Surgical treatment for gastroesophageal reflux disease

Tratamento cirúrgico da doença do refluxo gastroesofaneano

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ABSTRACT

Gastroesophageal reflux disease (GERD) is one of the clinical entities that affect the upper digestive tract with the highest prevalence in western countries and its incidence is increasing in the other countries. The Brazilian consensus conference considered GERD to be “a chronic disorder related to the retrograde flow of gastro-duodenal contents into the esophagus and/or adjacent organs, resulting in a spectrum of symptoms, with or without tissue damage”. Esophagitis, stricture, Barrett's esophagus and esophageal cancer are some of the complications arising from the acid reflux, which affect many patients. In this article we reviewed physiopathology, diagnosis, the various treatment options and stated that surgical treatment can be a good option in severe forms of GERD.

Key words: Gastroesophageal reflux. Esophagus. Stomach. Diagnosis. Surgical Treatment.

RESUMO

Doença do Refluxo Gastroesofágico (DRGE) é uma das entidades clínicas que afetam o trato digestivo superior, com maior prevalência nos países ocidentais e sua incidência está aumentando em outros países. A conferência de consenso brasileiro considerado DRGE ser "uma doença crônica relacionada com o fluxo retrógrado do conteúdo gastro-duodenal para o esôfago e / ou órgãos adjacentes, resultando em um espectro de sintomas, com ou sem dano ao tecido". Esofagite, estenose, esôfago de Barrett e câncer de esôfago são algumas das complicações decorrentes do refluxo ácido, o que afeta muitos pacientes. Neste artigo foi feita revisão da fisiopatologia, diagnóstico e das diversas opções de tratamento, estabelecendo que o tratamento cirúrgico pode ser uma boa opção nas formas graves da DRGE.

Descritores: Refluxo gastroesofágico. Esôfago. Estômago. Diagnóstico. Tratamento cirúrgico.

INTRODUCTION

Gastroesophageal Reflux Disease (GERD) is one of the clinical entities that affect the upper digestive tract with the highest prevalence in western countries and its incidence is increasing in the East and some Asian countries[1]. This may be related to excessive consumption of high fat diet, obesity and associated to poor quality-of-life.

The Montreal consensus conference defined GERD as "a condition which develops when the reflux of gastric contents causes troublesome symptoms and/or complications".[2] The Brazilian consensus conference considered GERD to be "a chronic disorder related to the retrograde flow of gastro-duodenal contents into the esophagus and/or adjacent organs, resulting in a spectrum of symptoms, with or without tissue damage". This definition recognizes the chronic character of the disease, and acknowledges that the reflux can be gastric and duodenal in origin, with important implications for the treatment of this disease. It occurs mainly due to functional defect of the lower esophageal sphincter, and symptoms of heartburn and acid regurgitation during daily activities are common. In addition, approximately 45% of the symptomatic GERD sufferers have nighttime symptoms[1]. Esophagitis, stricture, Barrett's esophagus and esophageal cancer are some of the complications arising from the acid reflux, which affect a sizeable portion of patients.

The esophageal syndromes include the symptomatic syndrome, that is the typical reflux syndrome and the reflux chest pain syndrome, and the syndrome with esophageal injury, that includes reflux esophagitis, reflux stricture, Barrett's esophagus (BE) and esophageal adenocarcinoma. The extra-esophageal syndromes are respiratory conditions, such as chronic coughing, asthma, laryngitis, otitis media, mainly caused by the reflux of gastric juice into the respiratory tract[3]. In the mild cases of GERD, the clinical management is most indicated; however, the surgical treatment is a good option in severe forms and in young patients who do not want to take tablets for the rest of their lives[4]. The two main treatment options are proton pump inhibitors (PPI) and antireflux surgery. Various clinical trials have shown that laparoscopic fundoplication is safe and more effective than PPI treatment, with better long-term reflux control and improved cost effectiveness.[5]

