

Cardiopexy with ligament of teres after sadi-s due to severe gerd.

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Summary:

Clinically severe gastro-gastroesophageal reflux, after sleeve gastrectomy is performed, is a frequent condition despite the endoscopic preoperative evaluation of the patient. In cases in which this sleeve gastrectomy is associated with a duodenal-ileal bypass (SADI-S or single-anastomosis duodenal switch), the difficulty of transforming it into a Roux-en-Y gastrojejunal bypass makes a surgical approach difficult to rescue. On the other hand, a limited experience on the treatment of esophageal-gastric reflux in non-obese patients, is collected from the literature, with the use of Teres's ligament, but with good results, by performing a fixation of the esophagus-gastric junction in the abdomen. We present a case with a good clinical and imaging response to the treatment of reflux, after sleeve gastrectomy and duodenal-ileal bypass, by performing cardiopexy with the Teres ligament.

Keywords:

- Gastro-esophageal reflux
- SADI-S
- Cardiopexy
- Ligament of Teres

Introduction

GERD is frequently associated with obesity, considered as a comorbidity that depends on being overweight and which conditions an increase of intra-abdominal pressure (1). On the other hand, approximately 53% of the obesity control surgeries in the world are sleeve gastrectomies (2). Structural alterations in the hiatus are frequently observed in preoperative tests, in which an upper gastrointestinal endoscopy is mandatory (3). In these cases, maneuvers associated with the GV, reinforcement, hiatus reconstruction, essentially are frequent. The lack of weight loss and the appearance of GERD are the main causes of re-operation in patients with GS; studies show a range that presents between 2.1 and 34.9% of GERD and that requires surgical action in the event of failure of the usual medical treatment (4). In these cases, most of the authors transform the GS into BPG, with the transformation of the gastric tube into a small reservoir that anastomoses to the jejunum, thus preventing reflux; this mechanism also ensures a good subsequent nutritional behavior (5 and 6). Good results have also been obtained by fixing the gastric remnant to the gastro-splenic and / or gastro-hepatic ligament -omentopexy- (7), using the pre-aortic fascia (gastropexy of Hill) (8)

On the other hand, there is not much experience in the cases in which GS is included in a SADI-S type treatment (9). We have found the description of some cases, in which a sleeve gastrectomy was performed in the first surgery, associated with a Nissen or Belsey-Mark with gastric fundus; also the group of Docimo et al, has performed in a series of 34 patients, with an anterior plication (D-Sleeve) in patients with functional criteria of severe GERD (10). For all those situations in which a GS has been performed, some endoscopic techniques such as LINX DEVICE, MUSE

system, STRETTA PROCEDURE and ESOPHYX procedure have been described, in which endoluminal endoscopic reconstruction of the Hiss angles, also applicable in the case of SADI-S, therefore and with diverse results and pending evidence (11). We describe a resource technique for the treatment of severe gastroesophageal reflux (GERD) after a vertical gastrectomy (VG) associated with duodenal-ileal bypass (SADI-S) due to the difficulty of transformation into a Roux-en-Y gastrojejunal bypass (BPG), the technique of choice.

Material and Methods

We present a case of a 36-year-old woman at the time of the multidisciplinary approach by the morbid obesity unit with a BMI of 58Kg / m², with a maximum weight 142 Kg recorded in her case.

At the time of diagnosis there were no disease criteria due to gastroesophageal reflux (GERD), or endoscopic alterations in relation to reflux esophagitis. After performing the SADI-S, she presents a good nutritional behavior with a stabilization of weight 3 years after surgery at 82 kg (BMI: 32.4) but begins a progressive picture of occasional food vomiting and symptoms of progressive and severe gastroesophageal reflux, with no apparent response to medical treatment. It is evaluated by endoscopy and radiological imaging studies, reaching the diagnosis of a bulky, sliding hiatal hernia with gastro-oesophageal reflux and without oesophageal mucosal involvement -fig. 1 and 2-.



Figure 1.- Post-SADI-S gastro-duodenal study (EGD) and pre-caryopexy with Teres: severe reflux in decubitus.



