

# Peri-and post-operative comparison of 24 hour ph monitoring results in patients who with laparoscopic ant-reflux surgery

● Mümtaz Erakın,<sup>1</sup> ● Murat Akıcı,<sup>2</sup> ● Sezgin Yılmaz,<sup>2</sup> ● Yüksel Arıkan<sup>2</sup>

<sup>1</sup>Department of Surgical Oncology, Zonguldak Ataturk State Hospital, Zonguldak, Turkey

<sup>2</sup>Department of General Surgery, Health Sciences University Faculty of Medicine, Afyonkarahisar, Turkey

## ABSTRACT

**Introduction:** Gastroesophageal reflux disease (GERD) is a common medical problem affecting the quality of life and causing morbidity. Twenty four hour pH monitoring is the most sensitive and specific test in diagnosing GERD. The aim of this study is to compare pre- and post-operative 24 h pH monitoring results, life quality, and demographic features of patients with GERD diagnosis who underwent laparoscopic ant-reflux surgery.

**Materials and Methods:** In this study, 40 patients who were referred to Afyon Kocatepe university hospital general surgery clinic between January 2016 and August 2017, diagnosed with GERD and underwent laparoscopic ant-reflux surgery were enrolled. The results of pre- and at least 3 months post-operative 24-h pH monitoring were compared.

**Results:** Of those 40 patients who were enrolled to the study 16(40%) were male and 24 (60%) were female. The average age of the male patients was  $47.65 \pm 15.3$ , and the average age of the females was  $42.55 \pm 13.5$ . It was observed that the quality of life scores of the patients, evaluated with GERD-HRQL in the pre-operative period, decreased statistically significantly in the post-operative period. ( $p=0.001$ ) The pre-operative DeMeester Score of all patients was above the normal value, and when the post-operative analysis results were examined, it was observed that the reflux parameter results decreased.

**Conclusion:** It has been shown that the post-operative 24-h pH monitoring results in patients who underwent laparoscopic anti-reflux surgery decreased significantly compared to the pre-operative results. It was observed that the symptoms were brought under control and the quality of life was improved in the patients. Based on these results, Nissen fundoplication is a successful and effective procedure. 24 h pH monitoring should be done post anti-reflux surgery to assess the effectiveness of the procedure and symptom post-surgery.

**Keywords:** Gastroesophageal reflux disease, Laparoscopic antireflux surgery, Twenty four hour pH monitoring

## Introduction

Gastroesophageal reflux disease (GERD) is a very common health problem in the community, affecting quality of life and causing morbidity.<sup>[1]</sup> The symptoms that occur as a result of reflux of acid and peptic gastric fluid into the

esophagus are called gastroesophageal reflux syndrome.

<sup>[2]</sup> Although the presence of symptoms such as pyrosis and regurgitation in the diagnosis of GERD is sufficient for the diagnosis, 24-h pH monitoring has been shown to be the most sensitive and specific method for definitive indica-



Received: 17.01.2022 Accepted: 01.02.2022

Correspondence: Mümtaz Erakın, M.D., Department of Surgical Oncology, Zonguldak Ataturk State Hospital, Zonguldak, Turkey

e-mail: mmtzerkn@gmail.com



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

tion of acid reflux.<sup>[3]</sup> In 24-h pH monitoring, the esophageal pH value, the duration of reflux attacks and the relationship of these data with the patient's activity and position are evaluated. The basis of the treatment of GERD is the medical approach. Anti-reflux surgery is performed in patients who are resistant to medical treatment. Diagnostic methods are recommended before surgical treatment.<sup>[4]</sup> In our study, we aimed to compare the results of pre- and post-operative 24-h pH monitoring, demographic characteristics and quality of life evaluation in patients with GERD who underwent laparoscopic antireflux surgery.

## Materials and Methods

The study included 54 patients who came to Afyon Kocatepe University Medical Faculty General Surgery Out-patient Clinic between January 2016 and August 2017 and were diagnosed with gastroesophageal reflux and underwent laparoscopic antireflux surgery. 10 cases that could not be measured due to device problems at the time of registration and 4 cases that could not be treated were excluded from the study, and 40 cases were included in the final study. Pre- and post-operative pH monitoring results, age, height (cm) and weight (kg) data were recorded using patient files and computer archive records. Body mass index of the cases was calculated with the formula body mass index (BMI) (%) = Body weight (kg)/height<sup>2</sup> (m<sup>2</sup>).

All patients underwent 24-h pH monitoring pre and post-operatively. Post-operative application was performed at least 3 months after surgery. For pH monitoring, patients should be evaluated after 8–12 h of fasting, they should have discontinued drugs known to affect gastroesophageal reflux at least 7 days before and should not use these drugs during the study. When the patients are registered after 24 h, the data of this procedure are reported as “Total reflux time (TRT), number of reflux periods (NRP), number of long reflux periods, longest reflux and DeMeester score.” “Laparoscopic nissen fundoplication” surgery was performed on all patients under general anes-

thesia by faculty members of the department. Patients were evaluated with GERD-health related quality of life (GERD-HRQL) index form when they came for both pre- and post-operative follow-up. The obtained results were compared using the T test and Wilcoxon test. Statistical calculations were made using SPSS 13.0 for Windows® (2010, LEAD Technologies, USA).

