

Case report

Missed post-traumatic haemopneumothorax under general anaesthesia – A case report

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Abstract

Chest trauma is an important factor that determines the morbidity and mortality in patients admitted with polytrauma. Impeccable clinical examination and chest x-ray is a must in all trauma patients to rule out major chest injuries. We present a case of undiagnosed haemopneumothorax in a haemodynamically stable child without obvious symptoms or signs of chest trauma posted for emergency lower limb surgery after road traffic accident.

Keywords: General anaesthesia, haemopneumothorax, positive pressure ventilation, trauma

Introduction

Rib fractures are the commonest injuries following blunt thoracic trauma.¹ Thorough clinical examination and a chest X-ray is a must in all trauma victims to rule out rib fractures complicated by pneumothorax, haemothorax and pulmonary contusions. Immediate diagnosis of haemopneumothorax will facilitate urgent thoracocentesis and re-expansion of the collapsed lung. If left untreated, it could worsen with the use of positive pressure ventilation and nitrous oxide. We present a case of undiagnosed haemopneumothorax in a haemodynamically stable child without obvious symptoms or signs of chest trauma posted for emergency lower limb surgery after road traffic accident.

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Case presentation

A 12 year old female child, weighing approximately 25 kg, with alleged history of road traffic accident presented with visible injuries over both knees and left forearm. There was no history of loss of consciousness, chest trauma and head injury. The child presented to the hospital six hours after the accident and was posted for an emergency wound debridement of the soft tissue injury over both the knees. Preanaesthetic evaluation of the child revealed that the child had history of recurrent respiratory tract infections during childhood with history of wheezing suggestive of bronchial asthma. The last such episode occurred five years before she was not on any medication for bronchial asthma at the time of admission. Physical examination showed a heart rate of 112/min, blood pressure of 108/60 mm Hg, respiratory rate of 16 breaths per minute, oxygen saturation 99% and normal body temperature. Auscultation of the chest revealed bilateral equal air entry with vesicular breath sounds and no added sounds. All other systemic examination was unremarkable. Airway seemed adequate. Lab investigations were within normal limits. The chest X-ray that was taken could not be examined due to a technological error in the imaging system due to which the image was not uploaded.

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The child was fasting adequately and debridement of the lower limb injury was planned under general anaesthesia. After preoxygenation, anaesthesia was induced with intravenous (IV) propofol (2.5 mg/kg) and fentanyl (2 µg/kg). After confirming the ability to mask ventilate, neuromuscular blockade was achieved with IV atracurium (0.5 mg/kg). Anaesthesia was deepened with 2% isoflurane in oxygen. Direct laryngoscopy followed by endotracheal intubation was achieved easily. Anaesthesia was maintained with nitrous oxide, isoflurane and oxygen. IV paracetamol (15 mg/kg) was given as supplementary analgesia.

Ventilator settings were as follows: Volume controlled ventilation, tidal volume of 200 ml, respiratory rate of 18 breaths/min and inspired oxygen concentration of 50%. The peak airway pressure ranged between 21-23 cm H₂O. The end-tidal carbon dioxide 38-42 mm Hg and was adjusted with the respiratory rate.

The child was haemodynamically stable and oxygen saturation was 100% throughout the procedure. At the end of the procedure, the anaesthetic gases were tapered, residual neuromuscular blockade was reversed and the child extubated when fully awake. On extubation, a uniform film of clotted blood was noticed on the inner aspect of the ET tube (*Figure 1*) which we thought was bizarre as the intubation was atraumatic.



Figure 1: Blood inside endotracheal tube

In the immediate postoperative period, the child was conscious, oriented and breathing spontaneously with oxygen supplementation at 4 L/min by a face mask. Her heart rate was 96 bpm, respiratory rate 19 breaths/min, systolic blood pressure 102 mm Hg and oxygen saturation 100%. Examination of the respiratory system revealed a decreased chest rise and decreased breath sounds on the left side and occasional crepitations. A dull note was perceived on percussion on the left side. Examination of the cardiovascular system showed a shift of the apical impulse to the midline with normal heart sounds.

The technical error in Syngoimaging™ was resolved by then and the chest x-ray became available for viewing (*Figure 2*). It showed uniform haziness in the left lung field with tracheal deviation to the right side.