Figure 2.- Post-SADI-S tomography (CT) and pre-caryopexy with Teres: the tube partially rises in the posterior mediastinum.



Figure 3: Surgical outline

Results

After 2 years of clinical and radiological follow-up, there is no hernia recurrence, there are no changes in her metabolic and anthropometric condition and there are no GERD symptoms –fig. 4-.



Figure 4.- EGD after cardiopepy with Teres ligament: valve effect conditioned by respiratory movements of the ligament with minimal reflux.

We performed a laparoscopic approach through 5 ports: 1 of 12mm, supraumbilical -access under direct vision-, and 4 of mm. located in the subxiphoid region -hepatic separation-, both para-rectal areas and the left hypochondrium -work doors-. The patient is placed in a semi-sitting position with open limbs and a 35° inclination. We dissect the hiatus, with visualization of the posterior crura; we identified the hiatal hernia and reduced it –no apparent sac was observed-, leaving about 4 cm of abdominal esophagus; We reconstructed the hiatus with two posterior points of non-absorbable, double material, which we executed with a 32 Fr probe-tutor inside the esophagus-tube and gastric tube. We completed the surgery with the careful dissection of the Teres ligament, which we dis-inserted from its umbilical path and carried the esophagus-gastric junction around (like a tie) and finally anastomosed its end with the anterior gastric face to the level of the angle of Hiss and fundus (with a non-absorbable discontinuous suture) –fig. 3-.

Discussion

The Teres ligament is a remnant of the umbilical vein that forms a fibrous tract in the adult; It forms the lower border of the supra-hepatic ligament and extends from the umbilicus to the liver receiving its blood supply from a small arterial branch of the hepatic artery, and preventing long-term resorption when used for the described procedure. During the said procedure, the round ligament connects the esophagus-gastric junction with the left lobe of the liver, acting as a floating anchor that moves with ventilatory movements. This system maintains the Hiss angle by pushing the joint forward, down, and to the right. To control reflux, an associated posterior crural closure should be performed (12). Pedninielle initially proposed a cardiopepy procedure using a sling around the esophagus-gastric junction, with a skin strap; but got poor results due to the necrosis of the tract. For this reason, Rampal in France in 1964 and Narbona in Spain in 1972 proposed the use of the Teres ligamentum to perform cardiopepy (13).

Abutment closure has proven not to be sufficient to prevent back-flow; therefore, this technique attempts to restore the valve function of the lower esophageal sphincter by means of a tie over the Hiss angle of the Teres ligament, fixing it to its anterior side and to the fundus itself.

GERD is a frequent complication in patients undergoing bariatric surgery, whether by itself or associated with another surgical procedure (14). Poor control of symptoms, together with the imaging and endoscopic findings of GERD, added to the insufficient control of the disease with the usual medical treatments –proton pump inhibitors and / or pro-kinetics-, therefore requiring a surgery. In the case of a single GS, the transformation into a BPG (6) is the efficient and simple solution. In the case at hand, in which the GS is included in a SADI-S, there is no possibility of transformation into a BPGY, the closure of the abutments –poster hiatal cruciate- is not enough (8). This has led to the idea of endoscopic actions after SADIS-type bariatric surgery - under development - as well as the possibility, from the start, of performing a specific anti-reflux technique, especially in patients with functional criteria for severe GERD, such as a D- Sleeve, with good results in the control of GERD but only in patients with GS (10);

It is therefore that the proposed technique with its two movements, the closure of the pillars and the tie with the Teres ligament, seems to become very efficient since the first movement achieves the reduction of the hernia and cardiopexy, with respiratory movements, by enhancing or replacing the lower esophageal sphincter. The other possibility is in patients with preoperative criteria for GERD; to approach in any GS, in isolation or associated with an ileal bypass of simple or double anastomosis, is to perform a D-Sleeve technique.

Conclusions

Cardiopexy with the Teres ligament combined with the closure of the posterior hiatal crura seems to be a good technique for the control of GERD and becomes a very useful option in patients who have undergone a sleeve gastrectomy in the context of a SADI-s bariatric surgery where the transformation into a BPG is more complex.

