

Delayed Right-Sided Hydrothorax after Right-Sided Subclavian Central Line Insertion

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Complications associated with central venous catheters (CVC) can be early or delayed, and among them, hydrothorax is a rare one. Inappropriate initial positioning of the catheter, repeated changes in positioning and movement of the patient, and improper vigilance may be the causative factors. We describe a 47-year-old man with delayed right-sided hydrothorax after right-sided subclavian central line insertion. He was posted for anterior communicating artery aneurysmal clipping when the right-sided subclavian CVC was placed. His intraoperative and postoperative periods were uneventful. However, on postoperative day two, the patient developed labored breathing with desaturation to 76% of room air, with hypotension and tachycardia. An urgent chest x-ray was ordered and showed features suggestive of right-sided hydrothorax, which improved after right-sided intercostal drainage. This case report highlights the presentation of a rare complication of CVC and its recognition in patients with diminished consciousness. It also emphasizes the optimum site of positioning the CVC tip and the need for increased vigilance by healthcare providers in ordering routine chest x-rays, aspirating from all catheter ports prior to administering substances through them.

Keywords: Hydrothorax, Central venous catheter, Delayed complication, Subclavian vein, Anaesthesia

Introduction

Central venous catheterization is a common procedure in the intraoperative and perioperative periods to secure venous access and monitor central venous pressure. Almost 15% of patients with central venous catheterization experience some complication.¹ The various complications of central lines can be classified into mechanical, thromboembolic, and infectious or into early and delayed. Although subclavian vein catheterization carries the lowest risk for infectious and thrombotic complications, the risk for mechanical complications is the highest when compared with other sites of catheterization.² We report a case of right-sided hydrothorax two days after a right-sided subclavian central line insertion.

Case Report

A 47-year-old man diagnosed with an anterior communicating artery (ACOM) aneurysm rupture was taken up for aneurysmal clipping. He was intubated preoperatively in view of his poor consciousness. After induction with fentanyl, propofol, and muscle relaxation with vecuronium, a triple lumen central venous catheter (CVC) was placed in the right subclavian vein using the modified Seldinger wire technique via a blind, infraclavicular approach. After aspirating blood from all three ports, the CVC was flushed with saline and secured to the skin. Post-insertion chest X-ray revealed correct placement of the central line. The patient was maintained on an isoflurane, air, and oxygen mixture in a supine position. The intraoperative period was uneventful without any hypotension or a significant rise in peak airway pressures or desaturation. Postoperatively the patient was shifted to the intensive care unit with the endotracheal tube in situ in view of his poor preoperative sensorium and was planned for elective extubation later. He was started on sedation postoperatively using an infusion of morphine and midazolam. He was extubated on the first postoperative day. On the second postoperative day, the patient developed labored breathing and desaturated to 76 percent in room air, with hypotension and tachycardia. Urgent chest x-ray showed complete right-sided

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homogenous opacification with mediastinal shift to the left, with a provisional diagnosis of right-sided hydrothorax. An intercostal drainage tube was inserted in the right-side fifth intercostal space, and 2090ml of pleural fluid was drained. The right-sided subclavian central line was removed, and a triple lumen catheter was inserted into the left subclavian vein using the infraclavicular approach and was confirmed with three port backflow and chest x-ray. The patient was tracheostomized and was eventually weaned to a T piece and decannulated.

Figure 1: Post-insertion chest x-ray to confirm the correct placement of the Subclavian central venous catheter (black arrows)

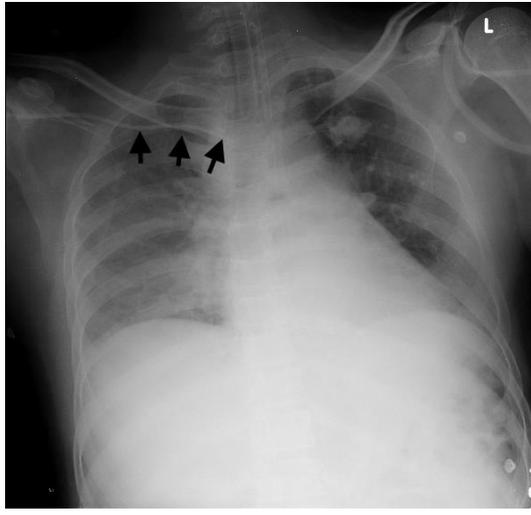


Figure 2: Chest x-ray on postoperative day 2 shows massive right-sided hydrothorax

