CASE REPORT

Unusual Complications of Ultrasound Guided Central Venous Cannulation

Sonu Sama[1], Sanjay Agarwal[1]*, Vijay Adabala[1], Michael Leonard Anthony[2]

Central venous catheter (CVC) insertion is a common procedure in operation theaters and intensive care units (ICU). The procedure is performed through anatomical landmark technique, open surgical procedure, and ultrasound-assisted insertion. In the 1990s, ultrasound guidance of CVC insertion has been advocated as a means to reduce mechanical complications and placement failures compared with the landmark technique. Still CVC complications can be related to insertion, indwelling, or extraction. There is a need for continuous monitoring to avoid possible risk factors so as to minimize the morbidity and mortality.

Keywords: Central venous catheter; Ultrasound; Pleural effusion

Central venous catheter (CVC) insertion is a common procedure in operation theaters and intensive care units (ICU). The procedure is performed through anatomical landmark technique, open surgical procedure, and ultrasound-assisted insertion. In the 1990s, ultrasound guidance of CVC insertion has been advocated as a means to reduce mechanical complications and placement failures compared with the landmark technique. Still CVC complications can be related to insertion, indwelling, or extraction. We report two rare complications associated with ultrasound guided central line insertion.

Case Description 1

A 25 year old female patient, diagnosed case of tubercular meningitis, underwent right sided ventriculo peritoneal shunt surgery was shifted for ventilator support in view of low preoperative Glasgow Coma Scale (GCS). Central line was inserted in left Internal Jugular Vein as the patient was hemodynamically unstable for inotropic support. Successful insertion of the central cannulation was performed under ultrasound guidance. Two days after central line insertion we noted anhydrosis on the left side of the face with mild ptosis and anisocoria of pupils (left pupil smaller than right pupil) (Figure 1). On palpation of neck no lymph nodes were palpable. Imaging revealed no abnormality in chest and neck. Ophthalmology consultation was done. Provisional diagnosis of Horners syndrome was made and confirmed with apraclonidine test.

Figure 1- Patients face with Anhydrosis and Ptosis on the left side of face.

Case Description 2

A 56-year old male diagnosed case of pituitary tumour operated for transnasal transpnenoidal tumour and mass excision was shifted for postoperative ventilation due to intraoperative blood loss and hemodynamic instability. As the patient had persistant hypotension not responding to fluid therapy decision of CVC insertion and inotropic support was taken. Right IJV cannulation was done under USG guidance and a triple lumen 7 FG catheter inserted on first attempt, aspiration of blood from all the ports was confirmed. Patient was started on inotropic support, and gradually weaned off from ventilator in next 24 hours. As the patient had stable hemodynamics patient was shifted to ward. On 3rd postoperative day patient developed

[1]Department of Anesthesiology, All India Institute of Medical Sciences Rishikesh, Rishikesh, India.
[2]Department of pathology, All India Institute of Medical Sciences Rishikesh, Rishikesh, India.
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*Corresponding author: Sanjay Agarwal, MD. Department of Anesthesiology, All India Institute of Medical Sciences Rishikesh, Rishikesh, India. E-mail: sanjay.anaes@aiimsrishikesh.edu.in

respiratory distress and was again shifted to ICU for further management.

On arrival to ICU patient had tachypnea (respiratory rate of 40/min) and absent breath sounds on right side of chest. Patient was put on NIV support and ultrasound of chest done which showed massive pleural effusion on right side which was confirmed with a bedside chest x-ray (Figure 2). Aspiration of the central line showed serosanguinous fluid from all three ports. Right sided Inter Costal Drain was inserted and approximately 1.5-2 L serosanguinous blood stained fluid was drained gradually, after which patient showed clinical and radiological improvement. (Figure 3). The CVC was removed and pressure dressing applied. Pleural fluid examination showed red cell count of 80,000/cu.mm, WBC count of 300/cu.mm, and sugar 0f 45mg/dl and protein of .09mg/dl.

