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Quality of life and long-term results of reinterventions performed by laparoscopy after oesophageal hiatus surgery

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A B S T R A C T

Introduction: Laparoscopic surgery has had a significant impact on gastro-oesophageal reflux disease (GORD), para-oesophageal hiatal hernia (POHH), and achalasia. There have been a percentage of poor results due to reappearance, persistence or appearance of new symptoms. Reinterventions of the hiatus are more complicated and are not always accompanied by a satisfactory clinical response.

Objective: To evaluate the long-term results of a series of 20 patients reintervened by laparoscopy and their quality of life.

Material and methods: A total of 20 patients operated on between February 1998 and December 2008 after previous surgery for the hiatus. The mean age of the patients was 56 (19–77) years. A total of 18 patients had been operated on due to GORD or POHH and 2 due to achalasia. They were followed up until December 2008 and a quality of life GIQLI test was performed.

Results: Of the 20 patients, 13 were operated on by laparoscopy and 7 by laparotomy. The mean pre-operative time was 74 (1–24) months. The reintervention was for GORD and HH in 12 (63%); dysphagia in 4 (21%); and POHH (3). Conversion was 10% and the operating time was 180 (105–300) min. The procedures were: pillar closure and re-Nissen (10), re-Nissen (2), Toupet (2), Collis (1), mesh removal (1), re-myotomy (2), and pexy (1). There was 16% morbidity and no mortality. After a follow up of 68 (1–116) months, 14 patients were symptom-free. The GIQLI score was 106 (97–124), which was less than standard (125).

Conclusions: Reintervention of hiatus is reliable and effective over the long-term, but quality of life scores were lower than normal.

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Calidad de vida y resultados a largo plazo de las reintervenciones efectuadas por laparoscopia tras cirugía del hiato esofágico

RESUMEN

Introducción: La cirugía laparoscópica ha tenido un importante impacto en el tratamiento de la enfermedad por reflujo gastroesofágico (ERGE), la hernia de hiato paraesofágica (HHPE) y la acalasia. Se acompaña de un porcentaje de malos resultados por reaparición, persistencia o aparición de nueva sintomatología. Las reintervenciones sobre el hiato son más complejas y no siempre se acompañan de respuesta clínica satisfactoria.

Objetivo: Resultados a largo plazo de una serie de 20 pacientes reintervenidos por laparoscopia y evaluar su calidad de vida.

Material y métodos: Se intervino a 20 pacientes entre febrero de 1998 y diciembre de 2008 tras cirugía previa del hiato, con una media de edad de 56 (intervalo, 19–77) años; 18 pacientes habían sido operados por ERGE o HHPE y 2, por acalasia. Fueron seguidos hasta diciembre de 2008 y se pasó el test de calidad de vida GIQLI.

Resultados: 13 pacientes habían sido operados por laparoscopia y 7, por laparotomía. La media de tiempo preoperatorio fue 74 (1–24) meses. La reintervención fue: en 12 (63%) por ERGE y hernia de hiato, 4 (21%) por disfagia y 3 por HHPE. La conversión fue del 10% y el tiempo operatorio, 180 (105–300) min. Los procedimientos fueron: cierre de pilares y re-Nissen (10), re-Nissen (2), Toupet (2), Collis (1), extirpación de malla (1), remiotomía (2) y pexia (1). La morbilidad fue del 16% y no hubo mortalidad. Tras seguimiento de 68 (1–116) meses, 14 pacientes están libres de síntomas. El valor de GIQLI fue 106 (97–124), menor que el estándar (125).

Conclusiones: La reintervención del hiato es factible y eficaz a largo plazo, sin lograr valores de calidad de vida semejantes a la normalidad.

Introduction

The development of laparoscopic surgery has had a great impact on the clinical intervention of gastro-oesophageal reflux disease (GORD), paraoesophageal hiatal hernias (POHH), and achalasia, and it has increased the number of procedures performed for these diagnoses. Logically, the increase in the number of procedures has been accompanied by a percentage of poor results from the return, the persistence or the appearance of new symptoms.[1-4] The clinical evaluation and the selection of the right moment to indicate surgery for post-operative syndromes of the oesophageal junction are difficult. The re-interventions of the hiatus have generally been considered as technically more complex regarding the risk of iatrogenic lesions and because they do not always give satisfactory clinical responses. However, various initial experiences have shown that it is possible to carry out a laparoscopic technique on the previously operated hiatus (Table 1).[5-15]

The results after the laparoscopic re-intervention of the hiatus that has previously been operated on is usually evaluated regarding anatomic or symptomatic recurrences, although the most important objective is to know the long term functional results. Therefore, the specific tests to evaluate quality of life are especially useful instruments as they make evaluating the true impact of the surgical treatment on the patient's well-being possible.

