

PREVALANCE OF TRAUMATIC DIAPHRAGMATIC RUPTURE IN JAMMU REGION.

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ABSTRACT:

Traumatic diaphragmatic rupture (TDR) is rare but potentially life threatening and its diagnosis requires a high index of suspicion. A retrospective cross-sectional study of 1236 cases of torso trauma who were admitted in GMC Jammu in the emergency (over a period of around one year) was carried out. Out of 1236 patients included in the study, 18 (1.45%) had traumatic diaphragmatic rupture. Hence, prevalence of traumatic diaphragmatic rupture is 1.45%. These patients included 6 females and 12 males and the median age was 32 years. Blunt trauma accounted for 16 (88.88%) cases while penetrating trauma was the cause in 2 (11.12%) patients. Of these 18 patients, 10 (55.55%) were the result of road traffic accidents while 8 (44.45%) were due to fall from height. One of the patients died in the post-operative period due to severe lung injury. Left hemidiaphragm was ruptured in 16 (88.88%) patients while 2 (11.12%) patients had rupture of right hemidiaphragm. A pre-operative diagnosis was made in about 17 (94.44%) cases. 3 (18%) cases were diagnosed on clinical examination, 8 (42%) cases were diagnosed by Chest X ray changes, 2 (12%) cases were diagnosed on Ultrasonography, 4 (20%) cases were diagnosed on CECT Chest imaging and one patient was diagnosed on laparoscopy. Most of the diaphragmatic rents were primarily repaired using non-absorbable monofilament sutures while in one patient, diaphragmatic rent was repaired using mesh as prosthesis.

Keywords: *traumatic diaphragmatic rupture, retrospective, blunt trauma, ultrasonography, laparotomy, hemidiaphragm, road traffic accident, thoraco-abdominal injury, chest radiography*

PATIENTS AND METHODS:

A cross-sectional retrospective study of 1236 cases of torso trauma who presented to GMC Jammu was done. All patients were above 18 years of age including males and females. Out of these 1236 patients, 18 (1.46%) patients were diagnosed to have traumatic diaphragmatic rupture and underwent laparotomy for the repair of diaphragmatic rupture.

RESULTS:

During the period of study, TDR was identified in 18 out of 1236 patients who were admitted with abdominal and thoracic trauma. 6 of the 18 patients were females and the median age was 32 years (range 23 to 52 years). Blunt trauma accounted for 16 (88.88%) cases while penetrating trauma was the cause in 2 (11.12%) cases. Of all these patients, 10 were the result of road traffic accidents and 8 were caused by fall from height. One of the patients died in the post-operative period due to severe lung trauma. All the patients underwent laparotomy. At laparotomy, the left

hemi-diaphragm was ruptured in 16 cases (88.88%) and the right hemi-diaphragm in 2 cases. Visceral herniation into thorax was seen in almost all the cases. Stomach was herniated in 12 cases, small bowel loops in 6 patients, colon in 2 patients, spleen in 8 patients and liver in two patients. Rib fractures were seen in almost all patients, femur and tibia fractures in 2 patients, pelvic bones fractures in 2 patients while spinal cord injury was noticed in 4 patients. A pre-operative diagnosis was made in about 17 cases (94.44%). Out of these 18, 3 (18%) patients were diagnosed on clinical examination, 8 (42%) patients by Chest X ray changes, 2 (12%) patients on ultrasonography, 4 (20%) patients on CECT Chest findings and one patient was diagnosed on laparoscopy. Most of the diaphragmatic rents were primarily repaired using nonabsorbable monofilament sutures while in one patient, diaphragmatic rent was repaired using mesh as prosthesis.

Mode of diagnosis	Percentage of patients(%)
Clinical examination	18
Chest X ray films	42
Ultrasonography	12
CECT chest	20
Laparoscopy/ Laparotomy	08

Table 1: Mode of diagnosis in our patients.

Injuries	Number of patients(n)
Splenic injury	08
Small bowel injury	06
Transverse colon injury	02
Liver injury	02
Rib fractures	18
Long bone fractures	02
Pelvic fractures	02
Spinal cord injury	04

Table 2: Associated injuries in patients of traumatic diaphragmatic rupture.

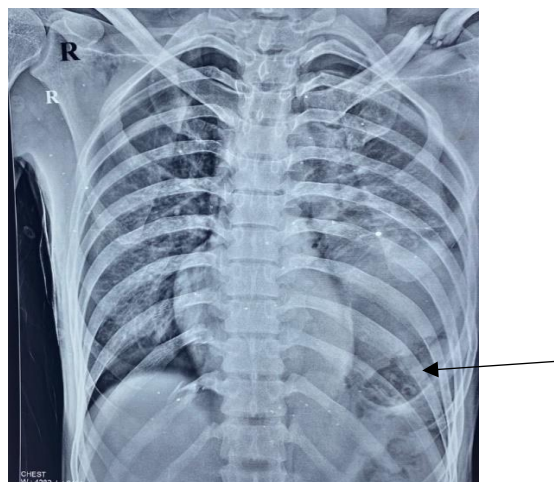


Figure 1: CXR showing herniation of abdominal contents (black arrow) into left thoracic cavity.

