Morgagni-Larrey Hernia- a Review of 20 Cases

Vijay Abraham · Yacob Myla · Sam Verghese ·
B. Sudhakar Chandran

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Abstract Morgagni-Larrey hernia is an uncommon entity. The majority of the literature describes hernia occurring mostly on the right side, a few on the left side and rarely bilateral. Retrospective chart review was done for the patients with the diagnosis of adult diaphragmatic hernia from January 1997 to December 2010. Post-operative course was evaluated for outcome, morbidity and mortality. Out of 20 patients, 13 (65%) were males and 7 (35%) were females. Their age ranged from 17 to 50 years (mean=29.6). Abdominal discomfort was the most common presentation. Eight patients (40%) were asymptomatic at presentation. Plain X-Ray chest was done for all. Ten patients (50%) underwent suture repair, 6 (30%) had mesh placement and the other 4 (25%) underwent both: suture repair buttressed with mesh. Volvulus of stomach was noted in 5 (25%) cases. All patients had left sided hernia. There was insignificant morbidity and no mortality. There was no recurrence in 16 patients followed up for a mean duration of 20 months (range=8 to 32 months). In Morgagni-Larrey hernia, abdominal approach gives good accessibility to reduce the hernia and to undertake repair. When complicated with incarceration, perforation, gangrene or volvulus of the herniated bowel; this can be dealt with ease. Plain X Ray of the chest is fairly accurate in suggesting the diagnosis of Morgagni-Larrey hernia.

Keywords Morgagni-Larrey hernia · Adult diaphragmatic hernia

Introduction

Morgagni-Larrey hernias are “rare congenital diaphragmatic hernias” that present later in life. They constitute 3–5% of

all congenital diaphragmatic hernia [1]. They are frequently associated with elusive clinical and radiological findings. They entail potential for considerable morbidity and even mortality if diagnosis is delayed or missed. In English literature study, occurrence on the right side is common, left side is few, and bilateral is rare. We report a series of adult congenital diaphragmatic hernias occurring through “left sternocostal hiatus” or space of Larrey.

Methods

Records of all individuals operated for adult diaphragmatic hernia during the period of January 1997 to December 2010 were reviewed retrospectively. Data were collected for patient demography, presenting symptoms, duration, mode of diagnosis, type of repair, and outcome. All patients underwent plain X-ray chest, and in a few barium series was done. Patients presenting acutely with trauma or who were suspected to have other abdominal pathology underwent ultrasonogram of the abdomen and CT scan. Operation was performed by abdominal route for all patients. The hernia contents were reduced; sac was inverted, plicated, or excised, and repair was performed by nonabsorbable suture or by placement of nonabsorbable mesh. Additional procedures were carried out according to the associated findings.

Results

During the period of January 1997 to December 2010, 24 patients (15 males and 9 females) were diagnosed to have diaphragmatic hernia. Five patients gave history of trauma (both blunt and penetrating). Four of them had rupture/rent in the diaphragm and hence were excluded from the study. One of them with blunt trauma abdomen had hernia through space of Larrey, and was included in the study. Their age

V. Abraham (✉) · Y. Myla · S. Verghese · B. S. Chandran
Upper GI Surgery unit, Department of Surgery,
Christian Medical College and Hospital,
Vellore, TN 632004, India
e-mail: vijayabraham@hotmail.com

ranged from 17 to 50 years (mean=29.6 years). All of them were found to have left-sided diaphragmatic hernia. Eight patients (40%) were asymptomatic at presentation but had intermittent symptoms in the past. Most common presentation was that of abdominal discomfort and pain after meals. One patient at 33 weeks of gestation had become symptomatic with diaphragmatic hernia. All patients had plain X-ray chest; some had barium series and a few who were also suspected to have other abdominal pathology underwent ultrasonogram of the abdomen. Most common hernia content was stomach and colon followed by omentum. Method of repair was based on surgeon preference and satisfaction with the repair. Ten patients (50%) underwent suture repair with interrupted polypropylene suture; 6 patients (12.5%) had polypropylene and polyglactin 910 mesh, sutured over defect, and 4 patients (25%) underwent both, suture repair buttressed with mesh. Five patients (25%) who had associated gastric volvulus underwent tube gastropexy using Foley's catheter after reduction and de-rotation. There were two (10%) morbidities in this series. One patient presenting with respiratory distress and sepsis was found to have 30 cm of small bowel as hernia content which had become gangrenous and had perforated. She underwent resection anastomosis of small bowel and repair of hernia. She developed incisional hernia after 3 months, which was rectified at a later date. The second patient who presented with occlusive symptoms had herniated stomach, colon with mesentericoaxial volvulus of stomach. He underwent reduction,

repair, and tube gastropexy. Postoperatively he had developed pneumonic consolidation of the left-sided lung, which improved with parenteral antibiotics. There was no in-hospital mortality in this series. Fourteen patients had follow-up ranging from 8 to 32 months (mean=20 months) with no recurrence (Table 1).

