

Evaluation of the Quality of Life in Pre- and Post-Operatory in Patients Submitted to Surgical Treatment of Reflux Disease and Hiato Hernia

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How to cite this paper: Madureira, F.A.V., Filho, R. and Galvão, P.P.F. (2023) Evaluation of the Quality of Life in Pre- and Post-Operatory in Patients Submitted to Surgical Treatment of Reflux Disease and Hiato Hernia. *Surgical Science*, 14, 441-455. <https://doi.org/10.4236/ss.2023.146049>

Received: March 6, 2023

Accepted: June 27, 2023

Published: June 30, 2023

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Abstract

Gastroesophageal reflux disease affects 40% of the population in industrialized countries. GERD has a negative impact on the quality of life of affected patients. Although PPIs induce a good response in the control of symptoms, the need for prolonged use of the medication and the fact that more than a third of the patients have symptoms even after its correct use, make surgery, an alternative for the treatment of the disease. The aims of this study were to compare the quality of life related to GERD before and after MIS surgical treatment of GERD and/or hiatus hernia, and to analyze the results and complications of the MIS treatment of GERD. **Methods:** For retrospective analysis, the electronic database of patients with indications for surgical treatment due to GERD and/or patients with sliding or paraesophageal hernias was examined. The study included patients from Hospital Universitário Gaffrée e Guinle and the Postgraduate Course in General Surgery at PUC-Rio (Rio de Janeiro, Brazil) who underwent surgery using video laparoscopy or robotic surgery between January 2013 and March 2020. This is an observational, longitudinal, descriptive study with retrospective analysis of the data. Surgical treatment was indicated due to incomplete response to clinical treatment, young age with persistent symptoms, or complications of GERD. Patients with hiatus and/or paraesophageal hernia with indication for surgical treatment were included. **Results:** The study evaluated 160 patients who underwent anti-reflux surgery by laparoscopic or robotic surgery in the period from 2013 to 2020. A total of 88 women and 72 men were operated, mean 46.6 ± 13.7 years. An improvement in the preoperative QS-GERD scores compared to the postoperative scores was observed (27.56 ± 10.93 vs 1.4 ± 2.47 , $p < 0.01$). Additionally, it

was observed that there was no association between worse prognosis and failure rate with gender, sex, age, body mass index, surgical technique, or the number of sutures on the fundoplication valve. The length of hospital stay was 24 hours in 74.2% of patients, 48 hours in 19.3%, and 72 hours in 4.6%, with a global median of 24 hours and a mean of 28.7 hours. No patient required blood transfusion; none had early postoperative complications (seroma, wound infection, or eventration), or died. **Conclusion:** A significant drop in the QS-GERD score was found before and after the surgical treatment of GERD and or hiatus hernia. The MIS surgical treatment of GERD controlled the symptoms in most of the treated individuals, presenting a low rate of complications without mortality.

Keywords

GERD, Reflux Disease, Hiatal Hernia, Robotic Surgery, Minimal Invasive Surgery, Quality of Life

1. Introduction

Esophageal hiatal hernia is frequently associated with gastroesophageal reflux disease (GERD) [1]. Gastroesophageal reflux disease affects 40% of the population in industrialized countries [1], has a high incidence, and without adequate treatment can generate complications that are difficult to manage [1] [2] [3].

GERD has a negative impact on the quality of life of affected patients. The main symptoms of GERD are heartburn, burning, and regurgitation, which are the typical symptoms related to reflux. The atypical symptoms: pharyngitis, cough, hoarseness, and dysphagia, may have pulmonary, otorhinolaryngological origin and a multifactorial cause [4].

