ORIGINAL RESEARCH ARTICLE

Surgical Management of Adult Diaphragmatic Hernia - An Instituitional Experience

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A B S T R A C T

Introduction: Congenital diaphragmatic hernia usually occurs in childhood. Presentation in adulthood is extremely rare. Surgical repair has been associated with low morbidity and mortality and excellent long term outcomes with low rate of recurrence. Here we present our experience of surgical management of diaphragmatic hernia over the last 10 years.
Material and Methods: Records of 40 patients who underwent surgery for adult diaphragmatic hernia between January 2007 to December 2017, were reviewed retrospectively.
Results: Median age of presentation was 38 (18–71) years with a male female ratio of 1.6:1. The most common symptom was breathlessness, followed by chest discomfort. Laparotomy and mesh repair was the most commonly performed procedure followed by anatomical repair. No recurrence was reported during the follow-up period ranging from 3 months to 7 years.
Conclusion: Congenital diaphragmatic hernia is a rare surgical condition primarily diagnosed in infants and seen rarely in adults. Surgical repair has been associated with low morbidity and mortality and excellent long term outcomes with low rate of recurrence.

Keywords: Congenital Diaphragmatic Hernia, Adulthood Presentation, Surgical Repair

INTRODUCTION

Congenital diaphragmatic hernia (CDH) usually occurs in childhood. Presentation in adulthood is extremely rare. The pathogenesis is due to failure of the development of muscular diaphragm, which leads to herniation of abdominal viscera into thoracic cavity. It is diagnosed on the basis of clinical features and imaging characterstics on chest radiograph and computed tomography scans.

The types of CDH described are: posterolateral hernia of Bochdalek, parasternal hernia of Morgagni-Larrey, eventration of diaphragm, and peritoneal-pericardial hernia. Among these, Bochdalek hernia is the most common type which was first described by Bochdalek in 1848.[1] Pathogenesis involves failure of closure of pleuroperitoneal canal, during embryogenesis. Left sided CDH are more common (85%) as the left canal closes later than the right.[2]

Eventration of the diaphragm occurs due to failure of development of part or whole of muscular hemidiaphragm.[3] Clinically, it is characterized by abnormal elevation of hemidiaphragm due to paralysis, aplasia, or atrophy of muscle fibers.[4] Complete eventration almost exclusively occurs on the left side.[5,6] In symptomatic patients, surgical repair is the treatment of choice with low morbidity and mortality. The rate of recurrence is low with good long-term outcomes. Here we present our experience of surgical management of diaphragmatic hernia over last 10 years.

MATERIAL AND METHODS

The present study was a retrospective analysis of our experience of surgical management of CDH over last ten years. A total of 40 patients with CDH were included.

After permission from Institutional Ethical Committee and Review Board, records of patients who underwent surgical management of diaphragmatic hernia between January 2007 and December 2017 at our institute, were reviewed retrospectively. Patients of age 18 years and above who underwent surgical treatment only, were included in the study. Traumatic diaphragmatic hernias were excluded. Patient records were reviewed for demographic characteristics, clinical presentation, radiological findings, past and present surgical details and outcome of surgery in terms of morbidity and mortality. Meshplasty was the preferred surgical procedure and primary repair was done for small defects (<10cms). Postoperative complications and morbidity were recorded. Follow-up was done on outpatient basis. Patients were screened for recurrence by chest radiograph and ultrasound chest.

STAISTICAL ANALYSIS

The results are reported as median with range, and percentage. All analysis was done with the help of microsoft office 2007.

RESULTS

A total of 40 patients were included in the study. The median age of presentation was 38 years (18–71 years). There were 25 males and 15 females in the study.(Table 1) The most common symptom was shortness of breath (60%), followed by chest pain and discomfort (50%) and abdominal pain (40%). Incidental detection was present in 4 patients (Table2). The median duration of symptoms was 28 months (12-120 months). Twenty five patients had left sided hernia (Bochdalek) and rest 5 had right sided hernia (Morgagni). Ten patients had eventration of diaphragm. Three patients had associated gastric volvulus. One patient had recurrent hernia after 5years of initial repair.

