



Infrapopliteal arterial pseudoaneurysm development secondary to blunt trauma: Case series and literature review



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Background and Objectives

- Infrapopliteal arterial pseudoaneurysms (IAPs), **Figure 1**, following orthopedic injuries are uncommon and can be a challenging diagnosis.
- We present a series of IAPs that were diagnosed following blunt orthopedic trauma and discuss their management strategies.

Methods

- Case series consisting of three subjects and a systematic review of the literature.

Case 1

- 60-year-old male pedestrian was struck by a motor vehicle.
- Right, closed mid-tibia and fibula fracture that was repaired with intramedullary nail (**Figure 2A**).
- Three weeks later**, he presented complaining of pain in his right lower extremity with edema and tenderness of the right calf.
- Pulses of the dorsalis pedis and posterior tibial arteries were faint but palpable.
- A right lower extremity duplex ultrasound identified a posterior tibial artery pseudoaneurysm measuring 10 x 5 cm (**Figure 2B**).
- An angiogram of the **posterior tibial artery** identified and confirmed the pseudoaneurysm originating from an area near a fractured fragment of tibia (**Figure 2C**).
- Coil embolization of the posterior tibial artery proximal and distal to the injury was then performed (**Figure 2D**).

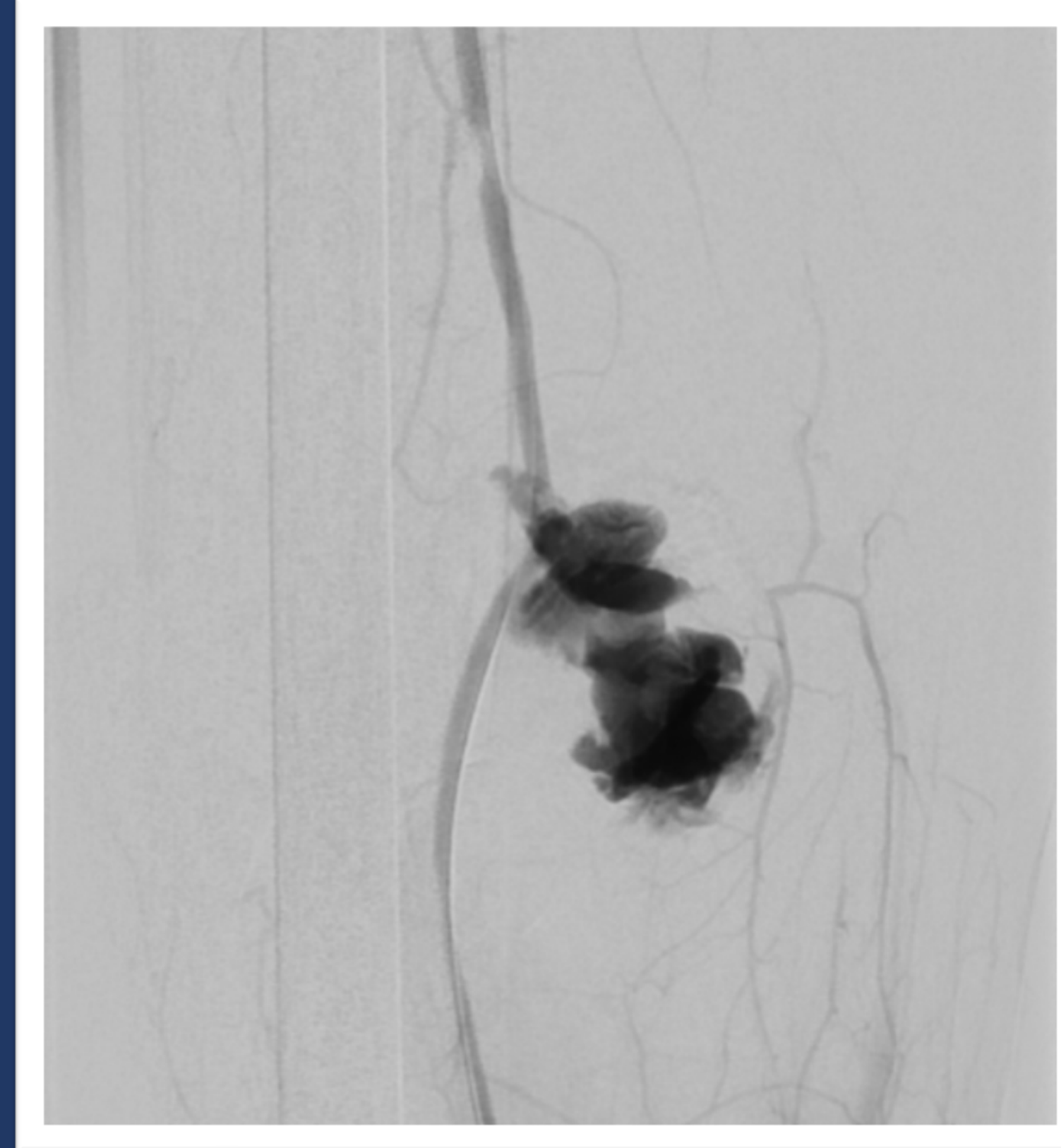


Figure 1: Angiogram displaying an infrapopliteal arterial pseudoaneurysm.

Results

- 51 reported cases in the literature since 1950.
- 59% resulted from a tibia and/or fibula fracture.
- Artery involved: anterior tibial: 43%, posterior tibial: 29%, peroneal: 22%, tibioperoneal trunk: 4%, multiple tibial arteries: 2%.
- Mean delay in diagnosis:** 5.6 months, median 1.8 months, range 1 day – 4 years.
- 41% managed with ligation, 10% endovascular embolization, 10% covered stent/stent graft, 4% saphenous vein interposition graft, 4% ultrasound guided thrombin injection, 4% spontaneously resolved, and 2% treated with ultrasound guided compression.
