

Clinical Image

A Tale of Misplaced Intercostal Chest Drain Tube

Ejaj Uddin Ahmed¹, Umme Kulsum Chy², Mohammad Omar Faruq³, Amina Sultana⁴, Eshrak Jahan Ema⁵

DOI: <https://doi.org/10.3329/bccj.v13i2.84405>

Abstract:

Intercostal chest drain tube placement is one of the many invasive bedside procedures done at ICU. Misplacement of the tube is one of the common complications. Misplacement into liver is rare but life threatening. Here we present a case of a patient with right sided hemothorax having a misplaced chest drain tube.

Keyword: Chest Drain Tube, ICD, Liver, Pleural Effusion.

Introduction:

Drainage of the pleural space by thoracostomy originated with Hippocrates trying it in around the fourth century B.C.¹. Intercostal chest drain tube (ICD) is done at bedside due to various indications. Different specialty of physician can perform this invasive bedside procedure¹. Indications of ICD placement include pneumothorax, gross pleural effusion, hydro-pneumothorax secondary to thoracic injury. Urgency for placement mostly depends on underlying pathology, symptoms and degree of involvement. Intensivists are frequently involved in placement, maintenance, troubleshooting and discontinuation of chest tubes. In 30 % of cases there are reports of complications like laceration, improper positioning, bleeding, subcutaneous emphysema and so on². Malpositioned tubes are often intra fissural, intra-abdominal, mediastinal³. Intra-abdominal injury is rare and include injury to viscera like stomach, spleen, liver⁴.

Case History

Here we present a case of a 75 years old female patient who got admitted to a tertiary care hospital with shortness of breath. She also had recent history of fall from bed. Her arterial blood gas (ABG) in the emergency room (ER) showed severe type- II respiratory failure. She was intubated there and then shifted to ICU after initial resuscitation. Chest X-ray

showed right sided opacity in lower and midzone with obliteration of both costophrenic and cardiophrenic angle (Figure -1). CT scan of the chest suggested right sided hemothorax and mild hemopericardium. There was no obvious rib fracture. She was on low dose of noradrenaline. Intercostal drain tube was placed by a thoracic surgeon. Around 100 ml of blood was collected in chest drain bag. Opinion from department of cardiology was taken. They performed bedside echocardiography and opted for conservative management for hemopericardium. In the post procedural CXR, position of intercostal drain tube seemed too low and misplaced into liver (Figure 2). Ultrasound abdomen showed a hyper echoic tubular structure in right lobe of liver. There was minimal collection in subhepatic space. Repeat CT scan confirmed that the ICD tube was indeed in right lobe of liver (Figure 3,4). Lab results showed slightly elevated levels of liver transaminases. Opinion from thoracic surgeon and hepatobiliary surgeon was taken regarding withdrawal of the misplaced tube and insertion of a new ICD tube. Existing misplaced chest tube was removed slowly on the following day under strict supervision. New ICD tube was not placed considering overall status of the patient. Hemothorax was also resolving. Patient was still on mechanical ventilation for persistent type- II respiratory failure. Repeat ultrasound of abdomen showed no significant abnormality. Liver transaminases level came down to normal range and hemoglobin level was stable. Patient was later discharged on risk bond as per her family's wish.

1. Specialist, Critical Care Medicine, Unico Hospitals PLC, Bangladesh
2. Consultant, Critical Care Medicine, Unico Hospitals PLC, Bangladesh
3. Senior Consultant, Critical Care Medicine, Unico Hospitals PLC, Bangladesh
4. Consultant, General ICU and Surgical Critical Care Medicine, United Hospital Limited, Bangladesh
5. Resident Medical Officer, General ICU, United Hospital Limited, Bangladesh

Corresponding Author:

Dr. Ejaj Uddin Ahmed
MBBS, MD (CCM)
Specialist, Department of Critical Care Medicine,
Unico Hospitals PLC, Dhaka 1205, Bangladesh
E-mail: ejajuddinahmed@yahoo.com

