Abstract:
Traumatic diaphragmatic hernia is a type of diaphragmatic hernia which is acquired through an abdominal thoracoabdominal injury. Traumatic diaphragmatic hernias constitutes 5% of all diaphragmatic hernias of which 90% of all strangulated diaphragmatic hernias. Herniation of abdominal contents through the diaphragm into the chest. This is a case report of a middle aged lady presenting with acute intestinal obstruction — causative factor for which is a diaphragmatic hernia due to old blunt injury abdomen and chest. Emergency surgery was done. We also present a review of available literature.

Keyword: Traumatic diaphragmatic Hernia closed loop intestinal obstruction.

Introduction:
With the history 1541 Sennertus report, the postmortem finding of strangulated stomach associated with diaphragmatic hernia. 1853 Bowditch recognized the injury before death. Even though congenital diaphragmatic hernias occurring in Neonatal cases being more common, traumatic diaphragmatic hernias can present in adult age group with acute symptomatology. Penetrating injuries of diaphragm being the cause of these diaphragmatic hernia (30%). Blunt abdominal can cause these 5% which is rare (our case).

Case Report:
A 28 yrs old lady presenting with abdomen pain—3 days duration/ sudden onset / diffuse / progressive / intermittent / colicky nature. She had abdominal distension for 2 days and vomiting— for 2 days/ 3 to 4 episodes / biliary / non projectile. Obstipation for 1 day. History of recurrent wheezing episode for past 7 months. History of Trauma fall from 10ft height and sustain injury to abdomen and chest 7 yrs back treated symptomatically for the same. Underwent peurperal sterilization 4 years back and re-canalisation 2 years back. Not a known case of HT/DM/TB. Physical examination revealed features of subacute
intestinal obstruction. Initially with clinical and primary investigations diagnosis of scar adhesive obstruction was made and treated conservatively. Symptomatically and clinically patient didn’t get better and c/o Left shoulder pain and wheezing. Immediate contrast enhanced CT with gastrograffin taken which shows features of closed loop obstruction with features of left basal pneumonitis. Basic investigations were normal. X-ray abdomen – multiple fluid levels with caecum distension / Transverse colon distension. X-ray chest features of left basal pneumonitis ECG – Normal. CECT shows dilated Transverse colon- 9cm, distended caecum-11cm / left basal pneumonitis. The patient was resuscitated with intravenous fluids and an emergency exploration laparotomy was decided in view of pre-op diagnosis of splenic flexure growth / diaphragmatic hernia. Intra op findings were dilated Transverse colon, Ascending colon, Ceacum impending rupture with serosal breach. Whole of splenic flexure, greater omentum, posterior wall of stomach was found inside the left pleural cavity. Defect of 2cm approximately noted over the left hemidiaphragm lateral aspect, which was incised laterally and anteriorly, avoiding Phrenic Nerve and contents delivered in Toto, after checking viability Gangrenous omentum excised. The Stomach and splenic flexure were viable. Defect in the diaphragm closed in two layers with 1 prolene. Left Intercostal Drain kept in 5th space functioning well. Laparotomy wound closed in single layer after perfect hemostasis with abdomen drain. Patient observed in post op ICU with ventilator support for one day and extubated. Oral fluids started on POD3, Semisolids on POD5, passed stools on POD 6, Abdominal drain removed on POD6. Cardio thoracic surgeon and pulmonologist opinion sought and they advised our same line of management. ICD removed on POD 8. Lung expansion was full and no collection in left pleural space. Inhalation spirometry exercises were advised. Patient improved well. Sutures removed on POD 10.

Patient discharged on POD 12 after taking lung function tests and is within normal limits.
INTRAOPERATIVE PICTURE

Discussion:
Diaphragmatic hernia occurs as congenital and Acquired events. Acquired defects being further classified into – Traumatic (Rare) and esophageal hiatus (commoner). Traumatic Diaphragmatic Hernia- True incidence – not known. Autopsy series shows blunt injury abdomen – 5% (our case)/ Penetrating injury – 30%

ANATOMY
Diaphragm DIA – in between PHRAGMA - Fence
Peripheral muscle fibers insert into a central tendon.

Superior surface is partially fused with the pericardium and chest wall laterally, Posteriorly – first three lumbar vertebrae Anteriorly – Sternum. Nerve Supply: Phrenic Nerve – Motor Sensory to Central tendon, Parietal pleura, peritoneum. Enters near junction of pericardium and central tendon, then it splays out laterally over the dome. Sensory innervations to peripheral portions is by lower five intercostals nerves. Blood supply: Branches of Aorta Peripherally from intercostals vessels and vessels along Phrenic nerve

Mechanism of Injury:
Blunt injury

Penetrating injury – common

Penetrating Injury:
Commonly leave only small defect.

