

Case Report: Repositioning of Misplaced Central Venous Catheter with Saline Injection under C-Arm Imaging

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Introduction

Central venous catheterization (CVC) is an important and common procedure for the clinical management of many patients in intensive care unit (ICU). It allows for resuscitation of intravascular volume depletion and access for vasoactive medications and for hemodynamic monitoring and pacing.^[1] The placement of central venous catheters is a technically challenging procedure. Malpositioning is the most common cause of early malfunctioning of the central venous catheter.^[2] Misplacement of a central venous catheter tip may result in incorrect venous pressure readings or serious complications such as vascular erosion and thrombosis.^[3] It is currently recommended that the tip of CVC is positioned at the level of mid-lower SVC to cavoatrial junction.^[4] Malposition of a CVC means a catheter lies outside of SVC, whose tip does not lie in the 'ideal' position. Misplaced catheters have been reported in almost every possible anatomical position, which can be of two types such as intra-cava malposition and extra-cava malposition on the base of the location of the catheter.^[5] Malposition of the catheter is a relatively common complication with incidence 5.01%, which results in the malfunction of catheters.^[6]

Case Report

A 45-year-old male patient was admitted with acute pyelonephritis & had difficult peripheral venous access. So decision was taken to insert central line for intravenous (IV) access. Plan was made to insert central line under ultrasound guidance. After standard aseptic precautions, under ultrasound guidance, right internal jugular vein (IJV) was pierced with 16 G cannula, guide wire inserted and right IJV cannulated with a double lumen catheter using Seldinger's technique. While inserting catheter resistance was felt towards the end, however, blood could be aspirated from both ports of the catheter. Post procedure chest X-ray revealed that central line has entered Right subclavian vein [Fig-1]. We decided to reposition the central line using hydrostatic method under fluoroscopic guidance. Neck was painted with povidone iodine & sterile draping done. Sutures holding the central venous catheter (CVC) were removed & catheter withdrawn by 5cm under C- arm guidance. Then a syringe containing 10ml of normal saline was connected to the 16 G lumen & a sudden push of saline was given & this was repeated four times. After each saline push, the central line tip was visualized under C-arm. We could see the central venous catheter straightening with each saline push [Fig-2]. When the catheter had fully straightened, it was

inserted another 6cm and fixed at 12cm at skin level and the tip of central line could be visualized just above superior vena cava. Blood could be aspirated from both ports. Blood sample was taken from both ports for culture and sensitivity ,did not reveal any growth.

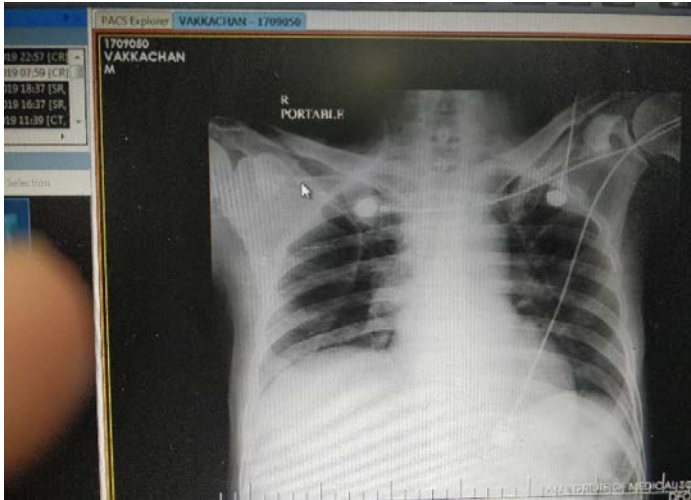


Figure 1

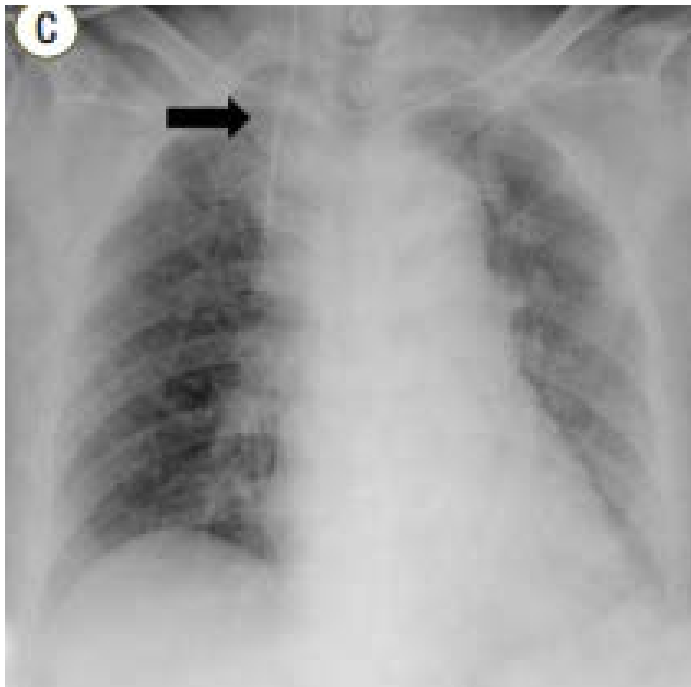


Figure 2

Discussion

Central venous cannulation is a commonly performed procedure in critically ill patients with ,ultiple indications. Malposition of CVC is a technical complication with incidence of 2% which is often diagnosed on post

