patients were not included in the study due to the lack of their contact information. Another limitation of the study is that it is a retrospective study.

Conclusion

When the study data were examined, no significant superiority of one technique over the other was observed. Therefore, the method to be chosen should be determined according to the opinion of the surgeon as a result of the evaluation of the patient and the per-operative findings. It would be appropriate for the surgeon to choose the most patient-oriented technique. However, there is a need for randomized-prospective studies, reviews, and meta-analyses on this subject.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: None

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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How to cite this article:

Sibel Özkara, Hüseyin Sinan, Murat Özkara. *A Comparison of Postoperative Results of Laparoscopic Nissen and Nissen-Rossetti Fundoplication.* *Ann Clin Anal Med* 2023;14(Suppl 3):S215-219

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