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Resuscitation and organ reduction in large traumatic diaphragmatic hernia: A case study

Dr Ashish Lakhote

Senior Resident, Trauma unit, Department of General Surgery, Government Medical college, Nagpur, M.H.

Dr Ujjwal T Sharnagat*

Junior Resident, Department of General Surgery, Government Medical college, Nagpur, M.H.

*Corresponding author

Dr AHM Quraishi

Professor, Department of General Surgery, Government Medical college, Nagpur, M.H.

Abstract---Diaphragmatic injury is a rare entity and clinically difficult to be diagnosed as symptoms are often masked due to associated injury in a poly trauma case. There are no specific signs and symptoms for diagnosing diaphragmatic rupture. High degree of clinical suspicion is needed in all cases of thoraco-abdominal injury to diagnose a case of diaphragmatic rupture. Cardiovascular and Thoracic compromise secondary to Large Diaphragmatic hernia can be significant and needs consideration and immediate intervention.

Keywords---Traumatic diaphragmatic injury, Cardio-respiratory Arrest.

Introduction

The term (diaphragm) is derived from the Greek, dia meaning in between and phragma meaning barrier. This muscular partition between the chest and abdomen is the most important muscle in the human body after the heart [1]. The three muscular components of the diaphragm (pars costalis, pars sternalis and pars lumbaris) converge on the central tendon [2]. In between these parts, there are gaps of potential weakness consisting of pleura, peritoneum and two fascial layers through which traumatic diaphragmatic rupture (TDR) with or without visceral herniation is possible [3] [4].

Acute rupture of Diaphragm can severely compromise respiratory and cardiac functions; there-fore extensive diaphragmatic rupture should be considered as a

possible cause or at least a contributing factor to cardiorespiratory dysfunction in patient with thoracoabdominal trauma.[5] Treatment of rupture diaphragm mainly consists of repair of diaphragm, can be performed through a thoracotomy or laparotomy. Laparotomy has additional benefits of directly inspecting all intra-abdominal organs during surgery [6] [7].

Case Report

The 51 years old male presented to our emergency room with h/o fall from tree 3 days back. On presentation he was c/o pain in left side of chest and upper abdomen. He had no c/o difficulty in breathing. He was initially treated in a private hospital where an x-ray chest (Figure 1a and 1b) was also obtained and then referred to our hospital. On clinical examination the vitals were stable, there was decreased breath sound noted in left side of chest and apical beat was also noted in the center of chest with patient maintaining saturation at room air.

A plain x-ray which was taken outside (Figure 1) showed Bowel loops and Stomach within left Hemithorax with mediastinal shift towards right. Patient was then stabilized in the Emergency and later shifted for High Resolution CT scan of thorax and abdomen. Ryle's tube was placed, patient was catheterized. All routine investigations were sent.

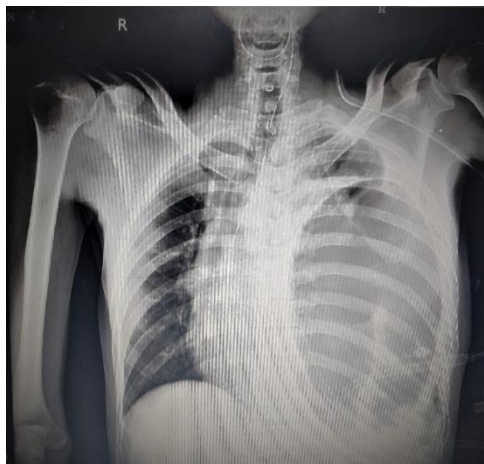


Figure 1: X-ray showing gastric shadow in left hemi- thorax

Patient was shifted for computed tomography of chest and abdomen for confirmation of diagnosis. CT chest and abdomen was suggestive of defect of size 13.5 X 5.5 cm noted in left hemidiaphragm through which stomach, splenic flexure, tail of pancreas, spleen and mesocolon are seen herniating. The stomach is folded over itself with gastro-esophageal junction and pylorus in vicinity to each other at the level of defect. Linear displaced fracture of anterior part of 3rd to 5th and posterior part of 5th and 6th ribs on left side. Hence authors arrived at a confirmatory diagnosis of traumatic diaphragmatic rupture with herniation of intra- abdominal parts into left hemi-thorax.