Discussion

In his masterpiece, *On the Seats and Causes of Disease Investigated by Anatomy*, Giovanni Batista Morgagni described a diaphragmatic hernia presenting through right "anterior sternocostal hiatus" of diaphragm in 1761 (Millar and Cadell, 1769). Larrey described surgical approach to the pericardial cavity through the anterior diaphragmatic defect on the left side in 1828 [2]. Being of similar anatomic origin, they are collectively referred to as "anterior diaphragmatic hernia of Morgagni–Larrey [3].

These hernias occurring in either side of midline are discovered in adulthood presenting with occlusive symptoms of herniated bowel or due to compression of thoracic organs manifesting sometime as respiratory dysfunction [4]. Their presentation in neonatal period and childhood is uncommon. This could possibly be due to increased intra-abdominal pressure with age, causing stretching of the defect [5]. According to some, its origin lies in the maldevelopment of septum transversum and failed fusion of sternal

Table 1 Details of study patients. BR, barium series; USG, ultrasonogram; CT, computerised tomogram; Compl, complications; Y, yes; N, = No; LB, large bowel; SB, small bowel; ST, stomach; OT, omentum; LV, left lobe of liver

SN	BR	USG	CT	Content	Repair	Other	Compl
1	N	N	N	LB	suture		N
2	Y	N	N	ST	suture/mesh	volvulus	N
3	Y	N	N	ST/LB/SB	suture	volvulus	N
4	N	Y	N	ST/LB	suture	volvulus	N
5	N	Y	N	ST	suture		N
6	N	N	N	SB	suture/mesh		Inc hernia
7	Y	N	N	ST/LB	mesh	volvulus	Pneumonia
8	N	N	N	LB/SB/OT	suture		N
9	N	N	Y	ST/LB/LV	suture		N
10	N	N	N	ST	suture/mesh		N
11	N	Y	N	ST/LB/OT	suture	33 week gestation	N
12	Y	Y	N	ST/LB//OT	suture	volvulus	N
13	N	Y	N	LB	suture		N
14	Y	N	Y	ST/LB/OT	Mesh		N
15	N	N	Y	ST	Mesh		N
16	N	N	Y	ST/LB	Suture		N
17	N	N	Y	ST	Mesh		N
18	N	N	Y	ST	Mesh		N
19	N	N	Y	ST/LB/OT	Suture/mesh		Wound inf
20	N	N	Y	ST/OT	Mesh		N

and costal fibrotendinous elements of diaphragm, total or partial agenesis of the sternal or costal band with its altered insertion. Others believe that augmentation of intra-abdominal pressure, as in episodes of vomiting and coughing, provokes abdominal contents to herniate into thorax. It is also possible that the latter could act on already abnormal anatomy to produce the effect [6]. Abdominal trauma, obesity, and pregnancy can also cause herniation of abdominal content into thorax [7]. Morgagni–Larrey hernia contains the hernia sac as opposed to posterolaterally located Bochdalek hernia, which is a congenital problem manifesting in early life. Traumatic hernia is also devoid of “sac” and is due to rupture of diaphragm with herniation of bowel into thorax. Right side occurrence of traumatic diaphragmatic hernia seems to be less frequent as liver offers some protection.

Fig. 1 Plain X-ray chest and abdomen, PA, and lateral projections showing air-fluid level in the left lower chest

The presentation of Morgagni–Larrey hernia can be acute with dramatic symptoms, usually caused by acute volvulus of its contents, respiratory distress, intermittent with long symptom-free intervals or be detected incidentally for mild nonspecific respiratory/bowel symptoms. Approximately 50–70% is of the latter variety [2]. Occurrence on the right side seems to be more than that on the left and rarely is the hernia bilateral [6, 8]. Most common contents of the hernia are omentum and colon. Less commonly liver, stomach, and small bowel are found in the hernia sac [2].

In this series, 50% of patients were asymptomatic at presentation as also reported by Minneci et al [2]. All the hernias were on the left side, and the most common content was stomach and colon, followed by spleen. Even though some omentum may be drawn in with the stomach, omentum forming major hernia content was noted only in four cases.

