Case report

Tension gastrothorax causing cardiac arrest in a child

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Abstract

Diaphragmatic herniation following blunt injuries is uncommon in children. We present a case report of a child presenting with a diaphragmatic hernia following a trivial injury leading to mediastinal shift and circulatory compromise resulting in an electromechanical dissociation cardiac arrest.

Keywords: Tension gastrothorax; Cardiac arrest; Diaphragmatic rupture

1. Introduction

Diaphragmatic injury following blunt injury is rare in children. It can present itself acutely or as a chronic manifestation. We report a case in which a traumatic diaphragmatic hernia caused an Electromechanical Dissociative circulatory arrest.

2. Case report

A 13-year-old girl presented to our unit with 2 days history of progressive left sided chest pain, dyspnea and vomiting. There was no other positive history other than residual childhood poliomyelitis in the right leg. No positive history of trauma was elicited on direct questioning. On examination she was distressed and in pain. Her pulse rate was 110 bpm regular, blood pressure was 100/70 mmHg and respiratory rate was 35/min. Examination of the chest revealed a decreased air entry in the left side, which was dull in percussion and had a succession splash. There was a shift of mediastinum to the right side. The epigastrium and left hypochondrium were tender and bowel sounds were heard. The haematological and biochemical parameters were within normal limits. The chest X-ray revealed a large air fluid level in the left hemithorax (Fig. 1). A clinical suspicion of diaphragmatic hernia was entertained and a nasogastric tube was placed which was confirmed to be in the right position with no significant aspirate. An ultrasonogram of the chest and abdomen was performed which showed a large collection of fluid in the hemithorax but was inconclusive as to whether it was supradiaphragmatic or infra-diaphragmatic. Barium meal was done under fluoroscopic control, which revealed a normal oesophagus and a gastric herniation into the left thorax (Fig. 2). During the procedure her symptoms of obstruction worsened while she was taken up for emergency surgery. The patient had an Electromechanical Dissociation arrest as she entered the anaesthetic room. There was no air entry on the left side with a shift of mediastinum. She was intubated and a left paramedian laparotomy was performed immediately. There was a 5 cm linear tear in the left dome of the diaphragm through which the stomach, greater omentum, part of transverse colon, the spleen and loops of jejunum had herniated into the left chest. The stomach had dilated inside the thorax to the capacity of 2 l causing a mediastinal shift and rotation of the heart as to impair venous return. The stomach was decompressed by naso-gastric aspiration and the contents were reduced. The patient’s vital signs improved immediately. There was no gangrene in the bowel. The diaphragmatic tear was repaired with prolene mattress sutures. An intercostal drain was placed in the left pleura. She made an uneventful recovery except for wound infection, which was treated with antibiotics. A retrospective discussion with the parents revealed that the father had pushed her during a domestic scuffle onto a pillar, which hit her chest wall 3 days prior to the presentation. She made an uneventful recovery and a fluoroscopic examination on the 15th post-operative day revealed good function of both domes of the dia-
diaphragm. She has been followed up for 3 years without any recurrence.

3. Discussion

Diaphragmatic injuries are life threatening unless diagnosed and treated early. It is commonly as a result of violent injuries to the lower chest or upper abdomen. The left side is more commonly involved than the right [1,2].

Diaphragmatic trauma with visceral herniation usually presents itself as an emergency and may produce misleading features [3]. The presence of other associated significant injuries generally masks the injury. The nature of the injury depends on the force of the impact and the site of impact. Most often it is associated with other visceral injuries. The commonest associated injury is splenic injury [1].

Diaphragmatic injury remains a diagnostic challenge and the management depends on the associated lesions [1]. The sequelae of the injury may manifest as an acute or chronic presentation. The acute manifestation may be bleeding and herniation of viscera into the thoracic cavity causing haemodynamic compromise.

Traumatic diaphragmatic hernia is a rare injury in children [4,5]. Diagnosis of diaphragmatic injuries involves high level of suspicion and a thorough clinical examination, as it does not have any classical signs and symptoms. As they are commonly associated with poly trauma a systematic approach is advisable. There will be diminished air entry on the side of the lesion depending on associated pneumothorax, haemothorax or herniation. The abdominal signs may vary from focal tenderness to frank peritonism.

Diagnosis is made by a high level clinical suspicion, as no investigation is definitive in diagnosis of diaphragmatic rupture [6]. A chest radiograph reveals an air fluid level, an elevation of the dome of diaphragm. The presence of a naso-gastric tube may aid in the diagnosis.

A gastrointestinal contrast study is very helpful however the pitfalls are when there is a solid organ herniation or if the contrast fails to enter the viscus. Abdominal and chest ultrasonogram have a role in the diagnosis of diaphragmatic hernia [6]. A computerised tomography with sagittal reconstruction is useful in assessing the diaphragm and also establishing the positions of the various intra-abdominal organs [4]. Thoracoscopy is a very useful tool in the diagnosis of diaphragmatic hernia.

Management is surgical repair and should not be delayed once a diagnosis has been made. It can be repaired from the thoracic or abdominal approach. In acute settings a laparotomy is advisable as there will be associated intra-abdominal visceral damage [1]. The principle is reduction of herniated contents and closing the defect with a non-absorbable suture material and if need be a synthetic graft.

Fig. 1. Chest radiograph showing large air fluid level in the left hemi thorax.

Fig. 2. Barium swallow showing contrast entering the stomach in the left hemi thorax.
Tension gastrothorax is a rare but life threatening complication of traumatic diaphragmatic injuries. Acute dilatation of the herniated viscera may simulate a tension pneumothorax and hence has been called tension gastrothorax [7].

The acute dilatation of stomach or colon can cause mediastinal shift and impair the venous return and lead to cardiac arrest. It may also cause ischaemia of the herniated viscera due to compromised blood supply.

It can be managed with decompression of the stomach with a nasogastric tube or needle aspiration of the viscus in acute emergencies before performing a definitive surgical procedure [4,7].

Tension gastrothorax as result of traumatic diaphragmatic hernia in children has not been reported.

References