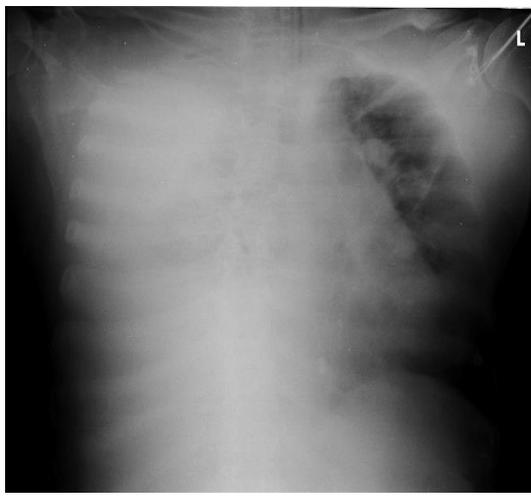
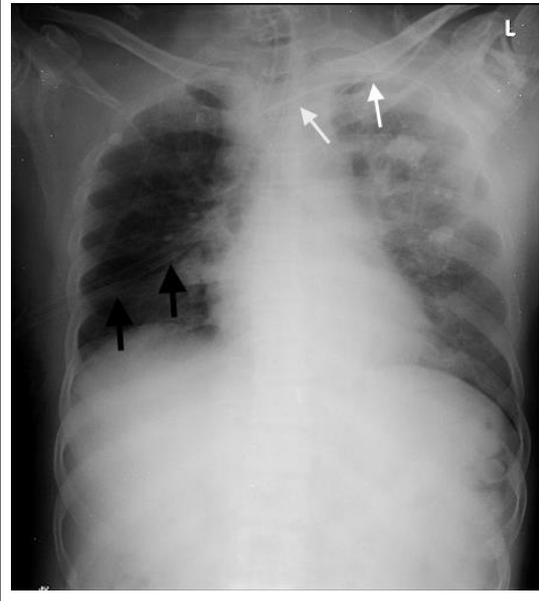


Figure 3: Chest x-ray shows a right-sided intercostal drain (black arrows) and a left-sided subclavian central venous catheter (white arrows).



Discussion

Our patient required a CVC for fluids, possible inotropic support, and monitoring central venous pressure intraoperatively. The subclavian vein was selected as the site of insertion for the CVC to allow for unhindered head and neck movements. Improper placement of the CVC was ruled out by aspiration of blood from all ports and hence was used for giving drugs intraoperatively. A post-insertion chest x-ray showed the correct placement of the CVC. The most probable mechanism of the catheter displacement could be mechanical displacement due to repeated movement and change of position of the patient.³ This case report is important as it highlights the risk of mechanical complications, which may be hard to identify in cases where the patient has decreased level of consciousness. It also highlights the need to be aware of such complications to monitor for them in the postoperative period and emphasizes the need for routine chest x-rays to rule out mechanical complications with CVCs, although some literature claims that chest x-rays are insufficient to predict delayed complications.⁴ This report also highlights the importance of aspirating from all ports prior to administering anything through the CVC to avoid complications. A study on the right mediastinal border and central venous anatomy on frontal chest radiographs recommended that CVC be positioned in the

region of the cavo-atrial junction and located 1-2cm below the superior vena cava right atrial appendage on chest radiograph.⁵ Hence readjusting the central line to its optimum position by readjusting and re-fixing the catheter might have reduced the risk of this complication.

Conclusion

Delayed hydrothorax after a subclavian CVC is a rare complication most likely caused by initial incorrect placement or catheter migration. It is essential to confirm CVC placement intraoperatively with a chest x-ray and note that chest x-rays might not be ideal tools for predicting delayed complications, especially mechanical complications in subclavian central venous catheters. Routinely check for aspiration of blood at regular intervals, especially if the patient has been moved. In patients with a decreased consciousness, it is vital to keep a high level of vigilance and always suspect mechanical complications of CVC whenever there are clinical signs of respiratory distress. More vigilance during handling of a patients, including a high suspicion of central line catheter tip migration, could lead to avoidance of such avoidable consequences of CVC.

References

1. Taylor RW, Palagiri AV. Central venous catheterization: Critical Care Medicine 2007;35(5):1390–1396.
<https://doi.org/10.1097/01.ccm.0000260241.80346.1b>
2. Parienti J-J, Mongardon N, Mégarbane B, et al. Intravascular Complications of Central Venous Catheterization by Insertion Site. New England Journal of Medicine 2015;373(13):1220–1229.
<https://doi.org/10.1056/nejmoa1500964>
3. Choi J-G, Choi J-S, Park C-H, et al. Hydrothorax due to extravasation of intravenous contrast through left subclavian catheter -A case report-. Korean Journal of Anesthesiology 2010;58(6):550.
<https://doi.org/10.4097/kjae.2010.58.6.550>
4. Shirvani A, Zadeh M. The role of routine chest radiography for detecting complications after central venous catheter insertion. Saudi Journal of Kidney Disease and Transplantation 2014;25(5):1011.
<https://doi.org/10.4103/1319-2442.139895>
5. Verhey PT, Gosselin MV, Primack SL, et al. The Right Mediastinal Border and Central Venous Anatomy on Frontal Chest

Radiograph—Direct CT Correlation. Journal of Association of Vascular Access 2008;13(1):32–35.

<https://doi.org/10.2309/java.13-1-7>