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Traumatic diaphragmatic hernia challenging diagnosis and early management

Mohamed Abdelshafy [a], Yusuf S.E. Khalifa [b, *]

[a] Department of General Surgery, Qena Faculty of Medicine, South Valley University, 83511, Egypt
[b] Department of Cardiothoracic Surgery, Qena Faculty of Medicine, South Valley University, 83511, Egypt

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ABSTRACT

Background: Early diagnosis and management of traumatic diaphragmatic hernia (TDH) can be challenging for the emergency department or the trauma surgeon, as these injuries are often clinically masked by other associated severe injuries.

Methods: We retrospectively reviewed data of 50 patients diagnosed with an acute traumatic hernia from September 2014 to September 2017.

Results: 50 patients were included in this study. Blunt trauma was the main cause in 40 patients (80%) patients. TDH occurred more on the left side; in 72% of patients. The diagnosis was preoperative in 20 patients (40%). In our study, 74% of cases were repaired through abdominal approach and 26% patients through thoracic approach. Complications of TDH occurred in 30 patients (60%) and were mainly pneumonia in 16 patients (32%), only 8 patients (16%) died (6 patients of them had delayed referral and 3 patients of them had severe head injury).

Conclusions: TDH may be masked by associated injuries in multiple trauma patients and may lead to life-threatening intestinal and gastric strangulation. So, early diagnosis and treatment of TDH are important. Emergency physicians and trauma surgeon should maintain a high index of suspicion of TDH while dealing with patients assessed for abdominal or respiratory symptoms regardless the history of trauma was recent or delayed.

1. Introduction

Traumatic diaphragmatic hernia (TDH) or rupture is a serious complication of abdominal or thoracic trauma. The incidence of TDH in trauma patients is around 0.8%–5% and occurs more commonly in males than females [2–4].

TDH occurs mostly in blunt trauma, and less frequently in penetrating injuries (13.3–55%) [5,6] and was described in rare cases of iatrogenic trauma as insertion of chest tubes [7]. It is more frequent on the left side and its width and dimension are bigger in blunt trauma [8].

* Corresponding author.
E-mail addresses: mabdelshafy138@yahoo.com (M. Abdelshafy), yusuf.shieba@med.svu.edu.eg (Y.S.E. Khalifa).
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TDH mainly presents with respiratory and abdominal complaints as dyspnea (86%), abdominal pain (17%) and diminshed breath sound on the affected side (73%) [7].

Imaging investigations as chest X-ray (CXR), and computerized tomography (CT) are generally diagnostic. A positive CXR or with a high index of suspicious findings are effective for diagnosis especially when CXR is associated with other imaging techniques [6,9].

The diagnosis of TDH can be missed because of lacking typical symptoms and because it is associated with major injuries which result in its late presentation [10].

Also, the low index of suspicion of TDH plays a role in missing or delaying the diagnosis; any delay in the diagnosis of TDH can lead to increased morbidity and mortality. However, with failure of preoperative diagnosis, some cases are diagnosed intra-operatively [11].

So early detection and management of TDH are important to avoid the possible life-threatening complications as gastric and intestinal strangulation [12]. The approach may be through laparotomy [1,9] or thoracotomy [6,13]. Mortality ranges from 0 to 33%, often due to associated injuries [9,13].

2. Patient and methods

This is a retrospective analysis of data of patients in adult and pediatric age diagnosed with TDH either preoperatively or intra-operatively, at trauma unit (General Surgery and Cardiothoracic Surgery Departments Emergency and Trauma Unit) Qena faculty of medicine, South Valley University from September 2014 to September 2017. Data from 50 patients who had traumatic diaphragmatic hernias were collected from archives files.

Inclusion criteria: All patients referred to our trauma unit and had been diagnosed as TDH either preoperative by investigation or as intra-operative finding when exploration was done for any abdominal trauma.

Exclusion criteria: any cause of a traumatic hernia other than trauma as a congenital diaphragmatic hernia or acquired hiatal hernia.

All the cases underwent a diagnostic CXR, abdominal US and intravenous contrast-enhanced abdominal or chest CT in some cases to confirm the diagnosis and in suspicious cases.

All the cases were evaluated in terms of etiology, age, gender, presenting symptoms and signs, diagnosis either preoperatively or intraoperatively, early or late diagnosis, investigations, side of injury, concomitant organ injuries, treatment, early or late complications, and mortality rate.

Statistical analysis: the statistical analysis of data was done by using SPSS (Statistical Package for the Social Sciences version 10.0, SPSS Inc, Chicago, Illinois, USA) computer software for Statistical analysis under Microsoft window 8. For all statistical analyses, $p > 0.05$ was considered significant.

3. Results

50 patients were included in this study from September 2014 to September 2017. Ages of patients ranged from 3 months to 65 years with a median 25 years. Number of children (under 18 years) was 12 patients (24%). 42 patients were males (84%) and only 8 females (8%) with the male-female ratio of 5.25:1.

TDH occurred due to blunt trauma in 40 patients (80%), penetrating trauma in 9 patients (18%) and iatrogenic in one patient (after chest tube insertion) (2%). Main causes of penetrating trauma among 9 patients were firearm in 6 patients (12%) and penetrating sharp object in 3 patients (6%).

The main causes of blunt trauma were motor car accident in 20 patients (40%), 15 patients with motorcycle (bike) accident (30%), and 5 patients fall from height (10%). 35 patients (70%) patients were polytraumatized, isolated abdominal trauma in 9 patients (18%) and isolated chest trauma in 6 patients (12%).

The site of TDH was left in 36 patients (72%), right in 12 patients (24%) and central in 2 patients (4%) (Fig. 1 and 2) (Table 1).

The dimension of hernia was more than 5 cm in 43 patients (86%), and less than 5 cm in 7 patients (14%).

Presenting symptoms were dyspnea in 45 patients (90%) with the respiratory discomfort, associated with abdominal pain in 40 patients (80%).

There were positive findings in CXR done for the first time in 13 patients (26%) of all patients and (65%) of preoperatively diagnosed patients. After repeating CXR, we discovered positive finding in additional 3 patients to increase all positive finding in CXR to (32%) of all patients and (80%) of preoperatively diagnosed patients (Fig. 3, 4). CT chest was used to confirm the diagnosis and was positive in all patients which were diagnosed preoperatively.

Preoperative diagnosis was made in 20 patients (40%); 11 patients early diagnosed (22%) and 9 patients (18%) diagnosed lately due to delay of referral to our centre. 30 patients (60%) were diagnosed intraoperatively during surgery either through laparotomy or thoracotomy (Fig. 5).

In intraoperative exploration, there was a concomitant injury in most of the patients. There were 20 patients with splenic injury, 2 patients with pancreatic trauma, 10 cases of hepatic injury, 15 cases with lung injury and one case with cardiac injury.

Head trauma and orthopedic fractures were present in 30 cases.

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