Chirurgia eCollection 2022 April 30

http://dx.doi.org/10.21614/chirurgia.117.eC.2714

Gastric Pull-up: A Back-up Surgical Solution in the Treatment of Large Hiatal Hernias

Ioan Cordos[1], Andrei-Cristian Bobocea[1,2]*, Ana-Adelina Afetelor[1,2], Codrut George Cosoveanu[1,2], Vlad-Cristian Dobrea[1,2], Corina Marinescu[3], Cristian Paleru[1,2]

[1]Department of Thoracic Surgery, "Marius Nasta" Institute of Pneumology Bucharest, Romania
[2]"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[3]Monza Oncological Hospital, Bucharest, Romania

*Corresponding author:
Andrei Cristian Bobocea, MD
Department of Thoracic Surgery
"Marius Nasta" Institute of Pneumology
Bucharest, Romania
E-mail: andrei.bobocea@gmail.com

Rezumat

Gastric pull-up: soluție chirurgicală de rezervă în tratamentul herniei hiatale de mari dimensiuni

Rezolvarea laparoscopică a herniilor hiatale este procedeul standard în zilele noastre. Totuşi, există situații în care din cauza vechimii şi volumului herniei este indicat abordul clasic. Acesta din urmă nu este lipsit de riscuri: apariția unor incidente sau accidente intra-operatorii care obligă la schimbarea tacticii şi tehnicii, respectiv, renunțarea la procedeele clasice şi recurgerea la soluții alternative. Acestea au menirea de a rezolva situația cu minime suferinte ale pacietului. Este prezentat cazul unei paciente în vârstă de 62 ani, cu o voluminoasă hernie hiatală tip II, la care s-a intervenit prin laparotomie mediană xifo-ombilicală. În timpul tentativei de a efectua procedeul Nissen, s-a produs efracția ireparabilă a esofagului abdominal, peretele fiind modificat de leziuni de esofagită. S-a recurs la refacerea continuității digestive prin gastric pull-up cu anastomoză gastro-esofagiană cervicală. Esofagul restant a fost extirpat în timpul 2, la 3 luni după intervenția primară. Evoluția post-operatorie imediată şi la distanță a fost excelentă.

Cuvinte cheie: hernie hiatală, gastric pull-up, chirurgia laparoscopică

Received: 17.02.2022
Accepted: 16.04.2022

Abstract

The laparoscopic treatment of the hiatal hernias is nowadays the

standard procedure. However, due to the volume and the age of the affliction, there are some situations in which the classical approach is indicated. The latter is associated with specific risks. The appearance of some intra-operatory incidents or accidents could lead to changes in the tactics and the techniques, moreover the abandon of the classical procedure and the use of alternative solutions. These procedures are meant to solve the case with minimum negative effects on the patient. This article presents the case of a 62 year-old female patient, diagnosed with a large type II hiatal hernia on which the surgical team had to intervene through a median xypho-umbilical laparotomy. During the attempt to perform the Nissen procedure, the irreversible lesion of the abdominal esophagus occurred, the esophageal wall having already suffered because of the esophagitis. This led to the restoring of the gastric continuity using the gastric pull-up technique and a cervical anastomosis. The remaining esophagus was removed during the second procedure, 3 moths later. The immediate and the late evolution of the patient was excellent.

Key words: hiatal hernia, gastric pull-up, laparoscopic surgery

Introduction

The minimal invasive surgery treatment of the hiatal hernia may be safely performed in the experienced centers covering this disease, with a 1,8% mortality for scheduled interventions and up to 8% for emergencies (1,2,3).

Serious complications developed after the intervention refer to pleural, pericardial and aortic lesions (4,5). Moreover, during the surgical procedure, the tension applied on the intra-thoracic gastric fundus, on the eso-gastric junction or on the inferior esophagus can lead to intra-operatory or post-operative leak lesions, that could in fact determine the death of the patient. These perforations must be acknowledged as soon as possible and require immediate surgical treatment, to prevent further disasters.

We present this case for which the intra-operatory change in the surgical technique was needed, due to the rupture of the abdominal esophagus, during the attempt to construct the gastric valve, thus evolving from a simple operation to a complicated one.