Signs and symptoms and radiological findings- Negative.

Positive intra-abdominal pressure (150 mm Hg)b) Negative intra-pleural pressure.c) Constant diaphragmatic motion
Prevents closure of defect in diaphragm. Stab wounds common on left side because most assailants have right handed.

Blunt Injury:
Automobile accidents – Lap-type seat belts.
Lateral impact collisions Other injuries causing increased abdominal pressures. -POSTEROLATERAL FASHION DEFECT

Pathophysiology:
Depends on the size of defect and degree of nearby organ injury. Hemodynamic instability

Blood from Abdominal Cavity enters into thorax causing respiratory and cardiac tamponades.

Collapse of ipsilateral lung – ventilatory compromise.

Mediastinal shift to opposite side Decrease venous return Decrease cardiac output Hypotension Hollow viscous inside the pleural cavity Vascular jeopardy Necrosis Rupture into cavity.

DIAGNOSIS:
Delay in diagnosis: 16 hrs to 14 years Clinical signs in visceral Herniation: Decreased Breath Sounds Dullness to chest percussion Bowel sounds heard on chest auscultation OFTEN NO ABNORMAL PHYSICAL
SINGS Blunt injuries 55% - no physical findings. Penetrating injuries 44% - no physical findings. Children uncommon, because of increased compliance of thoracic cage.

A. CHEST XRAY:
Most Commonly – gastric bubble or a naso-gastric tube in Left chest. Diagnostic significance less than 50% of left and less than 14% of Right sided injuries.

B. COMPUTED TOMOGRAPHY: HELICAL COMPUTED TOMOGRAM
70% sensitivity 78% left sided 50% right sided 100% specificity 88% left sided 70% right sided

FINDINGS:
direct discontinuity of diaphragm b) Intrathoracic herniation of abdominal contents c) Collar sign or waist like constriction of viscous at site of tear d) Dependent viscera sign (supine position organs oriented to posterior rib cage and chest wall)

MRI
Beneficial for patients with delayed signs of diaphragmatic tear.

Well suited for visualization of entire diaphragm.

INVASIVE DIAGNOSTIC MODALITIES:
a. Diagnostic peritoneal lavage: Poor predictor.

b. Diagnostic laparoscopy: Hemodynamically stable patients. asymptomatic no indication for celiotomy.


TREATMENT:
Acute Injuries: Best approached through an abdominal incision. Most chest injuries are managed non operatively. Thoracotomy reserved for chronic herniation midline incisions. Herniated viscera are reduced from thoracic cavity by gentle traction. If resistance occurs, extend the defect, lateral extension for central ruptures and anterior extension for medial and para-hiatal defects will avoid injury to Phrenic Nerve branches, thereby minimizing postoperative diaphragmatic dysfunction. Pleural cavity irrigated with warm saline.

SMALL DEFECTS:
Non absorbable figure of eight sutures Horizontal mattress sutures.

LARGER DEFECTS:
Non absorbable materials continuous inter locking TEFLON pledges are used when closure is tenuous.

DEFECT > 2CM TWO LAYER CLOSURE:
Inner layer with horizontal mattress interlocking non absorbable.

Second layer 3 ‘0’ non absorbable running stitch. A catheter is placed through final suture. Air and fluid are then withdrawn under suction. With the lungs held in full inspiration. Catheter is removed and suture line is secured. Synthetic material is rarely needed for smaller defects. It may be indicated for larger defects. Tube thoracostomy was placed. Post operative chest x-ray mandatory.

POST OP: Diaphragmatic dysfunction Atelectasis Recurrence in acute post injury period is rare.
CONCLUSION:
Diaphragmatic hernia though being a rare cause of intestinal obstruction, it should be considered in differential diagnosis. Congenital diaphragmatic hernias are common and even then acquired defects due to penetrating (commoner)/blunt trauma (rarer) can occur. Here our case is a rarity because diaphragmatic hernia followed a blunt trauma that too with an intestinal obstruction as a presentation. Most of the diaphragmatic hernias are diagnosed at autopsy only but, in our situation we diagnosed and operated at appropriate time which saves the patient's life.

ABBREVIATIONS:
POD - Post operative day. ICU - Intensive care unit.

REFERENCES:
1 Brandt ML, Luks FI, Spigland NA, et al