Management of Traumatic Diaphragmatic Rupture

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ABSTRACT
Traumatic diaphragmatic rupture (TDR) is rare and needs high index of suspicion for diagnosis. TDR is life threatening if missed and has high mortality rate. Prompt surgical intervention and repair ensures favourable outcome.

KEY WORDS: trauma, diaphragm

INTRODUCTION

Traumatic diaphragmatic rupture (TDR) is a rare condition which requires emergency surgical intervention. A prospective study from a tertiary hospital in central Nepal reports that diaphragmatic injury comprises of 1.6% of thoracic injuries. In an autopsy study in tertiary referral center of eastern Nepal, 21.75% diaphragmatic injury was seen in association with liver injuries.2 A retrospective study of traumatic diaphragmatic rupture during eight years duration from UK showed that out of 480 cases of torso trauma, 16 (3.3%) had TDR. In 2008, Chughtai et al from the largest trauma center in Canada has concluded that diaphragmatic rupture is rare (1.9%) and difficult to diagnose.4 Fair KA and colleagues have shown that diaphragmatic injury is an uncommon but significant diagnosis in trauma patients based on their data from The American College of Surgeons National Trauma Data Bank which is the largest trauma database in the United States.5 Prompt recognition of TDR is important because it is potentially life threatening. In the United States, a mortality rate of 23% has been reported by Williams M et al in a retrospective review of diaphragmatic trauma 6 and 31% overall mortality in TDR has been reported by Willsher PC et al in Australia.7 This is a case of traumatic diaphragmatic rupture diagnosed and managed early.

CASE

26 year old gentleman stabbed on central chest and posterior neck with a sharp weapon sustained 8cm oblique laceration on central chest with fracture of xiphisternum and 5cm laceration on posterior neck exposing C3 vertebra. His chest x-ray showed bowel loops in right hemithorax (fig. 1). With the diagnosis of right traumatic diaphragmatic rupture, laparotomy was done which revealed 8cm X 6cm defect in the right diaphragm with herniation of small bowel loops (figs. 2 and 3). There was a 10cm cut with 2mm depth on right lobe of liver with falciform ligament tear. After repositioning the bowel, the repair of diaphragm was done primarily with monofilament non absorbable (Polyprolylene no. 1) single layer interrupted suture and right tube thoracostomy was done. Absorbable gelatin sponge was kept over the liver injury and repair of falciform ligament was done. The posterior neck laceration was repaired by neurosurgery team and cervical collar was applied followed by conservative treatment for right hemiparesis. The chest tube was removed on post operative day 9 (fig. 4). The patient was discharged on post operative day 13.
DISCUSSION

In a case of polytrauma, traumatic diaphragmatic injury may be missed. In a four years experience of blunt diaphragmatic rupture, Matsevych had reported that out of 12 cases, 3 were diagnosed intraoperatively when they presented with bowel obstruction. Guth Awith his report of 12% missed diaphragmatic...
injury on initial evaluation, has highlighted that right diaphragmatic injuries are easily missed as they are often interpreted as thoracic trauma. In this case, the initial suspicion was made with chest radiograph. Willsher P et al. has shown that the sensitivity of chest radiograph as a diagnostic method in TDR is 66%. Surgical repair is necessary even for small tears.

In contrary to the chest approach stated by Gokhan H et al., we approached the acute right diaphragmatic rupture with abdominal approach with a successful outcome. Turhan K et al. has highlighted that the most common approach for TDR is the transabdominal approach, which allows a complete exploration of the abdominal organs for associated injuries. Shah R et al. have also emphasized that acute diaphragmatic injuries are best approached through the abdomen, as more than 89% of patients with this injury have an associated intraabdominal injury. In this case, there was associated cut injury in liver and falciform ligament. Abdominal approach to TDR via midline incision allows assessment of associated intraabdominal viscera.

Although a sharp weapon caused trauma, the deformation shear of diaphragm can be the possible mechanism of diaphragmatic injury in our case. Spontaneous closure of the diaphragmatic tear is unlikely because of the abdominothoracic pressure gradient, and there is possibility of progression to enlargement of the defect.

If there is no sign of respiratory distress and absence of radiological signs, TDR can easily be missed. A high index of suspicion makes early diagnosis more likely and immediate timely surgical intervention and repair ensures favourable outcome in traumatic diaphragmatic rupture. In addition, the associated injuries also determine the outcome in the early diagnosed cases of TDR.

REFERENCES