



# Misplaced Central Venous Catheter: Diagnosis and Management of Femoral Artery Cannulation

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**Keywords:** Central venous catheter (CVC); Arterial cannulation; Femoral artery injury; Contrast-enhanced CT angiography.

**Abbreviations:** CVC: Central venous catheter; CTA: Computed tomography angiography.

## Case Observation

A 72-year-old patient arrived at the emergency department experiencing respiratory distress. As his condition worsened, a central Venous Catheter (CVC) was placed. Shortly after, the patient developed a hematoma in the groin region and lower limb ischemic symptoms. Contrast-enhanced CT Angiography (CTA), performed after the catheter had been removed but with contrast administered through the catheter prior to its removal, further delineated the arterial anatomy and ruled out significant complications. Given the catheter's large bore and the high-risk arterial involvement, surgical intervention was performed to remove the catheter and repair the arterial puncture. Postoperative management included close monitoring and anticoagulation therapy to prevent thrombosis, with no complications observed.

## Abstract

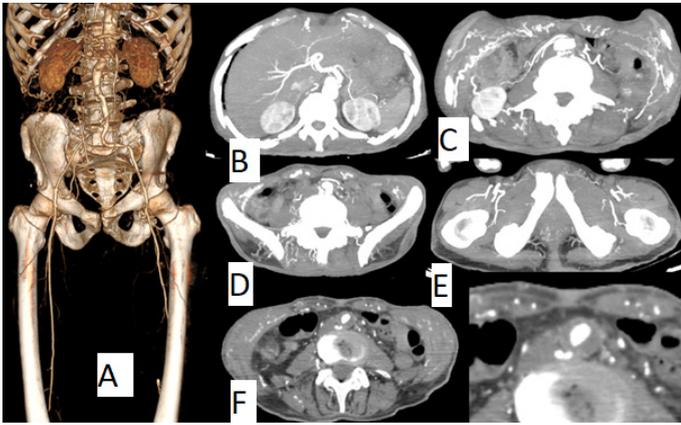
Accidental arterial placement of a Central Venous Catheter (CVC) is an uncommon but potentially serious complication of vascular access procedures. This complication is most frequently encountered during attempts to cannulate the internal jugular or femoral veins, where close anatomical proximity to major arteries increases the risk. Such misplacements can lead to severe outcomes, including arterial thrombosis, hematoma, pseudoaneurysm, or fatal bleeding, particularly with large-bore catheters. Early recognition is critical, aided by clinical indicators like pulsatile blood flow, high-pressure readings, and imaging confirmation. Management strategies range from manual compression to surgical or endovascular interventions, depending on the catheter size and arterial involvement. Preventive measures, such as ultrasound-guided techniques and proper training, have significantly reduced these complications.

## Comment

Misplacement of a central venous catheter in an artery underscores the importance of careful procedural technique and early detection. Imaging modalities such as ultrasound and CT angiography are crucial in preventing and diagnosing arterial cannulation [1]. The management strategy depends on the catheter's size and arterial involvement; smaller catheters can often be removed with manual compression, larger bore catheters, or those in high-pressure arteries require surgical or endovascular repair to prevent severe outcomes. Prevention hinges on using ultrasound guidance during catheter placement and rigorous verification of venous positioning before use. Integrating these practices into routine care is essential to reduce morbidity and enhance patient safety [2].



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**Figure 1:** A 3D reconstruction of CT angiography was performed via a misplaced venous catheter inserted into the femoral artery before its removal (A). Panels B to E display MIP CT sections, highlighting the vascular anatomy, including arteries and capillaries throughout the body. Notably, in panel F, there is a partial filling of the aorta due to contrast injection from the femoral artery, resulting in a filling artefact influenced by blood hemodynamics.

## References

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