

## A Case of Paraesophageal Hernia Repaired by Laparoscopic Approach

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*Paraesophageal hernia comprises only 2~5% of all hiatal hernias but is prone to incarceration and strangulation. For this reason they must be recognized and repaired as expeditiously as possible. The laparoscopic approach has already been successfully applied to the repair of the more common sliding hiatal hernia and it seems reasonable to propose that the paraesophageal hernia, provided it is not complicated, might also be repaired by the laparoscopic technique. We present here a case of paraesophageal hernia which has been successfully repaired by the laparoscopic approach. A 73-year-old female suffering from postprandial fullness in the retrosternal area was diagnosed preoperatively with paraesophageal hiatal hernia with gastroesophageal acid reflux and was submitted for laparoscopic repair. The procedure entailed reduction of the hernia, mobilization of the esophagogastric junction with crural repair and partial fundoplication. At the 9th-month follow-up, the patient had remained asymptomatic and follow-up studies revealed no evidence of hernia or acid reflux. As a result of this favorable experience with minimal morbidity, early hospital discharge, and effective control of symptoms without adverse sequelae, laparoscopic repair can be considered as the curative and minimal invasive method in the management of paraesophageal hernia.*

**Key Words:** Paraesophageal hernia, laparoscopy, gastroesophageal reflux

### INTRODUCTION

Though a hiatal hernia is not an uncommon condition in western countries, its incidence in oriental countries is much lower. Hiatal hernia is classified into two major types: a sliding

hiatal hernia and a paraesophageal hernia. Paraesophageal hernia comprises only 2~5% of all hiatal hernias (Hill and Tobias, 1968; Ozdemir *et al.* 1973), but have a clinical significance characterized by the potential for life-threatening complications. Since many patients with paraesophageal hiatal hernias are known to present as emergencies with gastric strangulation and volvulus if left untreated, elective repair is advocated (Skinner and Belsey, 1967). Traditionally these hernias have been repaired by either an open transabdominal or transthoracic approach.

The scope of minimal access abdominal surgery through the laparoscope is being expanded and is likely to be applicable to the majority of functional gastrointestinal operations. Collective data of successful repair by lapa-

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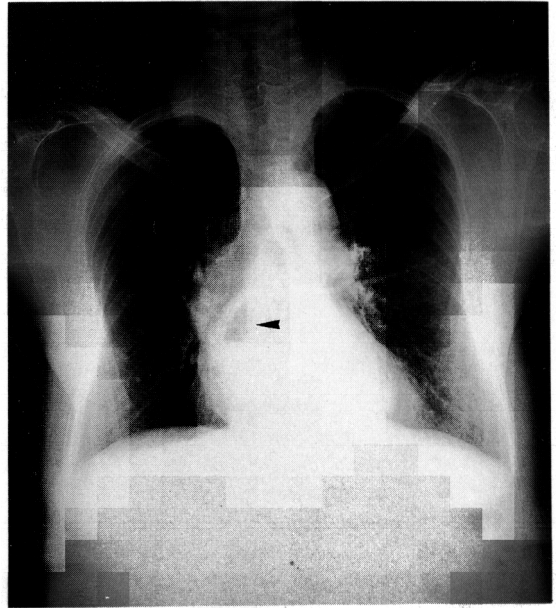
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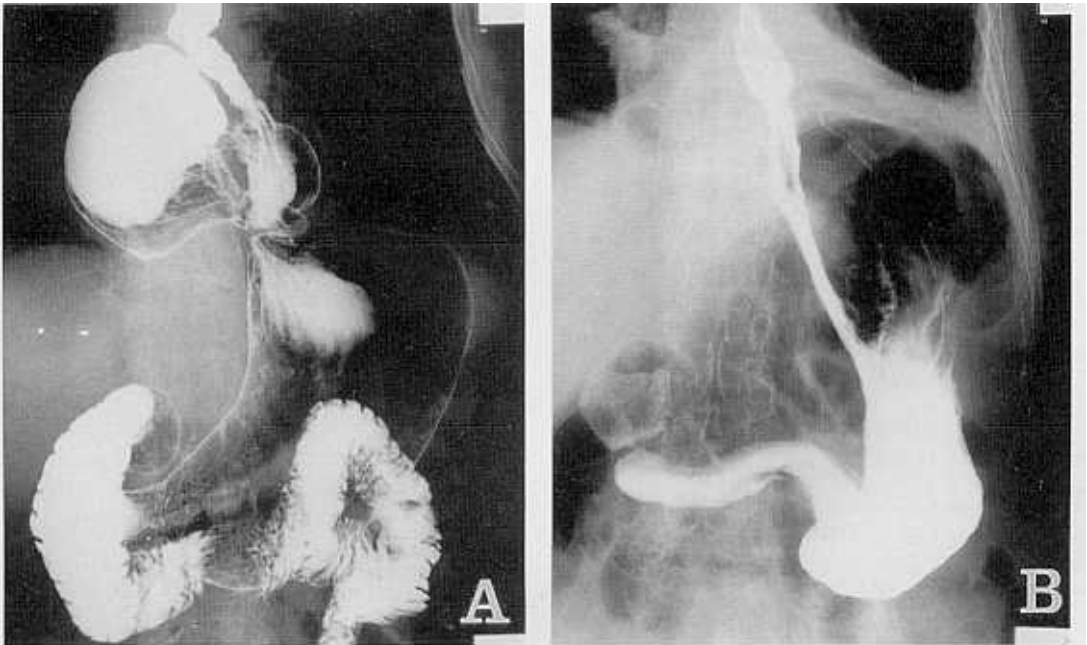
roscopic technique have already been reported with respect to the more common sliding hernias (Cuschieri *et al.* 1992; Cuschieri, 1993), but no such data are available on paraesophageal hernias even in western countries, probably due to the rarity of the disease. We present here a case of paraesophageal hernia which was unsuitable for major surgery and has been successfully repaired by the laparoscopic approach.

