

Emergency Chest Tube Insertion in A Case of Thoracic Trauma with Hidden Diaphragmatic Rupture Resulted in Injury of Herniated Stomach - A Case Report

Sandeep Kumar Kar*, Tanmoy Ganguly and Jishnu Nayek

Department of Cardiac Anaesthesiology, Institute of Postgraduate Medical Education & Research, India

***Corresponding Author:** Sandeep Kumar Kar, Department of Cardiac Anaesthesiology Institute of Postgraduate Medical Education & Research, Kolkata, India.

Received: June 06, 2015; **Published:** August 18, 2015

Abstract

Chest drain insertion in a case of traumatic chest injury is common in emergency hospital services, which may lead to complications of its own. Here the authors present a unique case of traumatic chest injury complicated by insertion of chest tube into herniated stomach. A 30 year old male patient with chest trauma was treated by blind insertion of a chest drain, which could not alleviate the patient's symptoms. Radiological investigations revealed left sided hydropneumothorax, fracture of 6th and 7th ribs and collapse consolidation of left lung. Endoscopy revealed tear in distal oesophagus. The patient underwent emergency thoracotomy in our institution where it was found to be a case of traumatic diaphragmatic rupture, through which the stomach herniated into thorax and the chest drain was placed inside it. Primary repair of stomach and diaphragm was done and the patient recovered uneventfully in the post-operative period.

Keywords: Traumatic diaphragmatic hernia; Gastro thorax; Diaphragmatic injury; Emergency chest tube insertion

Introduction

Chest tube insertion is one of the most commonly performed procedures in a hospital and utilised by all divisions of medical care. It is one of the life saving procedures which is practised by clinicians of all fields including surgeons, emergency physicians, anaesthetists, general practitioners, intensivists and respiratory physicians. Therefore every clinician must be familiar with techniques, approaches and probable complications of intercostal tube drainage (ICTD). The usual complications following ICTD are pneumothorax, subcutaneous emphysema, intercostal vessel or nerve injury, injury to thoracic structures etc. Here the authors present surgical management of a case of traumatic chest injury with diaphragmatic rupture where the stomach herniated through the diaphragmatic opening and emergency chest tube insertion resulted in tube entry into the herniated viscus, ultimately leading to hemothorax, pneumothorax, gastrothorax and rupture of stomach.

Case Report

A 30 years old male patient was referred to our institute with a history of left sided chest trauma due to fall on a bamboo log 15 days back. There was no previous history of any significant acute or chronic past disease. Immediately after the injury, patient complained of severe chest pain, respiratory distress and cough. Patient was rushed to a nearby private health facility where he was diagnosed as hemopneumothorax and treated with analgesic, antacids and blind insertion of a chest tube into 5th intercostal space in mid axillary line. On subsequent days patient's condition did not improve. Chest pain deteriorated, frequency of cough increased and surgical emphysema developed. A skiagram of chest was done, and it revealed fracture of 6th and 7th rib with hemopneumothorax. CT scan of chest revealed left sided pleural fluid collection with partial loculation and left pneumothorax; collapse consolidation of left lung; surgical emphysema of left chest wall with a hematoma of left lower lateral chest wall. There was absence of pneumomediastinum with mild mediastinal shifting to the right. An esophago-gastro-duodenoscopy revealed a tear in distal end of esophagus without any evidence of hiatus hernia or

Citation: Sandeep Kumar Kar, et al. "Emergency Chest Tube Insertion in A Case of Thoracic Trauma with Hidden Diaphragmatic Rupture Resulted in Injury of Herniated Stomach - A Case Report". *EC Anaesthesia* 2.1 (2015): 47-51.

varix; tear in the cardia. Distal visualisation was not possible because of this injury. The patient was referred to our institute for better management and was admitted to cardiothoracic intensive care unit. Examination revealed a conscious oriented patient with pulse 112/minute, blood pressure 104/62, room air oxygen saturation 88% and diminished air entry to left side. The chest tube was in situ and fluid column was moving with respiration. The chest tube drainage consisted of mixed bloody discharge. Exploratory thoracotomy was planned and patient was shifted to operation theatre. Following preoxygenation with 100% oxygen for 5 minutes after 100% arterial oxygen saturation was achieved, general anesthesia was induced and a 37 F double lumen endobronchial tube was introduced. Chest wall was opened by a posterolateral thoracotomy incision. The diaphragm was found to be ruptured and the stomach herniated through the ruptured diaphragm into thoracic cavity. The stomach was found to be lacerated with large perforation with liberation of gastric contents into pleural cavity. The stomach was closed with primary closure and the stomach along with omentum was reduced to peritoneal cavity. Diaphragmatic injury was repaired. No injury to the lung was found. Abdomen was opened with midline laparotomy incision. Both thoracic and abdominal cavity was thoroughly washed and a feeding jejunostomy was done. Adequate volume replacement was done in the intraoperative period with crystalloids and colloids. Vitals were stable and urine output was adequate throughout the period. Patient was extubated immediately after surgery. Postoperative recovery was uneventful.