Case Report

A 62 years old female patient was transferred from a General Surgery clinic, after being clinically and imagistically diagnosed with a giant hiatal hernia. The General Surgery team that admitted the patient first considered that this case could not be solved through a laparoscopic approach. The chest X-ray (*Fig. 1*) showed an almost complete protrusion of the stomach into the thoracic cavity, fact that was also confirmed by the CT-scans (*Fig. 2*).

The general status of the patient was satisfactory, apart from the impossibility of convenient oral ingestion, due to dysphagia,

Figure 1. Chest X-ray that shows the presence of the stomach in the thoracic cavity

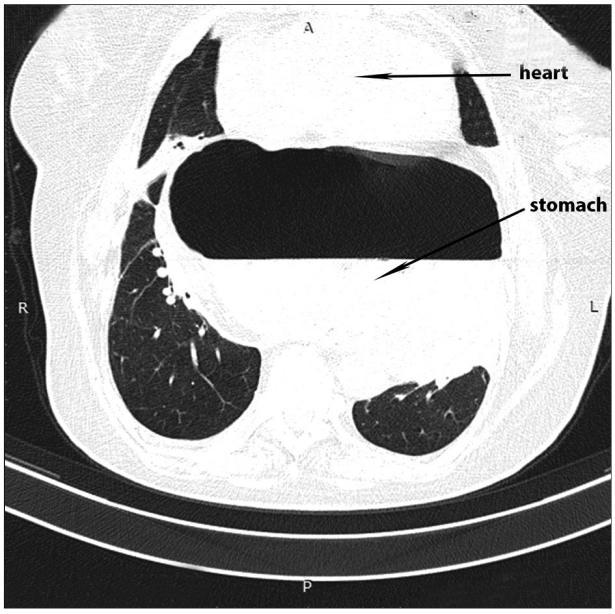

Figure 2. Large para-esophageal hernia

nausea and occasional regurgitations. Taking this fact into consideration, the hydro-electrolytic and nutritional balance of the patient had to be restored through intravenous administration of colloidal and crystalloid solutions.

The surgical approach required a median xypho-umbilical laparotomy. After opening the abdominal cavity, multiple thin adhesions were observed between the left hepatic lobe and the gastric antrum, the gastric body and the fundus having been pushed forward and fixed, transdiaphragmatic, into the hernial sac. The hernial sac was situated anterior to the eso-gastric junction, fact that was better acknowledged after drawing it back into the abdominal cavity. The dissection and the removal of the adhesions were largely done using the cautery. After repositioning the organs we noticed the impressive size of the stomach. The gastro-splenic ligament was sectioned and the abdominal esophagus was circled. Then we tried to pass the gastric valve behind the esophagus to carry out a Nissen procedure. At this moment, we have seen the gastric probe through a rupture on the front wall of the esophagus. The attempts to suture the leakage lesion with non-absorbable thread failed, every suture point enlarging further the breaks in the altered esophageal wall. At this point the correct approach was to change tactics and, helped by the remarkable volume of the stomach, we resorted to the thoracic esophagus's by-pass, acquiring the digestive continuity through the retrosternal gastric pull-up (the gastric graphon prepared and proven by application on the chest, reached the cranial end of the mandible angle) (*Fig. 3*) and an eso-gastric anastomosis at the cervical level, anastomosis which was performed with 4-0 non-absorbable monofilament wire, monolayer, in an absolute lack of tension. We mention that the gastric graphon was passed posterior to the sternum. The ends of the remaining esophagus were sutured and it was left on site in the chest, in order to be excised through a later intervention, avoiding further immediate dissection.

The pillars of the diaphragm were jointed and a jejunostomy was performed for early nourishment. The peritoneal cavity was double drained: a drainage system were places in the subhepatic area and one at the level of the Douglas pouch. The abdominal wall was sutured in anatomical layers.

The post-operative evolution was simple: in post-operative day 1 hydration being carried out with 10% glucose solution administered on the jejunostomy while in day 5 partial oral feeding was carried out. The gas transit was resumed on the 5th day. The patient left the hospital on the 10th day after the surgery, oral feeding being done with semi-solid foods and, in addition, with liquid nutrients on the jejunostomy. Standard post-operative chest X-ray showed a normal appearance (*Fig. 4*).