The objective of this study is to present the long term results of a series of 20 patients where a laparoscopic technique was used on the hiatus that had previously been operated on, and to evaluate their quality of life after the surgery.

Material and methods

Patients

The series studied corresponds to the patients that had undergone laparoscopic surgery between February of 1998 and December of 2008 after a previous surgery for an oesophageal hiatus, whose initial surgery was for GORD, an hiatus hernia (HH, POHH and achalasia, collected in the prospective database (1998-2008) of advanced laparoscopic procedures carried out in the General and Digestive Surgery Department of the Hospital de Sant Pau. Three hundred eighty-seven patients were operated on in said period for oesophageal hiatus (311 for GORD, HH, or POHH, and 76 for achalasia), and of them, 20 (5%) patients were identified (7 men and 13 women) with an average age of 56 (interval, 19-77) years old. Of these patients, 18 had been operated on for GORD (compared with HH in 14 cases) and 2 for achalasia. The pre-operative study before the re-intervention included an oesophagogram, a fibrogastroscopy, an oesophageal

Table 1 – Results of the re-intervention by laparoscopy of the oesophageal hiatus. Global experience

Author, y	Patients, No.	Conversion	Morbidity	Mortality	Stay, d	Follow-up, mo	Satisfactory evolution
GORD and POHH							
Pointner et al[5] (1999)	30	7%	7%	0	8	29	No data available
Horgan et al[6] (1999)	31	10%	33%	No data available	3	25	87%
Watson et al[7] (2002)	11	0	0	0	No data available	No data available	91%
Dutta et al8 (2004)	28	7%	10%	0	3	25	NS
Granderath et al[9] (2003)	51	4%	No data available	0	No data available	12	97%
Smith et al[10] (2005)	285	8%	15%	0.3%	No data available	No data available	70%
Oeschlager et al[11] (2006)	41	0%	12%	0	2	60	68%
Iqbal et al[12] (2006)	58	8%	32%	No data available	No data available	No data available	70%
Achalasia							
Gorecki et al[13] (2000)	8	0	0	0	No data available	No data available	87%
Duffy et al[14] (2003)	5	0	0	0	2	13	60%
Rakita et al[15] (2007)	12	No data available	0	0	No data available	24	73%

GORD indicates gastro-oesophageal reflux disease; POHH, para-oesophageal hiatal hernia.

manometry or pH-metry, depending on symtoms. These 20 patients were operated on 23 times, and 2 of the 3 re-interventions were also initiated using laparoscopy.

Surgical technique[3]

In all patients, the re-intervention was initiated with laparoscopy. The hiatus technique was performed after freeing the left lobe of the anterior face of the oesophagus and the stomach in order to identify some structure that could serve as orientation for the normal anatomy of the area. The most helpful references and those that are usually best conserved are the diaphragm pillars, whose dissection creates access to the inferior mediastinum and it makes the dissection of the oesophagus easier without direct manipulation. When it is difficult to anatomically identify structures, the placement of a Fouché catheter or an intra-operative endoscope helps to identify the oesophagus and to safely dissect the different parts. In especially difficult cases, the short vessels were sections (if applicable) and the trans-cavity of the omenta was accessed to visualise the hiatus from its inferior side. The intra-operative fibrogastroscopy was also used to avoid oesophageal lesions (perforation) or to confirm that the myotomy was completed, in the cases of achalasia. If the Nissen fundoplication was disrupted, it was undone and a new Nissen or Toupet fundoplication was performed. When the proximity of the pillars was difficult, or when the anatomic structures were very fragile, the closure of the pillars was reinforced with a retro-gastric mesh (Ethicon) fixed with "tackers" (ProTack, Covidien).

Post-operative evolution and follow-up

The patients were controlled in the outpatient clinic and all of them underwent a post-operative oesophagogram. Any other necessary explorations were carried out (fibrogastroscopy, manometry, or pH-metry) depending on their symptoms.