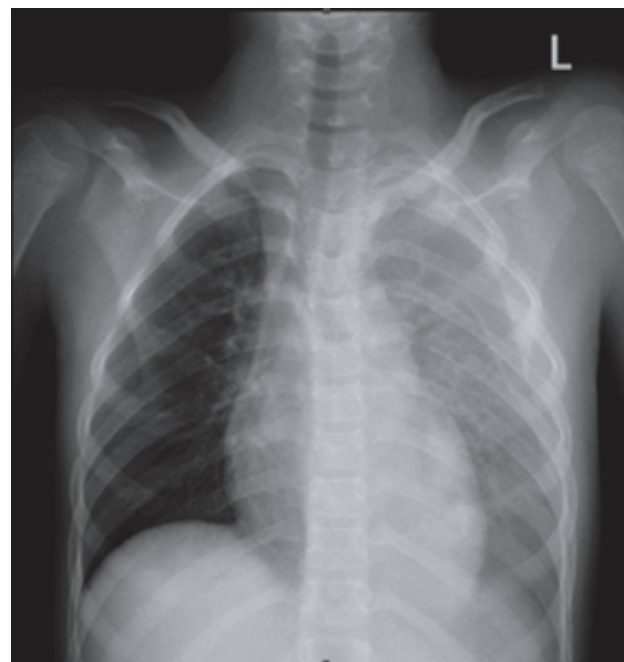


Figure 2: Preoperative chest x-ray

A repeat chest X-ray (*Figure 3*) revealed increased haziness on the left side compared to the preoperative X-ray, gross shift in the mediastinum to the right and a left anterior second rib fracture which was not noticeable in the first x-ray. Since the child was asymptomatic, the differential diagnosis of synpneumonic effusion in view of the history of recurrent respiratory tract infections was also considered. Ultrasound of the thorax confirmed

moderate amount of fluid in the left pleural cavity. A CT thorax was obtained and showed gross haemopneumothorax with collapse of left lung, mediastinal shift towards the right side and ground glass opacities in the upper lobe suggestive of contusions.

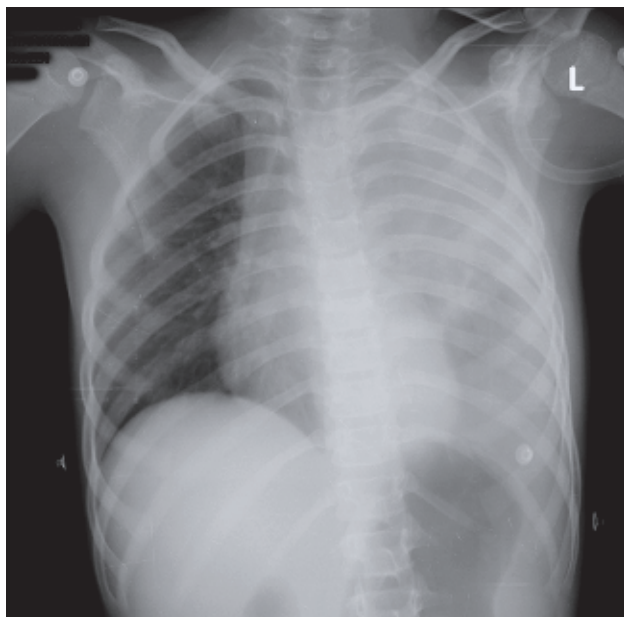


Figure 3: Postoperative chest x-ray

A 20F thoracostomy tube was placed immediately in the left fourth intercostal space in the mid-axillary line. 300 ml of haemorrhagic fluid was drained on the first day. Air entry on the left side improved remarkably after ICD insertion. ICD was removed after five days.

Postoperative haemoglobin measurement revealed a drop to 7.3 g/dL from 10.6 g/dL as is expected in a haemothorax. The child did not require any blood transfusion. The child was discharged from the hospital after one week of admission.

Discussion

Road traffic accidents are one of the leading causes of chest trauma following vehicle collisions. Twenty to twenty five percent of deaths occurring due to trauma in the United States are due to thoracic injuries according to the data provided by the United States National Trauma Data Bank.² Chest x-ray evaluation is a very important initial step in all polytrauma victims in the emergency department

and should be performed within ten minutes of their arrival.³ Rib fractures, pulmonary contusions, haemothorax and flail chest are amongst the commonest injuries/ pathology observed in thoracic trauma cases. In elderly patients, a minor trauma can cause a more serious injury due to increased stiffness of the rib cage. In children, the elasticity of the osseous structure of the chest can lead to an underestimation of parenchymal injuries.⁴

In our case, neither the history nor the physical examination suggested chest injury. The chest x-ray, although taken was not available for viewing due to technical glitches prior to surgery. Nitrous oxide is contraindicated in cases of chest trauma as it has the propensity to expand in closed spaces⁵ but was unsuspectingly used for most of the procedure. With positive pressure ventilation, a simple rib fracture could cause a tension pneumothorax leading to major cardiorespiratory embarrassment. Clinical examination after endotracheal intubation was normal. Signs of tension pneumothorax could be hypotension, hypoxaemia and rise in peak airway pressures were not observed at any point in our patient despite using nitrous oxide.⁶

Also the history of prior respiratory tract infections misled us into thinking that the effusion could be a synpneumonic effusion. Surprisingly, the child never complained of pain in the chest or dyspnoea in spite of having a rib fracture which further confused the clinical picture. Tachycardia, one of the commonest findings, was also not present. This was one of the reasons for not inserting chest drain or performing a needle thoracocentesis in a haste as we did not want to cause avoidable air leaks.⁷

Conclusion

Thorough physical examination of polytrauma cases is a must. Chest X ray must be performed in all cases of road traffic accidents. Missing a simple case of haemopneumothorax could have devastating complications after the administration of general anaesthesia with nitrous oxide.

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