Hiatus hernia (HH) type I, also called sliding hiatal hernia is present in 90% of cases. Types II and III are considered para-esophageal hernias, with types III and IV considered mixed [1] [2] [5] [6]. Giant hernia occurs when a hernia of type III or IV has more than 50% of the stomach in the mediastinum or a type II has more than 30% [7]. Bulky hernia consists of hernias larger than 5 cm [5]. Although the three types of esophageal hernia can induce classic reflux symptoms, type I hernia is the most frequently associated with them [1] [2]. Recent evidence points to hiatus hernia as the main risk factor for the onset of GERD [1]. Obesity is an isolated risk factor for GERD and hiatus hernia [8] [9] [10]. The Montreal consensus defines GERD as reflux from the stomach into the esophagus causing symptoms or complications [8]. The management of GERD and type I hiatus hernia is similar and consists of controlling gastroesophageal reflux and its symptoms through changes in lifestyle, drug treatment with proton pump inhibitors (PPIs), and anti-reflux surgery [2].

The popularization of PPIs has reduced the incidence of GERD symptoms [2]. However, patients with esophageal complications or incomplete response to

clinical treatment, and young people with persistent symptoms, become candidates for surgical treatment [1] [2] [8]. Although PPIs induce a good response in the control of symptoms, the need for prolonged use of the medication and the fact that 40% of the patients have symptoms even after its correct use, make surgery a good alternative for the treatment of the disease. The laparoscopic approach is the gold standard [11]. In addition, drug treatment is ineffective in 15% - 20% of patients who have associated GERD, and in 80% the symptoms return with discontinuation of the use of PPI [5]. The low morbidity and mortality of minimally invasive surgery (MIS) for the treatment of GERD qualify it as a good alternative to drug treatment [12].

The aims of this study were to compare the quality of life related to GERD before and after MIS surgical treatment of GERD and/or hiatus hernia, and to analyze the results and complications of the MIS treatment of GERD.

2. Material and Methods

We retrospectively analyzed the electronic database of patients with indication for surgical treatment due to GERD, and/or patients with hiatal hernia due to sliding and/or paraesophageal hernia, from January 2013 to March 2020. Were included patients from surgical clinic of Hospital Universitário Gaffrée e Guinle (HUGG), and the Postgraduate Course in General Surgery at PUC-Rio (Rio de Janeiro, Brazil). Were included on the study the patients, who underwent surgery by video laparoscopy or robotic surgery on an intention to treat basis. The surgery was indicated due to incomplete response to clinical treatment, young age with persistent symptoms, or complications of GERD. Patients with hiatus and/or para-esophageal hernia with indication for surgical treatment were also included.

This is an observational, longitudinal, descriptive study with retrospective analysis of the data.

Were recorded preoperatively, the characteristics of the studied population, the use of medications (PPI), symptoms as: heart burn, regurgitation, dysphagia, cough, gagging, asthma. By this time, the gastroesophageal reflux symptoms questionnaire (QS-GERD), validated by Fornari *et al.* [13] was used. Data of the pre op exams were collect: pre operative (pre op) endoscopy, esophago-manometry, Phmetry, classification of the Hiatal hernia according to type, volume, or redo surgery.

At hospitalization period were recorded: the aspects related to surgical technique; type of fundoplication, number of suture stitches on the valve, section of short gastric vessels, changes in operative tactics; surgical time, need for conversion. At early postoperative period were recorded: complications, re-operations, need of blood transfusion, use of drains, UCI admissions, hospital length of stay.

All patients were operated by the same surgical team, and the preferred surgical technique was hiatus hernia repair with resection of the hernial sac (when present) and Nissen fundoplication; however, the technique could be adapted on a case-by-case basis.

At late postoperative (pos op) period, on ambulatory. The first pos op evaluation was performed between postoperative days 10 and 15, and the follow-up of the patients was performed 30 and 90 days after surgery for a period of at least 6 months.

The gastroesophageal reflux symptoms questionnaire (QS-GERD), validated by Fornari *et al.* [13] was used. The QS-GERD is a portuguese language questionnaire validated from the GERD-HRQL questionnaire by Velanovich *et al.* [14]. It is a scale based on typical symptoms for GERD. The degree of satisfaction was the result of the combination of QS-GERD, the presence of symptoms, and postoperative exams (upper digestive endoscopy and pH metering). The QS-GERD was again applied about 90 days after surgery. The application was made in an outpatient consultation. The questionnaire was delivered on paper, where the patient had to grade his symptoms. These sheets are archived.

