ANNALI ITALIANI DI CHIRURGIA
Pubblicazione on-line
ISSN 2239-253X
Direttore Nicola Picardi

An unexpected case of giant hiatal hernia and review of literature

GHH: case report and literature review

Ann. Ital. Chir.
Published online (EP) 19 April 2013
pii: S2239253X13020756
www.annitalchir.com

Salvatore Marano, Antonio Zullino, Stefano Mattacchione, Valentina Mingarelli, Barbara Luongo, Filippo Tosato

Department of General Surgery "F. Durante", Policlinico Umberto I Hospital, Sapienza University of Rome, Italy
Referral Center for the Surgical Treatment of Gastroesophageal Reflux Diseases

An unexpected case of giant hiatal hernia and review of the literature

INTRODUCTION: *The management of giant hiatal hernia remains one of the most complicated surgical challenge and several operative approaches have been proposed during the years. Currently, the most practiced is the laparoscopic approach, which adds functional outcomes overlapping those of the conventional open surgery to the own advantages of the technique. The main problem of this operation is the high rate of recurrence, occurring independently by the specific technique adopted.*
PRESENTATION OF CASE: *An unexpected case of giant hiatal hernia, incidentally discovered in a patient candidate to cholecystectomy for gallstones, is presented. We describe the surgical procedure performed and our cornerstones for a correct and long-lasting hiatal hernia repair, comparing us with the current standards of care.*
DISCUSSION: *Laparoscopy has facilitated the execution of some surgical steps, such as the hiatal visualization and the intra-thoracic esophagus mobilization, fundamental for the success of the operation. Inheriting the concept of tension free repair, the use of mesh reinforcing the hiatal defect is being encouraged, especially biologic meshes, although some authors warn their employment may introduce potential catastrophic complications for patient.*
CONCLUSION: *Laparoscopy should be the approach of choice, whenever possible, to treat this condition, while the use of supportive prosthetic devices depends on the single patient's hernia characteristics and on the surgeon's personal experience and preferences. Anyways, many factors determine the final outcomes of the surgical intervention, some of which patient-dependent, others operator-dependent but, independently from the approach adopted, this operation is often burdened by a high risk of recurrence.*

KEY WORDS: GERD, Hernia, Laparoscopic gastric surgery, Minimally invasive surgery, Perioperative complications

Introduction

An uniform definition of giant hiatal hernia (GHH) does not exist, but it is considered by most a more extensive type III hernia with at least 1/3 gastric and eventually other abdominal organs herniation, such as colon, small bowel, or spleen and liver, within the thoracic cavity [1]. Sometimes the GHH is collocated into an independent hernia class (type IV), but it is only a conventional distinction.
GHH is an uncommon condition and its clinical presentation is very heterogeneous, from completely asymptomatic subjects where the diagnosis is incidentally made to patients referring gastroesophageal reflux disease (GERD) symptoms and/or related to the space-occupying hernia volume in the chest, such as postprandial chest pain or pressure, dysphagia, early satiety, shortness of breath and pneumonia aspiration [2]. However, the clinical impact of GHH is given by its potential complications, such as strangulation, volvulus and acute digestive bleedings which require an emergency operation.

Pervenuto in Redazione Ottobre 2012. Accettato per la pubblicazione Novembre 2012
Correspondence to Filippo: Tosato, MD, Referral Center for the Surgical Treatment of Gastroesophageal Reflux Diseases, Department of Surgery "F. Durante", Policlinico "Umberto I", "Sapienza" University Rome, Italy (e-mail: filippo.tosato@uniroma1.it)

Because of these life-threatening complications, it is always advisable the early elective treatment of this condition, also in the mildly symptomatic patients, unless the advanced age or other relevant co-morbidity dissuade from any preventive intervention. The optimal surgical operation is still debated and the experiences reported in the literature are often based on heterogeneous patients populations and on too short follow-up periods to subscribe unanimous conclusions. Nowadays, the laparoscopic approach is undoubtedly the most practiced and it has demonstrated, in expert hands, the same reproducible results of open traditional approach with the consolidated benefits of a minimally invasive technique [3]. Finally, an other interesting issue of debate is the use of prosthetic devices to reinforce the hiatal repair in order to reduce the postoperative recurrence rate, still considered too high in most series published [4,5].
We report a clinical case of asymptomatic GHH, diagnosed incidentally during the preliminary preoperative exams to cholecystectomy for gallstones, and discuss our personal management revisiting the current literature.

