

INCIDENCE OF DIAPHRAGMATIC HERNIA IN THORACO-ABDOMINAL TRAUMA CASES

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Abstract

Background: The aim of this study is to find out the incidence of diaphragmatic hernia in Thoraco-abdominal cases. **Materials and Methods:** A prospective study was conducted on 48 patients of Thoraco-abdominal trauma reporting in Surgical Emergency, Patna Medical College and Hospital, Patna from July 2017 to June 2019. All the patients were included in the study and the surgery after diagnosis was done in the surgical emergency department. **Results:** 3 out of 48 patients of Thoraco-abdominal trauma who were operated by midline laprotomy in the Surgical Emergency were diagnosed to have diaphragmatic hernia while 1 was diagnosed on the operating table. The cause was blunt trauma in 3 cases and 1 was due to penetrating injury. **Conclusion:** Traumatic rupture of the diaphragm is rarely encountered clinical entity due to less incidence and very high pre hospital mortality. Diagnosis is difficult initially due to the lack of specific clinical signs and associated grievous injuries. We can manage effectively such cases by meticulous evaluation and early surgical repair and management of associated injuries.

INTRODUCTION

Diaphragmatic injuries occur in 1.1–3.9%.^[1] of the patients suffering from thoraco-abdominal trauma. Blunt traumatic rupture of diaphragm is a serious injury and can lead to a traumatic diaphragmatic hernia. Diaphragmatic rupture causes a loss of continuity in muscular and tendinous fibres of the membrane resulting in communication between the thoracic and abdominal cavities. Due to this rupture the pressure gradient between the thorax and abdomen disappears as a result of which the abdominal viscera migrate into the thorax leading to respiratory failure and circulatory collapse.

Diaphragmatic rupture was first described by Sennertus in 1541.^[2] while traumatic diaphragmatic hernia was first reported by Ambroise Paré in 1579.^[3] Riolfi performed the first successful repair in 1886.^[4] The first diagnosis and repair of an acute blunt diaphragmatic rupture was reported in 1910 by Walker.^[5]

Clinical presentation are widely variable from being asymptomatic to a state of hemodynamic instability due to bleeding to delayed manifestation of intestinal obstruction. The left hemidiaphragm is involved three times more frequently than the right possibly because the liver has a buffering effect. The most common site of rupture is the postero-lateral aspect of the hemi-diaphragm between the lumbar

and intercostal muscles slips. Rupture are radially and mostly are >10cm in length. The most commonly herniated viscera are the stomach and colon.

The present study evaluates the incidence of diaphragmatic hernia in thoraco-abdominal trauma cases.

MATERIALS AND METHODS

All patients of thoraco-abdominal trauma admitted to Emergency Department of general surgery, Patna Medical College and Hospital from the period of July 2017 to June 2019 were studied. During the study period a total of 48 patients of thoraco-abdominal trauma were treated. Out of this 4 patients were found to have diaphragmatic hernia. The following details were collected and used for analysis. Age, Presenting symptoms, Clinical findings, Findings on chest Xray, Operative approach, Findings and Technique of repair, Postoperative course, Duration of hospital stay and Outcome.

After diagnosis, the patients were immediately taken up for surgery. Midline laparotomy was the preferred approach in view to treat any intra-abdominal injuries if found associated. The diaphragmatic tear was repaired using interrupted prolene sutures after reduction of the herniated

abdominal contents. An intercostals drain was also placed on the affected side. Postoperatively patients were managed in the surgical intensive care unit.

RESULTS

Of the 48 patients of Thoraco-abdominal trauma treated during the study period, 4 (8.3%) patients underwent surgery for traumatic diaphragmatic hernia. All the patients were male. The youngest patient was 8years and the oldest was 40 years old.

Blunt injury was the cause of rupture in 3 (75%) patients and penetrating injury was seen in 1 (25%) patients. The blunt injuries included 2 road traffic accidents and 1 patients gave history of fall. The penetrating injuries included 1 stab injuries. Left sided rupture was seen in all the patients.

The mode of presentation was dyspnea, pain, shock and abdominal pain. On clinical examination patients had reduced air entry on auscultation. Bowel sounds were heard in the thoracic cavity.