For the descriptive analysis, summary measures were used, such as absolute frequencies, percentages, means, standard deviations, medians, minimums and maximums. The graphical analysis was done using bar graphs and box plots (box graphs). In a second step, to identify factors potentially associated with the outcomes, bivariate analyses were performed.

To measure the association between categorical variables, Pearson's chi-square test was used. Fisher's exact test was applied in cases where at least one expected frequency of less than five was observed. To compare continuous measures between two groups, the Student t-test was used for variables with normal distributions, while analysis of variance (ANOVA) was used when three or more groups were compared.

The assumption of equality of variances was assessed by the Levene test. When normality was not verified, Mann-Whitney tests were used if the categorical variable had two groups and the Kruskal-Wallis test for categorical variables with three or more groups. The hypothesis of normality was verified using the Shapiro-Wilk test. To compare the patients' quality of life in the pre and postoperative period, the Wilcoxon test for paired samples was used.

All statistical tests were performed with a 5% significance level as reference. The analyses were conducted using the SPSS (Statistical Package for the Social Sciences) programs, version 22, and R version 3.4.3.

The anonymity of all patients was maintained. The research project was previously approved by the Research Ethics Committee of HUGG. Patients signed an informed consent form (ICF).

3. Results

The study evaluated 160 patients who underwent anti-reflux surgery by laparoscopic or robotic surgery in the period from 2013 to 2020 (Table 1). A total of 88 women and 72 men were operated, with a mean age of 46.6 ± 13.7 years.

Drug treatment with PPI was performed in 96.1% of patients. The frequency analysis of symptoms showed that 96.5% of patients had typical symptoms, with

Table 1. Demographic characteristics.

Demographic characteristics	n = 160
Sex	
Female	88 (55%)
Male	72 (45%)
Age	
	46.6 (\pm 12.40)
BMI	
	27.43 (\pm 4.61)
Symptoms	
Heartburn	91.2%
Regurgitation	91.2%
Cough	47.4%
Asthma or bronchitis	5.3%
Hoarseness	33.3%
Dysphagia	8.8%
Complications	
Esophagitis	68.4%
Barrett	21.1%
Hiatus Hernia Type	
HH type I	69.3% n = 111
Paraesophageal	18.75% n = 30
Complex Hiatal Hernia	30.6% n = 49
Fundoplication Type	
Mixed	12.2%
Lindt	6%
Nissen	76.6%
MIS platform	
Video Laparoscopy	74.3%, n = 119
Robotics	25.7%, n = 41
Fundoplication suture stitches	
Three	10.5%
Four	69%
Five	18.8%
Section of gastric short vessels	
	67.7%
Length of hospital stay	
24 hours	74.2%

Continued

48 hours	19.3%
72 hours	4.6%
Conversion need	none
Postoperative complications	none
Mortality	none
Dysphagia at 15 days	12.3%
Dysphagia at 30 days	19.3%
Dysphagia at 90 days	1.8%

heartburn and regurgitation present in 91.2% of cases. Atypical symptoms were reported by 54.9% patients: pharyngitis in 49.1%, cough in 47.4%, hoarseness in 33.3%, and dysphagia in 8.8%. Endoscopy showed esophagitis in 69.1% of patients, with an average of 1.7 ± 1.15 on the Los Angeles scale. Barrett's esophagus was found in 21.1% of the individuals. On pH metering, the mean of the De-meester Scale (ED) in pre-op was 44.3. Esophageal manometry showed some degree of dysmotility in 12.5% of the patients; of these, 73% had mild, 13% had moderate, and 13% had severe dysphagia.

Of the 160 patients with GERD operated, the assessment of Hiatal Hernia were classified as "small" type I hiatal hernias 69.3% (111 cases) and 30.6% (49 cases) were complex hiatal hernias (type I > 5 cm or types II, III, or IV, or redo-operations), with 12 redo-operations, 30 operations for paraesophageal hernias, and 7 giant type I hiatus hernias.

The Nissen fundoplication technique was performed in 76.2% of patients, mixed valve in 12.2%, Lindt (parcial) valve in 6%, and in 2.45% (3 cases) the hiatal hernia was treated without making any valve. Anterior gastropexy was added in 14.8% of total cases and in 59% of complex cases.