## CASE REPORT

A 73-year-old female presented with a 2-year history of postprandial fullness in the retrosternal area for a medical evaluation in our department. The fullness was associated with nausea and relieved by intentional belching. A routine chest roentgenogram showed an air-fluid level in the retrocardiac position, suggesting a hiatal hernia (Fig. 1). An upper gastrointestinal barium study (Fig. 2) and en-



**Fig. 1.** Posteroanterior routine chest roentgenogram shows an air-fluid level (arrow) in the retrocardiac position.



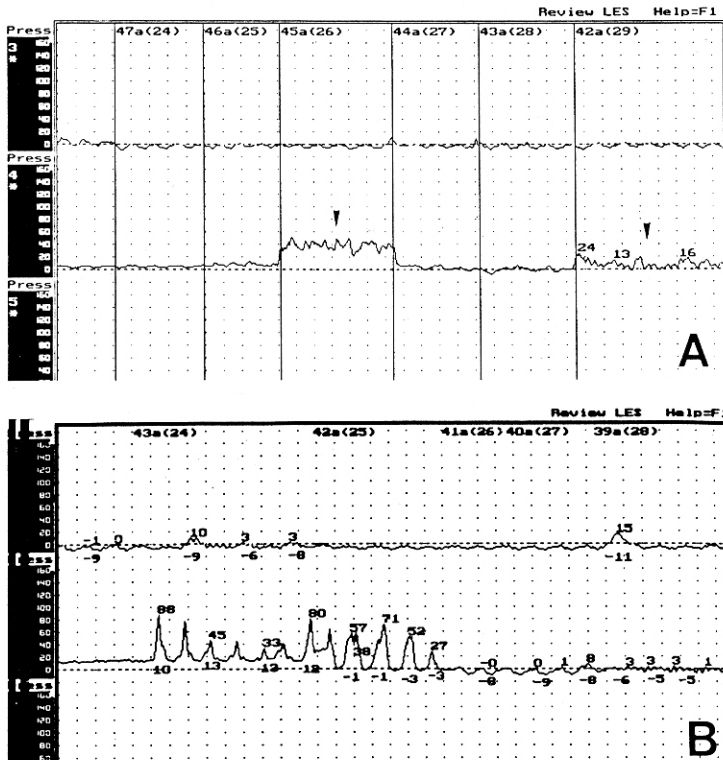
**Fig. 2.** Upper gastrointestinal barium studies: preoperative X-ray showing a large para-esophageal hernia (A) and postoperative X-ray showing successful repair of hernia (B).