This study was accepted by Afyon Kocatepe Medical Faculty Ethics Committee with the code of 2011-KAEK-2 dated 05.01.2018.

## Results

Of the 40 patients included in the study, 16 (40%) were male and 24 (60%) were female. The mean age was 47.65±15.3 in men and 42.55±13.5 in women. The mean BMI of the patients was 27.6±4.6 kg/m<sup>2</sup> (19.38–36.45 kg/m<sup>2</sup>). While 4 (10%) patients were using alcohol, 15 (37.5%) were smoking (Table 1).

Twenty four-hour pH monitoring findings; TRT, Total Reflux Time Percentage (TRTP), Number of Reflux Periods (NRP), Number of Reflux Periods Longer than Five Minutes (NRPLFM), and De Meester Score (DMS) were evaluated separately. Pre-operative scores of the patients were compared with post-operative scores and a statistically significant improvement was found in all post-operative scores (p<0.001 Table 2).

**Table 1. Demographic and General Characteristics of the Patients**

General features	n	%	Average±SD
Female	24	60	42,55±13,5
Male	16	40	47,65±15,3
BMI	40	100	27,6±4,6
Alcohol Drinker	4	10	
Smoker	15	37,5	

**Table 2. Preoperative and postoperative results of 24-hour PH Monitoring**

	Preoperative	Postoperative	p
Total Reflux Time	783,4±458 (0,3-1471)	453,5±488 (0-1290)	0,003
Total Reflux Time Percentage	59,5±30,1 (1,7-98,9)	31,6±37,7 (0-96,2)	<0,001
Number of Reflux Periods	139,6±96,6 (1-355)	98,6±72,9 (0-298)	0,003
Number of Reflux Periods Longer than Five Minutes	16,9±10,7 (0-42)	9,2±9,1 (0-31)	0,001
DeMeester Score	186,03±97,8 (15,2-466,7)	99,4±104,05 (0,2-331,9)	<0,001

The patients' quality of life scores evaluated with GERD-HRQL in the pre-operative period were  $27.32 \pm 8.93$  (8–45) on average, and these scores decreased to an average of  $16.55 \pm 9.7$  (1–40) in the post-operative period. GERD-HRQL scores were statistically significantly decreased in the post-operative period compared to the pre-operative period ( $p=0.001$ ).

## Discussion

GERD is a clinical condition defined as stomach contents leaking into the esophagus and causing symptoms and/or complications in patients.<sup>[5]</sup> Its incidence has been increasing in recent years, and it is accepted as one of the most common chronic diseases in developed countries. The incidence of GERD in our country is 20%, similar to developed countries.<sup>[6]</sup> One of the commonly used methods for the diagnosis of GERD is 24-h esophageal pH monitoring. This method is the gold standard method with the highest sensitivity and specificity to detect pathological reflux and the amount of reflux.<sup>[7]</sup> A scoring system developed by DeMeester et al. in 1974 is used to evaluate the results obtained from patients. Accordingly, if the total score is  $>14.72$ , it is considered as pathological reflux.<sup>[8]</sup> The pre-operative DMS of all 40 patients included in our study was above the normal value, and the DMS was found to be  $186.03 \pm 97.8$  (15.2–466.7). The fact that the symptoms of GERD do not respond to medical treatment and the presence of hiatal hernia and mechanical dysfunction in the sphincter require surgical treatment.<sup>[9]</sup> Laparoscopic funduplication is the most widely used surgical method in the surgical treatment of GERD and is considered the gold standard.<sup>[10]</sup> In our study, the diagnosis of GERD was made by the presence of symptoms, endoscopy and 24-h pH monitoring. 40 patients diagnosed with GERD by symptoms and endoscopy were included in the study, and laparoscopic nissen funduplication surgery was applied to these patients without any complications.

In general, studies are evaluated by comparing the results of clinical, laboratory and other diagnostic tests. Recently, however, it has come to the fore to evaluate how patients' lives are affected as a result of the disease and its treatment, as well as to evaluate their functional status and well-being.<sup>[11]</sup> To evaluate these criteria, the concept of "HRQL," which is the patient-centered concept, was developed. GERD-HRQL is a test that evaluates the effects of GERD on quality of life. It has been reported that GERD-HRQL is an effective method in evaluating the severity of the disease, its effects and the results of the treatment, regarding patient satisfaction.<sup>[12]</sup>

In our study, GERD-HRQL scores decreased statistically significantly in the post-operative period compared to the pre-operative period ( $p=0.001$ ). The study of K.-F. Chin et al., which was based on symptom follow-up with 24-h pH monitoring after laparoscopic nissen fundoplication; showed that 105 patients had a significant decrease in their typical symptoms and De Meester score 1 year after the operation.<sup>[13]</sup> In our study, patients' 24-h pH monitoring analysis results were examined and a decrease in TRT, TRTP, NRP, NRPLFM, and DMS results were seen. As a result of these changes, a statistically significant difference was observed ( $p<0.001$ ).