The fundoplication was made with three suture stitches in 10.5% of patients, four stitches in 69%, and five stitches in 18.8%. The section of short gastric vessels occurred in 67.7% of patients. No surgery has been converted to a conventional technique.

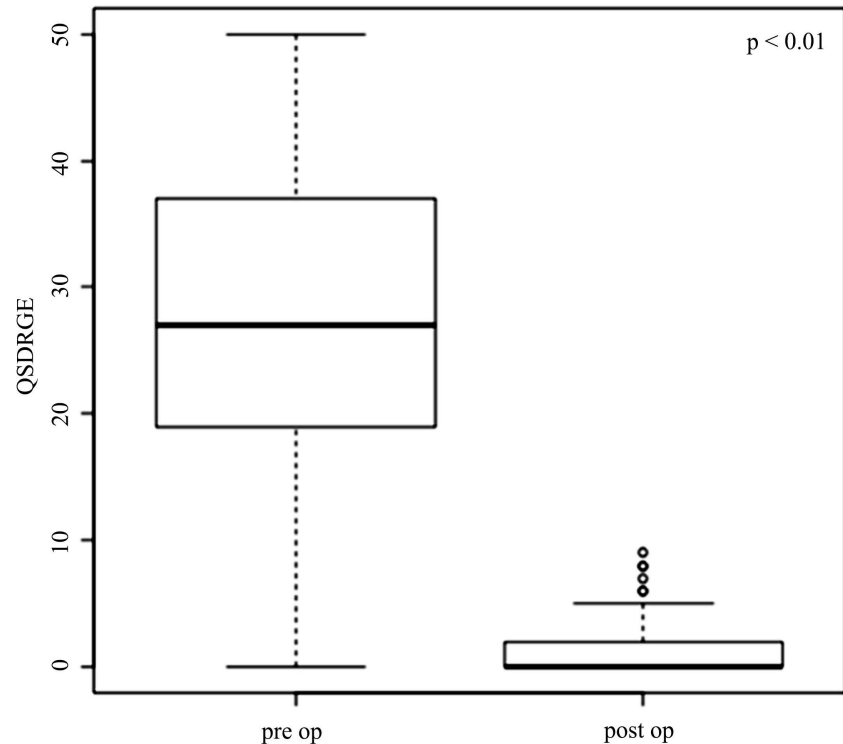
The length of hospital stay was 24 hours in 74.2% of patients, 48 hours in 19.3%, and 72 hours in 4.6%, with a global median of 24 hours and a mean of 28.7 hours. No patient required blood transfusion, none had early postoperative complications (seroma, wound infection, or eventration), or died.

Quality-of-Life Analysis

Fulfilled the QS-GERD score, 87 patients in the pre- and postoperative period.

Postoperative dysphagia was assessed at 15, 30, and 90 days, and was present in 12.3%, 19.3%, and 1.8% of patients, respectively.

The mean preoperative QS-GERD score was 27.56 points (± 10.93) and the mean postoperative score was 1.4 points (± 2.47) (**Table 2**) (**Graph 1**).



Graph 1. Boxplots - QS-GERD score, preoperative vs. postoperative.

Table 2. Preoperative and postoperative QS-GERD scores.

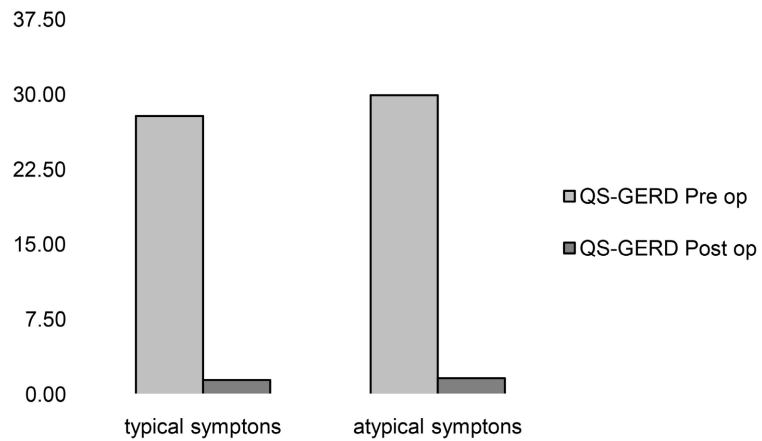
	QS-GERD		p-value*
	Preoperative	Postoperative	
Mean	27.56	1.40	
Median	27.00	0.00	
Standard deviation	10.93	2.47	$p < 0.01$
Minimum	0.00	0.00	
Maximum	50.00	9.00	