Evaluation of symptoms and quality of life test

The clinical records were revised and the patients were interviewed by telephone in December of 2008. A direct interrogation was used, including: *a)* symptoms related to the intervention including epi-gastric pain, pyrosis, dysphagia and regurgitation; *b)* anti-secretion medication being taken; and *c)* specific quality of life questionnaire (Gastrointestinal Quality of Life Index, GIQLI).

Table 2 – General characteristics, intra-operative details, and clinical evolution

	Total	Previous laparoscopy	Previous laparotomy
Patients	20	13	7
Age, y	56 (19–77)	60 (19–77)	108 (12–288)
Follow-up time, mo	68 (1–116)	27 (1–116)	87 (31–119)
Operating time, min	180 (105–360)	135 (105–300)	240 (180–360)
Conversion	2/20	0/13	2/7
Stay, d	4 (2–65)	4 (2–64)	4 (3–65)
Intraoperative complications	3/20	1/13	2/7
Post-operative complications	3/20	1/13	2/7
Re-interventions	3/20	2/13	1/7
GIQLI	106 (79–124)	101 (79–124)	116 (90–120)
Post-operative symptoms	5/19	4/13	1/7

Table 3 – Surgical technique used during the re-intervention

	Total	Previous laparoscopy	Previous laparotomy
Nissen	10	8	2
Reduction+closure of pillars	1	–	1
Toupet	1		1
Toupet+Collis-Nissen	1		1
Nissen+mesh	3	3	–
Pexia	2	2	–
Heller-Dor re-intervention	2	–	2
Removal of mesh+Nissen	1	1	

Statistical study

The values were expressed by medians and intervals. The Student *t* test and the χ^2 test were used as needed.

Results

The clinical characteristics and surgical indication for the initial intervention are described in Tables 2 and 3. The first intervention had been performed using laparoscopy in 13 cases and open surgery in 7; 11 patients had been operated on in our department and 9, in other centres. The average time that passed between the first and the second intervention was 74 (interval, 1-24) months.

The indication to re-intervene was for relapses of gastro-oesophageal reflux and hiatal hernia in 12 (60%) patients, and for dysphagia in 5 (25%) patients—relapse of hiatal hernia (1), peri-oesophageal fybrosis (1), stenosis caused by the mesh (1), and relapse of achalasia (2)—. In 3 (15%) patients, the motive to re-intervene was: in 2, POHH, and in 1, concomitant gastric volvulus. In 11 (55%) patients, intra-thoracic migration of the fonduplication was observed. The technique for the re-intervention was always initiated with laparoscopy and was converted into open surgery in 2 (10%) patients. The conversion reasons included large adherences and an accidental perforation of the posterior face of the stomach fundus. Operation time was 180 (105-360) min, with a significant difference regarding if the first intervention was done by laparoscopy—135 (105-360) min and 240 (180-360) min—or by laparotomy ($P<.005$).

The surgical techniques used were as follows: in 10 patients, separation of the hernia sack, hiatus closure and a new Nissen fonduplication (mesh was used in 3 cases); in 2, only a new Nissen fonduplication was performed; in 2, the pillars were closed and the fonduplication was reinforced without undoing it; in 2 patients, a Toupet fonduplication was performed, in one of them, also, a Collis gastroplasty was performed for a short intra-abdominal oesophagus; in 1 patient, a portion of the mesh was removed; in 1 patient, a new Heller's myotomy was performed with a Dor fonduplication and in other cases, the myotomy was extended in its distal direction. In 1 case of a relapsing gastric volvulus without hiatal hernia, a gastric pexia was performed.

The rate of intra-operative complications was 25% (3 of 20 patients) and included a lesion of a small intestine loop adhered to scar tissue from the previous laparotomy, 2 perforations of the stomach fundus and 2 pleural tears. The post-operative morbidity was 15% (3 patients): 1 bilateral pleural effusion with atelectasis, 1 case of nosocomial pneumonia and 1 oesophageal perforation with acute mediastinitis re-operated on the second post-

Table 4 – Post-operative symptoms after 68 months of follow-up

	Total	Previous laparoscopy	Previous laparotomy
Patients followed	19	14	5
Symptoms	5/19	4/14	1/5
Pain	1/19	1/14	0/5
Pyrosis	2/19	1/14	1/5
Regurgitation	0	0	0
Dysphagia	2/19	2/14	0/5

operative day. The average hospital stay was 4 (interval, 2-65) days.

