

Case Report

MALPOSITIONING OF THE SUBCLAVIAN CENTRAL LINE INSERTED WHILE PERFORMING CPR – A CASE REPORT

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ABSTRACT

Central venous catheter (CVC) placement is a procedure which has got many applications in emergency medicine. However, the placement of these catheters is not without risk. The standard technique utilizes external landmarks for finding the point of insertion of the catheter. Correct placement of the CVC is an essential prerequisite for accurate monitoring of central venous pressure (CVP) and long-term use of the catheter. The complications of central venous cannulation are numerous which include malpositioning. Malpositioning of the subclavian central venous catheter is an unusual occurrence. We describe a case in which a subclavian central venous catheter was placed while performing CPR in a patient who suffered from cardiac arrest, in which the catheter malpositioned into the contralateral subclavian vein. Subclavian venous catheter placement, usually being a blind procedure has got complications, of which misplacement remains a known but uncommon complication. Therefore, a chest x-ray should always be taken to confirm the position of the tip of the catheter.

Keywords: *Subclavian Central Venous Catheter, Malpositioning, Cardiac Arrest, Emergency Department*

Abbreviations

CPR – Cardiopulmonary resuscitation

ACLS – Advanced Cardiac Life Support

IJV –Internal Jugular Vein

US - Ultrasound

CVC – Central Venous Catheterization

INTRODUCTION

Central venous catheterization is a very common procedure nowadays for critically ill patients. It can provide not only a more effective route of administration for medications, but also can give important hemodynamic information. It has also got a role in the management of cardiac arrest when peripheral venous cannulation fails or if multiple long bone fractures are present which renders the non-viability of a peripheral line. Most often, it is a successful and uncomplicated procedure. The reported incidence of complications during subclavian vein puncture varies from 1.8% (Malatinsky *et al.*, 1976) to 9.3% (Dietel and McIntyre, 1971). Most commonly, it gets malpositioned to the ipsilateral internal jugular vein (Unal *et al.*, 2003), but rarely does it travel into the other neighbouring veins. Here we present a case of a subclavian central venous catheter which malpositioned into the contralateral subclavian vein.

CASE

A 38 year old male patient presented to the emergency department with alleged history of road traffic accident. On evaluation, he was found to have a compromised airway, high respiratory rate and hypotension. Glasgow coma score was 3/15. He also had open fracture of both lower limbs with crush

Case Report

and degloving injuries. He also had swelling of the right forearm suggesting fracture. After the initial evaluation, he soon went into cardiac arrest. CPR was started according to standard protocol. Meanwhile, he was intubated and we had obtained an IV access in the left cubital vein, through which we rushed crystalloids and blood products. To attain one more IV access, we had to insert a subclavian central line on the right side through infraclavicular approach; during CPR in the first attempt itself with very minimal interruption. ROSC was attained after 40 minutes and was started on post cardiac arrest care measures. Portable chest X-ray was taken which when reviewed showed the tip of the subclavian venous catheter malpositioned into the contralateral subclavian vein (Fig.1). The patient was being planned to be shifted to operation theatre for definitive hemorrhagic control and fracture fixation, when he again went into cardiac arrest an hour later. Resuscitative efforts were re-started but he couldn't be revived again.

DISCUSSION

Placing a central line has many advantages which include central venous pressure monitoring, volume resuscitation, infusion of hyper-alimentation, infusion of concentrated solutions etc. The ACLS guidelines have also mentioned placing a central line by an appropriately trained provider (internal jugular or subclavian) during cardiac arrest unless there are contraindications. The advantages include peak drug concentrations and shorter circulation times compared with drugs administered through a peripheral IV catheter (Link *et al.*, 2015). The subclavian vein has a caliber of 1-2 cm in adults and is thought to be held open by its surrounding tissues even in severe circulatory collapse. This route may also be preferred in trauma patients with suspected cervical spine injury. The right subclavian vein is usually preferred as this approach avoids damage to the thoracic duct. The infraclavicular approach is most commonly used where the needle is inserted into the skin slightly below the lower border of the middle and medial thirds of the clavicle. The needle is kept in the horizontal plane advancing medially posterior to the clavicle aiming for the sternal notch. The needle should not pass beyond the sternal head of the clavicle (Key and Duffy, 2017). During subclavian vein catheterization, the most common misplacement of the catheter is cephalad, into the ipsilateral internal jugular vein (IJV), accounting for 60-70 % of all malpositioning (Ambesh *et al.*, 2001). We report this case since contralateral subclavian is an extremely unusual site for malpositioning. Tripathi M *et al* suggested that keeping the guide wire J-tip directed caudally increased the placement of central venous catheters towards the right atrium. Real-time US guidance for CVC insertion, with or without Doppler assistance, improves catheter insertion success rates, reduces the number of venipuncture attempts prior to successful placement, and reduces the number of complications associated with catheter insertion (Bold *et al.*, 1998). In our case guide wire was inserted in the right subclavian vein which passed through the right brachiocephalic vein and instead of entering the superior vena cava, entered into the left brachiocephalic vein, and finally positioned into left subclavian vein. Since, the patient could not be revived after the second cardiac arrest, efforts to reposition the subclavian central line was put off.

CONCLUSION

Central venous catheter placements are a blind procedure and misplacement of CVC remains a known but uncommon complication as in our case report showing unusual misplacement. Confirmatory chest x-ray still remains the easiest method to confirm the catheter position and must always be done. The consensus among experts is that a malpositioned CVC is suboptimal. In most circumstances, if a catheter is malpositioned, a priority should be to reposition, replace, or remove as soon as it is practical (Gibson and Bodenmham, 2013) (Nayeemuddin *et al.*, 2013).

Case Report

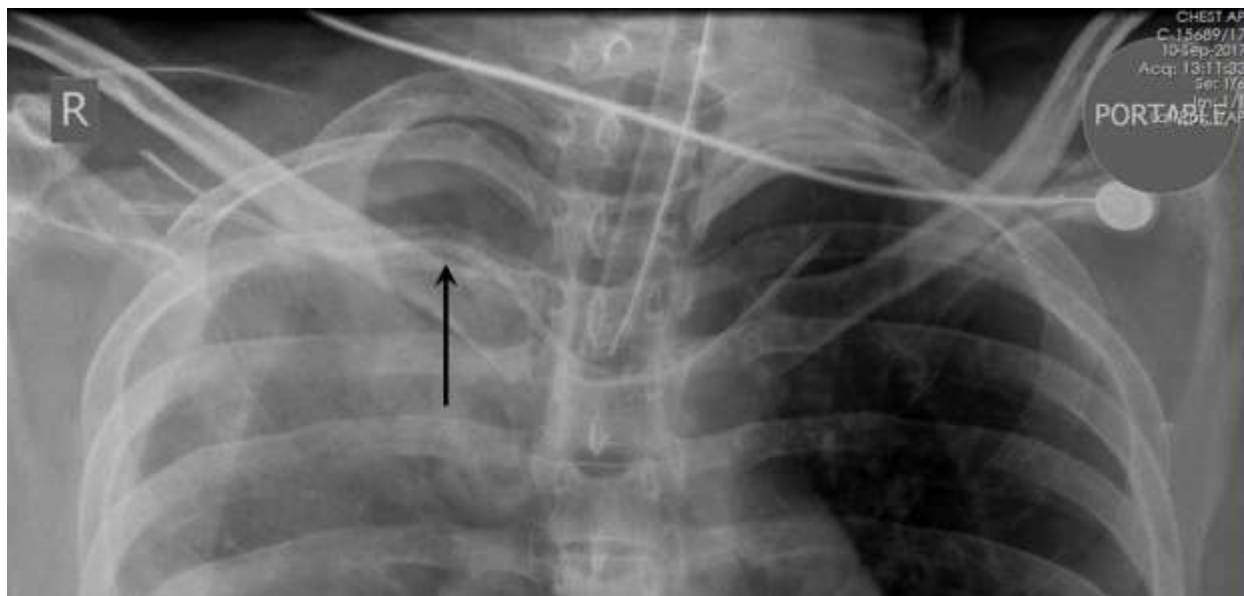


Figure 1: Subclavian central catheter tip malpositioned in the contralateral subclavian vein

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