NATURAL HISTORY

The natural history of GERD has not been well understood. The traditional concept approaches the disease as a spectrum, emphasizing the potential progress over time of patients along the spectrum. On the mild form of the spectrum are patients with nonerosive reflux disease (NERD) and on the severe form are patients with complicated GERD (erosive esophagitis, stricture, Barrett's esophagus). This

conceptual framework focused on esophageal mucosal injury as the most significant clinical outcome in GERD. A large prospective cohort study confirms this concept, showing that true progression from mild to severe disease has occurred over 2 years follow up.[6]

In contrast, a new concept indicates that GERD is a categorical disease with three distinct entities: NERD, erosive esophagitis and Barrett's esophagus. These three phenotypes represent different disorders and movement among them is limited. A large study with an average of 7.6 years follow up observed that GERD usually does not progress over the time[1]. GERD is a chronic but not progressive disease.

PATHOPHYSIOLOGY

Various physiologic mechanisms protect the esophagus from injury, including minimizing reflux itself through the lower esophageal sphincter, reflex peristaltic clearing of the esophagus to minimize the time exposure of the esophagus to the acidic contents, a mucus layer on the esophageal epithelium to act as a barrier to the acidic contents, and alkalinization of the acidic contents with saliva.[7]

The pathophysiology of GERD is clearly multifactorial. Defective peristalsis is associated with severe GERD, both in terms of symptoms and of mucosal damage. It is known that 40%-50% of patients with GERD have abnormal peristalsis. Esophageal clearance is slower than normal, therefore, the refluxate is in contact with the esophageal mucosa for a longer period of time and it is able to reach more often the upper esophagus and pharynx. Thus, these patients are prone to severe mucosal injury and frequent extra-esophageal symptoms.[8-10]

Diaphragm is an extrinsic component to the gastroesophageal barrier. It is particularly important as a protection against reflux induced by sudden increases in intra-abdominal pressure. Lower esophageal sphincter (LES) creates a high pressure zone between the esophagus and the stomach that prevents reflux. However, a normal LES pressure does not exclude GERD, because abnormal transient relaxation might occur. Periodic relaxation of the LES in normal individuals has been termed transient lower esophageal sphincter relaxation (TLESR), to distinguish it from relaxation triggered by swallowing. TLESR accounts for the physiological reflux found in normal subjects. When it becomes more frequent and prolonged, TLESR can contribute to reflux disease, and this phenomenon appears to explain the reflux seen in the 40% of patients with GERD whose resting LES pressure is normal. What determines TLESR is unknown, but posprandial gastric distention is probably involved.[10]

DIAGNOSIS

Research investigations have enhanced our understanding of both the utility and limitations of a variety of diagnostic modalities. New techniques for esophageal functional testing such as wireless pH capsule monitoring, duodenogastroesophageal (also referred to as alkaline or bile reflux) reflux detection, and esophageal impedance testing have been introduced over the past decade and are utilized in clinical practice. The American College of Gastroenterology, American Society for Gastrointestinal Endoscopy and American Gastroenterological Association have recently published updated reviews and guidelines on reflux management and monitoring[11].

As a result of complexities in phenotypic heterogeneity and pathophysiology, there is no single gold standard diagnostic modality for GERD. Herein, the utility and clinical applications of each test will be analyzed. However, taken together, these methods lend themselves to a reductionist view of GERD, whereas patients are classified into better-defined sub-groups[11]. Preoperative workup for patients presenting for antireflux surgery consists of 24-h pH monitoring, manometry, barium contrast study, and upper endoscopy. These diagnostic tests provide objective evidence to support a diagnosis of reflux, and they characterize the type of reflux[5]. This strategy could ultimately result in more effective, individualized management of GERD and improved outcomes.

TREATMENT

The spectrum of GERD treatment ranges from the change in dietary habits and lifestyle. The antireflux surgery, which, although invasive, act definitively in controlling symptoms. Recommendations such as weight loss, smoking cessation, raising the headboard and lower intake of reflux stimulants by reducing the pressure of the Lower Esophageal Sphincter, such as coffee, chocolate, peppermint and alcohol help to reduce exposure esophagus to acid.[12]

Medication is basically to reduce or even suppress the production of hydrochloric acid by the parietal cells. Antagonists of Histamine 2 receptor (AH2) were the first choice as acid suppression therapy since the 1970s until the arising of proton pump inhibitors (PPI's). The antacid drugs are not indicated for the treatment of GERD, but its use is still large in the general population for the immediate relief of heartburn.[12] The AH2, which can reduce the secretion of gastric acid, especially after meals, are not effective in the treatment of severe esophagitis. However, they are used for mild to moderate and mainly to control nocturnal symptoms. Ranitidine, cimetidine, famotidine, nizatidine, among others, have been used.

