CASE REPORT

Traumatic chylothorax in a young child: Case report and management

Chylothorax traumatique chez un jeune enfant: Rapport d’enquête et prise en charge

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A R T I C L E  I N F O

Article history:
Available online 20 April 2017

A B S T R A C T

Introduction: A chylothorax is an uncommon feature of paediatric chest trauma.

Case report: We report a case of traumatic chylothorax following blunt chest trauma in an eight year-old girl with polytrauma after being hit by a motor vehicle. She was initially found to have a bilateral frontal skull fracture extending into the left parietal area, pulmonary contusions, left posterior rib fractures, left clavicular fracture and a degloving injury of her left foot. On the fifth day of her admission she developed progressive dyspnoea with signs of a pleural effusion, which was confirmed radiologically and drained by tube thoracostomy. Biochemical analysis confirmed chylothorax, which was managed conservatively with a fat free diet. The chest tube was removed after it stopped draining over 20 mL per 12 hours and she made a full recovery.

Discussion: Initial management of chylothorax is conservative with tube thoracostomy drainage and fat free diet. Traumatic chylothorax is a rare complication following chest trauma and can take days to develop and to become clinically apparent. It is therefore important to be vigilant for potential late complications in blunt chest trauma in children, especially if there are extensive rib fractures, a sign of major transmission of force to the thorax.

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A U T H O R  C O N T R I B U T I O N S

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A B S T R A C T

Introduction: Un chylothorax est une caractéristique clinique peu fréquente des traumatisme du thorax chez l’enfant.

Observation: Nous signalons un cas de chylothorax traumatique suite à un traumatisme du thorax contondant chez une fillette de huit ans souffrant d’un polytraumatisme après avoir été percutée par un véhicule motorisé. Elle a d’abord été diagnostiquée avec une fracture frontale bilatérale du crâne s’étendant à la zone du pariétal gauche, des contusions pulmonaires, des fractures de la cage thoracique au niveau postérieur gauche, une fracture de la clavicule gauche et un dégagement du pied gauche. Au cinquième jour de son admission, elle a développé une dyspnée progressive avec des signes d’effusion pleurale, confirmée par radiologie, et drainée par tube de thoracostomie. Les analyses biochimiques ont confirmé un chylothorax, géré de manière conventionnelle par un régime sans matières grasses. Le drain thoracique a été retiré une fois le drainage passé à moins de 20 millilitres toutes les 12 heures et elle s’est totalement rétablie.

Discussion: La gestion initiale du chylothorax est conventionnelle, avec un drainage par tube de thoracostomie et un régime alimentaire sans matières grasses. Le chylothorax est une complication rare des traumatismes du thorax et peut mettre plusieurs jours à se développer et à apparaître cliniquement. Par conséquent, il est important de rester vigilant afin de détecter d’éventuelles complications tardives en cas de traumatisme du thorax contondant chez les enfants, notamment en cas de fractures graves de la cage thoracique, un signe de transmission de force majeure au niveau thoracique.

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African relevance

- Trauma is a leading cause of death and morbidity in low- and middle-income settings, such as Africa
- Paediatric chest trauma as a result of pedestrian hit by motor vehicle is common in the African setting
- Traumatic Chylothorax is a rare complication of chest trauma

Introduction

Chylothorax, following blunt chest trauma, is uncommon. In a case series, only 3% had been reported to be a result of non-surgical trauma in adults [1,2]. In a review of paediatric chest trauma from our database at Red Cross War Memorial Children’s Hospital in Cape Town, South Africa, we had no cases of traumatic chylothorax in the last five years [3]. The vast majority of paediatric cases result from iatrogenic injury during surgery [4–6].

Case report

We present a case of polytrauma in an eight-year-old girl who was a pedestrian hit by a motor vehicle. She was initially assessed at her local hospital and then transferred to our tertiary level trauma unit for further assessment. On arrival, her airway was patent, she was self-ventilating on facemask oxygen with a respiratory rate of 20 bpm and 100% saturation. Her heart rate was 102 bpm and her blood pressure 106/57 mmHg. Her Glasgow Coma Scale (GCS) was 11/15. She had facial and scalp trauma and a degloving injury of her left foot. Her chest was clear. Her abdomen was soft with no obvious pelvic or long bone injuries.

A whole-body digital low radiation dose scan (Lodox-scan) showed a left clavicle fracture, posterior rib fractures 1–9 with one flail rib and a skull fracture extending from the left frontoparieto-temporal skull. There was no obvious abnormality of the cervical-spine and no long bone fractures. Her haemoglobin was 10.4 mg/dl.

Computed tomography (CT) brain scan revealed a complex skull fracture. She was admitted to the trauma ward for further management. The following day her GCS improved to 15/15. She underwent debridement of her degloved foot injury and received a transfusion as her haemoglobin had dropped to 7.9 mg/dl; the transfusion raised it to 11.9 mg/dl.