Bibliografía

1. Santoro S, Mota FC, Aquino CG. Treating severe GERD and obesity with sleeve gastrectomy with cardioplication and transit bipartition. *Obes Surg* 2019; 4: 1439-1441.
2. Salman AS, Shehab A, Mohannad A, Jonathon D. Vaz Ba. Management of gastroesophageal reflux disease and hiatal hernia post-sleeve gastrectomy: cardiopexy with ligamentus teres. *Surgery for Obesity and Related Diseases* 2017; 13: 2032-2036.

3. Derek KT, Penney N, Ashrafian L, Darzi A, Asrafian H. Does sleeve gastrectomy expose the distal esophagus to severe reflux? *Annals of surgery*, 2019, pendiente de publicación.
4. Treiti D, Nieber D, Ben-David K. Operative treatments of reflux after bariatric surgery: current and emerging management options. *J Gastrointest Surg* 2017; 3: 577-582.
5. Delattre JF, Palor JP, Ducasse A, et al. The crura of the diaphragm and diaphragmatic passage. Application to gastroesophageal reflux, its investigation and treatment. *Anal Clin*. 1985; 7: 271-283.
6. Hawasli A, Bush A, Hare B, Meguid A, Tatimatia N, Szpunar S. Laparoscopic Management of severe reflux after sleeve gastrectomy, in selected patients, without conversión to Roux-en Y gastric by-pass. *J Laparoendosc Adv Surg Tech A* 2015; 8: 631-635.
7. Filho AMM; Silva LB, Godoy ES, Falcao AM, de Quadros LG, Zotarelli IJ, Camos JM, Rabelo LV. Omentopexy in sleeve gastrectomy reduces early gastroesophageal reflux symptoms. *Surg Laparos Endos Percutan Tech* 2018; 10: 1097.
8. Sánchez-Pernaute A, Talavera P, Pérez-Aguirre E, Domínguez-Serrano I, Rubio MÁ, Torres A. Technique of Hill's Gastropepy Combined with Sleeve Gastrectomy for Patients with Morbid Obesity and Gastroesophageal Reflux Disease or Hiatal Hernia. *Obes Surg*. 2016;26(4):910-912.
9. Surve A, Cottam D, Sánchez Pernaute A, Torres A, Roller J, Kwon Y, Mouro J, Scniederjan B, Neichoy B, Enochs P, Tyner M, Bruce J, Bovard S, Roslin M, Jawad M, Teixeira A, Srikanth M, Free J, Dhorepatil A. The incidence of complications associated with loop duodeno-ileostomy after single-anastomosis duodenal switch procedures among 1328 patients: a multicenter experience. *Surgery form Obeisty adn Related Diseases* 2018; 14: 594-601.
10. Genio G, Tolone S, Gambardella C, et al. Sleeve Gastrectomy and Anterior Fundoplication (D-SLEEVE) Prevents Gastroesophageal Reflux in Symptomatic GERD. *Obes Surg*. 2020;30(5):1642-1652.
11. Altieri M, Pryor A. Gastroesophageal reflux disease after bariatric procedures. *Surg Clin N Am* 2015; 95: 579-591.
12. Nathanson LK, Shimi S, Cuschieri A. Laparoscopia ligamentum teres (round ligament) cardiopexy. *Br J Surg*, 1991; 78: 947-951.
13. Narbona B, Olavarrieta L, Lloris JM et al. Le traitement du reflux gastro-oesophagien par prexie avec le ligament rond. A propos de 100 opérés suivis entre 16 et 23 années. *Chirurgie*, 1990; 116: 201-210.
14. Althuwaini W, Bamehriz F, Aldohayan A, Alshammari W, Alhaidar S, Alotaibi M, Alanazi A, Alsahabi H, Almadi MA. Prevalence and predictor of gastroesophageal reflux disease afther laparoscopic sleeve gastrectomy. *Obes Surg* 2018; 28 (4): 916-922.