Two patients required 2 late re-interventions. A polar superior gastrectomy was performed in one case from the intra-luminal oesophageal migration of a mesh reinforcement, and gastric defunctionalisation by the Y-en-Roux technique. A second patient that experienced a relapse of the gastric volvulus after a laparoscopic re-pexia, required a new gastric pexia and the insertion of a gastrostomy to fix the gastric body. In both cases, the re-intervention was initiated by laparoscopy and converted when it became impossible to continue with the dissection because of previous adherences.

Post-operative follow-up

1. Outpatient clinic follow-up: the patients were re-evaluated in December of 2008, after an average follow-up period of 68 (1-116) months. One patient died from lung cancer 48 months after the re-intervention. During the outpatient clinic follow-up, 8 patients (40%) reported gastro-oesophageal based symptoms. Three of the 20 patients (15%) were diagnosed with a relapsed hiatal hernia by a barium oesophagogram; 5 (25%) patients reported dysphagia: in 1 (5%) patient, oesophageal stenosis was observed by endoscopy with fistulisation of the mesh to the oesophagus, in another patient (5%), the barium oesophagogram showed a returning gastric volvulus, and in the other 3 (15%) patients, difficulty for the contrast to pass was observed, but that disappeared spontaneously.

2. Long term follow-up and telephone interviews. All of the live patients were interviewed by telephone; 5 of the 19 patients reported gastrointestinal symptoms, while 14 reported no symptoms (Table 4).

Quality of life test

The values of the post-operative GIQLI oscillated around 106 (79-124). Asymptomatic patients presented a GIQLI value below that of the standard population, which is 106 (97-124). In symptomatic patients, the GIQLI value was lower than that of the asymptomatic group (99 [79-120]), without significant differences.

Discussion

The success of the minimally invasive surgery has produced great changes in the therapeutic treatment of functional diseases of the oesophageal-gastric junction, so much that surgery carried out by laparoscopy has become the treatment of choice for severe GORD, POHH and achalasia.[1-4] The increase in its use has been accompanied, naturally, by an increase in the number of therapeutic failures, mostly as returning symptoms, anatomic failure or dysphagia that can require a second intervention in 3%-16% of patients.[4,18,19]

Surgical re-exploration of the hiatus that has been operated on has always been considered as a high-risk intervention because of the technical difficulty when dealing with an area that has previously been operated on, with the corresponding risk of iatrogenic lesions, and to achieve functional recuperation. Different authors have shown (Table 1)[5-15] that surgical re-exploration can be safely performed laparoscopically, although the most important objective, aside from the immediate surgical safety, is the long term recuperation of anatomical functionality. However, given the usual heterogeneity of this type of series and the subjectivity that the symptoms imply, instruments such as the specific quality of life tests are needed to analyse the long term clinical responses. The goal of this study has been to investigate the immediate results and those for the mid to long term of the surgical intervention on the hiatus, using a validated specific quality of life test (GIQLI), to evaluate, and our results show the technical feasibility of the re-intervention without mortality and with low morbidity, and with acceptable long term results.

One possible critique of this study is the inclusion of different types of clinical entities, such as the relapsing GORD, the POHH and achalasia, but there is a triple justification: the low frequency of these re-interventions, the use of a similar surgical technique and a common goal: to re-establish the normality of the oesophageal-gastric junction. The first observation of this series that is worth mentioning is the low incidence of re-interventions in our laparoscopic experience with the hiatus (11/387; 2.8%) and we did not have to re-operate on any patient that was initially operated on by laparoscopy for achalasia, although the re-intervened patients are only a small percentage, given that the majority of the surgery failures are treated medically or by endoscopy, and re-interventions are only performed in the most extreme cases.

In our experience, the most observed anatomic failure was the intra-thoracic migration of the fonduplication (11/20; 55%), which is considered to be the most frequent cause of failure in the first anti-reflux surgery.[2,10] However, the most frequent indications to re-intervene after gastro-oesophageal reflux

Table 5 – Quality of life according to the GIQLI test after laparoscopic surgery of the oesophageal hiatus