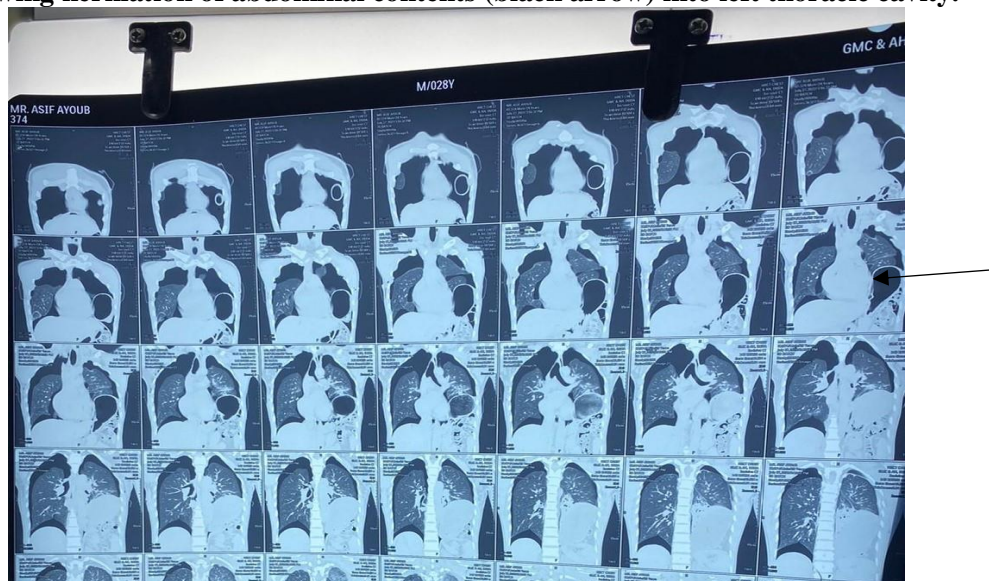


Figure 2: CECT Chest film showing herniation of stomach(black arrow) into left thoracic cavity.

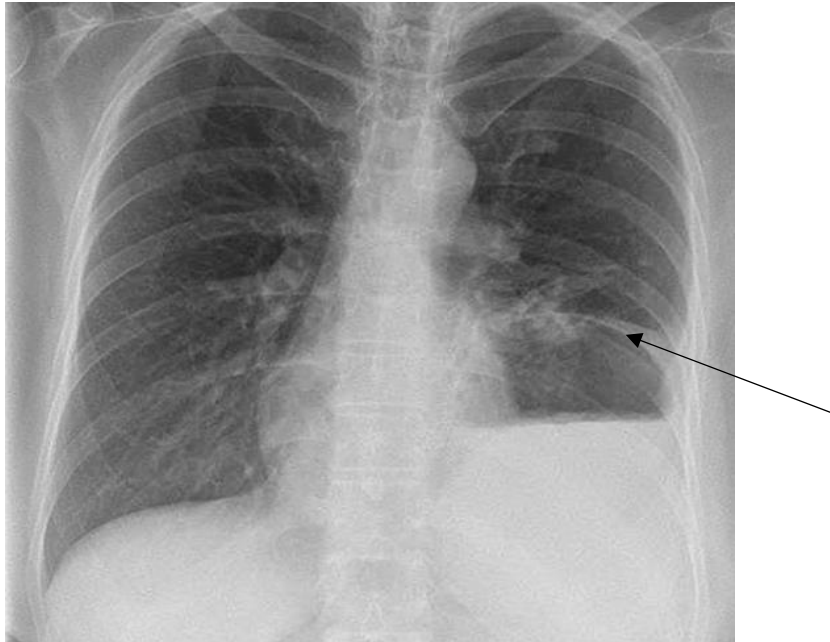


Figure 3: CXR showing elevated hemidiaphragm (black arrow) on left side.