**Fig. 3.** Retroflexed view of endoscopy showing a large hiatal hernia.

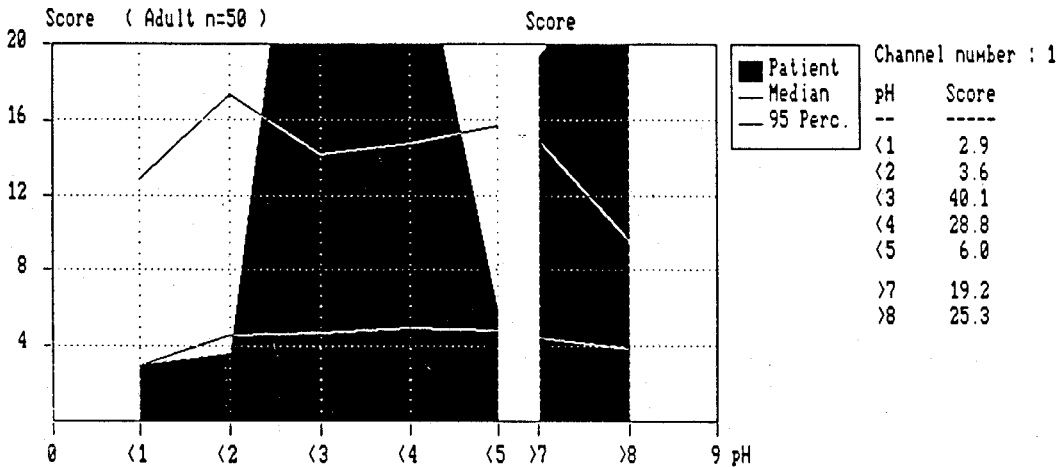
doscopic examination (Fig. 3) confirmed a large paraesophageal hiatal hernia. For the evaluation of concomitant physiologic defects which are crucial to determine the type of surgery, we also performed esophageal functional studies. Esophageal manometry (Fig. 4) and a 24-hour esophageal pH study (Fig. 5) revealed no incompetency of the lower esophageal sphincter pressure, but a pathologic gastroesophageal acid reflux. Due to the risk of complications, elective surgery should have been recommended to the patient. But her age and poor cardiopulmonary function, which were revealed by routine preoperative evaluation, mitigated against major surgery. So we offered her an option of laparoscopic repair, informing her of the experimental nature of the repair, and she consented.

The operation was done under general anesthesia with the patient in a supine position



**Fig. 4.** Esophageal manometric studies: preoperative finding of "double hump" sign (arrows) (A) and postoperative finding of normalized lower esophageal sphincter pressure (B).

ACID REFLUX		Total	Upright	Supine	Meal	PostP
Duration (HH:MM)		00:01	18:41	05:20	00:20	04:00
Number of reflux episodes (#)		21	17	5	0	12
Number of reflux episodes longer than 5.0 minutes (#)		2	0	2	0	0
Longest reflux episode (min)		33	2	32	0	4
Total time pH below 4.00 (min)		63	10	53	0	10
Fraction time pH below 4.00 (%)		4.4	0.9	16.5	0.0	4.2



**Fig. 5.** 24-hour intraesophageal pH study showing an abnormal acid gastroesophageal reflux (supine refluxer) with DeMeester score (pH < 4) of 28.8.

with her legs spread on leg boards. The pneumoperitoneum was maintained at a pressure below 14mmHg. Five 10mm trocars were placed on the superior of the umbilicus, right costal margin, left costal margin and either side of the midline far enough superior and a forward 30° oblique telescope was introduced through the supraumbilical port. The liver was elevated from the right subcostal port with an expandable retractor. The herniated stomach and greater omentum were adhered to adjacent structures, so they were carefully dissected with a metzembaum and reduced using a 10-mm laparoscopic Babcock clamp. After reducing the stomach the gastroesophageal junction was extensively dissected free and controlled with a silastic drain. Gentle blunt dissection using an ultrasonic dissector (Harmonic scalpel) was continued around