Discussion

ICTD is a very popular treatment option for thoracic diseases. It is practised as an elective procedure mainly in pleural collections and as an emergency procedure in pleural, pulmonary or chest wall ailments. Complication rate is found to be 21-30% in different studies [1-3] and is similar in traumatic and non-traumatic scenario [1,2,4-7]. Mefire, *et al.* [8] conducted a retrospective study over a four years period in a Regional Hospital, Limbe in South-West Cameroon to analyse the rate and nature of complications after ICTD performed for both traumatic and non-traumatic conditions. They found indication of more than 91% chest tube insertion is of nontraumatic reason. They also found chest tube dislocation and pneumothorax to be the most common complications. Deneuille M [1] examined 128 trauma patients having ICTD and found significantly higher morbidity and inappropriately extended hospitalisation in patients with chest tube placed by less experienced hands. Similar findings were also found in other studies [1-4]. Khanzada, *et al.* [6] found very low (5%) complication rate when chest tubes were inserted by the surgeons. Complications following ICTD are usually benign and self-limiting. Life threatening complications usually arise due to injury to vital organs or some associated problems. Shih, *et al.* [9] reported a rare case of injury to right atrium following tube thoracostomy which required a surgical correction. Odita JC, *et al.* [10] reported four cases of phrenic nerve palsy in newborns due to trauma by the medial end of chest tube. Studies reported occurrence of Horner's syndrome following chest tube insertion [11]. Infection is fairly common after chest tube insertion. Toprak, *et al.* [12] reported a case of infection of the tricuspid valve and right ventricle free wall after chest tube insertion for spontaneous pneumothorax. Rapid evacuation of pleural content is detrimental and may lead to re-expansion pulmonary edema [13], secondary hemorrhage from the compressed bleeders and other complications. Kalani MY, *et al.* [14] reported a case of a 40 years old male patient with a thoracic gunshot wound who developed cerebral herniation with compression of vital structures in brain after drainage of cerebrospinal fluid from thoracic cavity by a chest tube.

Diaphragmatic hernia following chest trauma is relatively common. Sennertus in 1541 first described an incidence of traumatic diaphragmatic hernia and Ambrose Pare in 1578 first described two deaths attributed to it [15,16]. Incidence of diaphragmatic hernia following traumatic injury is around 3-5% and 69% of them are at left side [17,18]. Patients present with severe respiratory distress, decreased breath sounds on the affected side and auscultation of bowel sounds in the chest. Management is essentially surgical.

There are very few published case reports on gastric herniation through traumatic diaphragmatic hernia. Janardhanan, *et al.* [19] described a case of displacement of stomach into thoracic cavity through left diaphragmatic rupture following a blunt abdominal trauma. Sersar and Batouk reported a case of successful repair of ruptured traumatic gastrothorax which was masqueraded as chylothorax [20]. Safdar, *et al.* [21] reported a successful laparoscopy assisted repair of a traumatic diaphragmatic injury with herniation of stomach, spleen and splenic flexure of the colon in the left chest. Most of the patients reported presented with abdominal or thoraco-abdominal injury.

Emergency Chest Tube Insertion in A Case of Thoracic Trauma with Hidden Diaphragmatic Rupture Resulted in Injury of Herniated Stomach - A Case Report

The patient described in this report presented with a history of thoracic trauma and clinical examination and initial chest x-ray revealed presence of hydro-pneumothorax at the affected side. The decision of immediate chest tube insertion is justified in this scenario. Later the upper GI endoscopy report also pointed towards oesophageal and gastric injury and denied presence of any herniation. Insertion of chest tube into the stomach complicated the situation. This caused release of gastric juice and other obnoxious material into pleura and subsequent deterioration of patient condition. In such conditions image guided intercostal tube placement might be the correct option but in developing countries that option is quite scarce in practice.

Management of these patients are proper resuscitation and thoracotomy. Volume restoration, analgesia and respiratory support are crucial in perioperative period. The chest tube should be kept in situ for proper drainage of thoracic collections. In presence of injury to the ipsilateral lung, protection of the other lung is very important and for this purpose double lumen endobronchial tube (DLT) is very helpful. It also helps in proper exploration of surgical field by creation of unilateral lung collapse. Although introduction of DLT requires expertise and not usually practiced in emergency surgery, the authors did not experience any problem. The authors suggest proper pre-oxygenation with CPAP if necessary to saturate the oxygen reserve prior to intubation.

Conclusion

Diaphragmatic hernia in thoracic injury is not an infrequently encountered condition. Diagnosis without imaging is difficult. Management is essentially surgical. Blind insertion of chest tube may cause injury to herniated structure and complicate the scenario.