*Wilcoxon test.

Regarding the main questions on VELANOVICH's instrument-GERD-HRQL symptom severity [14], **Annex**. That can infer the main complain. The GERD-HRQL question that had the highest mean score in the preoperative period was "How bad is your heartburn?", and in the postoperative period it was "Do you have difficulty swallowing?" (**Table 3**).

The QS-GERD scores vs. the type of hiatus hernia did not show a statistical difference between sliding and paraesophageal hernia (**Table 4**).

In relation to previous symptoms, patients with typical and atypical symptoms both showed a decrease in QS-GERD scores in the postoperative period (**Graph 2**; $p < 0.01$).



Graph 2. QS-GERD graph typical and atypical symptoms.

Table 3. Average points on the QS-GERD questions.

Questions QS-GERD	QS-GERD		p-value*
	Pre-op	Post-op	
1) How bad is your heartburn?	3.49 (±1.42)	0.18 (±0.63)	
2) Heartburn when lying down?	3.41 (±1.51)	0.04 (±0.18)	
3) Heartburn when standing up?	3.18 (±1.39)	0.02 (±0.13)	
4) Heartburn after meals?	3.35 (±1.39)	0.07 (±0.32)	
5) Does heartburn change your diet?	3.18 (±1.60)	0.16 (±0.07)	p < 0.01
6) Does heartburn wake you from sleep?	2.56 (±1.87)	0.05 (±0.29)	
7) Do you have difficulty swallowing?	1.46 (±1.76)	0.35 (±0.85)	
8) Do you have pain with swallowing?	1.14 (±1.63)	0.25 (±0.76)	
9) If you take medication, does it affect your daily life?	2.28 (±1.96)	0.12 (±0.53)	
10) Do you have gassy or bloating feelings?	3.34 (±1.63)	0.16 (±0.59)	

Table 4. Pre- and postoperative QS-GERD score vs. type of hernia

Hernia Type	QS-GERD		p
	Pre-op	Post-op	
Sliding hernia	22.28 (±10.30)	1.33 (±2.41)	
Paraesophageal hernia	26.16 (±11.70)	0.91 (±1.67)	p < 0.01

Patients categorized by sex, BMI, esophagitis, Barrett’s esophagus, and bulky hernia in the preoperative period showed decreased QS-GERD scores after surgery (**Table 5**).

There was no statistically significant association between postoperative dysphagia and the number of fundoplication sutures on confection, once there is a

concern about the length of fundoplication and the post operative dysphagia. Notice that the patients who presented postoperative dysphagia at post op 15 days and at 30 days had higher scores in the pre- and postoperative QS-GERD when compared with patients who did not report dysphagia ($p < 0.01$) (**Table 6**).

