

Malpositioning of Right Subclavian Central Venous Catheter into contralateral Subclavian Vein: An unusual presentation

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Abstract

Case Report

Central Venous Catheterization (CVC) is a routinely performed procedure in the perioperative and intensive critical care settings which is associated with malpositioning of catheter, contralateral subclavian vein being extremely uncommon. A case of malpositioning of right subclavian catheter into contralateral subclavian vein is being reported. The possible causes of its occurrence and prevention are discussed.

Key words: Central Venous Catheterization, malposition, contralateral subclavian vein.

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INTRODUCTION

Central Venous Catheterization (CVC) is a routine procedure in the Operation Theatre and the critical care settings. The standard landmark technique for CVC is associated with numerous complications [1]. Malposition of the catheter is a known complication of right subclavian vein cannulation with incidence of 9.1% [2]. Malpositioning of right subclavian catheter into the left subclavian vein is extremely uncommon. We report one such case. The possible cause of its occurrence and prevention are discussed.

CASE REPORT

A 27 yr old male steroid dependent ulcerative colitis patient scheduled for laparoscopic total

colectomy required central venous cannulation for total parenteral nutrition. Under aseptic precautions, using anatomical landmark technique, right subclavian vein was cannulated via infraclavicular approach with a 7 Fr, 20 cm, triple lumen CVP catheter using the standard Seldinger technique. The guide wire insertion through the needle and its removal after a smooth catheter placement was free. After confirming free backflow of blood from all the three lumens, catheter was fixed at 15 cm mark at the skin. A routine post cannulation chest radiograph revealed the catheter placement into the left subclavian vein (Fig). The catheter was withdrawn and reinserted for corrected placement in the superior vena cava subsequently.

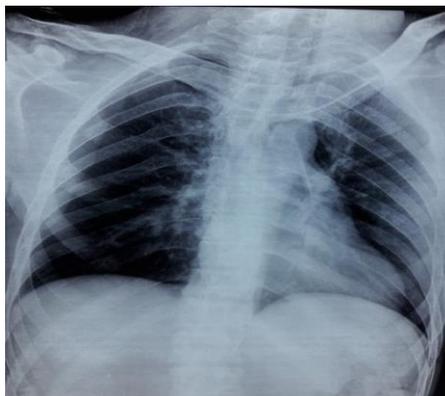


Fig-1: Chest X-ray PA view showing malposition of right subclavian vein catheter into the left subclavian vein

DISCUSSION

Subclavian vein is one of the preferred sites of cannulation owing to its large diameter and fixed course, apart from advantages like low risk of infection and increased patient comfort especially when long term therapy is intended. The most common site of catheter misplacement during subclavian vein cannulation is ipsilateral internal jugular vein accounting for 60-70% of total malpositioning[3]. Other unusual sites for aberrant placement include left internal mammary vein, external jugular vein, azygos vein, hemiazygos vein; lateral thoracic vein, inferior thyroid vein, left superior intercostal vein, thymic vein, pleural cavity, and the jugular foramen [3, 4]. Malposition of catheter may occur at the time of insertion or may result from spontaneous migration secondary to anatomical positioning or intra-thoracic pressure changes.

Although exact mechanism of CVC malposition is poorly understood, it appears to be multifactorial. While some authors suggest length of the guidewire to be the cause, others attribute it to the length of the catheter itself [5]. Methodological inaccuracy, anatomical variation, vein stenosis, head, or shoulder position at time of cannulation and the type of vein cannulated are other contributory factors for a catheter malpositioning.

The incidence of misplaced right sided catheters through infraclavicular approach varies from 5.5-11.5%. This is attributed to the differences of the vascular system on either side of the midline. On the right, the subclavian-jugular venous junction overlies the subclavian artery, making this vessel more prone to injury than the left [1]. Also, right subclavian vein enters the innominate vein at a sharper angle (near right angle) than its counterpart on the left [1], thereby making it difficult to negotiate the curve appropriately. The final position of the catheter tip has been reported to depend on the course that the guidewire takes which may be influenced by the initial orientations of the curve of guide wire tip [6]. The contralateral subclavian vein is the most uncommon site for catheter migration.

In our patient, the central line did not follow its normal course via right brachiocephalic vein into the superior vena cava; instead, it crossed the midline and lodged into contralateral subclavian vein (Fig). We assume that the guide wire inserted in the right subclavian vein passed through the right brachiocephalic vein and; instead, of entering into the superior vena cava, coursed through the left brachiocephalic vein into the left subclavian vein leading the catheter to malposition. The authors opine that the orientation of J-tip of guide wire during insertion may have caused the misplacement.

Various techniques and manoeuvres proposed to prevent malposition include, assuring caudad

position of J-tip of the guide wire during insertion, lateral flexion of head towards insertion side, manual compression of the junction between internal jugular vein and subclavian vein while threading the guide wire (Ambesh Manoeuvre)[3], flushing 10ml of saline and asking the patient if he can hear or feel any water gushing next to his ear, limiting insertion depth of central venous catheter to 16 cm for right subclavian vein and from the left sided veins insertion depth should not exceed a depth of >20cm[1].

Ultrasound assistance has reduced the incidence of failure or malpositioning of IJV catheterization but the rate of complications, malposition, or failure of subclavian vein catheterization has not reduced[2]. Although ultrasound has become the standard of care, it may not be readily available in busy critical areas due to its use elsewhere or in remote centres.

It is difficult to identify CVC malpositioning purely on the basis of clinical judgement as clinical criteria may not be reliable enough always. Also, free return of blood from catheter lumen after placement does not rule out the malposition [7], therefore, chest radiograph must be done post-procedure to confirm catheter tip location. Wherever feasible, use of additional diagnostic methods (USG, Fluoroscopy) during and after procedure to confirm or rule out CVC malpositioning should be made.

CONCLUSION

Malpositioning of the central venous catheter into the left subclavian vein can occur during right subclavian vein cannulation by landmark technique despite sound knowledge of anatomy and good operator skills. The authors speculate that the orientation of J-tip of the guide wire may play a role in malpositioning of the catheter and suggest caudally directed orientation of guide wire tip. Post-procedure radiological confirmation after catheter placement cannot be overstressed.

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