On day five she was noted to have increased work of breathing with dullness on percussion and absent breath-sounds on auscultation over her left base. An erect chest radiograph showed opacification on the left (Fig. 1). A pleural effusion was confirmed on ultrasound.

A tube thoracostomy was placed under ketamine sedation to drain the pleural effusion. This initially drained 200 ml of serosanguineous fluid and then another 400 ml overnight, resulting in immediate improvement of her respiratory status. This fluid was thought to be secondary to a haemothorax following lung contusions. Thereafter, the tube thoracostomy continued to drain 40–50 ml of yellow-whitish fluid daily. The fluid was sent for analysis on day nine of admission, as there was continued drainage. Analysis showed: protein 35 g/L, albumin 20 g/L, lactate dehydrogenase 321 U/L, triglycerides 2.34 mmol/L, and cholesterol 1.9 mmol/L.

The significantly raised triglycerides and cholesterol confirmed a chylothorax. Management was conservative with a fat free diet for two weeks with cardiothoracic surgery and dietetic input. From day 17 onwards, she stopped draining chyle. There was no recurrence of the chyle leak when she was challenged with normal diet. The tube thoracostomy was removed on day 20. She made a full recovery from her other injuries and was discharged home on day 23.

Discussion

Chest trauma is the second leading cause of paediatric trauma death [3,7]. Children have pliable rib cages, which make rib fractures, even in cases of extensive chest trauma, rare. In cases with multiple rib fractures, as in ours, a massive force must have been transmitted to the thorax. Therefore, one should be vigilant for any associated injury, which may not be evident initially [3].

Initial management of chest trauma follows Advanced Trauma Life Support (ATLS) guidance. Standard anterior-posterior (AP) chest radiographs provide a low-cost screening tool and will be abnormal in the majority of children with significant injuries [7]. Computed tomography scanning of the chest will yield further information if available. However, most paediatric chest trauma can be managed with a tube thoracostomy and supportive measures alone as in our case [3,7].

Chylothorax is caused by either injury or obstruction of the thoracic duct along its path through the posterior and superior mediastinum resulting in drainage of chyle in one or both pleural cavities. The thoracic duct crosses from right to left at the level of the fifth thoracic vertebra in the posterior mediastinum before continuing into the superior mediastinum to drain into the venous systems near the junction of the left subclavian and internal jugular veins. The level of injury will therefore dictate into which chest cavity the chyle will drain [1,2]. In closed chest trauma, the usual site of rupture is in the region of the 9th or 10th thoracic vertebra on the right [8]. In our case the chylothorax was on the left, therefore the injury must have been above the fifth vertebra.

Reported mechanisms of injury include blunt force as in our case, penetrating chest trauma, sudden hyperventilation, stretching of the chest wall, thoracic spine injury with fractures of a vertebra, severe coughing, vomiting and childbirth [5,6,9,10]. Heavy blows to the back or stomach in non-accidental injury can masquerade a ‘spontaneous’ chylothorax in small children, especially as chylothorax can take days to develop as explained below. Bruising and other injuries may be absent [10].

Traumatic chylothorax commonly presents with a latent period of two to ten days, but up to 25 days have been described, with the average being seven days. [8]. Our case presented on day five post...
Traumatic chylothorax is a rare complication following blunt chest trauma and can take days to develop and to become clinically apparent as a pleural effusion as was the case in our patient. It is therefore important to be vigilant for potential late complications in blunt chest trauma in children, especially if there are extensive rib fractures, a sign of major transmission of force to the thorax.

Conflicts of interest

The authors declare no conflicts of interest.

Dissemination of results

This case was shared through an informal presentation within the trauma team at Red Cross War Memorial Children’s Hospital.

Authors’ contributions

HKJ and ABvA conceived the original idea. HKJ and JHF performed the literature review and initial draft. ABvA critically revised the work. HKJ, JHF and ABvA approved the final version.

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Table 1

Management and treatment for Chylothorax [6]

| Non-operative management: A step-wise approach | Surgical treatment options: In no particular order |
|-----------------------------------------------|--------------------------------------------------|
| 1. Drainage either via thoracocentesis (single or multiple) or tube thoracostomy insertion depending on case. | Ligation of the thoracic duct or mass ligation (via thoracotomy or video-assisted thoracoscopic surgery) |
| 2. Dietary modifications, options depending on patient: | Tube thoracostomy or thoracoscopic pleurodesis |
| a. Fat-free diet | Pleuroperitoneal shunts |
| b. Medium-chain triglyceride diet | |
| c. Total parenteral nutrition | |
| 3. Somatostatin and analogues to decrease chyle flow (Octreotide) | |
| 4. Pleurodesis (chemical or radiation) | |

Conclusion

Potential complications of chylothorax include malnutrition, hyponatremia, fluid imbalance, respiratory distress, increased risk of thrombosis, and secondary immunodeficiency, none of which occurred in our case.