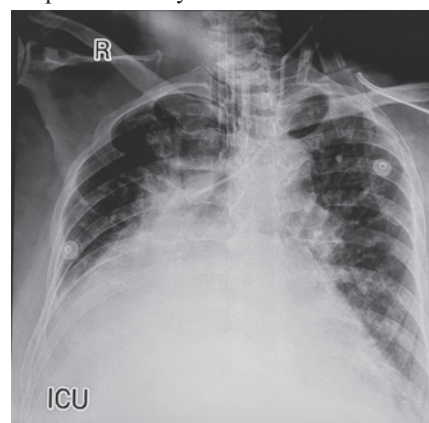


Figure 1: Chest X-ray after admission

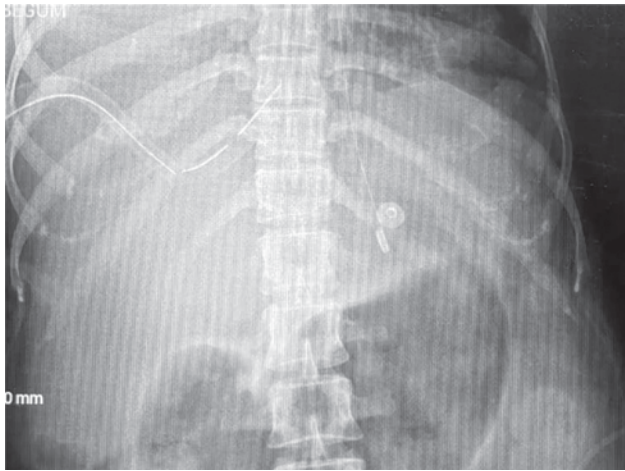


Figure 2: Bedside X-ray showing suspicious positioning of the ICD tube

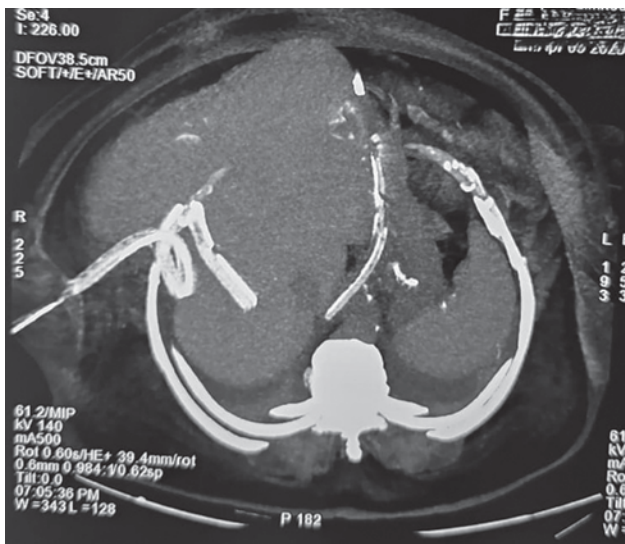


Figure 3: ICD Tube within the Liver

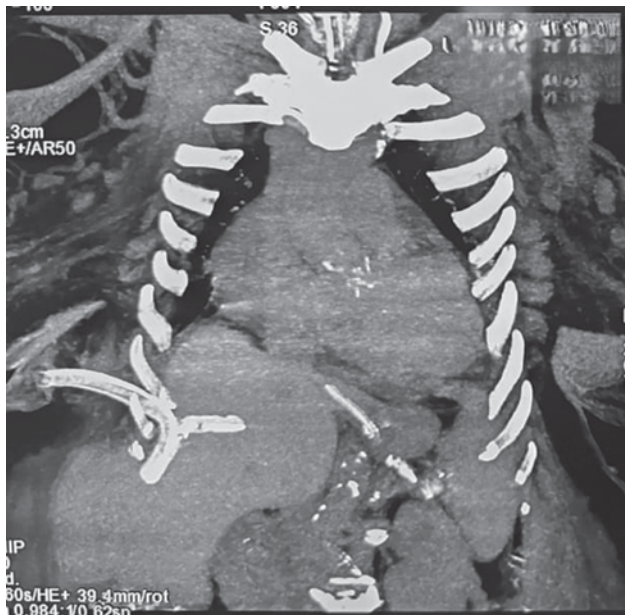


Figure 4: Misplaced ICD Tube

Discussion

Complications of misplaced chest tube include malposition, infection, organ injury. Misplacement into extrathoracic cavity is rare but life threatening. Misplaced ICD tube can cause catastrophe like severe bleeding, profound shock, severe pain. Injury to the liver can cause complications like sub capsular haematoma, intra hepatic haematoma, vascular injury or biliary disruption, devastating hemoperitoneum⁵. Obtaining a post procedural chest radiography is of paramount importance. CT scan provides greater insight but is not always feasible. Abdominal ultrasonography is accurate and useful in the evaluation of blunt abdominal trauma⁶. Criteria for non-operative management include: simple hepatic parenchymal laceration of intrahepatic haematoma, absence of active haemorrhage, haemoperitoneum of less than 500 ml, limited need for liver-related blood transfusions, absence of diffuse peritoneal signs in patients not neurologically impaired, and absence of other peritoneal injuries that would otherwise require an operation^{7,8}. In our case, conservative management was chosen due to mild collection and no active bleeding. Successful conservative ablation of a chest tube in the liver using embolization technique has been reported by some authors^{3,9}. Others prefer to simply remove the drain tube under close monitoring¹⁰. There are few reports where tube was removed slowly over few days rather than in a single incidence. In our case we removed it in a single setting but under strict supervision. A survey in 2010 reported that adverse incident following ICD insertion is not always reported. Forty-five percent of questioned doctors in this study localized the area of chest tube placement outside the triangle of safety¹¹. In our patient, thoracic surgeon introduced ICD tube outside of the safety triangle which can lead to complications like misplacement.

Conclusion