procedure check chest x-ray.Catheters will generally function equally well for pressure measurement and fluid infusion if the tip is situated in any major vein, above or below the heart. For dialysis or the infusion of irritant/hypertonic fluids, a high rate of blood flow past the catheter tip is desirable and this requires the placement of the luminal opening in as large a vessel as possible.⁽⁷⁾ There is increasing evidence of a relationship between high placement of the catheter tip (upper SVC or above) and thrombosis due to abutting at angle causing repeated trauma to the endothelium from the catheter tip, with rate of thrombosis from central venous catheterization between 30% and 70%.⁽⁸⁾ The incidence of pulmonary embolism from catheter-related thrombosis may be up to 60% for both short- and long-term catheterization In addition, thrombosis and stenosis subclavian veins can lead to significant morbidity and requires anticoagulation⁽⁹⁾. The site and frequency of misplacement depends on several factors; the site of insertion, the technique used, and body positioning. Various techniques have been introduced in the past to reposition the catheter with merits and demerits. Schaefer used a flow directed method using 2F Fogarty balloon-tipped catheter for this purpose . Hawkins & Paige described the use of a deflector to correct a malpositioned central line ^[10]. Percutaneous transfemoral approach offers a minimally invasive option for repositioning of the malpositioned catheter wherein, CVC tip is directly manipulated by use of tip-deflecting wires ^[11] We used a new method of an old technique that uses forceful saline injection under c-arm for correction of malpositioned CVC ^[11]. In this technique, first catheter is withdrawn under aseptic conditions to a favorable position and then a force is given using jet of saline to straighten the bend in the central line. After straightening the catheter, we reinserted & repositioned the CVC under fluoroscopic guidance and

visualized the tip in SVC. Misplacement into both IJV and subclavian vein can be corrected using this technique. ⁽¹²⁾

Conclusion

Correct placement of the central venous catheter is an essential prerequisite for accurate monitoring of CVP and long-term use of catheter. Since only saline flush is being used, the technique is safe and technically easy to perform. Hydrostatic method, as described above is a safe and effective method,

References

1. Miller AH, Roth BA, Mills TJ, Woody JR, Longmor CE, Foster B: Ultrasound guidance versus landmark technique for the placement of central venous catheters in the emergency department. *Acad Emerg Med* 2002; 9: 800-5.
2. Boardman P, Hughes JP: Radiological evaluation and management of malfunctioning central venous catheters. *Clin Radiol* 1998; 53: 10-6.
3. Oh AY, Jeon YT, Choi EJ, Ryu JH, Hang JW, Park HP, et al: The influence of the direction of J-tip on placement of a subclavian catheter: real time ultrasound-guided cannulation versus landmark method, a randomized controlled trial. *BMC Anesthesiology* 2014; 14: 11.
4. Hsu JH, Wang CK, Chu KS, Cheng KI, Chuang HY, Jaw TS, et al. Comparison of radiographic landmarks and the echocardiographic SVC/RA junction in the positioning of long-term central venous catheters. *Acta Anaesthesiol Scand* 2006;50:731-5
5. Gibson F, Bodenham A. Misplaced central venous catheters: Applied anatomy and practical management. *Br J Anaesth* 2013;110:333-46. doi: 10.1093/bja/aes497.
6. Gibson F, Bodenham A. Misplaced central venous catheters: Applied anatomy and practical management. *Br J Anaesth* 2013;110:333-46. doi: 10.1093/bja/aes497.
7. Multiple-lumen central venous catheterization product [package insert]. Reading, Pennsylvania: Arrow International, 1998
8. Puel V, Caudry M, Le Metayer P, et al. Superior vena cava thrombosis related to catheter malposition in cancer chemotherapy given through implanted ports. *Cancer* 1993; 72: 2248-5
9. Dollery CM, Sullivan ID, Bauraind O, Bull C, Milia PJ. Thrombosis and embolism in long-term central venous access for parenteral nutrition. *Lancet* 1994; 344: 1043-5
10. Hawkins IF, Paige RM. Redirection of Malpositioned Central Venous Catheters. *AJR*. 1983;140:393-95.
11. Iovino F, Pittiruti M, Buononato M, et al. Central venous catheterization: complications of different placements. *Ann Chir*. 2001;126:1001-06.
12. Olcott EW, Gordon RL, Ring EJ. The injection technique for repositioning central venous catheters: technical note. *Cardiovasc Intervent Radiol*. 1989;12(5):292- 93.

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