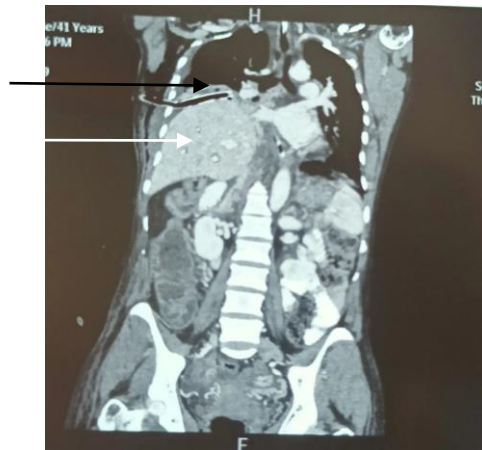


Figure 4: CECT chest showing elevation of right hemidiaphragm (black arrow) and liver in right hemithorax (white arrow).

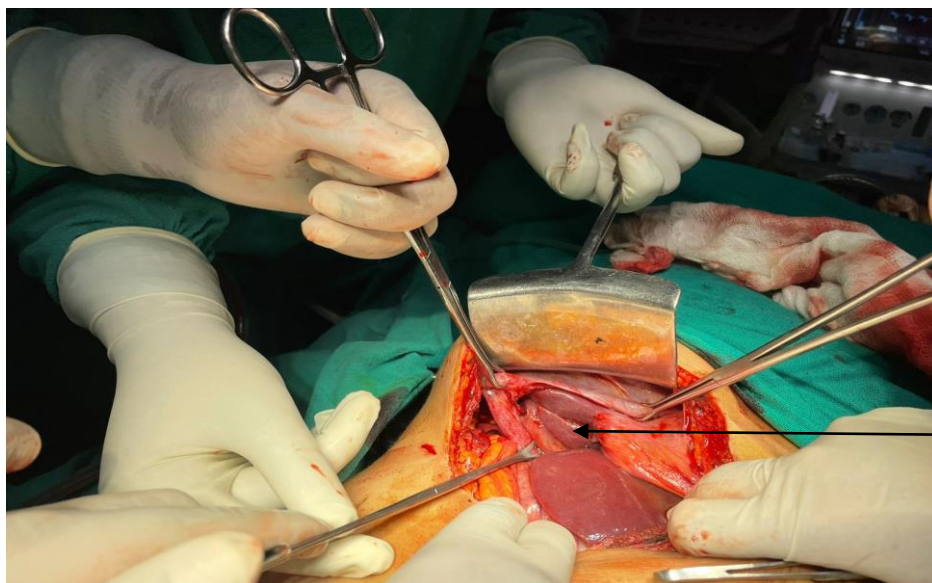


Figure 5: Ruptured right hemidiaphragm showing herniated liver (black arrow).



Figure 6: Suture repair of right sided diaphragmatic rent.

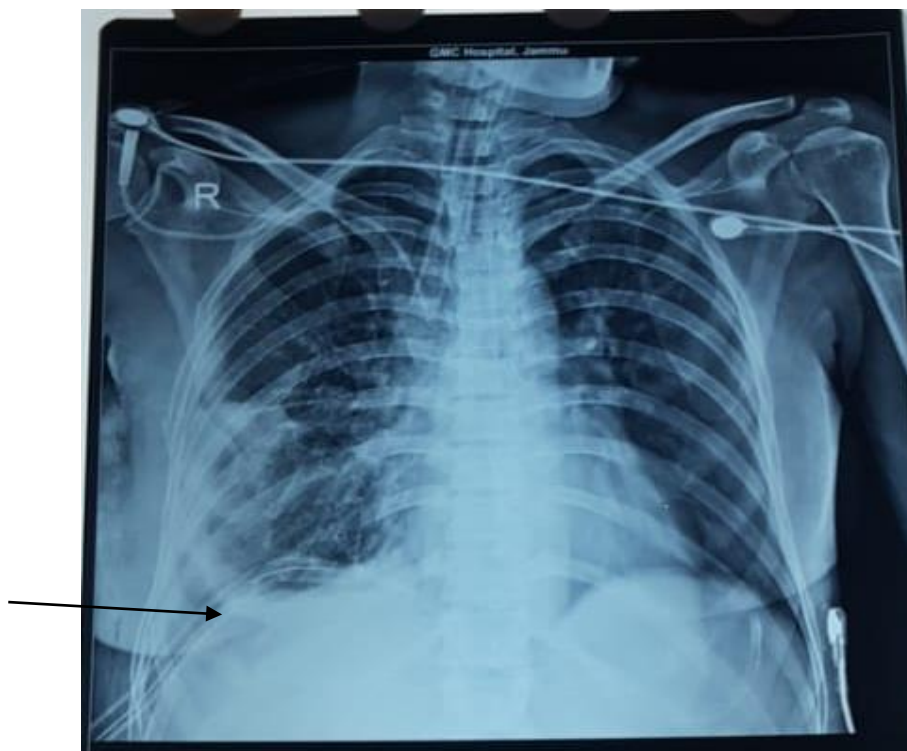


Figure 7: CXR showing expansion of lung after diaphragmatic hernia repair on right side with ICCT in situ (black arrow).