Case report

A 64 year-old male patient, with Body Mass Index (BMI) = 26, no relevant comorbidities and no previous abdominal surgical interventions, referred to our department to undergo cholecystectomy for symptomatic cholelithiasis. He experienced in the past two episodes of hepatic colic without fever and jaundice, both spontaneously resolved, with ultrasound finding of chronic cholecystitis and gallstones.

In the elective setting, chest X-ray showed a soft retro-aortic opacity enlarging the mediastinum, hypothesized as an aortic dilatation or as mediastinal mass (Fig. 1). So, firstly a thoracic Computed Tomography (CT) was ordered, showing an aneurysmal dilatation of the ascending aorta and the hemi-diaphragms markedly elevated, predominantly the left one and the middle portions of both them (Fig. 2). Then, a Magnetic Resonance Cholangio-Pancreatography (MRCP) with thoracic and abdominal scans was necessarily executed with evidence of a huge air-filled hiatal hernia, containing the transverse colon and the stomach completely, and part of the left and the right colon, with prevalent development posteriorly and into the left hemi-thorax (Fig. 3). No additional alteration was detected in hepatobiliary and pancreatic systems, except for gallbladder lithiasis. A careful investigation of the patient's clinical history was taken, with emphasis on the upper gastro-intestinal and respiratory symptoms, but none of the manifestations typically related to GHH was referred and also spirometrical parameters resulted within normal ranges. Finally, an endoscopic evaluation was performed, with evidence of repetitive waves along the gastro-esophageal trait but no direct signs of mucosal injures.
The patient was operated in general anesthesia with laparoscopic approach. A 12-mm camera port was inserted in the midline about 12 cm under the xifoid with open technique consenting to describe the presence of a voluminous hernia sac protruding into the mediastinal space with inside the omental apron, stomach and large part of colon. Then, four working ports were positioned under vision according to our conven-

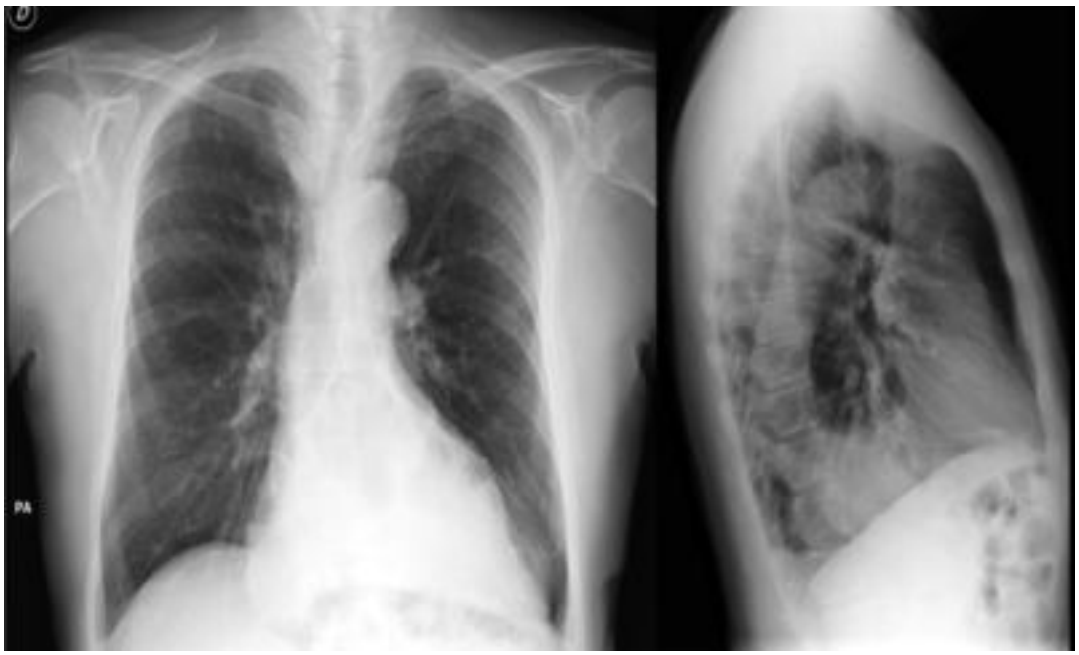

Fig. 1: Chest X-ray, postero-anterior and lateral views.