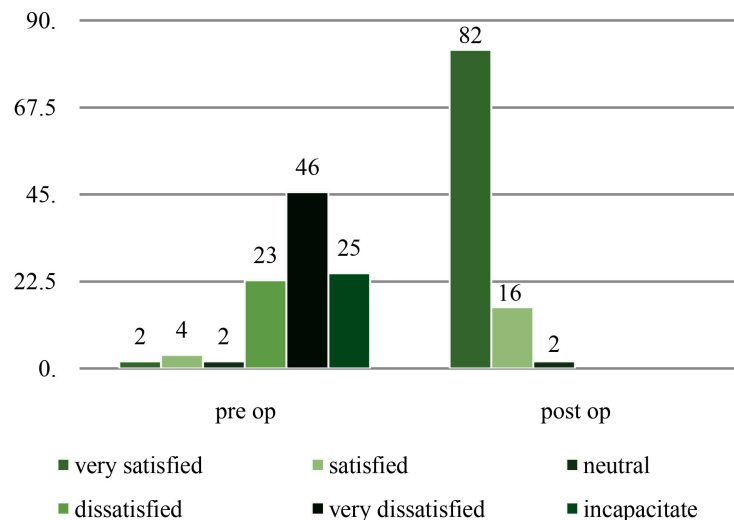
Regarding the qualitative question of the preoperative QS-GERD, 22.8% considered themselves dissatisfied, 45.6% very dissatisfied, and 24.6% incapacitated, whereas in the evaluation of the postoperative QS-GERD, 82.4% considered themselves very satisfied, 15.8% satisfied, and 1.8% of patients were dissatisfied (**Graph 3**).

Table 5. QS-GERD score by gender, symptoms and complications of hiatal hernia.

	QS-GERD		p-value
	Preoperative	Postoperative	
Sex			
Female	30.68 (± 10.40)	1.77 (± 2.77)	
Male	22.96 (± 10.22)	0.87 (1.89)	
BMI			
Eutrophic	31.45 (± 11.11)	2.91 (± 3.51)	
Overweight	26.94 (± 8.68)	0.44 (± 1.09)	
Obesity	25.79 (± 13.93)	1.50 (± 2.62)	
Barrett's			
Yes	23.33 (± 12.10)	2.33 (± 3.58)	p < 0.01
No	28.69 (± 10.46)	1.16 (± 2.07)	
Esophagitis			
Yes	25.67 (± 10.71)	1.33 (± 2.52)	
No	31.67 (± 10.52)	1.56 (± 2.43)	
Bulky hernia			
Yes	26.07 (± 10.78)	0.86 (± 1.56)	
No	28.05 (± 11.05)	1.58 (± 2.69)	

Table 6. QS-GERD in dysphagia at 15 and 30 days post op.

	QS-GERD	
	Preoperative	Postoperative
Dysphagia 15 days post op		
Yes	34.28 (± 9.96)	4.14 (± 3.13)
No	26.62 (± 10.81)	1.02 (± 2.13)
Dysphagia 30 days post op		
Yes	31.36 (± 12.02)	3.72 (± 3.13)
No	26.65 (± 10.53)	0.84 (± 1.94)



Graph 3. Degree of satisfaction. Source: Data compiled by the authors.

4. Discussion

Nissen was the pioneer of anti-reflux surgery in 1956, with the described of a 360° valve [15] [16]. The laparoscopic approach was described in 1991 by Bernard Dallemagne [12] [15] [16]. Recently, robotic surgery has been used to address this disease [17] [18].

Postoperative complications and mortality have low incidence [19]. The main postoperative symptoms include dysphagia, nausea, distention, postprandial fullness, and the trapped-gas syndrome [1] [11] [20].

Currently, the failure rate of anti-reflux surgery is 2% - 17% and is associated with surgical technique, Hiatal hernia size ≥ 3 cm, lack of response to treatment with PPI, prolonged exposure of the esophagus to pH < 4, and the presence of psychiatric and emotional stress [21].

Complications of esophageal reflux such as stenosis, Barrett's metaplasia, esophagitis, low response to PPI treatment, the presence of comorbidities, and atypical symptoms are associated with higher rates of patient dissatisfaction. [11] Redo operations on the hiatus due to dysphagia or recurrence of GERD are associated with higher morbidity rates, perioperative complications, and a worse degree of satisfaction when compared with primary surgery [22].

The assessment of quality of life is important in measuring the effectiveness of surgical treatment for GERD [5] [8] [23]. In 2007, Velanovich *et al.* proposed a questionnaire as a quality-of-life instrument associated with gastroesophageal reflux disease. In 2011, it was validated in Portuguese language, by Fornari *et al.*

In this study, we analyzed the patients operated for GERD, sliding or paraesophageal hiatal herniation. The prospective collect of these data began in December 2012, coinciding with the start of the first robotic (non-cancer) surgery program in the state of Rio de Janeiro, Brazil.