the right and left crural muscles, and then both the free edges of the crura were identified. The crura were approximated with three interrupted 2-0 vicryl sutures, each of which was tied extracorporeally. After retracting the stomach to the right site using a 10-mm laparoscopic Babcock clamp, the greater curvature site of the stomach was fully exposed. Mobilization of the upper 15cm of the greater curvature of the stomach with division of short gastric veins was carried out very carefully using an ultrasonic dissector. A right angle grasper was passed under the esophagus from the right to the left side of the esophagus. After grasping a portion of the upper fundus, which is then brought behind the esophagus to lie on the right side of this structure, two 2-0 vicryl sutures were carried out between the right lip of the fundic wrap and right pos-

terior portion of the distal esophagus. One was placed just next to the gastroesophageal junction while the other was placed 3cm proximal. The left lip of the fundic wrap was approximated to the right anterior portion of the distal esophagus. Partial(270°) fundoplication was completed. Blood loss was minimal and operating time was 135 minutes.

Postoperatively, the patient was able to tolerate a soft diet within 3 days after surgery and was discharged on the 5th day. At the 9th-month follow-up, the patient had remained asymptomatic and the follow-up studies of upper gastrointestinal barium study (Fig. 2), esophageal manometry (Fig. 4) and 24-hour intraesophageal pH study revealed successful reduction of the hernia and no evidence of reflux.

## DISCUSSION

Hiatal hernia is the herniation of an abdominal organ through the diaphragm's esophageal hiatus. Most hiatal hernias are of the sliding type (Type I), in which the the gastroesophageal junction is displaced into the mediastinum. A paraesophageal hernia is a herniation of a portion of the stomach along with the peritoneum through the diaphragmatic hiatus with a fixed gastroesophageal junction. Pure paraesophageal hernias (Type II) are rare, with most being a mixed type (Type III) (Ellis *et al*, 1986). Paraesophageal hiatal hernias, either type II or type III, are not commonly encountered, with a reported incidence of 2 ~5% of all hiatal hernias (Hill and Tobias, 1968; Ozdemir *et al*. 1973).

Paraesophageal hernia represents a distinct anatomic and clinical entity that requires a different strategy for evaluation and treatment than that used for the more common sliding hiatal hernia. A paraesophageal hiatal hernia occurs more often in women, with a median age of 61 years (Walther *et al*, 1984). The cause of paraesophageal hiatal hernia is unknown, but it is largely assumed to be an acquired disorder since it is rarely seen in children and young adults. Predisposing factors are believed to be those which cause in-

creased intraabdominal pressure, including obesity, ascites, and pregnancy.

Clinical manifestations of paraesophageal hiatal hernia range from the totally asymptomatic state to symptoms largely mechanical in nature that mimic a cardiopulmonary catastrophe such as myocardial infarction, aortic dissection, or pulmonary embolism. These symptoms include postprandial fullness and emesis, early satiety, precordial and epigastric pain, weight loss, dysphagia, and respiratory distress. The diagnosis of paraesophageal hiatal hernia is usually made from the history and confirmed by radiological examination. Standard chest films are frequently helpful in the diagnosis because the entrapped thoracic stomach retains sufficient gas to show a radiological air-fluid level superimposed upon the cardiac silhouette. The thoracic stomach fills easily with ingested barium, and the diagnosis is easily determined. The radiologist must identify the location of gastroesophageal junction to determine the hernia type. Endoscopic examination can also verify the location of the gastroesophageal junction, but it is most useful to exclude associated disorders and to determine the presence or absence of associated esophagitis. It is often difficult to identify the precise location of the esophagogastric junction by roentgenographic or endoscopic means, so that mixed varieties of the two types of hernias are not uncommon. This was consistent with our case, which was categorized as a type II paraesophageal hernia after an initial examination with roentgenography and endoscopy but was revealed to have a sliding component after a manometric study. The manometry showed two high-pressure zones (Fig. 4), a so-called double respiratory reversal, which is a characteristic finding of a sliding hiatal hernia. Cosequently we re-categorized the case as a type III paraesophageal hernia.