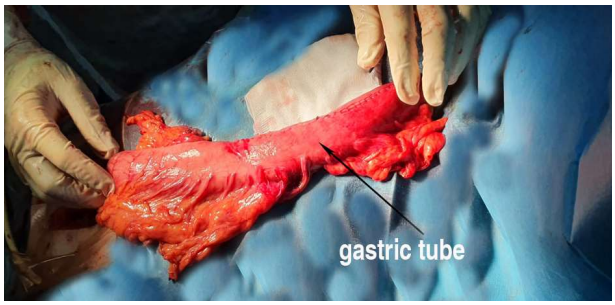

Figure 3. Intra-operatory image – the gastric tube

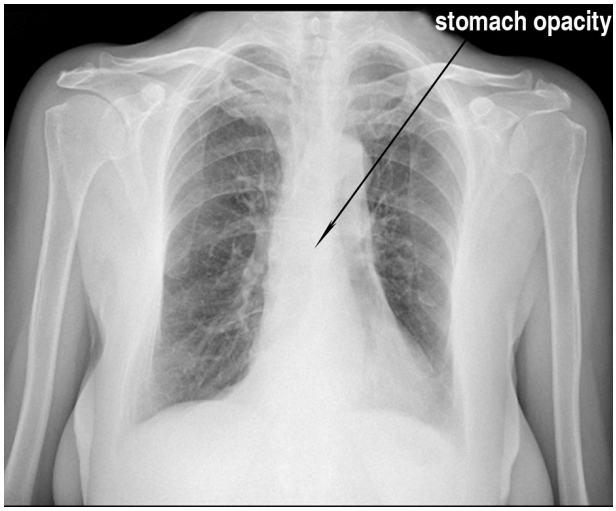

Figure 4. Post-operative Chest X-ray - normal appearance

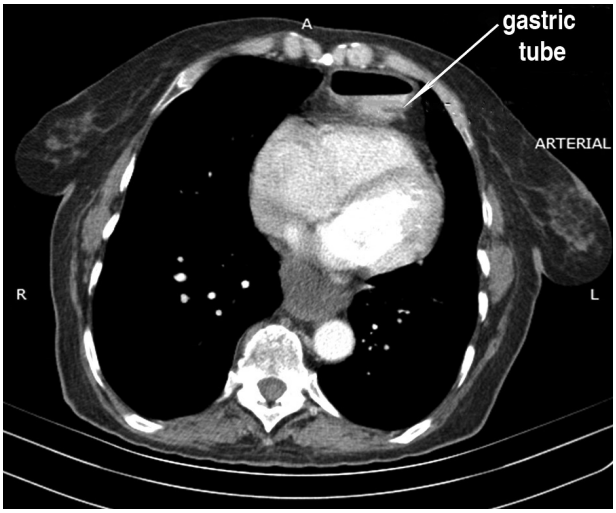

Figure 5. Thoracic CT-scan- retro-sternal gastric tube; Cystical transformation on the esophagus

The jejunostomy was suppressed one month after the first surgery, under normal oral feeding conditions. The patient returned after 3 months to carry out the esophagectomy. A thoracic CT-scan was performed, which highlighted the normal appearance of the retro-sternal gastric tube, as well as the "cystique" transformation of the remaining esophagus (*Fig. 5*). The esophagectomy was performed through the right postero-lateral thoracotomy, using the muscle sparring technique (*Figs. 6, 7*).

The post-operative evolution was simple, the discharge was carried out 7 days after the surgery, after suppressing the pleural drainage.

