Massive Haemothorax and Tension Pneumothorax Due to Fractured Second Rib: Case Report

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Massive Haemothorax and Tension Pneumothorax

Due to Fractured Second Rib: Case Report

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Abstract

Massive haemothorax and tension pneumothorax due to injury of internal thoracic vein and second rib fracture after blunt trauma is very rare. Possible mechanisms of injury to the thoracic vein include fracture of an bony structure, such as a rib, clavicle and sternum or shearing forces acting on the vessel during period of extreme acceleration or decelerations. We presented an urgent thoracotomy and ligation of the internal thoracic vein ruptured by blunt trauma immediately.

Keywords: Blunt trauma, rib fracture, internal mammary vein, urgent thoracotomy.

Case Report

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MASSIVE HAEMOTHORAX AND TENSION PNEUMOTHORAX DUE TO ...

Introduction

A rare case of massive hemorrhage and tension pneumothorax due to laserated internal mammary vein hemorrhage and bullae rupture caused by 2nd rib fracture as a result of blunt chest trauma is presented. Thoracotomy and ligation of the bleeding vein with chest drainage and bullae ligation was performed. We discussed the modalities for the management of blunt chest traumas.

Materials and Methods

A 56-year-old male construction worker was brought to the emergency department as a result of hemopneumothorax. He was hit in the right chest by a large wood pillar while working in the construction site. The patient’s vital signs were critical at arrival. The patient was dyspneic with a respiratory rate of 34/min, peripheral oxygen saturation of 85%, his blood pressure was 70/50mmHg and pulse rate 123 beats/min. On physical examination, breath sounds were remarkably decreased on auscultation and chest movement restricted on the right side. There were also subcutaneous emphysema and flail chest on the right anterior chest wall. Two large intravenous lines (16 G) were inserted.

The chest x-ray revealed right hemopneumothorax and fractures of the 1st, 2nd, 3rd and 4th ribs, the scapula and the clavicula. The Computed Tomography (CT) examination showed tension pneumothorax, hemothorax, multiple rib fractures on the right hemithorax and interestingly the fractured anterior portion of the 2nd rib was dislocated (Figure 1). Immediately rapid blood infusion and volume replacement was carried out and then, a closed thoracic drainage in the right chest was performed at the emergency room.

An initial total of 1000 ml of blood was drained out. Another 800 ml of blood was continuously drained from the chest tube in the next half hour indicating active bleeding in the right chest. The patient was transferred to the operating room for an urgent thoracotomy. The intraoperative bleeding including the hematoma amounted to 2000 ml. An isolated internal mammary vein was cut by the second fractured rib. It was causing massive bleeding. The fractured rib had also lacerated apical

Fig 1: Chest CT scan showing tension pneumothorax fractured and dislocated second rib anterior and minimal right haemothorax.
giant bullae which led to pneumothorax. The bleeding was controlled with suture ligation and this area was confirmed to be the bleeding point. The bullae was ligated and the dislocated portion of the second rib was resected (Figure 2).

The right 1st, 3rd and 4th ribs were fractured incompletely at the cartilaginous portion but they did not penetrate the right lung paranchyma. Careful intraoperative exploration was carried out in nearby heart and other major vessels. No other contusions or lacerations of the lung, hearth or aorta were observed before the closure of the thoracotomy. To treat the flail chest, all fractured ribs were sutured resiprocally via the loop absorbable sutures. A Single chest tube was placed for drainage and the chest was closed. The blood pressure was stable during the operation. The patient was transferred to the intensive care unit (ICU) and remained sedated and ventilated until the next day. In the ICU an apical chest tube was inserted for air drainage and the patient was extubated after confirmation of no major bleeding and no flail chest. The apical chest tube was removed on the 9th and the other chest tube was removed on the 10th day .The patient was discharged uneventfully on the 15th day. This case represents the second report of a traumatic rib fracture causing massive hemopneumothorax as a result of lacerated internal mammarian vein and ruptured apical bullea.

Results

Blunt chest injury accounts for the majority of severe chest traumas and is the second most common diagnosis, next to extremity injuries, in patients with multiple traumas. Pathologies occurring during trauma are often seen in the bony thorax. The majority of these cases is associated with mild injuries like thoracic bruises and rib fractures. Patients suffering thoracic trauma develop pneumothorax and hemothorax with second rank incidence [1]. Approximately 85% of patients with blunt thoracic traumas are able to be treated with only tube thoracostomy, observation and pain control. Only 10 to 15% of patients with thoracic injury require formal thoracotomy [2]. Urgent thoracotomy for blunt trauma has had very limited success. Such as unexplained deterioration in the patient’s hemodynamic and respiratory conditions
MASSIVE HAEMOTHORAX AND TENSION PNEUMOTHORAX DUE TO...

The decision for thoracotomy is based on bleeding volume and/or massive air leakage following chest drainage. If thoracotomy is performed to control ongoing intrapleural bleeding, the operation should consist of suturing the lung wounds by electrocautery homeostasis and by irrigation and drainage of pleural cavity. Resections of the lung by lobectomy or pneumonectomy are performed less frequently since conservative surgery is widely recognized. Blunt forces applied to the chest wall cause injury by three mechanisms: rapid deceleration, direct impact and compressions. These traumas may able to cause not only localized fractures of the ribs, sternum and scapula, but also underlying injury to the lung parenchyma, myocardial contusion and hemopneumothorax and other injuries, such as diaphragmatic disruption, aorta and great vessels injury. Most of the current high speed motor vehicle accidents result in multitrauma which can involve blunt trauma the heart and great vessels [4]. Vascular injuries are second only to central nervous system injuries as the most frequent cause of death after blunt trauma. However aorta and major aortic arch branch arteries are the most common injured by the thoracic trauma. In literature only one case was found where the internal thoracic vein was injured after blunt chest trauma [5]. Flail chest may be observed in the thorax as a result of blunt thoracic traumas and rib fractures. The injury is present in approximately 15% patients with blunt thoracic trauma [6]. Emergency treatment of flail chest is controversial but most of such patients can be treated conservatively. However, open fixation of flail segments is rarely necessary. We performed open fixation in our patients. There are numerous diagnostic tests that can help make the diagnosis and quantify the severity of the injury. These include conventional X-ray, CT of the chest, ultrasound examination, bronchoscopy, ventilation-perfusion scintigraphy, arterial blood gases and scoring systems. In the initial assessment of polytraumatized patients, physical examination is followed by chest X-ray and abdominal ultrasonography [1]. Chest roentgenograms have limited value and use in the diagnosis of chest wall injury. At the time of admission, the severity of pulmonary contusion is frequently underestimated by X-rays of chest [1]. CT scan was shown to be superior in diagnosing pneumothorax, hemothorax, lung parenchymal lesions and diaphragm rupture. Additionally, it is feasible for thoracic CT scan to be a first line examination in chest trauma. For this reason, in recent years we have started to employ CT as a diagnosis method together with chest X-ray.

References