Although misplacement of ICD tube is rare, it is life threatening. Therefore, it is crucial to do a chest imaging immediately after the procedure. If in doubt, CT scan provides valuable information of position and complication of chest drain tube. Proper training of chest drain tube management minimizes the risk of complication associated with chest drain tube. Misplaced chest drain tube can be managed conservatively in appropriate scenarios.

References

1. Gilbert, T. B., B. J. McGrath, and M. Soberman. 1993. Chest tubes: indications, placement, management, and complications. *J Intens Care Med* 8:73–86
2. Bae JM. Life threatening hemoperitoneum and liver injury as a result of chest tube thoracostomy. *Clin Med Insights Case Rep*. 2015 Feb 26; 8:15-7. doi: 10.4137/CCRep.S23139. PMID: 25780345; PMCID: PMC4345926.
3. Tait, P., Waheed, U. & Bell, S. Successful Removal of Malpositioned Chest Drain Within the Liver by Embolization of the Transhepatic Track. *Cardiovasc Intervent Radiol*. 2009; 32:825–827.

4. Kesieme EB, Dongo A, Ezemba N, Irekpita E, Jebbin N, Kesieme C. Tube thoracostomy: complications and its management. *Pulm Med.* 2012; 2012:256878. doi: 10.1155/2012/256878. Epub 2011 Oct 16. PMID: 22028963; PMCID: PMC3195434
5. Al Mosa AFH, Ishaq M, Hussein M, Ahmed M. Unusual Malposition of a Chest Tube, Intrathoracic but Extrapleural. *Case Reports in Radiology.* vol. 2018, Article ID 8129341, 4 pages, 2018.
6. Healey MA, Simons RK, Winchell RJ, Gosink BB, Casola G, Steele JT et al. A prospective evaluation of abdominal ultrasound in blunt trauma: is it useful? *J Trauma.* 1996; 40: 875–83
7. Keller GA, West MA, Cerra FB, Simmons RL. Multiple system organ failure. Modulation of hepatocyte protein synthesis by endotoxin activated Kupffer cells. *Ann Surg.* 1985; 201: 87–95
8. Meyer AA, Crass RA, Lim RC Jr, Jeffrey RB, Federle MP, Trunkey DD. Selective nonoperative management of blunt liver injury using computed tomography. *Arch Surg.* 1985; 120: 550–4.
9. Hegarty C, Gerstenmaier JF, and Brophy D. Chest tube' removal after liver transgression. *J Vasc Interv Radiol.* 2012; 23:275.
10. Sommacale D, Lhuair M, Piardi T, Palladino E, and Kianmanesh R. Chest drain in the liver. *Liver Int.* 2013; 33:958.
11. Harris A, O'Driscoll BR, and Turkington PM. Survey of major complications of intercostal chest drain insertion in the UK. *Postgrad Med J.* 2010; 86:68–72.