The PPI's act blocking the Na + / K + pump present in the gastric cells, the final step in acid secretion. Members of this group include omeprazole, pantoprazole, esomeprazole, lansoprazole and rabeprazole. Many studies have already demonstrated the superiority of PPI's in relation to AH2, by providing a long-term control of esophagitis and a better and faster relief of symptoms[1].

Recent research has focused on new drugs that work effectively in patients with GERD refractory to PBIs. Such drugs have the mechanism of action of reflux inhibition, i.e., inhibition of transient relaxation of the esophageal distal portion, the main point of the disease. One of the most promising drugs for this case are the gamma-aminobutyric acid type B (GABA B), whose role is to modulate this mechanism. Thus, patients with positive impedance for weakly acidic reflux, treatment with baclofen a GABA agonist, should be considered, since it reduces the transient relaxation of the esophagus[13,14]. Anti-reflux surgery is the second option for refractory GERD, especially if there is persistent regurgitation.

SURGERY

Fundoplication was first introduced by *Nissen* in 1956 after the incidental observation that the fundal patch used to reinforce the esophageal suture line could also correct gastro-esophageal reflux. Despite this short history, antireflux surgery techniques have been advanced gradually overtime, resulting in gradual improvement in the clinical outcome. Several studies have demonstrated that these operations reduce the hiatal hernia and restore the physiology of the gastroesophageal junction to near normal[1].

Patients with Barrett's esophagus usually suffer from severe GERD. Antireflux operations offer potential advantages by restoring the LES pressure and abolishing or gastric reflux into the esophagus. Several studies document the efficiency of surgical therapy in the prevention of intestinal metaplasia in GERD patients.[1,15,16]

Despite the fact that complete regression rarely occurs, regression of the length of Barrett’s epithelium is commonly observed. Furthermore, disease progression, after antireflux operation, to severe dysplasia or adenocarcinoma occurs in a reduced incidence compared with medical therapy. This is explained by the fact that fundoplication creates a new antireflux valve, which prevents both acid and bile reflux, a prerequisite for the development of Barrett’s esophagus.[1,17] Laparoscopic antireflux surgery provides good reflux control and very high patient satisfaction. Patients who reported regurgitation as the primary indication for surgery had a less favorable clinical outcome for the side effect dysphagia. However, at later follow-up, the preoperative type of reflux does not influence clinical outcome. Antireflux surgery provides good clinical results independent of the pattern of presentation of typical reflux symptoms.[5]

There are two major anti-reflux procedures: 360º total Nissen fundoplication (TNF) and 270º partial Toupet fundoplication (PTF). The superiority of one over the other is a matter of debate. The goal of surgical treatment for GERD is to provide optimal reflux control while minimizing adverse results.[18] According to Shan *et al.,* the prevalence of postoperative dysphagia and gas-related symptoms was much higher after TNF than after PTF. These results indicated that, irrespective of esophageal motility status, PTF would be a safer choice in reducing this complication.[18] Some findings suggest that laparoscopic fundoplication is very effective for the control of regurgitation, even in patients with other post-fundoplication symptoms or apparent recurrent reflux symptoms.[5]

Operating on patients who have good control of reflux with medication but do not want to take medication might be a risky strategy because if side effects develop after surgery, e.g., stricture, bloating or flatulence, then it would seem that the subjective outcome would not be very good. Nevertheless, randomized controlled trials comparing antireflux surgery with medical treatment using PPI all show greater improvement in health status in surgery groups. However, up to 30%[5] of surgery patients still used PPI medication after surgery. Thus, antireflux surgery does not guarantee that the patient will stay off medication, although have been shown that only one third of patients using PPIs after surgery actually have recurrent reflux.[5]

CONCLUSION

The gastroesophageal reflux disease is very prevalent in the world and, therefore, deserves special attention in diagnosis and therapeutic approach. Knowing the pathophysiology, surgical techniques and drugs have been created, significantly improving the patients quality of life.

