

Malposition of Central Venous Catheter – Three case reports.

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Abstract: Central Venous Cannulation is a routine procedure done in the Operation Theatre and the Intensive Care Unit. Malpositioning is a very common occurrence with the regular anatomical landmark technique. As the central venous catheters are essential in various critical care scenarios, hence any misplacement can hamper its purpose. Here we have three cases where in we saw the migration of the Right Subclavian Vein Catheter into the Ipsilateral Internal Jugular Vein, Contralateral Subclavian Vein and into the Ipsilateral External Jugular Vein radiologically. Hence a thorough knowledge of normal and variant anatomy is required for the proper positioning of Central Venous Catheters. Also radiological techniques like ultrasound guided cannulation may avoid inadvertent arterial puncture but may not be able to avoid malpositioning.

Keywords: Central Venous Catheter, Malposition, Right Subclavian Vein.

I. Introduction

Central Venous Catheterization is a regular procedure done in the Operation Theatre and the Intensive Care Unit. It is a challenging procedure which requires a good knowledge about the normal and variant anatomy and some expertise is required for the correct placement. Any misplacement can hamper its purpose and lead to further complications which may be life threatening also. Some of the complications that may occur with malpositioning can be thrombosis, thrombophlebitis and inaccurate measurement of Central Venous Pressure.[1] Embryological variations such as persistent left – sided superior vena cava[2] are often diagnosed incidentally only after placement of a Central Venous Catheter, which is seen to take an abnormal course on X – ray. Acquired abnormalities such as stenosis or thrombosis of the central veins can be problematic and can present as a failure to pass a guidewire or catheter or complications after many such attempts.

II. Case Reports

2.1 Case 1: A 55 yr old male patient operated for carcinoma cheek required parenteral nutrition. The Right Subclavian Vein was cannulated and post cannulation a chest radiograph was taken which revealed migration of the catheter into the Ipsilateral Internal Jugular Vein. Later the catheter was removed and reinserted and the position was confirmed in the Superior Vena Cava radiographically.

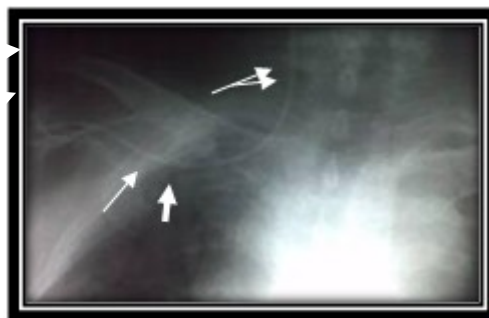


Fig. 1- This figure shows the migration of the Right Subclavian Vein Catheter into the ipsilateral Internal Jugular Vein.

Case 2: A 65 yr old lady with uncontrolled diabetes mellitus came to us with altered sensorium, hyperglycemia and dyselectrolytemia who required electrolyte corrections. A Right subclavian vein cannulation was attempted but revealed its migration into the contralateral Subclavian vein which was then withdrawn and positioned in the superior vena cava.

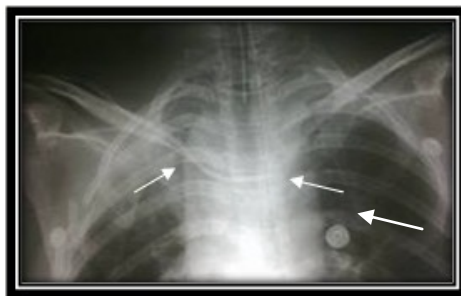


Fig. 2 –This figure shows the migration of the Right Subclavian Vein Catheter into the contralateral Subclavian Vein.

Case 3: A 37 yr old male patient was posted for Duodenojejunostomy. A Right Subclavian Vein Catheterisation was done in the operation theatre post – induction and intubation for intravenous fluid administration and central venous pressure monitoring but when a chest radiograph was done in the intensive care unit after the surgery it revealed the migration of the catheter into the right External Jugular Vein. We also observed that, when whole blood was transfused using the catheter we observed that there was no free flow.

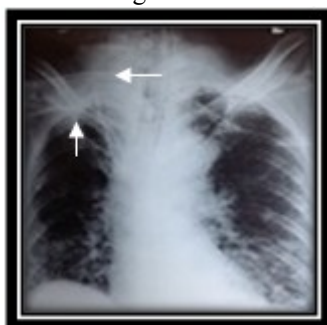


Fig. 3- This figure shows Right Subclavian Vein Catheter had a loop and then was seen to enter the ipsilateral external jugular vein.

III. Discussion

Malpositioning is a very common complication that occurs and migration of the subclavian catheter into the ipsilateral internal jugular vein is the most common malposition accounting for 60 – 70% of total malpositioning. Migration of the catheter tip into the contralateral subclavian vein is an uncommon occurrence which is around 0.5%. Other common sites for malposition include the external jugular vein, azygos vein, superior intercostals vein and the thymic vein. In all our three cases we used the anatomical landmark technique.[3]

There may be situations when there may be an anatomical or acquired variation which may cause malpositioning of the central venous catheter. Some of the anatomical variations in neck veins are Left Superior Vena Cava or persistent Superior Vena Cava or rarely patient may present with Dextrocardia.[5] While some of the acquired variations are stenosis or thrombosis of previously cannulated patients, stricture in the superior vena cava when patients are cannulated for hemodialysis, tortuosity of veins or due to mediastinal shifts in cases of effusions or lung collapse. [5]

Many studies have shown the possible causes for malposition of the central venous catheter. Some authors assume the length of the guidewire to be the cause while some other authors assume the length of the catheter itself maybe a cause for malpositioning in adults[5]. Some authors opine that the average safe insertion depth of central venous catheter from left subclavian vein is approximately 16.5cm and should not exceed a depth of >20cm from the right sided veins[6].

There have been studies showing the techniques which help to prevent malposition which include assuring that the J – tip of the guidewire is pointing caudal during insertion, turning the head towards the side of insertion which narrows the internal jugular vein, Ambesh Manuever[1] – which includes manual compression of the junction between internal jugular vein and subclavian vein while threading the guidewire, by flushing 10ml of saline and asking the patient if he can hear or feel any water gushing next to his ear[1].

Complications seen following malpositioning may be local toxicity, perforation, thrombosis, hematoma, neurological deficits or kinking of the catheter[6].

Some authors suggest that central venous catheterization using ultrasound guidance has reduced the incidence of failure or malpositioning but some authors are of the opinion that ultrasound guidance has no effect on the rate of complication, malposition or failure of subclavian – vein catheterization[4].

IV. Conclusion

Hence insertion of central venous catheter remains to be a challenge and suggests that ultrasound use and chest radiograph PA view will help to identify malposition of central venous catheter placement. Hence use of ultrasound and chest radiograph should be made mandatory in all central venous catheter placements.

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