Routine blood and coagulation parameters were within normal limits in all patients. Diagnosis of diaphragmatic hernia was confirmed with MDCT thorax in all cases (figure 1,2). Twenty one patients underwent open mesh repair of the hernia defect and for 4 patients primary repair was done in view of smaller defect(<10cm) (figure 3,5) Eight patients with diaphragmatic eventration underwent plication. 3 patients had associated gastric volvulus for which anterior gastropexy was done along with mesh repair of hernia (figure 4) Laparoscopic repair and plication was done in 3 patients. One patient had recurrent left sided diaphragmatic hernia for which mesh repair was done. There was one mortality due

Table 1: Demographic profile of patients.

Total number of cases	40
Range of age	18-71 years
Sex	M:F- 25:15
Bochdalek hernia	25
Morgagni hernia	5
Diaphragmatic eventration	10
Associated Gastric volvulus	3

Table 2- Clinical features

Symptoms	Number	Percentage (%)
Shortness of breath	24	60
Chest discomfort	20	50
Abdominal pain	16	40
Vomiting	3	7.5
Incidental	4	10

Table 3- Procedure and complications

Surgical procedure	Number of cases(total-40)
Laparotomy and mesh repair	22
Laparotomy and anatomical repair	4
Mesh repair with anterior gastropexy	3
Laparoscopic repair	3
Laparotomy and plication	8

Complication	Number
ARDS and mortality	1
Abdominal compartment syndrome	1
Prolonged ventilator support	2