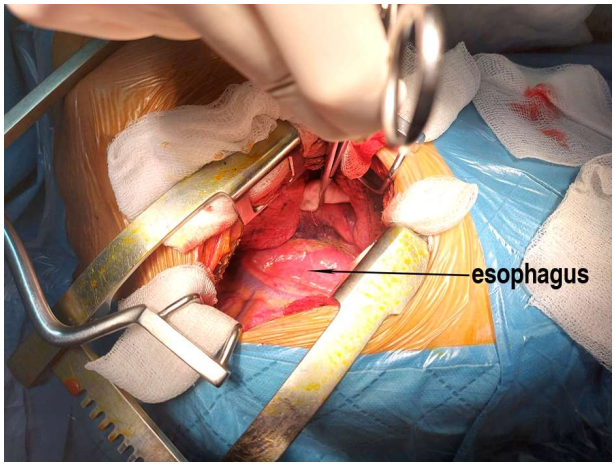

Figure 6. Intra-operatory images - dilated esophagus; partially dissected esophagus

Discussions

The surgical indication and the approach in the treatment of Hiatal hernia must be taken into account in those patients to whom the disease is diagnosed by various tests that aim to certify the presence of gastro-esophageal reflux: esophageal pH measurements, esophageal manometry, upper digestive endoscopy, barium ingestion and thoraco-abdominal CT scan. These patients must also experience symptoms to which the medication has not made any changes in better. Surgical treatment is also indicated when extra-esophageal manifestations (aspiration syndrome) or complications of reflux disease occur:

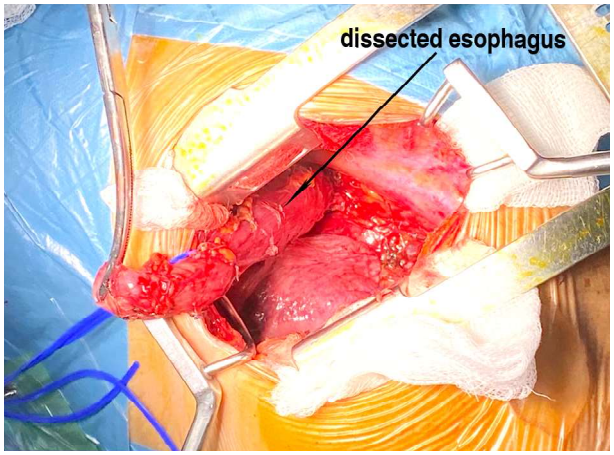

Figure 7. Intra-operatory images - dilated esophagus; partially dissected esophagus

esophageal ulcerations, stenosis, etc (6,7).

In the case of our patient, the symptoms had evolved recently, suddenly presenting with dysphagia and vomiting that had hydro-electrolytically unbalanced her. The X-ray and CT-scan images were impressive, with the only solution for solving the disease being the surgical one.

Laparoscopic surgery has become the gold standard for hiatal hernias because of generally better post-operative evolution than in open surgery, yet the operative moment and the technique still remain under debate (8). The case was referred to us was from a center where minimally invasive surgery has become the rule, our colleagues there considering that the volume and the age of the disease required a classic approach.

We are not going to discuss here the fundoplication procedures (180 degrees Dor procedure, 270 degrees Toupet technique, the 360 degrees Nissen process), as, we did not complete the intervention by a classic process because of an intra-operatory incident, but by using a back-up solution, apparently more difficult, it proved its effectiveness. The incident that modified the procedure occurred during the attempt to pass the gastric valve behind the abdominal esophagus in order to carry out a Nissen procedure.

The breach of the abdominal esophagus or of the gastric fundus during the attempt to repair para-esophageal hernias occurs from pulling the lower esophagus and the eso-gastric junction, during the preparation of the gastric fundus for the purpose of the valve, or due to thermal damage, when the cautery is used. When the lesions are immediately recognized, the best results are obtained through suturing using PDX 3-0 single or double layer resorbable threads (9,10).

The suture of the esophageal wall in inflammatory tissue seemed uncertain, and the stomach was highly dilated (enough material to make a gastric tube) and was well suited to replace the esophagus. The operatory time and the modified biological condition of the patient made us change the operative tactics and even if sometimes there might be some formidable complications, the simple post-operative evolution showed a correct judgment (3).

One might ask why we chose the cervical anastomosis instead of a intrathoracic approach. In this regard, we have already mentioned two reasons: the patient showed a degree of malnourishment, and the risk of developing an intrathoracic fistula at this point, would have been harder to manage. In addition, the volume of the stomach, which was already dilated, allowed us to perform a sufficient gastric tube, long enough to be sutured in the cervical area, comprising all the advantages that other authors mentioned in their studies (11).