Author, y	Patients, No.	Pre-operative value	Post-operative value	Follow-up	P	Comments
GORD						
Hartmann et al[24] (2008)	59	No data available	107	48		Robot
Fein et al[25] (2008)	120	No data available	110 (24)		120	
Clovica et al[26] (2006)	351	95 (79–108)	119 (106–130)	12	.05	
Dallemagne et al[27] (2006)	100	86 (16)		113 (21)	120	0.05
Kamolz et al[28] (2005)	500	94 (10)	121 (8.5)	60	.05	
Kamolz et al[28] (2003)	75	99 (9)	122 (8)	36	.05	Barrett
POHH						
Targarona et al[30] (2004)	46	No data available	127	24 (6–50)		
Re-fonduplication						
Ortiz (2009)	20	No data available	103 (79–124)	60		
Granderath et al[9] (2002)	27	No data available	113	36–60		
Achalasia						
Ferulano et al[32] (2007)	31	78 (38–109)	115 (71–140)	48	NS	Elderly
Decker et al[33] (2002)	40	84 (34–129)	119 (77–143)	31	.05	

NS indicates no statistical significance.

surgery was its return (12/20), HH (16/20), or dysphagia (5/20). Our immediate results are similar to those observed in other series, with no mortality and little need to convert (2/20; 10%). The causes to convert were consequences of the difficulty to dissect and it has been seen that this is greater after open surgery, as observed by the duration of the intervention and the index of major conversions (2/7 compared to 0/13) when the previous surgery was done by laparotomy. However, we must highlight the need for a careful and safe technique, where the reference structures can be identified, to avoid iatrogenic risks and recognise the possible intra-operative complications such as gastric perforation. The immediate post-operative results can be considered as satisfactory with low morbidity (10%) and short hospital stay (4 days), although the complications can be serious, as in our series, with late oesophageal perforations or oesophageal erosions from the mesh. These 2 patients required re-interventions, along with a third patient with reappearing gastric volvulus (3/20; 15%). Although 2 of these 2 new re-interventions were initiated by laparoscopy, both were converted for technical difficulties caused by adherences or the impossibility to perform the proposed intervention.

The use of mesh in the hiatus continues to be a controversial topic.[1-22] Mesh have been used, in the moment of the primary repair, to prevent relapses, and also during the re-interventions to ensure the repair. In our experience, in both situations, the insertion of mesh has caused complications that have required their removal. In the first situation, in a case where the dysphagia was secondary to compression caused by a section of the GoreTex mesh, solved with a simple removal of the redundant mesh section, and in the second situation, we observed the migration of the mesh to the oesophageal lumen, inserted after the total herniation of the stomach after repairing a simple reflux. However, the insertion of mesh may be necessary to close a difficult hiatus or if the pillars are of a poor quality, and therefore, our policy is to selectively use retro-gastric, low-density and partially re-absorbible mesh, located far from the oesophageal wall.

However, the final goal of the hiatal re-interventions is to re-establish the functional normality of the oesophageal-gastric junction in a sustainable manner. For that reason, the final goal of this study was to analyse the symptoms and quality of life depending on digestive states mid to long term. After a follow-up period of longer than 5 years (68 months), 75% of the patients reported to be asymptomatic, with good clinical results, and 25% reported symptoms or the need to take anti-secretion medication. This data is similar to that observed in other series,[11,17] where around 22% of patients reported use of proton pump inhibiting (PPI) drugs, including after 5 years of follow-up in patients after the first fonduplication. On the other hand, the use of PPI does not equal a recurrence of gastro-oesophageal reflux.[17,23]

When the Quality of Life index (GIQLI) was measured, we obtained values greater than 100 without reaching normality (125 [13]). The weak point of this study has been the impossibility to compare the improvement of the pre-operative GIQLI regarding the post-operative one, as this data was not collected before the interventions, but we have been able to compare them with a series of patients operated on for achalasia or POHH where the GIQLI was used; post-operative quality of life indexes were observed similar to those from the POHH surgery, although they did not reach the values obtained after the first surgery for achalasia, which indicates that, in spite of the absence of symptoms, the re-interventions do not reach absolute normalisation (Table 5).[24-33]

Finally, to show the possible technical realisation of the laparoscopic re-intervention for cases of achalasia.[14-16] There is not much experience with this clinical situation, as in the majority of the occasions, the treatment is endoscopic using dilation, however, in selected cases, and when endoscopic treatment has failed (dilation), there are various possibilities: extending the myotomy or performing a myotomy from another point of the oesophageal circumference.

In short, the re-intervention of the hiatus is feasible, with few conversions and effective mid to long term, although

without reaching quality of life values similar to normal values.

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