The diagnosis of diaphragmatic rupture was made within 24 h. Chest X-ray was diagnostic in 3 (75%) patients. Intra-operative diagnosis of rupture diaphragm was made in 1 (25%) patients.

Associated injuries were rib fractures, head injury, liver laceration, lung laceration. The approach was midline laparotomy..

The most common site of rupture was central tendon seen in 2 (50%) patients, muscular part in 1 (25%) patients combined muscular and tendinous portion in 1 (25%) patients. The length of tear ranged from 4 to 8 cm. all the rupture was repaired by interrupted sutures with prolene.

All patients were extubated on operating table and kept on elective ventilation for 24 hours. Postoperative morbidity was seen in 1 (25%) patients. Complications seen were wound infection, respiratory failure. Mean Duration of stay was 20 days (15-25 days). There was no mortality seen due to aggressive treatment of the patients post-operatively.



Figure1: showing tear in left side of diaphragm with irregular margin



Figure 2: Chest X-ray showing visceral herniation of bowel in the thorax

DISCUSSION

Traumatic diaphragmatic injury generally develops after blunt and penetrating injury. Clinically, three phase classification of diaphragmatic rupture was there. In this clinical staging system, first phase is described as stage where the clinical finding develop during acute period of injury and second phase is described as where the obstructive finding develops related to strangulation and third stage connected to the skip of rupture. Second phase is considered as silent clinical period can take up to month or even years.

The striking problem with traumatic diaphragmatic injuries is the frequent difficulty in making the diagnosis. It is ironic that many groups point to its usefulness as a marker of severe injury while, at the same time, demonstrating the ease with which it can be missed. Abnormal radiographs commonly reveal elevation of the hemidiaphragm, blunting of the costophrenic angle, absence of a sharp hemidiaphragm, or presence of a hemopneumothorax.

The diagnosis of diaphragmatic injuries is challenging and requires a high index of clinical suspicion.^[6] Diaphragmatic injuries should be diagnosed before the complications like diaphragmatic hernia and strangulation occur. The mortality and morbidity increases after the herniation and strangulation of the abdominal viscera in the thoracic cavity.^[7]

The commonest etiology of diaphragmatic injury was blunt trauma seen in 3 (75%) patients, this compared well with other series. Dyspnea and chest pain was the most common presenting complaint. All patients were diagnosed within 24 hours of presentation.

On evaluation with regards to blunt trauma it seems diaphragmatic injury on left side 65-85%, right side is 15-35% and both sides is 1%. Left side is more common than right side. The dominance of left-side traumatic diaphragmatic rupture has been explained by increased strength of the right hemi-diaphragm, hepatic protection of the right side, under-diagnosis of right-sided ruptures, and weakness of the left hemi-diaphragm at points of embryonic fusion.

The diagnosis of right sided ruptures is difficult, serial chest X rays and CT scan are recommended in the diagnosis of right sided ruptures. Chest X-ray was diagnostic in 75% of the patients. In 25% the diagnosis was made on operating table. Despite its limitations chest x-ray still plays a major role in the diagnosis of diaphragmatic injuries.^[8] CT is reported to have a sensitivity of 71% (78% left and 50% right) and a specificity of 100% and an accuracy of 88% for left and 70% for right sided injuries.^[9] In the diagnosis of right sided ruptures the use of MRI has also been reported.^[10] Associated injuries were rib fractures, head injury, liver laceration, lung laceration. The approach was midline laparotomy in all the patients.

The torn diaphragm was repaired by interrupted non-absorbable suture like prolene. A intercostal drainage tube was place in the affected side.

CONCLUSION

It is a common diagnosis in the severely injured patient and one made most often at exploratory laparotomy. Careful visual and manual inspection of the entire diaphragm is necessary to avoid missed diaphragmatic defects. Additional imaging modalities such as CT and MRI may play a role in studying the stable traumatized patient with a persistent abnormality on standard chest radiography, such as pleural effusion, elevated hemidiaphragm, or lower lobe collapse. The high frequency of associated injuries combined with the 70% chance of missing the diagnosis on a routine chest radiograph point to the need of a high index

of suspicion to avoid the sequelae of missed injuries. Optimal treatment consists of early repair through an abdominal approach with careful attention given to associated injuries. The outcome is dependent almost entirely on the severity of these associated injuries.

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