AMSER Case of the Month October 2025

77-year-old female with persistent unremitting right hip and knee pain after ORIF of a femoral fracture due to a ground-level fall

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Patient Presentation

History of Present Illness

- 77-year-old female presents with acute displaced distal femoral diaphyseal fracture after a ground level fall
- Received open reduction and internal fixation of the femoral fracture.
- Persistent unremitting right hip and knee pain and altered mental status since operation

PMH Asthma, Parkinson's disease, hypertension, anxiety/depression, right-sided hip replacement, cholecystectomy, hysterectomy

Patient Presentation (cont.d)

Physical Exam

- **VASCULAR**: Nonpalpable b/l DP and PT.
  - Multiphasic signals in b/l DP and PT. Warm and well perfused throughout.
  - **ABI** of RLE: 0.96, **ABI** of LLE: 1.5
- **NEUROLOGICAL**: Motor and sensation remain intact in b/l lower extremities.

Pertinent Labs

- **Hgb 11.4 (pre-op) → 6.8 (POD#3)**
- **Cr 0.93 (pre-op) → 0.93 (POD#3)**

Differential Diagnoses

- Hardware-related complication (e.g entrapment, or hardware failure)
- Post-operative infection (e.g. osteomyelitis, septic arthritis)
- New fracture of distal femur
- Deep vein thrombosis

Select the applicable ACR Appropriateness Criteria

Variant 6: **Lower-extremity vascular trauma. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CTA lower extremity with IV contrast	Usually Appropriate	☢☢☢
Arteriography lower extremity	May Be Appropriate	☢☢☢
US duplex Doppler lower extremity	May Be Appropriate	O
MRA lower extremity without and with IV contrast	Usually Not Appropriate	O
MRA lower extremity without IV contrast	Usually Not Appropriate	O
US intravascular lower extremity	Usually Not Appropriate	O

This imaging modality was ordered by the orthopedic surgeon

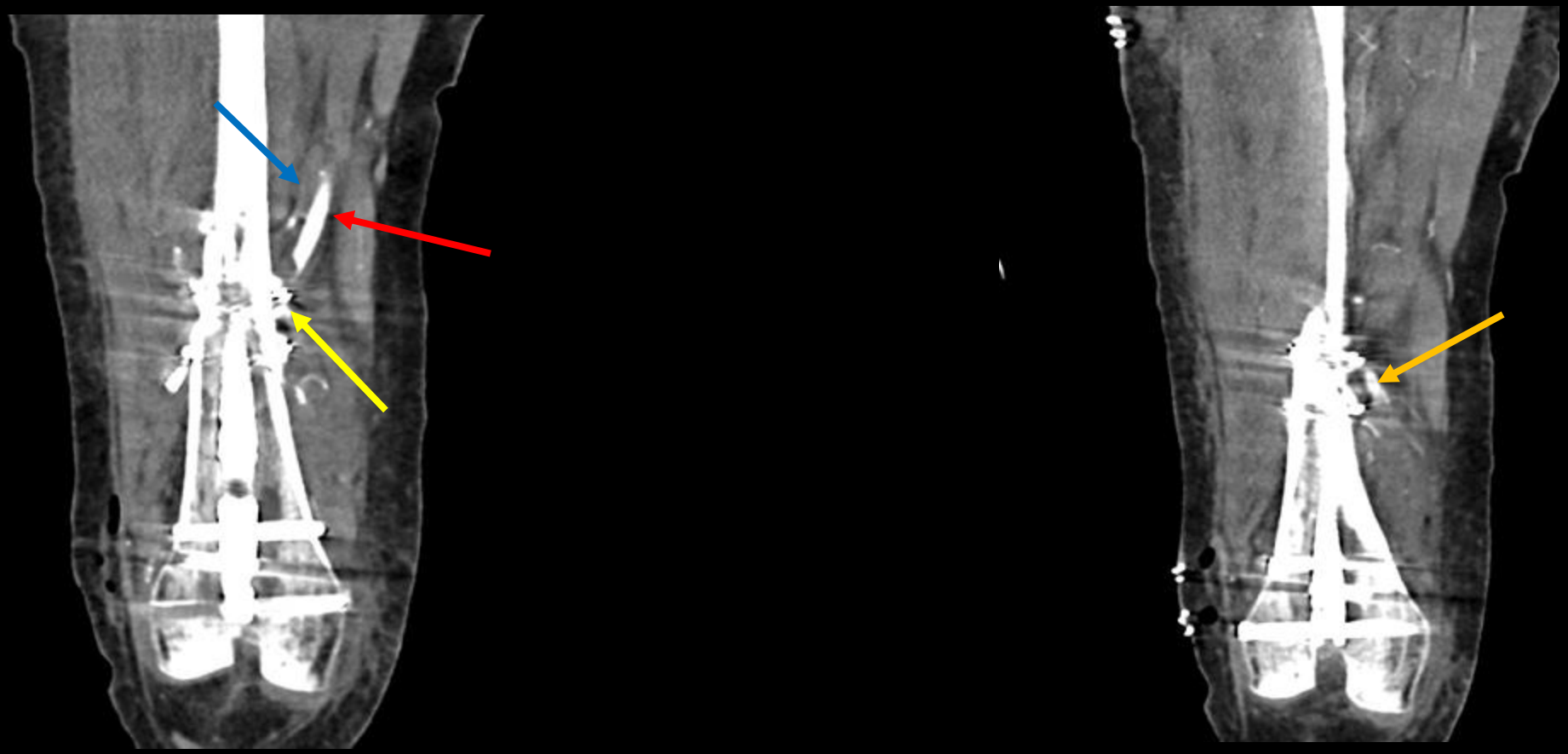
Findings (unlabeled)

Coronal CT angiography (CTA) of the femur after intravenous contrast and performed in the arterial phase.

