Migration of subclavian venous catheter tip: Patient positioning in ICU makes a difference

Sir,

Right subclavian vein cannulation is one of the commonest central venous catheter (CVC) placements carried out in intensive care unit for administration of vasopressors, inotropes, and various other purposes. The CVC catheter tip migration is a known complication seen through infraclavicular approach of subclavian vein cannulation. The incidence reported is 5.5-24%.[1] There are various factors held responsible for the spontaneous migration of catheter tip such as, "jet effect" of drug injection, increased intrathoracic, intra-abdominal pressures, and mechanical ventilation.[1,2] The CVC catheter tip placement in various venous tributary systems and structures such as left subclavian vein, left internal mammary vein, azygos vein, hemiazygos vein, lateral thoracic vein, inferior thyroid vein, left superior intercostal vein, thymic vein, pleural cavity, and the jugular foramen is known.[3] CVC malpositioning into left subclavian through right subclavian is also been described in literature.[4]

We report a case of spontaneous migration of tip of CVC, after correct insertion in right subclavian vein into the left brachiocephalic vein with change in patient's arm position. A 14-years-old boy admitted to the ICU with history of neck stiffness and fever since 3 days and sudden loss of consciousness. His respiration was supported mechanically with pressure controlled ventilation and PEEP of 6 cm of H_2O. Vasopressors and inotropes were required for his hemodynamic instability. A CVC (ABLE® Disposable Triple lumen catheter 7Fr-16 cm length) was placed through the right subclavian vein under ultrasound guidance. The bedside chest X-ray confirmed the position of CVC tip at superior vena cava – right atrium junction [Figure 1]. On day 3, a repeat bedside chest X-ray was taken in sitting position. To achieve a satisfactory view for chest X-ray patient's arm position was repeatedly manipulated through a wide range of arm movement from adduction to abduction of 180° to rotate the scapulae. We noticed that, the tip of CVC migrated to left brachiocephalic vein with exaggerated curve of the catheter under the clavicle [Figure 2].

According to our review of literature, this is the first report of early migration of CVC tip from initial correct position to left brachiocephalic vein. A late migration of CVC tip from its initial position has been proposed to be with a possible explanation of more medial placement of catheters into subclavian vein.[1] This was related to mechanical compression forces in the cervico-axillary area between clavicle, subclavius muscle, costocoracoid ligament anteriorly and first rib, and anterior scalene ligament posteriorly.[2] Our CVC catheter placement is more lateral into the subclavian vein as recommended by de Graaff *et al*. to avoid the entrapment or kinking of the CVC. A more lateral approach leads to insertion of CVC into the subclavian vein through axillary vein. This approach leads to traversing pectoralis minor muscle and other soft tissues depending on the distance and angle of insertion into the vein.[5] The point of skin fixation and the length of catheter through pectoralis minor and soft tissues make

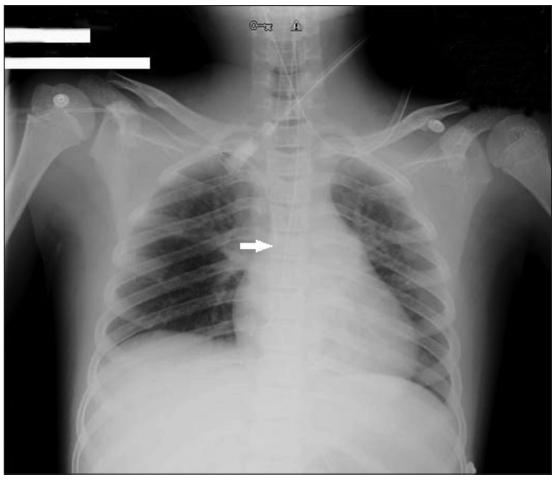

Figure 1: Chest X-ray with central venous catheter tip (white arrow) at superior vena cava-right atrium junction with patient in supine position (Day 1)

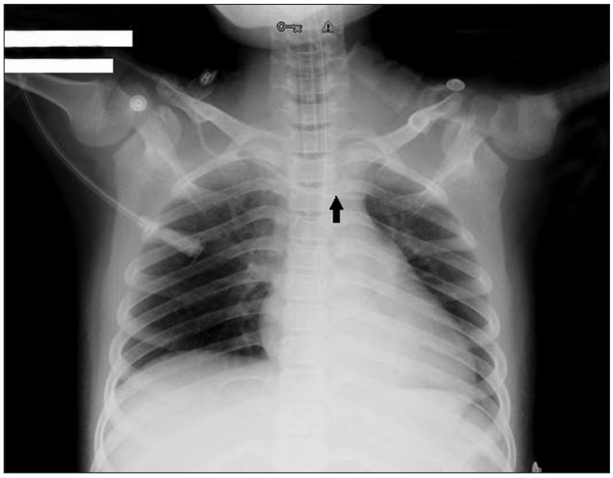

Figure 2: Chest X-ray with central venous catheter tip (black arrow) migrated to left brachiocephalic vein on patients arm position in hyper abduction (Day 3)

the catheter part fixed while the intravascular part more mobile during arm rotation. This might cause pulling of the catheter as the arm is abducted to 180° and the tip moved and migrated to the left brachiocephalic vein. The skin fixation point of CVC preferably over the chest and curling the line back over chest rather than taping on arm can avoid pulling force on the catheters. A careful patient positioning during ICU procedures like bedside chest X-rays, in patients with CVC should be kept in mind to avoid such problem. The migrated CVC catheter should be removed and new catheter should be placed, if continuous central venous pressure monitoring is required.[1]

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