Figure 2- X-ray of a patient showing massive effusion on the right side

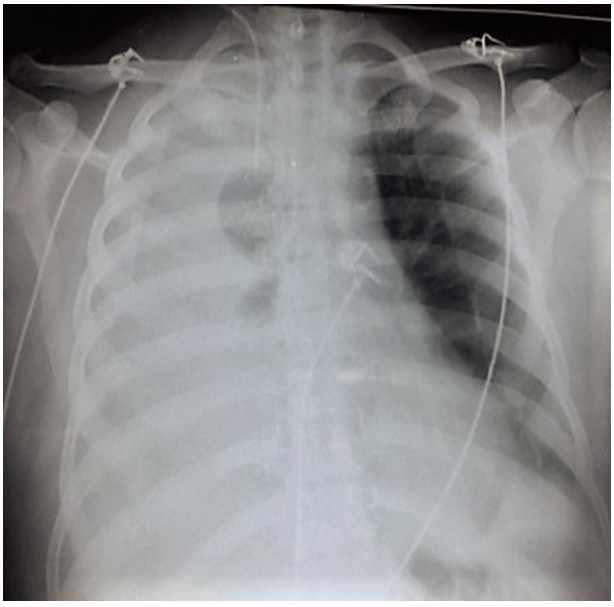
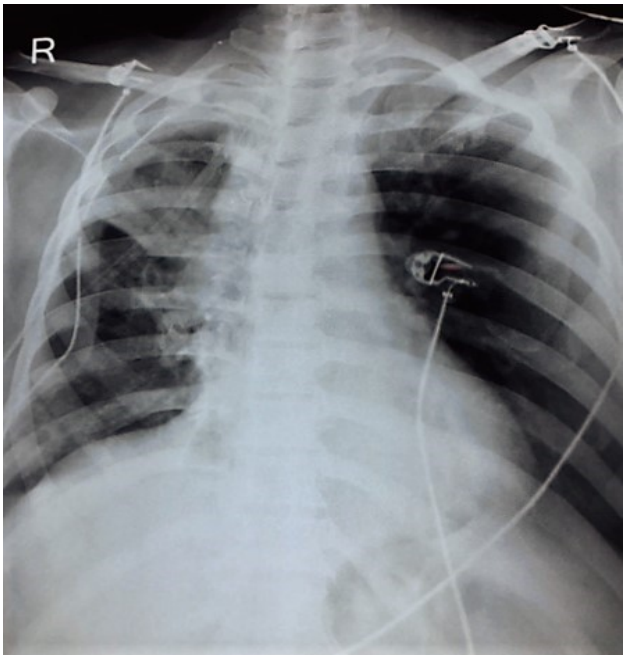


Figure 3- X-ray of the patient with right side ICD in-situ with lung expansion



Discussion

The complications related to CVC insertion can be divided into immediate and delayed complications. The immediate complications are like arterial puncture, pseudo-aneurysms, arterio-venous fistulas, arrhythmias vascular and cardiac perforation, hematoma, hydrothorax, cardiac tamponade, tension pneumothorax, and air embolism [1] etc. The delayed complications include infection, thrombosis, catheter malfunction, catheter migration, vascular erosion, retained intravascular catheter fragments, and formation of calcified cast in a long-term indwelling CVC.

Hydrothorax is a delayed complication of CVC insertion. It can be either due to placement of an indwelling subclavian or internal jugular central venous catheter. Immediate complications are anticipated and managed accordingly most of the times whereas, delayed complications can go unnoticed. One of the independent risk factors is left-sided vessels for catheter placement because these catheters are more likely to abut the right wall of superior vena cava at a sharp angle resulting in endothelial damage and subsequent vascular erosion and hydrothorax [2]. Paw have reported that the incidence of malposition following catheterization via the left IJV was more than the right IJV [3]. The position of catheter can change with respiration, postural rotation, and neck movements [4]. The explanation given for extravasation of fluid include endothelial damage, phlebitis of vessel wall, leading to perforation and migration of CVC.

Horner syndrome is characterized by classic triad of miosis (constricted pupil), partial ptosis, and loss of hemifacial sweating (anhydrosis) which results from an interruption of the sympathetic nerve supply to the eye. It may be congenital, acquired, or hereditary (autosomal dominant) [5]. Birth trauma is a frequent cause of Horner syndrome. Acquired Horner syndrome with no previous surgery is usually thought as being associated with potentially serious underlying disease. Sympathetic fibers may get disrupted centrally (ie, between the hypothalamus and the fibers' point of exit from the spinal cord [C8–T2]) or peripherally (ie, cervical sympathetic chain, superior cervical ganglion, or along the carotid artery [7].

Although there were case reports reported on Horners syndrome following internal jugular vein cannulation most of them were associated with failed or difficult catheterization [6]. Another possible cause of Horner's syndrome implicated is dissection of the carotid artery, with associated risk of severe cerebrovascular complications accordingly we have excluded carotid artery dissection in our patient. Hematoma developing at the cannulation site may cause direct compression and damage the stellate ganglia or its associated sympathetic neurons that supply the eye, which are embedded in the carotid sheath with the internal jugular vein [8].

Although Ultrasound has become gold standard for CVC insertion but it has its own limitations for confirming tip position. Chest x ray has its own limitation as it is a 2D view and without obvious misplacement it cannot detect the position of catheter. The gold standard for confirming catheter tip is CT scan with contrast, but is expensive. There is a need for continuous monitoring to avoid possible risk factors so as to minimize the morbidity and mortality.

Conclusion

CVC complications can be related to insertion, indwelling, or extraction. There is a need for continuous monitoring to avoid possible risk factors so as to minimize the morbidity and mortality.

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