Plain X-ray chest may show unidentified chest density at cardiophrenic angle, air-fluid level at paracardiac location, or bowel loops in the chest. The nasogastric tube may also be seen coiled above the level of diaphragm. Upper gastrointestinal barium series may show part or whole of the stomach in paracardiac location with volvulus or inverted stomach with abnormally high pylorus. CT scan is 100%

Fig. 2 Barium study showing upside down stomach in the left lower chest

Fig. 3 **a.** Defect superolateral to gastroesophageal junction (*black arrow*)—spleen is seen inferiorly (*yellow arrow*). **b.** Defect partially closed with polypropylene suture. **c.** A “sandwich” mesh sutured over the defect

sensitive for the diagnosis of Morgagni–Larrey hernia. It helps to differentiate its content based on the fat density and vascular pattern [9].

We found plain X-ray chest, with given clinical scenario to be fairly accurate in suggesting the diagnosis of Morgagni–Larrey hernia. Ultrasonogram was performed in five patients and CT scan in four, suspected to have other abdominal pathology. CT scan as recommended by others [2, 9] for the confirmation of diagnosis was found to be unnecessary (Figs. 1 and 2).

Treatment for Morgagni–Larrey hernia is essentially surgical, performed in a timely fashion to prevent complications such as incarceration, obstruction, strangulation, or volvulus with gangrene of the bowel [10]. Approaches for repair can be abdominal [11] or thoracic [12, 13]. For patients who have undergone previous abdominal operation, thoracic approach seems to be better suited. However, for those in whom bowel gangrene is suspected, abdominal approach gives wider exposure to control, reduce, and resect the affected segment with relative ease. The hernia sac is plicated or excised after reducing the contents, and repair is done with nonabsorbable suture, preperitoneal placement of nonabsorbable mesh [14] or by using sandwich mesh (polypropylene/polyglactin 910 sutured together) or commercially available dual or hybrid mesh, placed directly over the defect to prevent subsequent bowel erosion (Figs. 3a, b, c).

Minimally invasive treatment for this condition is technically challenging. Laparoscopic reduction, repair with nonabsorbable suture or mesh [15, 16], or thoracoscopic repair has also been described with successful outcome with shorter hospital stay. Addition of tube or percutaneous endoscopic gastrostomy (PEG) to “fix” the stomach to anterior abdominal wall in its native location has also been tried in order to prevent recurrence of gastric volvulus. Upper GI endoscopy, though not helpful in diagnosis, has been used to de-rotate and reduce the herniated stomach followed by PEG to fix it [17, 18]. However, this can be done only when the defect is small and content is the herniated stomach (Table 2).

Conclusions

The lack of typical clinical presentation in cases of late-presenting Morgagni–Larrey hernia leads to delayed diagnosis of the defect. This clinical entity should however be taken into account in the differential diagnosis of patients presenting with GI disturbances and respiratory distress. The imaging studies are essentials in every case. Plain X-ray chest in the given clinical setting is fairly accurate in suggesting the diagnosis of Morgagni–Larrey hernia. Abdominal approach gives excellent exposure of the area to perform repair of the hernia. If complicated by volvulus,

Table 2 Case series of Adult diaphragmatic hernia. DR, duration; *n*, number; Rt, right sided; Lt, left sided; M, male; F, female; AS, asymptomatic; F/up, follow up

Author	DR (yrs)	<i>n</i>	Age in yrs {mean}	Rt	Lt	M/F [%]	AS	Approach	Mean F/up (yrs)	Complications
Minneci et al [2]	15	12	{42.1}	12	0	7[58]–5[42]	6	10 abdom 2 laparos	4.4	1pneumothorax 1 inc hernia
Yilmaz et al [11]	7	11	42–85 {69.4}			2[18.2]–9[81.8]	3	All abdominal	2.8	1death pul failure
Kilic et al [12]	15	16	16–68 {51.5}	16	0	5[31.25]–11[68.75]	–	All thoracic	5.7	None
Sirmali et al [13]	14	24	42–69 {55.1}	23	1	8[33.3]–16[66.7]	5	All thoracic	8.3	None
Yavuz et al [16]	3	5	41–69{56}	3	2	3[60]–2[40]	–	All laparosc	0.58	None
Present	14	20	17–50 {29.6}	0	20	11[56.2]–7[43.8]	8	All abdominal	1.3	1 pneumonia 1 inc hernia

gangrene, or perforation of the herniated bowel, resection and any additional procedure required can be performed with relative ease and with negligible morbidity.

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