

## Dilated internal mammary veins in liver disease - A potential pitfall in central venous cannulation

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### Abstract

Portal hypertension leads to dilation of internal mammary veins. Among the various sites of misplacement of a catheter inserted via the internal jugular vein, misplacement in the internal mammary vein is relatively rare in the general population, when compared to liver disease patients. Catheter misplacement during central venous cannulation can be associated with thrombosis, wedging, erosion, and perforation. The option of replacing or removing the catheter is not always risk-free, particularly with associated coagulopathy. We describe the management of a misplaced CVC which was accessed through the left internal jugular vein and repositioned under fluoroscopic guidance.

**Keywords:** central venous catheter, repositioning of central venous catheter, central venous catheter in left internal mammary vein, portal hypertension, fluoroscopy

### Introduction

Central venous cannulation involves insertion of a large bore catheter into the internal jugular, the subclavian or the femoral vein. The incidence of catheter misplacement is 6.4 to 7%, which may be associated with thrombosis, wedging, erosion and perforation [1]. Among the various sites of misplacement of a catheter inserted via internal jugular vein, misplacement in the internal mammary vein is relatively rare. We describe a patient with misplaced CVC (inserted via left internal jugular vein) into the left internal mammary vein that was diagnosed and repositioned under fluoroscopic guidance. We obtained written consent from the patient for publishing this case report.

### Case report

A 50-year-old male with type 2 diabetes, obesity, and liver cirrhosis was admitted with diabetic ketoacidosis in the high dependency unit. Fluid resuscitation was initiated with an 18 G cannula in the right external jugular vein. Central venous access was planned in the left Internal jugular vein (IJV) in order to meet the need for multiple infusions. The cannulation was performed under local anaesthesia with ultrasound guidance using Seldinger's technique. While inserting the guide wire, resistance was encountered around the 10 cm mark. Ultrasound was performed, which did not show any guidewire misplacement in the ipsilateral subclavian vein. Hence, a triple lumen CVC was inserted and fixed at 13 cm. Blood was aspirated in all the three lumens. Post-procedure X-ray chest

showed the misplaced catheter, which had travelled straight down the axis of left IJV (Figure 1 A). There was no kink, knot, or acute deflection.

The catheter was left in situ and a fluoroscopy with contrast (venogram) was performed. The venogram showed that the tip was in the left internal mammary vein (Arrow, Figure 1 B). The tip was not floating freely and had created an indentation on the wall of the vein (circle, Figure 1 B). Under fluoroscopic guidance, the guide-wire was threaded through the CVC lumen, CVC was pulled back over the guidewire, then the "J" tip of the wire was directed towards the innominate vein and inserted up to the superior vena cava (SVC) followed by advancing the catheter over the guide-wire. It was ensured that the CVC had no acute bends, and it was taking a proper course (Figure 1 C) before it was finally placed in the SVC above the SVC-right atrium junction.

### Discussion

The left brachiocephalic vein is anatomically longer and has more tributaries. Therefore, CVC malposition is common on the left side. Misplacement of CVC into minor veins might cause erosion, perforation, hemorrhage and hemothorax. Porto-systemic collateral circulation in portal hypertension leads to dilatation of internal mammary vein. It is one of the sites for portosystemic collaterals [2]. Normal size of internal mammary vein is 1.7 to 2.8 mm, whereas in our case it was 6.1 mm [3]. Also, the left internal mammary vein is in-line with the left internal jugular vein, making

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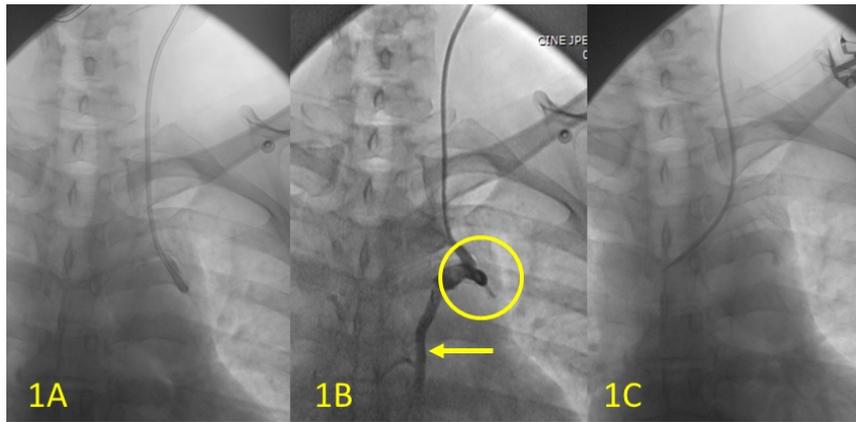


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**Figure 1:** **1A:** Chest X-ray AP view showing central venous catheter tip not taking the course from left internal jugular vein to superior vena cava. **1B:** shows contrast distribution through the central venous line into the internal mammary vein (Arrow) and the indentation of the catheter on the wall of the vein (circle). **1C:** image during repositioning, showing the catheter taking a proper course

it easier for the catheter to take this course, especially if it is dilated. Similar to our case, misplacement into the internal mammary vein has been reported in the literature in patients with portal hypertension [4]. If the misplacement is detected, it is preferred to remove the catheter and replace the catheter in another vein or another attempt. The option of replacing or removing the catheter is not always risk-free. Particularly in the liver disease group of patients with the associated coagulopathy, it can be a cause of concern for performing cannulation twice in the same sitting. In such scenarios, repositioning the catheter under fluoroscopic guidance is a feasible option. Fluoroscopy along with injection of dye has the advantage of diagnosis and confirmation of the tributary, and option of intervention following the diagnosis. Hence, we preferred it after initial screening with chest X-ray.

### Conclusion

CVC malpositions are common on the left side and the internal mammary vein can be dilated in patients with portal hypertension and is a potential site for misplacement. In case of misplacement, repositioning the catheter under fluoroscopic guidance is a feasible option.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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