

IDENTIFICATION OF PREOPERATIVE RISK FACTORS FOR PERSISTENT POSTOPERATIVE DYSPHAGIA AFTER LAPAROSCOPIC ANTIREFLUX SURGERY

Identificação de fatores de risco pré-operatórios para disfagia pós-operatória persistente após cirurgia laparoscópica para doença do refluxo gastroesofágico

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ABSTRACT - Background: Postoperative dysphagia is common after antireflux surgery and generally runs a self-limiting course. Nevertheless, part of these patients report long-term dysphagia. Inadequate surgical technique is a well documented cause of this result. **Aim:** This retrospective study evaluated the preoperative risk factors not surgery-related for persistent dysphagia after primary laparoscopic antireflux surgery. **Methods:** Patients who underwent laparoscopic antireflux surgery by the modified technique of Nissen were evaluated in the preoperative period retrospectively. Postoperative severity of dysphagia was evaluated prospectively using a standardized scale. Dysphagia after six weeks were defined as persistent. Statistical tests of association and logistic regression were used to identify risk factors associated with persistent dysphagia. **Results:** A total of 55 patients underwent primary antireflux surgery by a single surgeon team. Of these, 25 patients had preoperative dysphagia (45,45%). Persistent postoperative dysphagia was reported by 20 (36,36%). Ten patients (18,18%) required postoperative endoscopic dilatation for dysphagia. There was statistical association between satisfaction with surgery and postoperative dysphagia and requiring the use of antireflux medication after the procedure; and between preoperative dysphagia and postoperative dysphagia. Logistic regression identified significant preoperative dysphagia as risk factor for persistent postoperative dysphagia. No correlations were found with preoperative manometry. **Conclusions:** Patients with significant preoperative dysphagia were more likely to report persistent postoperative dysphagia. This study confirms that the current manometric criteria used to define esophageal dysmotility are not reliable to identify patients at risk for post-fundoplication dysphagia. Meticulous review of the clinical history about the presence and intensity of preoperative dysphagia is important in the selection of candidates for antireflux surgery.

HEADINGS - Gastroesophageal reflux disease. Fundoplication. Antireflux surgery. Dysphagia.

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RESUMO - Racional: Disfagia no pós-operatório é comum após a operação anti-refluxo. No entanto, uma parte dos pacientes relatam disfagia persistente, e técnica cirúrgica inadequada é uma causa bem documentada deste resultado. **Objetivo:** Este estudo retrospectivo avaliou os fatores de risco no pré-operatório para a disfagia persistente após operação anti-refluxo por via laparoscópica. **Métodos:** Pacientes submetidos à operação anti-refluxo por via laparoscópica pela técnica de Nissen modificada foram avaliados no pré-operatório de forma retrospectiva. A severidade da disfagia pós-operatória foi avaliada prospectivamente usando uma escala estabelecida. A disfagia após seis semanas foi definida como persistente. Os testes estatísticos de associação e regressão logística foram utilizados para identificar os fatores de risco associados à disfagia persistente. **Resultados:** Um total de 55 pacientes foram submetidos ao procedimento por via laparoscópica por uma única equipe de cirurgiões. Destes, 25 doentes referiam disfagia pré-operatório (45,45%). A disfagia pós-operatória persistente foi relatada por 20 (36,36%) pacientes. Dez (18,18%) necessitaram de dilatações por endoscopia digestiva. Houve associação estatística entre a satisfação com a operação e disfagia no pós-operatório e exigindo o uso de medicação anti-refluxo após o procedimento, e entre disfagia no pré-operatório e disfagia no pós-operatório. A regressão logística identificou a disfagia no pré-operatório, como fator de risco para a disfagia pós-operatória persistente. Não foram observadas correlações com manometria pré-operatória. **Conclusões:** Os pacientes com disfagia no pré-operatório foram mais propensos a relatar disfagia pós-operatória persistente. Os critérios manométricos atuais utilizados para definir dismotilidade esofágica não identificaram pacientes com risco de disfagia persistente pós-fundoplicatura. Análise minuciosa da história clínica sobre a presença e intensidade da disfagia no pré-operatório é muito importante na seleção de candidatos à operação anti-refluxo.