The need for physiologic studies is well established in sliding hernias, but it remains controversial in the case of paraesophageal hernias. It has been assumed for a long time that a paraesophageal hernia constitutes a purely anatomical entity and is not associated with an underlying physiologic defect. But re-

cent reports describe a higher incidence of reflux symptoms and physiologic derangements of the lower esophageal sphincter on esophageal manometry and pH testing (Walther *et al.* 1984; Myers *et al.* 1995). Thus, it is now recognized that the paraesophageal hernia can be associated with a pathologic gastroesophageal reflux. Further complicating the issue is the indication that larger paraesophageal hiatal hernias often have variable sliding components (type III hernia) (Ellis *et al.* 1986), as in our case. Reflux is frequently present in type III hernias despite the absence of symptoms. In one report (Walther *et al.* 1984), 60% of patients with type III hernias had a hypotensive lower esophageal sphincter and an abnormal 24-h intraesophageal pH study. The patient in our case had no symptoms of reflux, but her 24-h pH study revealed a pathologic gastroesophageal reflux.

The operative approach for repair of paraesophageal hernias has traditionally been either transabdominal or transthoracic. In either case, the principles of repair are to return the stomach to the subdiaphragmatic position and closure of the crura. Due to the occasional recurrence of the condition, some authors have recommended either gastropexy or tube gastrostomy to help anchor the stomach in the abdomen (Ellis *et al.* 1986; Allen *et al.* 1991).

Numerous authors have recommended that paraesophageal hiatal hernia be repaired upon diagnosis (Hill, 1973; Ellis *et al.* 1986). This is based both upon its propensity for disastrous and sometimes fatal complications and upon the marked difference in operative mortality rates between an elective repair and an emergency procedure. Patients may be entirely asymptomatic prior to the acute onset of volvulus, and catastrophic complications such as incarceration with volvulus, strangulation, and perforation are known to occur in up to 30% of patients left untreated (Skinner and Belsey, 1967; Hill and Tobias, 1968). Skinner and Belsey (1967) reported that 6 of 21 patients who were managed medically because of lack of symptoms subsequently died as a result of gastric complications. Furthermore while an elective operation can be performed with low

morbidity and mortality, an emergency operation in a predominantly elderly population with multiple medical problems can be associated with mortalities as high as 50% (Hill, 1973).

Despite agreement on the timing of paraesophageal hernia repair, there remains considerable controversy over the role of a concomitant antireflux procedure (Williamson *et al.* 1993). Some authors have insisted on simple reduction and closure of the hiatal defect without antireflux measures (Menguy, 1988; Williamson *et al.* 1993). In contrast, others have advocated a more routine application of antireflux procedures during the surgical repair (Pearson *et al.* 1983; Walther *et al.* 1984). When an antireflux procedure is not performed, one-fifth of the patients will have reflux symptoms postoperatively (Williamson *et al.* 1993). We agree that careful preoperative evaluation should include, if possible, esophageal manometry and a 24-h intraesophageal pH study, to aid in identifying those few patients who require a concomitant antireflux operation. It is also recommended to add an antireflux procedure, if the status of the lower esophageal antireflux mechanism is unclear (e.g., emergency operation, failed attempt at manometry) (Myers *et al.* 1995). In surgical repair of large paraesophageal hernias, a need for an adequate antireflux reconstruction is further emphasized due to the observations that large hernias almost always had advanced degrees of sliding hernia (Pearson *et al.* 1983), and that most of them require a significant dissection of the normal phrenoesophageal attachments during repair which can disrupt the otherwise normal lower esophageal reflux barrier and lead to postoperative reflux (Hill and Tobias, 1968). Although preoperative manometric study in our case showed a mechanically competent lower esophageal sphincter, we added a concomitant antireflux procedure prophylactically since the case was a large paraesophageal hernia which had a sliding component and required an extensive dissection of the gastroesophageal junction to be reduced. In view of a prophylactic measure, we chose a partial (270 degree) fundoplication since this procedure was safe to be applied

laparoscopically and had a low incidence of postfundoplication symptoms such as dysphagia and gas bloating (Mosnier *et al*, 1995).

Patients with paraesophageal hernias are generally older than patients with sliding hiatal hernias, and commonly have other medical problems. A laparoscopic approach offers these patients an opportunity for a fast recovery with reduced postoperative discomfort, and a reduced likelihood of cardiopulmonary complications, as in our case and other cases reported (Kuster and Gilroy, 1993; Cloyd, 1994).

As the results of this experience have been favorable with minimal morbidity, early hospital discharge, and effective control of symptoms without adverse sequelae, laparoscopic repair can be considered as the curative and minimal invasive method in the management of paraesophageal hernias.

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