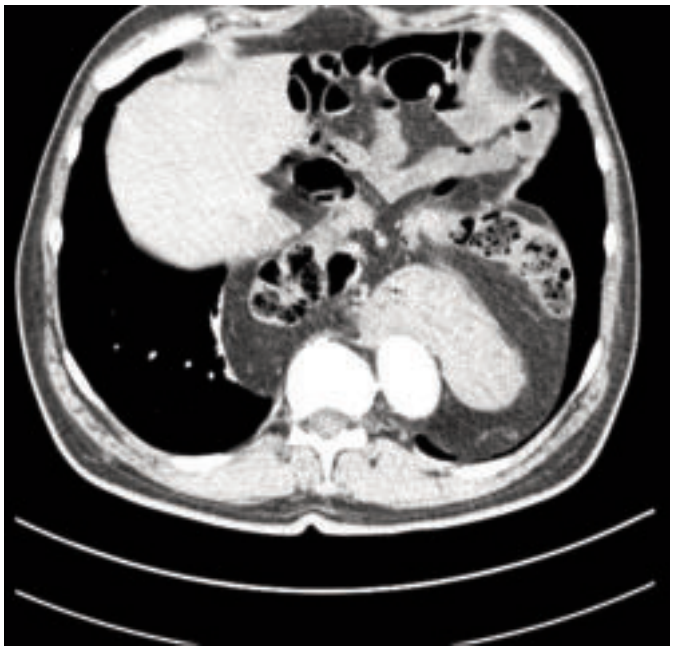

Fig. 2: Thoracic Computed Tomography scan.

tional scheme, respectively subcostally in the right midclavicular line, in epigastric region on the left of the falciform ligament, subcostally in the left midclavicular line and 3-4 cm below the left costal margin in the anterior axillary line. After retraction of the left lobe of the liver, a cautious dissection of the hernia sac was carried along all the circumference of the diaphragmatic defect, beginning anteriorly and then proceeding laterally and posteriorly, paying attention to preserve the mediastinal pleura and the vagus nerves. It was necessary to cautiously dissect the adherences between the hernia sac and the mediastinal structures to guarantee the complete mobilization of hernia content. As this was obtained satisfactorily, it was easy to progressively replace all the dislocated viscera into the peritoneal cavity, simultaneously assuring a sufficient intra-abdominal length (≥ 2.5 cm) of the oesophagus. The hernia sac was then everted, completely excised and removed, so evidencing a diaphragmatic defect of about 8 cm, which was repaired with two-stitch (non-resorbable, monofilament suture) crural approximation, anteriorly and posteriorly, without guillotining the esophagus (preventively isolated on loop). We decided intraoperatively to reinforce the hiatal repair, by using a pre-shaped 150×200×1.5 mm porcine collagen mesh secured with interrupted sutures directly to the diaphragm surface. The operation was completed with a Nissen-Rossetti fundoplication, calibrated using a 48-Fr bougie. This procedure is well described in other our works [6].
A nasogastric tube was left overnight and a gastrografin-swallow X-ray was performed on the second postoperative day. The patient resumed a pureed diet on the third postoperative day and was discharged on the sixth postoperative day. Postoperative functional outcome and quality of life were evaluated (1 year post-surgery) using the GERD-Health Related Quality of Life (GERD-HRQoL) scale, resulted to be "excellent" (score=3, range 0-30). A barium-swallow X-ray, organized at one month from dimission, was negative and two subsequent endoscopic controls, at 6 and 12 months after surgery respectively, did not show any abnormality in absence of referred symptoms.