Anti-reflux surgery and laparoscopic hiatal hernia treatment have low morbidity and mortality, short length of stay, and early return to work activities.

However, GERD is a chronic disease. Severe reflux esophagitis (LA grade C and D) does not heal reliably with any medical therapy other than PPIs, and studies have demonstrated that severe esofagites returns quickly in most patients when PPIs are stopped. It might be possible to reduce or even eliminate medical therapy for patients with mild forms of GERD (e.g., no reflux esophagitis worse than LA grade B), but patients with severe reflux esophagitis (LA grade C or D) will require PPI therapy indefinitely to maintain healing. In light of recent concerns regarding the safety of long-term PPI usage, many patients are uncomfortable with the prospect of lifelong PPI treatment. Although antireflux procedures have their own well-established risks, some of which are serious, there are a number of patients who prefer to opt for those over the putative risks and inconvenience of lifelong PPI therapy [24].

Young and symptomatic patients benefit from operative treatment because drug treatment requires patient compliance and has a high cost in the long run. In addition, there are now questions about of side effects—possibly including nutritional deficiencies (in vitamin B12, iron, and magnesium), neoplasms, bone fractures, pneumonia, intestinal infections, and dementia—of prolonged PPI use [24] [25] [26]. Almost all of the questioning, are by now already refuted. Another important issue is, that drug treatment turns GERD into a chronic disease. In this context, minimally invasive surgery becomes an option, not only for patients refractory to drug treatment, but also for those who have the prospect of long-term use [8].

The comparison of the pre- and postoperative QS-GERD scores in this series, shows a significant drop in the score, suggesting that there was an improvement in quality of life after the surgery. This was also described by Sharona *et al.* [19], who demonstrated that the results of anti-reflux surgery in cases of GERD are excellent; patients followed for 10 years showed symptom relief and a high degree of satisfaction. Ciovica *et al.* [24] reported that comparing with medical treatment, the GERD surgery has superior results [8] [21] [24]. Hiran Fernando *et al.* (2002), using the QS-GERD and comparing medical therapy (for 1 year) with surgery, reported a mean score of $21 (\pm 1.4) \times 4 (\pm 0.6)$, 6 points (Table 7). In the prospective and randomized trial by Spechler *et al.* (2019), using quality of life (QS-GERD) to assess the success of medical and surgical treatment in refractory heartburn, the base (pre-therapeutic) score was between 21.0 and 25.8 (Table 7). In the present series of patients, who were also previously treated using

Table 7. GERD-HRQL baseline and Post operative.

Preoperative	Postoperative	Series
27.56 ± 10.9	1.4 ± 2.5	Madureira <i>et al.</i>
$21 (\pm 1.4)$	$4 (\pm 0.6)$	Hiran Fernando <i>et al.</i>
21.0 - 25.8	-	Spechler <i>et al.</i>

PPI, the mean preoperative QS-GERD score of 27.56 points (± 10.93) and postoperative score of 1.4 points (± 2.47) (**Table 2**).

At our study, the variables sex, age, BMI, and surgical technique, did not statistically influence the degree of post op patient satisfaction. Salvatore *et al.*, in a study that evaluated the quality of life in elderly patients, concluded that there was no difference between the degree of satisfaction of the elderly population compared with the young population in anti-reflux surgery, and the procedure is safe and effective. In the elderly population, they also reported that the surgery is not only effective but also has low rates of morbidity and mortality [4].

Repair of paraesophageal hernia can be challenging. Although several studies have shown that these hernias can be repaired safely and with a low rate of intraoperative or minor injuries [6], recurrence rates in this HH subtype are not negligible, ranging from 5% to 30%. Despite this, patients with a diagnosis of complex HH undergoing surgical treatment showed improvement in quality of life and satisfactory results, as reported in the literature [6] [15].

