Inadvertent Subclavian Artery Canulation.. The Tip Is In The Tip!
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Description
The chest x-rays (CXR) shown were taken to confirm central venous line position and rule out pneumothorax in two different patients, using a left subclavian vein access. Both revealed no pneumothorax. The CXR on the left (A) demonstrates a normal course of the catheter with the tip ending on the right of the trachea where the right atrium is expected. The CXR on the right (B), however, exhibits an atypical course of the catheter with the tip ending on the left side of the trachea, indicating a possible inadvertent canulation of the left subclavian artery, which was confirmed with pressure transduction.

Central venous catheters provide an easy and reliable access to the venous circulation for administration of medications and hemodynamic measurements in the critically ill patient, and have been in use for many decades [1]. The most common access sites include the internal jugular, subclavian and femoral veins; all of which run alongside their corresponding arteries, which poses a risk of inadvertent arterial canulation and injury [2].

The overall reported complication rate with central venous access is 14%; including arterial puncture, improper position, pneumothorax, hematoma, hemothorax, and asystolic cardiac arrest of unknown etiology; with the subclavian approach accounting for the greatest percentage (39%) of observed complications [3]. The subclavian vein approach is particularly susceptible to unintentional artery canulation due to the depth of the vein underneath the clavicle and the difficulty using ultrasound guidance; this complication has been reported in 2.7% of subclavian vein approach procedures, compared to 1% for the internal jugular vein technique [4].
Musculoskeletal abnormalities, anomalous vascular anatomy, hypotension causing loss of pulsatile flow and emergent nature of the procedure can increase the risk of arterial cannulation. Stroke [5] and subclavian artery occlusion during endovascular repair of such arterial injuries [6] have been reported.

Prompt recognition of iatrogenic arterial injury is crucial to early successful repair. Catheter tip position on CXR and transduction of an arterial waveform can confirm the diagnosis. CT scan of the chest and angiography help assess the extent of the injury and identify an entry site [7].

Successful endovascular repair of subclavian artery cannulation injury has been reported utilizing collagen-based closure devices (Angioseal) [8], suture-mediated closure devices (Perclose) [9], temporary balloon tamponade [10], stent-graft placement [11], Gelfoam Pledge tract embolization and gradual sheath downsizing [12]. Manual compression is rarely sufficient given the lack of compressibility of the vessel, and may cause a pseudoaneurysm or a massive hemothorax.

References:


KEYWORDS: Subclavian artery; Central venous line; Intravascular access

Reference this article as: