



Misplacement of Central Venous Catheter into Inferior Vena Cava

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Abstract:

Central venous catheter insertion is defined as placement of an indwelling catheter into a large central vein of the body to administer fluids and medications. However, like every other invasive procedure it is also associated with inherent risks and complications, even in the hands of expert clinician. We here in, report a case of misplacement of a part of central venous catheter into inferior vena cava during its removal. Use of ultrasound has not only decreased the complications related to catheter placement but also diagnosis of its complications.

Keywords: Central venous catheter, complication, ultrasound

Introduction:

Central line insertion is a skilled procedure frequently desired in emergency and intensive care unit. It is often used for drug delivery, sampling, nutrition, and functional haemodynamic assessments but like other invasive procedures it is not devoid of complications like pneumothorax, chylothorax, arterial puncture, nerve injury, malposition of catheter and catheter site infection etc.¹ We report a very rare accidental complication of central line catheter where it stretched and tore into pieces while removing.

Case Report: A 55-year-old male with road traffic accident presented to private hospital with head injury, multiple rib fractures in hemorrhagic shock where he was resuscitated and stabilized. With a right side subclavian central venous catheter and left side ICD with underwater seal, patient was referred to our hospital for further management. On arrival his vitals were stable with 6 lt/min of oxygen. His CT chest revealed left sided haemo-pneumothorax with collapse of left lung and mediastinal shift towards left with fracture of 3rd to 11th ribs along left clavical fracture. CT head showed pneumocephalus with EDH without any midline shift. Neurosurgical & Orthopaedic opinion was sought. Pain management and supportive care was initiated. On post trauma day 3, his central line was blocked and was without negative aspiration, so its removal was planned. Procedure was performed by surgical resident on ward duty, while removing the central line there was some resistance and when he pulled it with some effort, the catheter was stretched and removed incompletely (Figure 1), leaving the distal end inside the vascular tract. Immediately surgical local site exploration was done but another end of central line was not traceable. Xray Chest was done but central venous catheter could not be located. Patient was shifted to intensive care unit in view of increased oxygen requirement and haemodynamic instability. 2D Echocardiography (subcostal view) with pointer towards right shoulder revealed tip of torn central line inside inferior vena cava (Figure 2) which was confirmed by contrast CT scan also. Interventional removal of catheter was planned by cardiology department but unfortunately could not be processed due to non-affordability of the patient. Risk of venous thromboembolism was explained to patient. Then Surgical Removal of catheter tip was planned afterwards. But meanwhile patient's haemodynamic status deteriorated, left femoral central line was inserted and he was started on vasopressors and inotropes. Further patient was intubated for respiratory support. Gradually patient haemodynamics and respiratory parameters could not be maintained, and he had cardiac arrest from which he could not be revived.



Figure 1 . Proximal part of torn central venous catheter



Figure 2 . Distal part of torn Central venous catheter seen in Inferior Vena Cava in subcostal view.

Discussion

Central venous catheterization (CVC) is a routinely performed procedure for gaining large vascular access in patients who present in shock and in various other clinical scenarios. We use them for administering drugs, cardiac catheterization, total parenteral nutrition and transvenous cardiac pacing.² Various sites of catheter placement are internal jugular vein, subclavian vein, and femoral vein. Selection of the site depend upon patient's condition and ease of clinician.³ Usually right sided veins both internal jugular and subclavian are preferred sites for CVC placement due to low complication rates. A clinician should be aware of anatomy and possible complications during and after catheter placement.

Complications are inadvertent arterial puncture, hematoma formation, airway obstruction, phrenic nerve injury, hemothorax, pneumothorax, air embolism, venous embolism, malpositioning and misplacement etc. Great expertise is required for successful placement of a CVC catheter.^{4,5,6}

Our patient had history of polytrauma from roadside accident. He was in hemorrhagic shock so right sided subclavian vein catheter placed for resuscitation. It got blocked and blood could not be aspirated from any port so surgical team decided to remove it. During removal it stretched and broke down while a part remained in patient's vasculature. Chest X-ray didn't show the remaining part. 2D Echocardiography revealed tip of torn central line inside inferior vena cava which was confirmed by CT scan. Interventional removal could not be planned as patient wasn't able to afford cost.

Meanwhile patient became hemodynamic unstable and could not be revived despite our best efforts.

Use of ultrasound has not only decreased the complications related to catheter placement but also diagnosis of its complications like pneumothorax, vascular injury, misplacement¹ etc. Great care should be undertaken while removal of central venous catheter as it may break and distal part can embolize in major vessel. In our patient the broken part got struck in inferior vena cava leading to hemodynamic instability and arrest.

Ideal management would have been immediate fluoroscopic guided interventional removal of fractured end with a gooseneck snare but unfortunately patient was not able to afford the expenses. But more than that prevention of such complication was possible by avoiding excessive force, may be taking the central venous catheter out over guide wire using seldinger technique could have been a better option. So it is a lesson to be learned not to forcefully attempt the removal of central venous catheter in case of any resistance is experienced while pulling it.

Conclusion:

Clinician should be aware of potential complications while insertion and removal of the CVC catheter. Ultrasound and Echocardiography are excellent repeatable bedside modality which can be used not only to place a CVC but also to diagnose and manage CVC related complications. But prevention is better than cure and removal of CVC should never be forcefully pulled in case of any resistance.

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Reference:

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