Discussion

After the first laparoscopic paraesophageal hernia repair by Cuschieri *et al* in 1992 [7], this approach had wide acceptance and diffusion, demonstrating from the

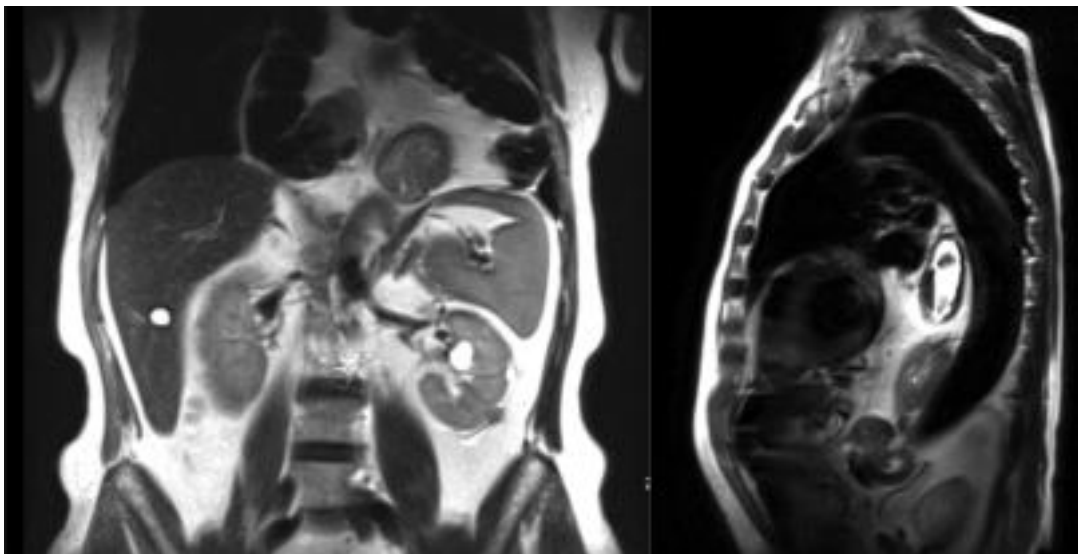

Fig. 3: Abdomen Magnetic Resonance, transverse and lateral scans.

beginning less surgical impact and less morbidity versus the open techniques. The apparent drawback was the high recurrence rates reported in the first works, but those results were difficult to interpret because derived from studies heterogeneous for criteria of patients selection and operative technique [8,9]. Increasing the experience of physicians performing this surgery, the feasibility and the safety of laparoscopic approaches have been established with functional outcomes comparable to those of conventional surgery [10]. Nevertheless, a standardized laparoscopic operative technique does not exist yet, remaining operator-dependent several surgical choices, such as the need for an esophageal lengthening procedure, for routine fundoplication, for prosthetic reinforcement of the hiatal repair [2,11-13].

We believe that, independently from the operative approach adopted, three surgical principles must be respected to obtain a feasible GHH repair: a) the complete dissection and removal of hernia sac, in order to promote the natural replacement of migrated viscera and to minimize the early recurrences and the mediastinal seromas described by some authors [14]; b) the restoration of an adequate length to the intra-abdominal esophagus, achievable with an extended mobilization from its mediastinal adherences, easier through laparoscopy than by open approach [15]. In our opinion, the laparoscopic approach has greatly reduced the necessity for esophageal lengthening procedures, which should be reserved to only patients with a real documented shortened esophagus; c) an anti-reflux procedure should be always associated, because most of the anatomic anti-reflux structures resulted invalidated after the hiatal dissection. Our procedure of choice is Nissen-Rossetti fundoplication, calibrated on bougie.

As concerns the use of routine mesh reinforcement of the hiatus, our standard of care does not include it. Frantzides *et al.* [16] and Granderath *et al.* [17] showed a reduction of recurrences with synthetic mesh comparing with simple sutured hiatoplasty; conversely, the advocates of direct hiatal suture raise concerns about the potential complications of prosthetic crural repair, such as mesherosion, ulceration, stricture and dysphagia [17,18]. Our policy is to use a mesh reinforcement in two selected circumstances, first when the hernia defect is too large to guarantee a tension-free repair and second when cruroplasty does not seem to be alone intraoperatively satisfactory, because of thin or feeble pillars. Anyway, our current preferences go towards the employment of biologic meshes, whose theoretical advantages expected over the traditional synthetic meshes have been proved in some recent clinical [11] and experimental studies [19,20].