In this study, BMI was not a predictor of a worse prognosis of surgery, with improvement in postoperative QS-GERD scores and a high patient satisfaction rate [10]. It is important to highlight that a BMI above 35 is accepted as a limit for the indication of fundoplication, with many groups choosing to indicate gastric bypass (bariatric surgery) in these individuals, for concomitant treatment of obesity.

In this study, we did not observe a significant association between atypical symptoms and a worse degree of satisfaction in the pre- and postoperative QS-GERD. In the postoperative period, despite presenting higher scores when compared with only typical symptoms, the results are similar and demonstrate good outcome, after the operation [2]. A worse result of the surgery was associated with the presence of atypical symptoms in a study carried out by Davis [16], but we did not observe this fact.

Zhang *et al.* (2017) and Chang *et al.* (2016) compared Nissen fundoplication with treatment with PPI in the management of laryngoesophageal reflux and observed better results in operated patients, with surgery being effective in reducing symptoms and superior in relation to patient satisfaction.

Anti-reflux surgery for GERD or hiatus hernia is associated with satisfactory results in 86% - 95% of operated patients [4] [23] [27]. Transient dysphagia is expected; long-term dysphagia is problematic. However, patients who had some degree of dysphagia had higher pre- and postoperative mean QS-GERD scores than patients who did not have this complication.

Valve construction was performed using four suture stitches in 75% of patients, but there was no association with worse rates of QS-GERD scores dysphagia question.

The qualitative question in the questionnaire reports the patient's opinion about their satisfaction with their current situation. The preoperative analysis showed that more than 90% considered themselves as dissatisfied to disabled. In contrast, the analysis of this same variable in the postoperative period showed

that more than 90% were satisfied or very satisfied.

Fault in fundoplication is a challenge and the long-term evaluation revealed that the failure rate increases with the follow-up time [12]. Re-intervention in cases of hiatal hernia recurrence shows good results; however, in the assessment of quality of life, worse results are observed than in the initial approach [9].

The limitations of this study are the retrospective analysis of the data and a non randomized matter. Although the data was prospectively collect and the patients was consecutively enrolled. The absent of a clinical treated (PPI) “arm” to compare as a control is another limitation. Nowadays the number of patients referred by the gastroenterologists, for surgical treatment of GERD is lower, and usually they are sustained for several years with growing doses of PPI. We emphasize that in the present series, which is with intent to treat, all patients had a surgical indication: some because are refractory to medical management, had complications of GERD or para esophageal Hiatal Hernias, which may add a bias at the analysis. But even this “most difficult” sample, had a statistical benefit on quality of life after surgery.

The success of surgical treatment is difficult to define. Considering only the elimination of esophageal reflux can be simplistic. Resolution of symptoms and patient satisfaction should also be pursued [11].

5. Conclusion

A significant drop in the QS-GERD score was found before and after the surgical treatment of GERD and or hiatus hernia. The MIS surgical treatment of GERD controlled the symptoms in most of the treated individuals, presenting a low rate of complications without mortality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Annex

The gastroesophageal reflux disease-health related quality of life instrument.

• **Scale:** No symptoms = 0; Symptoms noticeable, but not bothersome = 1; Symptoms noticeable and bothersome, but not every day = 2; Symptoms bothersome every day = 3; Symptoms affect daily activities = 4; Symptoms are incapacitating, unable to do daily activities = 5

• **Questions**

__ 1. How bad is your heartburn?	0 1 2 3 4 5
__ 2. Heartburn when lying down?	0 1 2 3 4 5
__ 3. Heartburn when standing up?	0 1 2 3 4 5
__ 4. Heartburn after meals?	0 1 2 3 4 5
__ 5. Does heartburn change your diet?	0 1 2 3 4 5
__ 6. Does heartburn wake you from sleep?	0 1 2 3 4 5
__ 7. Do you have difficulty swallowing?	0 1 2 3 4 5
__ 8. Do you have pain with swallowing?	0 1 2 3 4 5
__ 9. Do you have bloating or gassy feelings?	0 1 2 3 4 5
__ 10. If you take medication, does this affect your daily life?	0 1 2 3 4 5
__ How satisfied are you with your present condition? Satisfied __ Neutral __ Dissatisfied __	