

# Central venous catheter malposition into intrapleural space

*Ovais Nazir<sup>1\*</sup>, Mushtaq A. Wani<sup>2</sup>, Ashu Kumar Jain<sup>3</sup>, Tarun Sharma<sup>4</sup>*  
*Postgraduate Resident<sup>1,4</sup>, Chief Cardiac Anaesthetist<sup>3</sup>, Artemis Health Institute, Gurgaon, India,*  
*Postgraduate Resident<sup>2</sup>, Govt. Medical College, Jammu, J&K, India.*

*\*Corresponding author: [ovais.khan83@gmail.com](mailto:ovais.khan83@gmail.com)*

Placement of central venous catheter (CVC) can lead to complications such as, malposition of catheter and perforation and/or injury of nearby blood vessels and structures. We present a case about malposition of central venous catheter (CVC) from right internal jugular vein (IJV) into right intra pleural space. It is advisable to check free venous outflow in all the ports of CVC following placement of CVC catheter. Chest radiograph should be taken to confirm the position.

**Keywords:** central venous catheter, internal jugular vein, subclavian vein

## Introduction

Central venous catheters (CVC) are an essential component of modern critical care. Despite their utility, placement of CVCs is often associated with complications<sup>1,2</sup>. Our case report is about malposition of the central venous catheter (CVC) from right internal jugular vein (IJV) into right intrapleural space.

## Case report

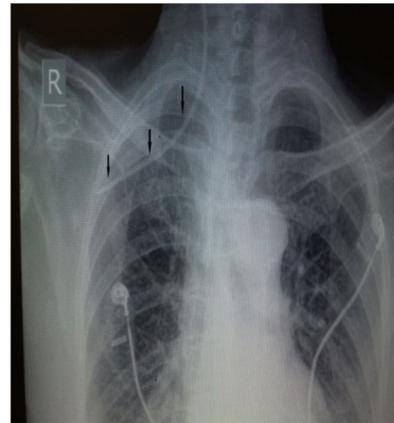
A 65 yr old lady was for an emergency tracheostomy after 5 days of admission into ICU for progressive stridor. She had a tumour arising from the upper airway. She had a right internal jugular vein CVC placed in ICU on the second day of admission.

After placing her on the operating table it was noticed that out of the three ports of the CVC, fluid was going freely only through the proximal port. We attempted to check all the ports by aspirating with a 5 ml syringe and blood could be aspirated freely only from the proximal port while the other two ports failed to yield blood on aspiration. So it was a situation where proximal port of CVC was intravascular while the status of the other two ports was unclear.

We then decided to withdraw the CVC 4-5 cm proximally while continuously aspirating from the ports to rule out any possibility of adherence of catheter to vessel wall or catheter kinking. It was noticed that upon withdrawing catheter 4-5 cm we could now aspirate blood from the middle port also but as soon the CVC was pushed back it again yielded the same result. We then decided to do check chest X-ray to look for catheter position which showed

that catheter instead of going into superior vena cava was curving towards right chest wall

**Figure 1:** Chest X-ray showing malposition of CVC



**Figure 2:** CxR showing CVC in left subclavian vein



The chest X-ray showed half the CVC catheter was inside the vessel and rest outside in the

right pleural cavity. The possibility of catheter going into right subclavian/axillary vein was ruled out by the path of CVC line on X-ray (compare the path of left subclavian CVC that was put later) and non aspiration of blood from distal and middle ports. The catheter was removed and another CVC inserted through left subclavian approach and position was confirmed by check X-ray. She had an uneventful course in ICU post tracheostomy.

## Discussion

Malposition of the catheter into the intrapleural space is a known complication of central venous catheterization. In a systematic review performed by Ruesch et al, it was reported that catheter malposition rates were 5.3% and 9.3% for IJV and subclavian vein catheterization respectively<sup>3</sup>. Paw<sup>4</sup> reported that the incidence of malpositioning following catheterization via the left IJV was more than the right IJV. Cannulation by the right subclavian vein is associated with the highest risk of malposition of approximately 9.1%.<sup>5</sup>

Partial placement of catheter (half of the catheter inside the vessel and half outside) with distal part going up to lateral part of intrapleural space is seen very rarely, and till now, such a case has not been reported in the literature. Schummer et al<sup>6</sup> reported a case similar to our patient, with unrecognised stenosis of the superior vena cava (SVC). Perforation occurred in the SVC after catheterisation of the left internal jugular vein with a haemodialysis catheter. Extravascular

positioning of the catheter was unrecognised and the patient subsequently died of complications.

Iwakura H et al report a case of malpositioned CVC in a 2-year-old boy who was scheduled for patch closures of ASD and VSD. Chest X-ray examination in ICU revealed the misplacement of the catheter into his right intrapleural space with later development of severe haemothorax of the right side, where catheter had been inserted<sup>7</sup>.

In our case, the catheter up to the proximal port was partially inside the vessel, through which we could aspirate blood, but rest of the catheter was outside the vessel having pierced the vessel wall, leading to malpositioning into the right pleural cavity. Catheter placement is a blind procedure and misplacement of CVC remains a known but uncommon complication. In this patient as the middle and distal ports were not used for infusion of fluids occurrence of hydrothorax was prevented. Failure to aspirate blood from the middle and distal ports, lead to the suspicion of malposition, which was later confirmed by radiography. A post-procedural chest radiograph is considered essential in identifying malposition of the catheter.

## Conclusion

We recommend that free venous outflow must be carefully checked from all the ports of CVP catheter, and following placement a chest radiograph should be taken to confirm the position.

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