Few randomized controlled trials have been performed to date about the impact of mesh use on GHH recurrence, expressed as radiologic and not as clinical recurrences [19,20]. Really, only patients with a symptomatic anatomical recurrence could need for re-intervention and they represent the minority.

Conclusion

We think that laparoscopic technique, routinely used at our department for the surgical treatment of GERD, can be reproduced safety and effectively even for GHH. We recommend the above-mentioned surgical principles for a correct and long-lasting hiatal repair, remembering that several factors influence the final outcome of this intervention, some of which patient-dependent (hernia size, BMI, comorbidities), others operator-dependent (professional speciality, surgical skill and experience) and that, independently from the approach used, this operation is burdened by a high risk of recurrence.

Riassunto

INTRODUZIONE: Il trattamento dell'ernia iatale "gigante" rimane una delle più complicate sfide della chirurgia e diversi approcci operativi sono stati proposti durante gli anni. Attualmente l'approccio laparoscopico è di gran lunga quello più praticato, che somma ai vantaggi propri della tecnica esiti funzionali sovrapponibili a quelli della chirurgia tradizionale open. Occorre però sottolineare come il problema principale di tale intervento sia rappresentato dal tasso di recidive erniarie, insensibile a grandi linee alla tecnica adottata.

PRESENTAZIONE DEL CASO: Viene illustrato un caso clinico di ernia iatale "gigante" misconosciuta, diagnosticata occasionalmente in un paziente candidato a intervento chirurgico di colecistectomia per colelitiasi. Ne descriviamo iter diagnostico e procedura chirurgica, e chiariamo i nostri punti cardine di tecnica chirurgica per ottenere una plastica iatale funzionale nel tempo, confrontandoci con gli standard correnti.

DISCUSSIONE: La laparoscopia ha semplificato l'esecuzione di alcuni tempi chirurgici, come la preparazione e la mobilizzazione dell'esofago intra-toracico, tappe fondamentali per il buon esito dell'intervento. Con riguardo al concetto di riparazione *tension-free*, l'utilizzo di una rete protesica, specie di natura biologica, a rinforzo della plastica iatale diretta è incoraggiato da molti Autori, mentre è scoraggiato da altri che ne rilevano i potenziali rischi.

CONCLUSIONI: La laparoscopia dovrebbe essere l'approccio di scelta, ogniqualvolta possibile, per il trattamento di questa condizione, mentre la decisione di utilizzare un rinforzo protesico può dipendere dal singolo caso trattato e dall'esperienza e preferenze personali del chirurgo. In conclusione, molti fattori incidono sui risultati finali dell'intervento, specie sulla lunga distanza, alcuni dei quali paziente-dipendenti, altri operatore-dipendenti, ma, in indipendentemente dall'approccio adottato, l'intervento è spesso gravato da un alto rischio di recidive.

References

1. Landreneau RJ, Del Pino M, Santos R *Management of paraesophageal hernias.* Surg Clin North Am, 2005; 85: 411-32.

2. Horvath KD, Swanstrom LL, Jobe BA: *The short esophagus: Pathophysiology, incidence, presentation, and treatment in the era of laparoscopic antireflux surgery*. Ann Surg, 2000; 232: 630-40.

3. Nason KS, Luketich JD, Qureshi I, Keeley S, Trainor S, Awais O, et al.: *Laparoscopic repair of giant paraesophageal hernia results in long-term patient satisfaction and a durable repair*. J Gastrointest Surg, 2008; 12:2066-75.

4. Johnson JM, Carbonell AM, Carmody BJ, Jamal MK, Maher JW, Kellum JM, et al.: *Laparoscopic mesh hiatoplasty for paraesophageal hernias and fundoplications: A critical analysis of the available literature.* Surg Endosc. 2006; 20: 362-66.