Figure 2: CT section showing defect in left diaphragm

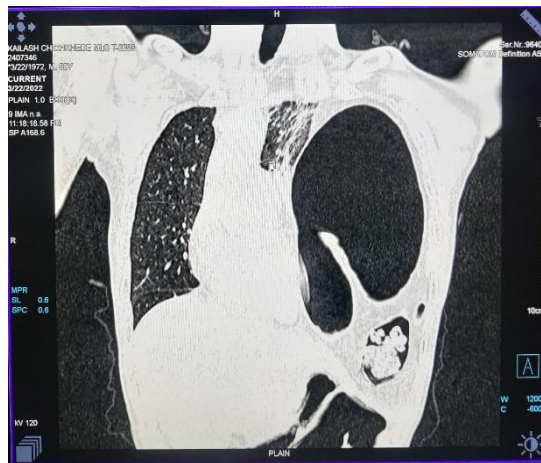


Figure 3: CT section showing herniation of Stomach folded on itself in left hemithorax on left side

Patient was taken for emergency laparotomy. Intraoperatively Patient went into pulseless Ventricular Tachycardia before Induction and Immediate Cardioversion with 200 J given and Inj Adrenaline 1mg was administered, patient was revived and stabilized.

In view of Life saving surgery, decision was taken to continue with the surgery and Laparotomy incision was taken through anterior abdomen midline. Patient went in Cardiorespiratory arrest, External Cardiac Massage started and Inj Adrenaline 1mg was given. Pulse started at rate of 30/min and shockable rhythm was obtained on ECG monitors. Immediate Cardioversion with 200 J given, simultaneously patient's Stomach, small bowel, spleen and mesocolon was reduced back into abdomen. Followed by which Normal Rate and rhythm was obtained. IntraOperatively Intercostal drainage tube was placed from 5th

intercostal space. Diaphragmatic defect was closed with 1-0 proline suture (Figure 4 and 5).

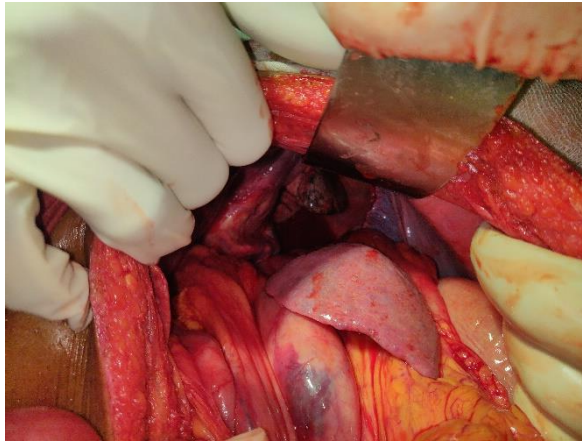


Figure 4: Intra-operative picture showing rent left hemi-diaphragm

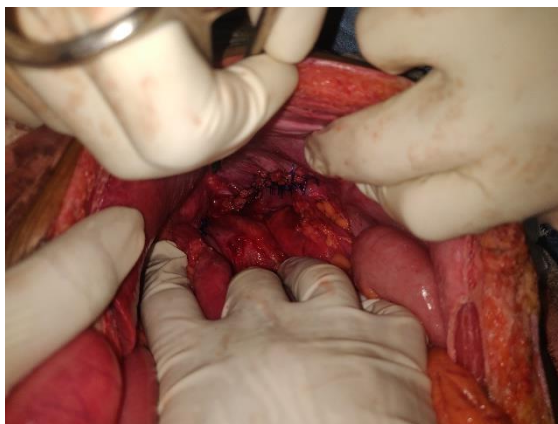


Figure 5: Intra-operative picture showing rent closed with proline sutures

Simple interrupted sutures were applied. After inspecting all intra-abdominal organs, a peritoneal lavage was done and abdominal drains were kept. Abdomen was closed in layers. Repeat chest x-ray was done to see ICD tube and position of mediastinum (Figure 6). Patient showed a good recovery and discharged from hospital in 2-week time.

Discussion

Etiology

Traumatic diaphragmatic rupture is mainly associated with multiple injuries [8]. It is mainly seen as a result of high velocity trauma in a road traffic accident [9]. Mechanism of injury mainly involves the shearing of stretched diaphragm at the point of diaphragmatic attachment due to sudden force transmission through viscera in abdomen.