Coronal CTA of the femur after intravenous contrast and performed in the arterial phase.

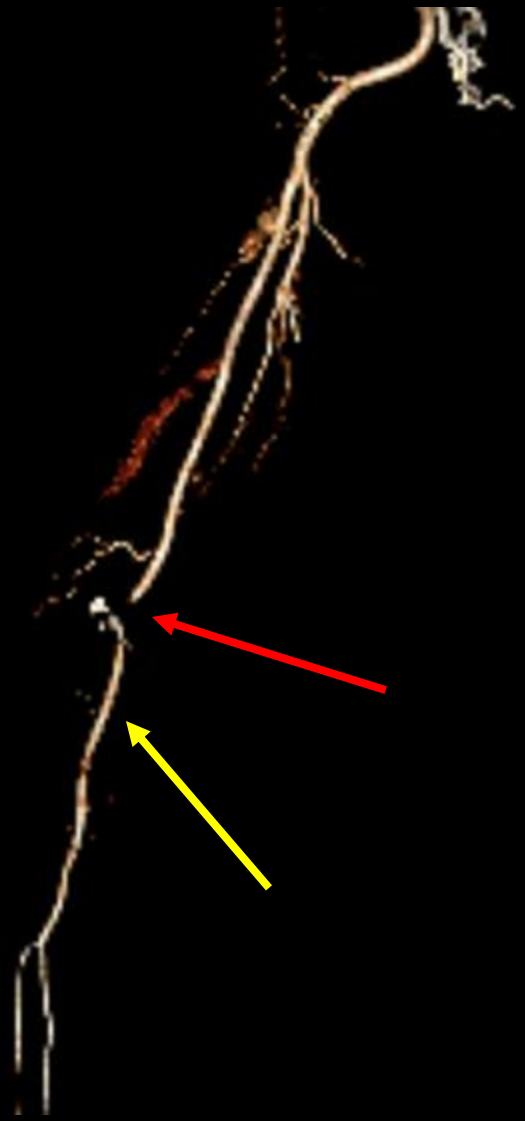
3d surface rendering reformats of the lower extremity arteries from CTA of the femur

Findings: (labeled)



Coronal CTA images of the femur with intravenous contrast in the arterial phase demonstrate the distal superficial femoral artery (red arrow) and vein(blue arrow) deviated towards the most proximal cerclage wire (yellow arrow) consistent with entrapment of the femoral neurovascular structures between the bone and the cerclage wire. The femoral nerve, artery (orange arrow), and vein extend to the normal location distal to the cerclage wire with partial opacification of the artery distal to the cerclage wire.

Findings: (labeled)



3D surface rendering reformats of the right lower extremity arteries demonstrate abrupt cut off of the distal right superficial femoral artery (red arrow) at the level of the adductor canal related to entrapment from cerclage wires. There is distal reconstitution (yellow arrow)

Final Diagnosis:

Right distal superficial femoral artery entrapment with distal reconstitution

Case Discussion (Pathophysiology)

- Cerclage wiring during femoral fracture fixation poses risk of iatrogenic vascular injury.
- Distal femur anatomy places superficial femoral artery and deep femoral artery in close proximity to the posterior cortex.
- Injury mechanisms include direct laceration, compression, kinking, entrapment, or delayed thrombosis.
- Entrapment may result in partial or complete occlusion with possible preservation of perfusion via collateral vessels.
- Potential complications: acute limb ischemia, chronic claudication, pseudoaneurysm formation, venous thrombosis, and nerve involvement.

Case Discussion (Imaging)

- **CTA** is the gold standard for diagnosis:
  - Identifies abrupt arterial cutoff, site of entrapment, degree of vessel occlusion, and distal reconstitution.
- **Duplex ultrasonography** may aid in assessing distal flow but is limited for deep structures.
- **MR angiography** serves as an alternative if contrast contraindicated.
- In this case: CTA revealed abrupt cutoff of distal SFA at adductor canal, entrapped by a cerclage wire, with distal reconstitution via collaterals.

Case Discussion (Treatment)

- Early recognition is critical to prevent irreversible ischemia.
- **Intraoperative identification** allows immediate wire repositioning or removal.
- **Post-operative management** depends on perfusion status:
  - Adequate distal flow: observation with vascular monitoring.
  - Ischemia or flow compromise: urgent vascular surgery consultation for wire removal, thrombectomy, endarterectomy, or bypass.
- Delay in diagnosis increases risk of limb-threatening complications.

References:

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Apivatthakakul T, et al. Safe zones and a technical guide for cerclage wiring of the femur: A CTA study. Arch Orthop Trauma Surg. 2018.

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