5. Zaninotto G, Portale G, Costantini M, Fiamingo P, Rampado S, Guirroli E, et al:. *Objective follow-up after laparoscopic repair of large type III hiatal hernia. Assessment of safety and durability*. World J Surg. 2007; 31:2177-183.

6. Tosato F, Monsellato I, Marano S, Leonardo G, Portale G, Bezzi M: *Functional evaluation at 1-year follow-up of laparoscopic Nissen-Rossetti fundoplication*. J Laparoendosc Adv Surg Tech A. 2009; 19:351-54.

7. Cuschieri A, Shimi S, Nathanson LK: *Laparoscopic reduction, crural repair, and fundoplication of large hiatal hernia*. Am J Surg 1992; 163:425.

8. Jobe BA, Horvath KD, Swanstrom LL: *Postoperative function following laparoscopic Collis gastroplasty for shortened esophagus.* Arch Surg, 1998; 133:867-74.

9. Hashemi M, Peters JH, DeMeester TR, Huprich JE, Quek M, Hagen JA, et al.: *Laparoscopic repair of large type III hiatal hernia: objective follow-up reveals high recurrence rate.* J Am Coll Surg, 2000; 190: 553.

10. Draaisma WA, Gooszen HG, Tournoij E, Broeders IA: *Controversies in paraesophageal hernia repair: A review of literature*. Surg Endosc 2005; 19:1300.

11. Oelschlager BK, Pellegrini CA, Hunter J, Soper N, Brunt M, Sheppard B, et al.: *Biologic prosthesis reduces recurrence after laparoscopic paraesophageal hernia repair: A multicenter, prospective, randomized trial*. Ann Surg, 2006; 244:481-90.

12. Johnson JM, Carbonell AM, Carmody BJ, Jamal MK, Maher JW, Kellum JM, et al.: *Laparoscopic mesh hiatoplasty for paraesophageal hernias and fundoplications: A critical analysis of the available literature*. Surg Endosc, 2006; 20:362-66.

13. Whitson BA, Hoang CD, Boettcher AK, Dahlberg PS, Andrade RS, Maddaus MA: *Wedge gastroplasty and reinforced crural repair: Important components of laparoscopic giant or recurrent hiatal hernia repair*. J Thorac Cardiovasc Surg, 2006; 132:1196-202.

14. Mattar SG, Bowers SP, Galloway KD, Hunter JG, Smith CD: *Long-term outcome of laparoscopic repair of paraesophageal hernia*. Surg Endosc. 2002; 16:745-49.

15. O'Rourke RW, Khajanchee YS, Urbach DR, Lee NN, Lockhart B, Hansen PD, et al.: *Extended transmediastinal dissection: an alternative to gastroplasty for short esophagus*. Arch Surg, 2003; 138:735-40.

16. Frantzides CT, Madan AK, Carlson MA, Stavropoulos GP: *A prospective, randomized trial of laparoscopic polytetrafluoroethylene (PTFE) patch repair vs simple cruroplasty for large hiatal hernia*. Arch Surg, 2002; 137:649-52 .

17. Granderath FA, Schweiger UM, Kamolz T, Asche KU: Pointner R: *Laparoscopic Nissen fundoplication with prosthetic hiatal closure reduces postoperative intrathoracic wrap herniation: preliminary results of a prospective randomized functional and clinical study*. Arch Surg, 2005; 140:40-48.

18. Trus TL, Bax T, Richardson WS, Branum GD, Mauren SJ, Swanstrom LL, et al.: *Complications of laparoscopic paraesophageal hernia repair*. J Gastrointest Surg, 1997; 1:221-28.

19. Oelschlager BK, Barreca M, Chang L, Pellegrini CA: *The use of small intestine submucosa in the repair of paraesophageal hernias: Initial observations of a new technique*. Am J Surg, 2003; 186:4-8.

20. Strange PS: *Small intestinal submucosa for laparoscopic repair of large paraesophageal hiatal hernias: A preliminary report*. Surg Technol Int, 2003; 11:141-43.