Figure 1: CT scan of chest horizontal section.



Figure 2: CT scan of chest sagittal section.



Figure 3: CT scan chest coronal section.

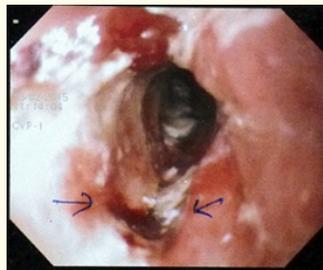


Figure 4: Esophageal tear found in esophago-gastro- duodenoscopy.

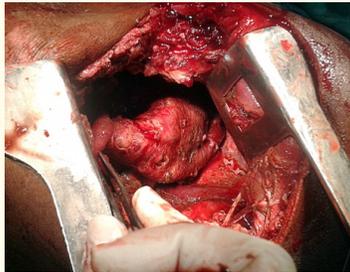


Figure 5: Posterolateral thoracotomy showing presence of stomach within thoracic cavity.

Bibliography

1. Deneuille M. "Morbidity of percutaneous tube thoracostomy in trauma patients". *European Journal Cardio-Thoracic Surgery* 22.5 (2002): 673-678.
2. Etoch SW, et al. "Tube thoracostomy. Factors related to complications". *Archives of Surgery* 130.5 (1995): 521-525.
3. Ball CG, et al. "Chest tube complications: how well are we training our residents?" *Canadian Journal of Surgery* 50.6 (2007): 450-458.
4. Aylwin CJ, et al. "Pre-hospital and in-hospital thoracostomy: indications and complications". *Annals of The Royal College of Surgeons of England* 90.1 (2008): 54-57.
5. Bailey RC. "Complications of tube thoracostomy in trauma". *Journal of accident & emergency medicine* 17.2 (2000): 111-114.

6. Khanzada TW and Samad A. "Indications and complications of tube thoracostomy performed by general surgeons". *Journal of Pakistan Medical Association* 58.1 (2008): 39-40.
7. Collop NA, *et al.* "Analysis of tube thoracostomy performed by pulmonologists at a teaching hospital". *Chest* 112.3 (1997): 709-713.
8. Mefire AC, *et al.* "Indications and morbidity of tube thoracostomy performed for traumatic and non-traumatic free pleural effusions in a low-income setting". *The Pan African Medical Journal* 18 (2014): 256.
9. Shih CT, *et al.* "Successful management of perforating injury of right atrium by chest tube". *Zhonghua Yi XueZaZhi (Taipei)* 50.4 (1992): 338-340.
10. Odita JC, *et al.* "Neonatal phrenic nerve paralysis resulting from intercostal drainage of pneumothorax". *Pediatric Radiology* 22.5 (1992): 379-381.
11. Nasser BA, *et al.* "Horner's syndrome after paediatric cardiac surgery: case report and review of the literature". *Cardiology in the Young* 25.3 (2014): 569-572.
12. Toprak C, *et al.* "Concomitant infection of the tricuspid valve and right ventricle free wall after chest tube insertion in a young patient without predisposing diseases". *Perfusion* 29.3 (2014): 275-277.
13. Toporcer T, *et al.* "Re-expansion pulmonary edema as a complication of spontaneous pneumothorax drainage--a case review". *Rozhl Chir* 87.7 (2008): 347-351.
14. Kalani MY, *et al.* "Cerebral herniation as a complication of chest tube drainage of cerebrospinal fluid after injury to the spine". *World Neurosurgery* 79.5-6 (2013): 798.
15. Blaivas M, *et al.* "Bedside emergency ultrasonographic diagnosis of diaphragmatic rupture in blunt abdominal trauma". *American Journal of Emergency Medicine* 22.7 (2004): 601-604.
16. Saladyga AT. "Acquired Diaphragmatic Hernias". (2014).
17. Turhan K, *et al.* "Traumatic diaphragmatic rupture: look to see". *European Journal Cardio-Thoracic Surgery* 33.6 (2008): 1082-1085.
18. Cameron JL. "Diaphragmatic injury". In: *Current Surgical Therapy*. 9th edn. Philadelphia, PA: Mosby-Elsevier (2008): 975-987.
19. Janardhanan J, *et al.* "Traumatic displacement of stomach - a case report". *Journal of Forensic and Legal Medicine* 21 (2014): 53-55.
20. Sersar SI and Batouk AO. "Post-traumatic ruptured gastrothorax mimicking chylothorax". *The Clinical Respiratory Journal* 9.3 (2014): 372-374.
21. Safdar G, *et al.* "Laparoscopically assisted repair of an acute traumatic diaphragmatic hernia". *BMJ Case Reports* 24 (2013): 009415.

Volume 2 Issue 1 August 2015

© All rights are reserved by Sandeep Kumar Kar, *et al.*