INTRODUCTION

Laparoscopic fundoplication is the definitive treatment for gastroesophageal reflux disease (GERD) with safe and good results in long-term follow-up^{9,20,22,29,37}. However, potential side effects include dysphagia, gasbloat and the inability to vomit. Early dysphagia is defined as during the first six weeks after surgery and is a very common postoperative symptom which rarely requires some specific treatment. Persistent dysphagia beyond six weeks has been reported in 3–30% of patients^{8,12,17,18,27,28,31,32,38}.

Inadequate surgical technique is a factor well documented of postoperative dysphagia which eventually requires reoperation¹⁷. However, participation of preoperative factors in this complication is not very clear. Preoperative dysphagia is often reported in candidates to surgical treatment for GERD and can resolve after fundoplication in some cases, suggesting the existence of esophagomyopathy caused by GERD³⁵.

The presence of esophageal motor dysfunction has been proposed to be important in the incidence of post-fundoplication dysphagia^{4,5,14,18,21,26,33,36}. Nevertheless, the studies have failed to demonstrate that preoperative manometry findings are a predictor of postoperative dysphagia^{3,7,25}.

Clinical evaluation well done for antireflux surgery is valuable for therapeutic success and to avoid dysphagia after fundoplication.

This retrospective study evaluated the preoperative risk factors not surgery-related for persistent dysphagia after primary laparoscopic antireflux surgery.

METHODS

Fifty-five patients who underwent laparoscopic fundoplication by modified Nissen technique² (Figure 1) in the Unicamp were evaluated in the preoperative period retrospectively, after approval by the ethics committee of the institution.

Variables were derived from demographic data, clinical history data, manometry reports, endoscopic reports, radiology reports, nuclear studies reports and from reviewing operative reports and postoperative follow-up notes. Postoperative severity of dysphagia was evaluated prospectively using a standardized scale proposed by Saeed et al.³⁰ (Figure 2).

Data were recorded in a Microsoft Excel® database (Microsoft Corp., Redmond, WA, USA) and then further analyzed. The main outcome variable was persistent postoperative dysphagia.

Preoperative clinical evaluation

All patients were queried about the presence and severity of dysphagia as well as symptoms of GERD, including atypical manifestations, before undergoing manometric testing. Severity data were reported on the following scale³⁰ (0–5): 5 = none; 3–4 = minimal; 0–2 = severe.



FIGURE 1 - Fundoplication by modified Nissen technique proposed by Brandalise et al.²

Classification	Ability to swallow
0	Unable to swallow
1	Swallows liquids with difficulty and cannot swallow solids
2	Swallows liquids with no difficulty but cannot swallow solids
3	Occasional difficulty in swallowing solids
4	Rarely has difficulty in swallowing, only with solids
5	Swallows normally

FIGURE 2 – Grade of dysphagia based on the classification defined by Saeed et al.³⁰

Preoperative esophageal manometry

Manometry was performed using a five-channel catheter and a low-compliance, pneumohydraulic capillary infusion system (Arndorfer Medical Specialties, Greendale, WI, USA) placed transnasally in all patients. The lower esophageal sphincter (LES) is identified and its length is measured; the LES pressure is measured at the respiratory inversion point (RIP), and then to assess body function the catheter is placed 3 cm above the upper border of the LES. A series of 10 wet swallows (5 ml of water) are performed at 30–40 s intervals. The pressure and wave progression in the distal two channels (3 and 8 cm above upper border of LES respectively) are used to assess the function of the smooth muscle portion of the esophagus. At the same time, the upper esophageal sphincter (UES) is identified, and the UES pressure and percentage of relaxation are measured.

Preoperative endoscopic evaluation

All patients underwent upper endoscopy before surgery. The classification used for endoscopic assessment of esophagitis was Los Angeles classification²⁰.

Preoperative contrast esophagram

Most patients (67.27%) had a contrast esophagram performed before surgery. The assessment of severity of gastroesophageal reflux was made by the radiologist

following a scale (0–3): 0 = absent; 1 = minimal; 2 = moderate; and 3 = severe. Presence of abnormal esophageal transit and emptying was also evaluated.

Preoperative esophageal nuclear study

Nuclear study of esophagus was performed in 27 patients (49.09%) with oral ingestion of Technetium-99m. The assessment of severity of gastroesophageal reflux was made following a scale (0–3): 0 = absent; 1 = minimal; 2 = moderate; and 3 = severe.

Postoperative clinical evaluation

All patients were evaluated postoperatively with a mean follow up of 47.5 (range, 10–420) months.