Figure 6: Immediate post-operative X-ray showing mediastinal shift to normal position

Most common site of rupture diaphragm is poster-lateral aspect of hemi-thorax because of its origin from pleura-peritoneal membrane which is structurally weak [10]. Left sided ruptures are more common as compared to right side because of the protective effect of liver [11]. Large right lobe of liver prevents herniation of abdominal contents into right hemi-thorax while smaller left lobe of liver is not able to provide a protective mechanism on left side so the left sided rupture is usually large and often associated with large hernias. A positive pressure gradient pushes the abdominal contents into thorax. with a high velocity abdominal injury, the pressure gradient in abdomen may rise up to 100 cm of water.

Management

When a diagnosis of rupture diaphragm is established, the patient should be stabilized and then taken for emergency laparotomy. Surgery may be performed through a laparotomy or thoracotomy. As rupture diaphragm is often associated with other abdominal injuries so a laparotomy is a preferred approach. Laparotomy has an additional benefit of visualizing the intra-abdominal organs directly. minimally invasive procedures through abdomen and thorax route are becoming popular as repair is technically easier in experienced hands. Repair of rupture diaphragm consist of approximation of rent by applying simple sutures, when rent is large a mesh placement is done.

Conclusion

As there is a current Lacuna in knowledge and no clear Guidelines on Management of such cases, authors suggest Attempt of Life saving surgery should be given in such cases with Large Diaphragmatic Hernia prompt reduction of

Herniated organs in Diaphragmatic Hernia and restoration of Physiology in Thorax can lead to resolution of Symptoms and Dramatic return of function and improvement in Prognosis.

Recent advances in the management of TDH have focused on early diagnosis and prompt surgical intervention to prevent complications. CT imaging is now the preferred diagnostic modality for TDH, as it allows for accurate visualization of the hernia and any associated injuries.

Surgical repair remains the primary treatment option for TDH, with minimally invasive laparoscopic approaches becoming more widely used. In cases where surgical repair is not immediately possible, temporary measures such as the use of a nasogastric tube or chest tube may be used to manage symptoms and stabilize the patient.

Overall, the prognosis for TDH depends on the severity of the injury and the promptness of diagnosis and treatment. With advancements in diagnostic imaging and surgical techniques, the outlook for patients with TDH has improved significantly in recent years.

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References

1. Anraku M, Yaron Shargall Y. Surgical conditions of the diaphragm: anatomy and physiology. *Thorac Surg Clin* 2009; 19:419–429.
2. Kaur R, Prabhakar A, Kochhar S, Dalal U. Blunt traumatic diaphragmatic hernia: Pictorial review of CT signs. *Indian J Radiol Imaging*. 2015; 25: 226–232.
3. Chayovan T, Tangsittitum C. Diaphragmatic hernia (unpublished lecture notes). Available at: http://www.slideshare.net/fernerferretie/diaphragmatichernia-and-injury?qid=798f677d-0ab2-4270-a63d-e06cc263a2d9&v=&b=&from_search=2. [Accessed 30 September 2016]
4. Abdulsalam Y. Tahaa, Waleed M. Hussenb,c, Mohammed B. Mahdib. Diaphragmatic rupture due to blunt trauma: a limited series case report. DOI: 10.4103/ejs.ejs_22_18.
5. Alberto H, Palmer Q, Joaquin A. Diaphragmatic Rupture in Blunt Trauma: Morbidity and Mortality in 42 cases*.
6. Fair KA, Gordon NT, Barbosa RR, Rowell SE, Watters JM, Schreiber MA. Traumatic diaphragmatic injury in the American College of Surgeons National Trauma Data Bank: a new examination of a rare diagnosis. *Am J Surg*.2015; 209:864-8.
7. Kishore A, Singh A, Jain A. Traumatic diaphragmatic hernia: a case report. *Int Surg J* 2018;5: 2378-82.
8. Goh BK, Wong AS, Tay KH, Hoe MN. Delayed presentation of a patient with a ruptured diaphragm complicated by gastric incarceration and perforation

- after apparently minor blunt trauma. *Canadian J Emerg Med.* 2004; 6:277-80.
9. Meyers BF, McCabe CJ. Traumatic diaphragmatic hernia. Occult marker of serious injury. *Ann Surg.* 1993; 218:783-90.
 10. Sangster G, Ventura VP, Carbo A, Gates T, Garayburu J, D'Agostino H. Diaphragmatic rupture: a frequently missed injury in blunt thoracoabdominal trauma patients. *Emerg Radiol.* 2007; 13:225-30.
 11. Eren S, Kantarci M, Okur A. Imaging of diaphragmatic rupture after trauma. *Clin Radiol.* 2006; 61(6):467-77