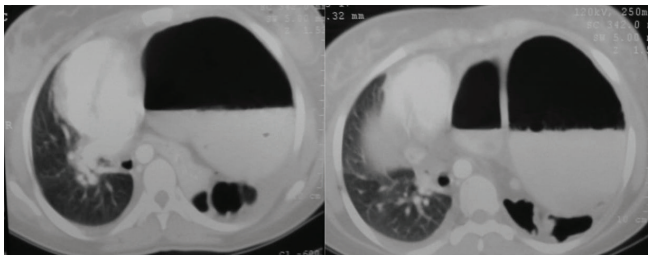

Figure-1: Bochdalek, hernia with stomach volvulus

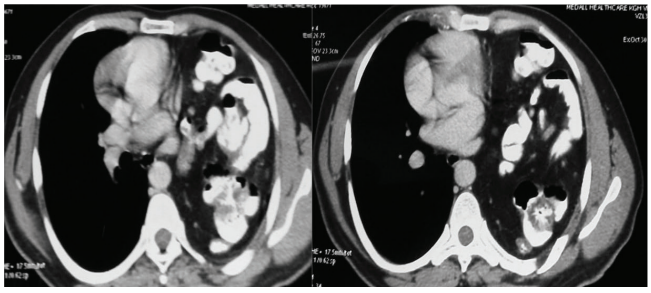

Figure-2: Bochdalek, hernia with small bowel herniation into left thorax

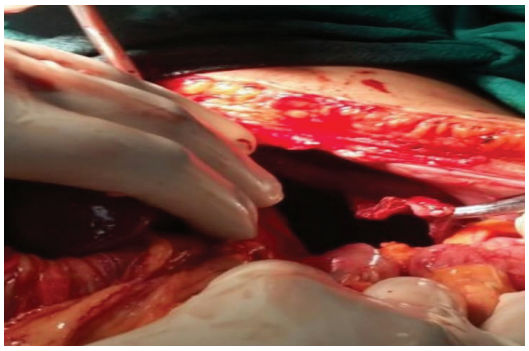

Figure-3: Intraoperative image of left sided deaphagmatic henia defect

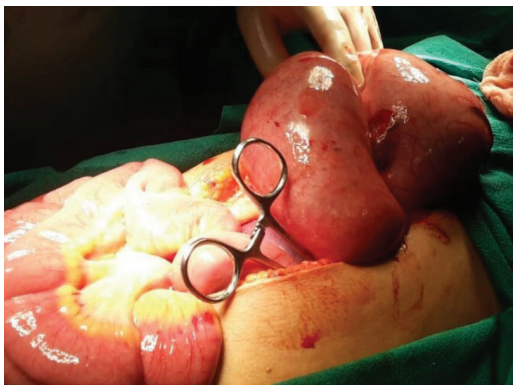

Figure-4: Gastric volvulus associated with Bochdalek, hernia

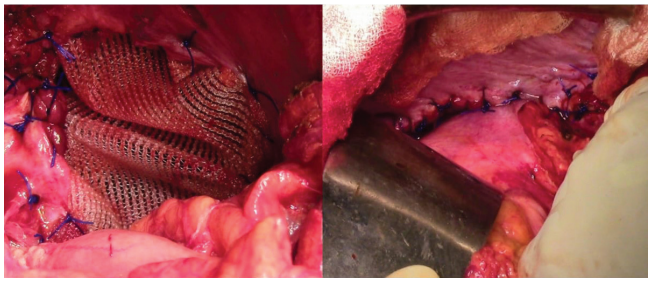

Figure-5: Meshplasty ad anatomical repair

to acute respiratory distress syndrome and respiratory failure. One patient had abdominal compartment syndrome post-operatively and was re-explored and laparostomy was done. 2 patients required prolonged ventilator support and were eventually weaned off and discharged in stable condition (Table 3). None of the patientshad recurrence duringa median follow-up of 24 months.

DISCUSSION

Congenital diaphragmatic hernia (CDH) presents in different ways in adults and pediatric age group. Cyanosis and respiratory distress are predominant features in neonates and infancy, while in adults it presents with chest pain, difficulty in breathing, abdominal pain and sometimes intestinal obstruction.[7] Some cases may remain asymptomatic and it may be due to the occlusion of diaphragmatic defect by the intra-abdominal viscous.[8] Majority of right sided CDH are asymptomatic because liver prevents herniation of other organs.[9]

In congenital diaphragmatic hernia various intra-abdominal organs can herniate into the thorax. Organs that commonly herniate are stomach, ileum, colon, and spleen and on the right side liver and right kidney may also herniate along with the bowel loops. Bochdalek hernia can be associated with lung hypoplasia, malrotation of midgut, and cardiac defects, whereas Morgagni's hernia may be associated with hypoplasia of the right lobe of liver.[10] Bochdalek hernia is a rare hernia in adults, so misdiagnosis is common. Strangulation of herniated bowel can occur due to missed or delayed diagnosis.[11] CT scan is imaging of choice for the diagnosis and evaluation of the hernia contents, especially when the defect is small.[12,13] About 38% of these cases are misdiagnosed as pleural effusion, empyema, lung cyst, and pneumothorax when CT scan is not done.[14] MRI is an alternative diagnostic modality.

All diaphragmatic hernias should be repaired at the time of diagnosis, given the risk of intestinal obstruction and strangulation. Traditionally, CDH have been repaired via laparotomy or thoracotomy. Minimally invasive approaches may also

provide excellent exposure for repair and may have additional benefits, such as decreased pain, shorter hospitalization and improved cosmesis.[15,16] Primary closure with interrupted, non absorbable suture is the preferred method of repair, when the diaphragmatic edges can be apposed without undue tension. The use of mesh has been recommended When the size of the diaphragmatic defect exceeds 20 to 30 cm.[17,18] (figure-5). Recurrence rates are low for all approaches (laparotomy, thoracotomy, laparoscopy, and thoracoscopy and outcomes have been excellent.[19]

CONCLUSION

Congenital diaphragmatic hernia is a rare surgical conditionprimarily diagnosed in infants and seen rarely in adults. Adult forms of CDH can be identified incidentally or as a part of investigations for nonspecific gastrointestinal or respiratory symptoms. All adult CDH patients should undergo surgical repair to prevent complications like incarceration and strangulation of abdominal viscera leading to increased morbidity and mortality. There is enough literature demonstrating the safety and efficacy of using open or minimally invasive repair techniques. Irrespective of the approach selected, surgical repair is the treatment of choice with low morbidity and mortality. The rate of recurrence is low with good long-term outcomes.

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