Mortality, morbidity, length of hospital stay, presence of postoperative dysphagia (early and persistent), need for antireflux medication after surgery and satisfaction with surgery were the postoperative data recorded.

Statistical analysis

Data analysis was performed with statistical analysis descriptive presentation of frequency tables for categorical variables and measures of dispersion and position for numeric variables. To assess the association or to compare proportions we used the chi-square test or Fisher's exact test when necessary. To compare numerical complexity measures between 2 groups we used the Mann-Whitney and between 3 groups the Kruskal-Wallis's test.

Finally, to identify factors associated with late dysphagia was used logistic regression analysis. A p value <0.05 was considered significant.

All data collected were recorded and organized into spreadsheet program built on Microsoft® Office Excel 2007. The computer program used for statistical calculations was Statistical Analysis System (SAS) for Windows, version 9.2. SAS Institute Inc, 2002–2008®, Cary, NC, USA.

RESULTS

There were 28 (50.91%) women and 27 (49.09%) men. The median age was 50 (range, 25–74) years. All patients had fundoplication by modified Nissen technique underwent by the same surgeons team. Thirteen patients (23.64%) had atypical symptoms of GERD.

Preoperative dysphagia

Of the 55 patients recruited for this study, 25 (45.45%) patients had preoperative dysphagia. Of the 25 patients with preoperative dysphagia, 9 patients reported severe dysphagia and 16 patients reported mild dysphagia. The presence or absence of preoperative dysphagia was not associated with any significant differences in preoperative disease duration, atypical symptoms of GERD, manometric alterations, endoscopic

esophagitis and barium swallows findings (Table 1).

TABLE 1 – Statistical associations with preoperative dysphagia.

Risk factor	Preoperative dysphagia – p Value
Disease duration	0.6468
Atypical symptoms	0.1554
Manometric alterations	0.6347
Endoscopic esophagitis	0.4647
Barium swallows (tertiary waves)	0.7983

Perioperative data

The postoperative mortality was zero. Only 4 patients had complications. Among the complications we had one abscess of the abdominal wall, one ischemic stroke, one opening lung pleura (no need drainage) and one prolonged ileus with symptomatic abdominal distention. The mean hospital stay was 3 days^{8,9,17,22,28,29,34,37,38}.

Postoperative dysphagia

Early postoperative dysphagia (during the first 6 weeks after surgery) was reported by 22 patients (40%) in our study. Twenty patients reported persistent postoperative dysphagia (36.36%). Of these patients, only 4 reported severe dysphagia. Ten patients were underwent endoscopic dilatation with Savary-Gilliard's dilators because of significant impact on quality of life. Nine patients showed complete remission and 1 partial improvement without complications.

The presence or absence of postoperative dysphagia was not associated with preoperative disease duration, atypical symptoms of GERD, manometric alterations and barium swallows findings. However, the presence or absence of postoperative dysphagia was associated with preoperative dysphagia (p = 0.0043), as shown in Table 2.

TABELA 2 – Statistical associations with postoperative dysphagia

Risk factor	Postoperative dysphagia – p Value
Disease duration	0.2560
Atypical symptoms	0.2588
Manometric alterations	0.2783
Barium swallows (tertiary waves)	0.5797
Preoperative dysphagia	0.0043

The results of logistic regression analysis for preoperative risk factors associated with persistent postoperative dysphagia are shown in Table 5. Severe preoperative dysphagia was associated with persistent postoperative dysphagia (odds ratio (OR), 5.5; 95% confidence interval (CI), 1.105–27.374; p = 0.0373).

Satisfaction with surgery

In a simple question about satisfaction with surgery, 85% of patients reported satisfaction with surgery on clinical follow-up. Satisfaction with antireflux procedure was associated with persistent postoperative dysphagia (p = 0.0193).

TABLE 3 – Logistic regression analysis for risk factors associated persistent postoperative dysphagia

Group Predictor	p – Value	OR	IC95%
Preoperative dysphagia			
Absent / Mild	0.4488	1.650	0.452; 6.029
Severe	0.0373	5.500	1.105; 27.374
Manometric alterations	0.7030	1.368	0.273; 6.839
Endoscopic esophagitis			
Absent / Los Angeles A	0.2363	4.285	0.386; 47.608
Los Angeles B	0.1284	5.999	0.596; 60.416
Los Angeles C	0.5851	2.000	0.166; 24.061
Los Angeles D	0.4275	2.999	0.199; 45.229
Esophagram - Gastroesophageal reflux			
Absent / Mild	0.9675	<0.001	-
Moderate	0.3554	4.000	0.211; 75.659
Severe	0.3059	3.385	0.328; 34.919
Nuclear Study - Gastroesophageal reflux			
Absent / Mild	0.4968	0.375	0.022; 6.348
Moderate	0.0556	0.050	0.002; 1.075
Severe	0.1290	0.143	0.012; 1.762

DISCUSSION

We include patients with GERD operated by the same group of surgeons of the same reference center using the same technique to try to minimize complications directly related to the operative technic.

