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CASE REPORT

Case Report: Malposition of Right Subclavian Central Venous Catheter into Right Internal Jugular Vein

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ABSTRACT

Central venous catheterization (CVC) via the subclavian vein is commonly performed for fluid resuscitation, hemodynamic monitoring, total parenteral nutrition, and the administration of vasoactive medications. Although considered safe when performed by experienced clinicians, complications such as malpositioning can occur. We report a case of right subclavian CVC malposition in which the catheter tip was found to course retrogradely into the right internal jugular vein (IJV). This case emphasizes the importance of imaging and ultrasound guidance in preventing and detecting such complications.

KEYWORDS

• Central venous catheter • Subclavian vein • Internal jugular vein • Malposition • Ultrasound guidance

INTRODUCTION

Central venous access is essential in critical care, emergency, and perioperative settings, with the subclavian vein often being favored for its consistent anatomical location, reduced infection risk, and superior patient

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comfort. However, complications such as pneumothorax, arterial puncture, and catheter malposition occur in 5–12% of cases[1]. Although malpositioning into the ipsilateral internal jugular vein is uncommon, it can result in inaccurate central venous pressure readings, thrombosis, and ineffective drug delivery[2]. This report presents a case of a right subclavian catheter malpositioned in the right internal jugular vein. American Society of Anaesthesiologists Task Force recommends the use of ultrasound during central venous catheterisation because it is rapid, safe and minimal complication[3].

CASE REPORT

A 35-year-old man with septic shock was admitted to the intensive care unit (ICU) for vasopressor support and invasive hemodynamic monitoring. All routine investigations were normal. Written informed consent was obtained. Standard ASA monitoring devices (ECG, noninvasive blood pressure, pulse oximetry, and capnography, as applicable) were attached, and the patient's vital signs were continuously observed throughout the procedure. Then start the procedure, under aseptic precautions the right subclavian vein was cannulated via an infraclavicular approach using anatomical landmarks with a 7 Fr, 20 cm triple-lumen central venous catheter by the standard Seldinger technique. Guide wire insertion through the needle and removal after smooth catheter placement were free. After confirming free backflow of blood from all three lumens, the catheter was fixed at the 15 cm mark on the skin. The radiograph revealed that the catheter was coursing upward, with its tip located in the right internal jugular vein rather than the expected position at the cavoatrial junction (Figure 1).

The catheter was removed and reinserted under ultrasound guidance via the right subclavian vein, ensuring correct guidewire trajectory. A repeat chest X-ray confirmed appropriate placement in the superior vena cava. The patient remained stable, and no complications were noted.

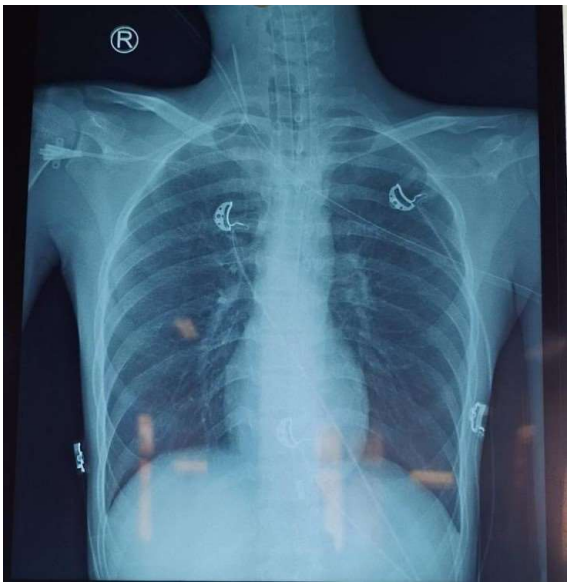

Figure 1: Chest X-ray PA view showing malposition of the right subclavian vein catheter into the right internal jugular vein

DISCUSSION

The subclavian vein is the preferred site for central venous cannulation because of its large diameter, fixed anatomical course, low infection risk, and enhanced patient comfort, particularly for long-term therapy. The catheter tip may be misplaced either within the venous system or, in dangerous cases, outside it in virtually any anatomical location, such as the arterial system from inadvertent arterial puncture or venous anomaly, the mediastinum, pleura, pericardium, trachea, esophagus, subarachnoid or paravertebral spaces, and other aberrant sites. Although the right internal jugular vein has a lower risk of

malposition because of its straighter route to the right heart, intravenous misplacement can still occur in the ipsilateral subclavian vein,[4] mammary vein,[5] accessory hemiazygos vein,[6] vertebral vein,[7] internal jugular vein,[8] and subclavian vein.[9]

CVC malposition is multifactorial include guidewire length, catheter length, methodological inaccuracy, anatomical variation, venous stenosis,and patient head or shoulder position during cannulation.The exact mechanism remains poorly understood because multiple interacting factors influence tip placement.

In our case, the right-sided central venous catheter did not follow the expected course through the right brachiocephalic vein into the superior vena cava but instead tracked retrograde into the right internal jugular vein, producing catheter malposition. We assume that the orientation of the J-tip of the guidewire during insertion directed the wire cranially, steering the catheter into the right IJV.[10]

Clinical judgment alone is insufficient to identify CVC malpositioning because free blood return from the catheter lumen does not exclude malposition[11]; ultrasound guidance has significantly reduced failure, malpositioning, and mechanical complications during internal jugular vein catheterization and is now standard in most emergency and ICU settings, whereas subclavian vein catheterization continues to show unchanged complication and malposition rates, likely due to anatomical challenges and limited acoustic windows[12] and prevention strategies include real-time ultrasound during venipuncture and guidewire advancement[13], careful observation of guidewire direction (visible neck movement suggests internal jugular entry), verification of blood aspiration from all catheter ports, mandatory post-procedural imaging such as chest radiograph or bedside ultrasound[14], and early recognition with prompt repositioning to prevent vessel thrombosis, catheter dysfunction, or inaccurate CVP readings.

CONCLUSION

Malposition of a central venous catheter into the left subclavian vein can occur during right subclavian vein cannulation, even with proper anatomical knowledge and techniques. The orientation of the J-tip guidewire may contribute to this complication, and directing the tip caudally can help prevent it. Radiological confirmation after catheter placement remains essential for detecting and correcting such malpositions.

Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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