The team was experienced in esophageal surgery, thus discussing about leaving on site the esophagus its excision at a later time, the reasoning was simple: further intra-thoracic dissection that could lead to pneumothorax would have complicated the post-operative evolution (3). The removal of the remaining modified esophageal "cystic" duct did not complicate with anything the late evolution and was performed when the patient was in a perfect biological state (3 months after the first intervention). We insisted on removing the remaining esophagus because, from the experience of the team, we faced cases that were treated prior to this one who developed neoplastic lesions on the remaining esophagus (12,13).

Conclusion

The surgical treatment of symptomatic hiatal hernia remains undeniably the apanage of minimal invasive procedures. Still, there are situations (exceptions?) which require classical methods, sometimes even exceptional solutions, which must be found on the spot and which can rescue the patient's life and the peace of the surgeon.

Conflict of Interest

The authors have no conflicts of interest to declare regarding this case.

References

1. Balian N, Luketich JD, Lev RM, Awais O, Winger D, Weksler B, et al. A clinical prediction rule for perioperative mortality and major morbidity after laparoscopic giant esophageal hernia repair. J Thorac Cardiovasc Surg. 2013;145(3):721-9.
2. Dallemagne B, Quero G, Lapergola A, Guerriero L, Fiorillo C, Perretta S. Treatment of giant paraesophageal hernia: pro laparoscopic approach. Hernia. 2018;22(6):909-919.
3. Kamarajah SK, Nepogodiev D, Bekele A, Cecconello I, Evans RPT, Guner A, et. al. Mortality from esophagectomy for esophageal cancer across low, middle, and high-income countries: An international cohort study. Eur J Surg Oncol. 2021;47(6):1481-1488.
4. Calikglu I, Ozgen G, Toydemir T, Yerdel MA. Iatrogenic cardiac tamponade as a mortal complication of peri-hiatal surgery. Analysis of 30 published cases. Heliyon. 2019;5(4):e01537.
5. Frechette E, Bolca C, Lebel S. Repair of complete longitudinal esophageal rupture with preservation of esophageal motility. Ann Thorac Surg. 2014; 98(4):1496-8.
6. Young MT, Brant K. Oeschlager: Indications and procedures for surgical Therapy of GERD with hiatal hernia. Springer international publishing AG: M.A. Memom (ed.) Hiatal Hernia Surgery. 2018. p. 73-91.
7. Bolca C, Has A, Bobocea A, Afetelor A, Stoica R, Strambu I, et al. A rare thymic tumor - lipofibroadenoma - always a postoperative surprise. In Vivo. 2021;35(6):3623-3626.
8. Howel RS, Liu HH, Petrone P, Anduaga MF, Servide MJ, Hall K, et al. Short-term outcomes in patients undergoing paraesophageal hiatal hernia repair. Sci Rep. 2020;10(1):7366.
9. Zhang LP, Chang R, Matthews BD, Awad M, Meyers B, Eagon JC, et al. Incidence mechanism, and outcomes of oesophageal and gastric perforation during laparoscopic foregut surgery: a retrospective review of 1223 foregut cases. Surg Endosc. 2014;28(1):85-90.
10. Evans RPT, Kamarajah SK, Bundred J, Nepogodiev D, Hodson J, van Hillegersberg R, et al. Postoperative outcomes in oesophagectomy with trainee involvement. BJS Open. 2021;5(6):zrab132.
11. Predescu D, Constantinoiu S. Esophageal reconstruction with the stomach, a functional dilemma? Chirurgia (Bucur). 2018;113(1):83-94.
12. Bacalbasa N, Halmaciu I, Bolca C, Neacsu A, Cretoiu D, Balalau C, et al. Debulking surgery for moderately differentiated neuroendocrine gastric carcinoma. A case report and literature review. In Vivo. 2020;34(3):1527-1531.
13. Bundred JR, Kamarajah SK, Siaw-Acheampong K, Nepogodiev D, Jefferies B, Singh P, et. al. International variation in surgical practices in units performing oesophagectomy for oesophageal cancer: a unit survey from the oesophago-gastric anastomosis audit (OGAA). World J Surg. 2019;43(11): 2874-2884.