In the first weeks after fundoplication, this is a common symptom that is relatively common until the sixth week postoperatively, present in up to 20–50% of patients^{2,3,7,23,24,30}. However, his persistence brings great discomfort for the patient therefore prevents him from eating normally. Therefore, it is a complication which must be avoided and if this identified, must be treated^{15,34}. We found a significant number of patients with some degree of preoperative dysphagia in our study (45.45%) which is consistent with the current literature. In our opinion, considerable rate occurs by active search for this symptom in the preoperative assessment in our clinical practice. We believe that if there is this search, patients often omit this symptom.

This study shows preoperative dysphagia to be a risk factor for persistent postoperative dysphagia. Recent publications also reported preoperative complaints of difficulty swallowing as a predictor of persistent postoperative dysphagia. Most likely these patients have esophageal dysmotility or anatomical derangements causing poor esophageal clearance. Postoperative dysphagia in patients with preexisting esophageal dysmotility is not uncommon even if patients have improved esophageal motility after antireflux surgery^{10,14,21}.

When assessing esophageal motility, manometry is considered the "gold standard." More recently, impedance manometry have been developed, which feature additional sensors for the detection of liquid and viscous bolus transit, permitting even further assessment of esophageal motility. However, preoperative high-resolution and impedance manometry has not been shown to be useful in predicting persistence or development of postfundoplication dysphagia¹¹. In our study, manometric alterations were not

risk factors for persistent postoperative dysphagia. Possibly, this occurs because there is an improvement in function of the esophagus after antireflux surgery in some cases which suggests the existence of a esophagomyopathy related to GERD and, probably, our current manometric criteria to diagnose esophageal dysmotility are not sensitive and specific enough to correctly identify these patients who have clinically relevant dysmotility, which would lead to dysphagia after fundoplication. Presence of conduction abnormalities in esophagram was risk factor for persistent postoperative dysphagia in some studies. In our series, the radiologist used the presence of tertiary waves in barium swallows as a sign of ineffective esophageal peristalsis which was not a risk factor. A major limitation of this study is that this is a subjective, user-dependent assessment, and not very clearly defined in the current literature. Thus, there is a need to develop a standardized contrast esophagram protocol that will allow for uniform reporting of findings for future comparisons.

Severe persistent postoperative dysphagia was detected in 7.27% of patients in our study which is consistent with the current literature^{1,19,28,39}. Ten patients underwent endoscopic dilatation with safe and excellent results. Therefore, this treatment modality should be considered in patients with dysphagia and decrease in quality of life^{6,16}.

Satisfaction with the surgery was statistically associated with persistent postoperative dysphagia. This means that the patient wants to surgical treatment not only be free of symptoms of GERD but also be able to eat normally.

This study has limitations. Foremost is that it is a retrospective review, although all data were collected prospectively. Although all surgeries were performed by the same team, yet there can be individual differences in fundoplication technique. An incorrectly created fundoplication has a higher likelihood of dysphagia (39), and so the experience and technique of the operating surgeon is an important variable. With greater experience, particularly at reference centers, funduplications have become far more standardized and have better outcomes.

CONCLUSIONS

The careful selection of patients for surgical treatment of GERD and refined surgical technique respecting the fundamental principles in esophagogastric fundoplication are essential, for the resolution of GERD and to prevent complications such as post-operative dysphagia persistent.

This selection begins with a thorough medical history to firstly fit the patient in the correct indications for surgical therapy in GERD. Then, this assessment assists the surgeon in the characterization of patients susceptible to complications.

In this study, the identification of dysphagia and its stratification, even if subjective, through medical consultation, was more important than exams, such as esophageal manometry, with data measured objectively, for presumption of postoperative dysphagia, which is directly related with patient satisfaction with the surgery, as well as effective control of symptoms without the need for regular medication.

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