## Conclusion

The following results were obtained, in this study, which was conducted to compare the symptoms and 24-h pH monitoring results in the post-operative period after laparoscopic antireflux surgery in adult patients with suspected GERD and who were diagnosed with the presence of symptoms, endoscopy and 24-h pH monitoring, and to evaluate the effects of surgical treatment on quality of life:

- The method with the highest diagnostic value in GER disease in adult patients is 24-h pH monitoring.
- 24-h pH monitoring is a guide for patients' need for medical treatment or surgery.
- It has been shown that the primary purpose of laparoscopic Nissen fundoplication surgery, which is performed as surgical treatment of GERD, is the anti-reflux barrier, and its result, the prevention of pathological reflux, is successful in controlling the symptoms and improving quality of life.
- It can be said that 24-h pH monitoring is a reliable method to monitor the symptoms and to see the surgical efficiency in the post-operative period in patients who have undergone laparoscopic anti-reflux surgery.

## Disclosures

**Ethics Committee Approval:** This study was accepted by Afyon Kocatepe Medical Faculty Ethics Committee with the code of 2011-KAEK-2 dated 05.01.2018.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept – M.E.; Design – M.A.; Supervision – M.E.; Materials – S.Y.; Data collection and/or processing – Y.A.; Analysis and/ or interpretation – M.E.; Literature search – M.E.; Writing – M.E.; Critical review – S.Y.

## References

1. Feldman M, Friedman LS, Brandt LJ. Sleisenger and Fordtran's gastrointestinal and liver disease e-book: pathophysiology, diagnosis, management, expert consult premium edition-enhanced online features, vol 1. Elsevier Health Sciences; 2010.
2. Koufman JA. The otolaryngologic manifestations of gastroesophageal reflux disease (GERD): a clinical investigation of 225 patients using ambulatory 24-hour pH monitoring and an experimental investigation of the role of acid and pepsin in the development of laryngeal injury. *Laryngoscope* 1991;101:1–78.
3. DeMeester TR, Johnson LF. The evaluation of objective measurements of gastroesophageal reflux and their contribution to patient management. *Surg Clin North Am* 1976;56:39–53.
4. Katz PO, Gerson LB, Vela MF. Guidelines for the diagnosis and management of gastroesophageal reflux disease. *Am J Gastroenterol* 2013;108:308–28; quiz 329.
5. Vakil N, van Zanten SV, Kahrilas P, Dent J, Jones R; Global Consensus Group. The Montreal definition and classification of gastroesophageal reflux disease: a global evidence-based consensus. *Am J Gastroenterol* 2006;101:1900–20; quiz 1943.
6. Bor S, Mandiracioglu A, Kitapcioglu G, Caymaz-Bor C, Gilbert RJ. Gastroesophageal reflux disease in a low-income region in Turkey. *Am J Gastroenterol* 2005;100:759–65.
7. Jung HK, Hong SJ, Jo YJ, Jeon SW, Cho YK, Lee KJ, et al; Korean Society of Neurogastroenterology and Motility. Updated guidelines 2012 for gastroesophageal reflux disease. [Article in Korean]. *Korean J Gastroenterol* 2012;60:195–218.
8. Harding SM. Gastroesophageal reflux: a potential asthma trigger. *Immunol Allergy Clin North Am* 2005;25:131–48.
9. Peters JH, DeMeester TR, Crookes P, Oberg S, de Vos Shoop M, Hagen JA, et al. The treatment of gastroesophageal reflux disease with laparoscopic Nissen fundoplication: prospective evaluation of 100 patients with "typical" symptoms. *Ann Surg* 1998;228:40–50.
10. Olberg P, Johannessen R, Johnsen G, Myrvold HE, Bjerkeset T, Fjøsne U, et al. Long-term outcome of surgically and medically treated patients with gastroesophageal reflux disease: a matched-pair follow-up study. *Scand J Gastroenterol* 2005;40:264–74.
11. Kanwal F, Gralnek IM. Measuring health-related quality of life in gastroenterology and hepatology: part 1. *Evid Base Gastroenterol* 2002;3:128–32.
12. Velanovich V. Comparison of generic (SF-36) vs. disease-specific (GERD-HRQL) quality-of-life scales for gastroesophageal reflux disease. *J Gastrointest Surg* 1998;2:141–5.
13. Chin KF, Myers JC, Jamieson GG, Devitt PG. Symptoms experienced during 24-h pH monitoring and their relationship to outcome after laparoscopic total fundoplication. *Dis Esophagus* 2008;21:445–51.