REFERENCES

1. Theodore L, George K, Paul P, Evangelos PM. Gastroesophageal Reflux Disease: Medical or Surgical Treatment? Gastroenterol Res Pract. 2009;26:1-15.
2. Vakil N, van Zanten SV, Kahrilas P, Dent J, Jones R. The Montreal definition and classification of gastroesophageal reflux disease: A global evidence-based Consensus. Am J Gastroenterol. 2006;101:1900-20;
3. Mohd I, Andrew JB, Robert TS, Brian TC. Outcome of Surgical Fundoplication for Extraesophageal (Atypical) Manifestations of Gastroesophageal Reflux Disease in Adults: A Systematic Review. J Laparoendosc Adv Surg Tech. 2007; 18:789-96

4. Ramos RF, Lustosa SA, de Almeida CA, da Silva CP, Matos D. Surgical treatment of gastroesophageal reflux disease: total or partial fundoplication? systematic review and meta-analysis. Arq Gastroenterol. 2011;48:252-60.
5. Zingg U, Smith L, Carney N, Watson DI, Jamieson GG. The influence on outcome of indications for antireflux surgery. World J Surg. 2010;34:2813-20.
6. Labenz J, Nocon M, Lind T. Prospective follow-up data from the ProGERD study suggest that GERD is not a categorial disease. Am J Gastroenterol. 2006;101:2457-62.
7. Velanovich V. Gastroesophageal reflux disease and the air-way-essentials for the surgeon. World J Gastrointest Surg. 2009; 30:8-10.
8. Patti MG, Perretta S. Gastro-oesophageal reflux disease: a decade of changes. Asian J Surg. 2003;26:4-6.
9. Meneghetti AT, Tedesco P, Damani T, Patti MG. Esophageal mucosal damage may promote dysmotility and worsen esophageal acid exposure. J Gastrointest Surg. 2005;9:1313-17.
10. Herbella FA, Patti MG. Gastroesophageal reflux disease: From pathophysiology to treatment. World J Gastroenterol. 2010;16:3745-9.
11. Gawron AJ, Hirano I. Advances in diagnostic testing for gastroesophageal reflux disease. World J Gastroenterol. 2010;16:3750-6.
12. Kripke C. Medical management vs. surgery for gastroesophageal reflux disease. Am Fam Physician. 2010;82:244.
13. [Boeckxstaens GE, Beaumont H, Mertens V, Denison H, Ruth M, Adler J, Silberg DG, Sifrim D. Effects of lesogaberan on reflux and lower esophageal sphincter function in patients with gastroesophageal reflux disease. Gastroenterology. 2010;139:409-17.
14. Lehmann A, Jensen JM, Boeckxstaens GE. GABAB receptor agonism as a novel therapeutic modality in the treatment of gastroesophageal reflux disease. Adv Pharmacol. 2010;58:287-313.
15. Mabrut JY, Baulieux J, Adham M, *et al*. Impact of antireflux operation on columnar-lined esophagus. J Am Coll Surg. 2003;196:60–7.
16. Wetscher GJ, Gadenstaetter M, Klingler PJ, *et al*. Efficacy of medical therapy and antireflux surgery to prevent Barrett's metaplasia in patients with gastroesophageal reflux disease. Ann Surg. 2001;234:627–32.
17. Watson DI, Mayne GC, Hussey DJ. Barrett's esophagus, fundoplication, and câncer. World J Surg. 2007;31:447–9.
18. Shan CX, Zhang W, Zheng XM, Jiang DZ, Liu S, Qiu M. Evidence-based appraisal in laparoscopic Nissen and Toupet fundoplications for gastroesophageal reflux disease. World J Gastroenterol. 2010 Jun 28;16(24):3063-71.