DISCUSSION:

Traumatic rupture of the diaphragm may be due to penetrating or blunt trauma. Eighty-four percent of TDRs due to penetrating injury have a defect shorter than 2 cm, whereas diaphragmatic ruptures due to blunt trauma are more than 2 cm long, with the majority being over 10 cm long. The diagnosis of TDR

due to penetrating trauma is usually clinical, relying on the entry site and direction of the wound, but TDR due to blunt trauma is much more difficult to diagnose. Rupture of the hemidiaphragm is an uncommon injury occurring in 0.8% to 1.6% of patients admitted with blunt force injury. Left-sided hemi-diaphragmatic injury predominates, probably because of the

protective effect of the liver on the right hemidiaphragm leading to underdiagnosis of right-sided injuries. The clinical diagnosis of laceration of the hemidiaphragm with herniated viscera is difficult, but may be suggested by audible bowel sounds auscultated in the lower thorax, unilateral absence of breath sounds, respiratory distress or a scaphoid abdomen. Often, bedside physical findings are masked by concurrent abnormalities, or these signs may be overlooked because of more apparent and life-threatening injuries in acute post trauma period. Delayed presentation of diaphragmatic rupture with visceral herniation and strangulation is associated with higher morbidity and mortality rates than when the diagnosis is made and managed acutely. Chest radiographs are the principal screening method for thoracic injury after blunt trauma. Study is often technically compromised by use of portable radiography units, supine projections, and limited patient cooperation. Despite these limitations, chest radiographs are good screening images for detection of diaphragmatic injury. Diagnostic or strongly suggestive findings include the definite presence of air-filled viscera or the tip of the nasogastric tube above the diaphragm, as well as a diaphragm that is "very elevated". A separate study to investigate the degree of diaphragmatic elevation that can occur in the patient with multiple traumas would be required to determine the upper limits of diaphragmatic elevation that can occur without TDR. Findings suggestive of TDR are elevation of the diaphragm not due to atelectasis, or obscuration of a non-elevated hemidiaphragm. The presence of air-containing viscera within thorax is an important sign. Delayed or progressive visceral herniation through a diaphragmatic rent may result from the constant negative intrapleural pressure pulling on mobile abdominal viscera. The appearance of delayed herniation might, thus, be anticipated after patients with ruptured hemidiaphragms are removed from positive-pressure ventilatory support. Other imaging methods that have been reported to be of value in evaluating the diaphragm include radiographs after nasogastric tube placement, fluoroscopy, upper and lower gastrointestinal contrast examination, sonography, CT, MR imaging and liver-spleen scintigraphy. The success of these imaging techniques depends largely on the demonstration of herniated abdominal contents, rather than a direct evaluation of the diaphragmatic tear. The use of sonography for diagnosing TDR has been reported, but is limited by subcutaneous emphysema, chest wall and abdominal pain, overlying bandages, and the presence of gas in stomach and splenic flexure. Sonographic performance is also highly operator-dependent. CT of the abdomen and chest has been reported to be useful in assessing for TDR, but direct imaging is only available in the axial orientation, and superimposed effusions,

atelectasis, and traumatic lung cysts can cause diagnostic confusion. MR evaluation of diaphragmatic injury also has been described. The major advantages of MR over CT are the capacity for direct coronal and sagittal imaging, as well as direct visualization of the low-signal-intensity diaphragm. Spontaneous closure of the diaphragmatic tear is unlikely because of the abdominothoracic pressure gradient, and progression to enlargement of the defect and thoracic herniation of the intra-abdominal contents can be expected. Acute ruptures are best approached transabdominally via a midline or subcostal incision along with the assessment of associated intra-abdominal injuries. Often the ruptures are approximated and repaired primarily. However, larger defects have been closed using prosthetic material. Diagnostic delay can lead to long-term sequelae that can present from a few days to many years following the injury. Recognised complications are respiratory compromise due to a volume effect, pleural collection, pneumoperitoneum and intestinal obstruction or strangulation. Patients sustaining high energy or penetrating thoraco-abdominal injuries are at risk of TDR. However, there is a high incidence of associated life-threatening injuries particularly following blunt trauma and morbidity and mortality are usually due to these. As diagnostic delay is associated with an increased morbidity, it is important to identify the problem as early as possible. When a laparotomy is performed, meticulous inspection of both domes of the diaphragm is essential. Death is usually due to associated injuries and the high morbidity is mainly due to pulmonary complications. One has to suspect and actively look for the injury when managing patients with torso trauma.

CONCLUSION:

Among all patients included in our study, TDR was observed in 1.46% of the patients which denotes the prevalence of TDR in Jammu region.

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