- Chronological shift from ligation to endovascular technique.

Case 2

- 36-year-old male pedestrian was struck by a motor vehicle.
- Bilateral, closed, proximal tibia and fibula fractures. Peripheral pulses were palpable with ABIs 1.0 bilaterally.
- Bilateral external fixators were placed for stabilization.
- One month later** he presented complaining of pain and swelling of his left lower extremity with numbness of his foot.
- Diminished dorsiflexion with hypoesthesia of the first web space and a foot drop. ABI was 1.0 on the right, 0.8 on the left.
- Angiogram showed 10 x 8 cm pseudoaneurysm of the **proximal anterior tibial artery**.
- ATA ligated with four compartment fasciotomy.

Case 3

- 41-year-old male pedestrian was struck by a motor vehicle.
- Left fibular head fracture, short leg cast applied.
- Six weeks later**, presented to the ER with severe pain in the left leg.
- Upon removal of the cast, his left leg was found to be swollen with a large pulsatile mass.
- Diminished left pedal pulses. ABI was 1.0 on right, 0.78 on left.
- An angiogram demonstrated a **tibioperoneal trunk pseudoaneurysm** with avulsion of the anterior tibial artery.
- This pseudoaneurysm was evacuated and a popliteal to tibioperoneal trunk bypass was performed with a reversed small saphenous vein interposition graft.

Conclusions

- Infrapopliteal pseudoaneurysms after trauma can result in major morbidity.
- Delay in diagnosis complicates surgical repair and increases the risk of nerve injury.
- A heightened awareness of this condition is necessary for prompt diagnosis.
- Non-invasive vascular testing such as an ABI or duplex ultrasound should be performed prior to cast or external fixator placement when the physical examination is suspicious or equivocal.
- Early diagnosis and treatment of blunt infrapopliteal arterial injury will decrease the incidence of pseudoaneurysms, AVF and thrombosis, and prevent neurovascular morbidity and limb loss.

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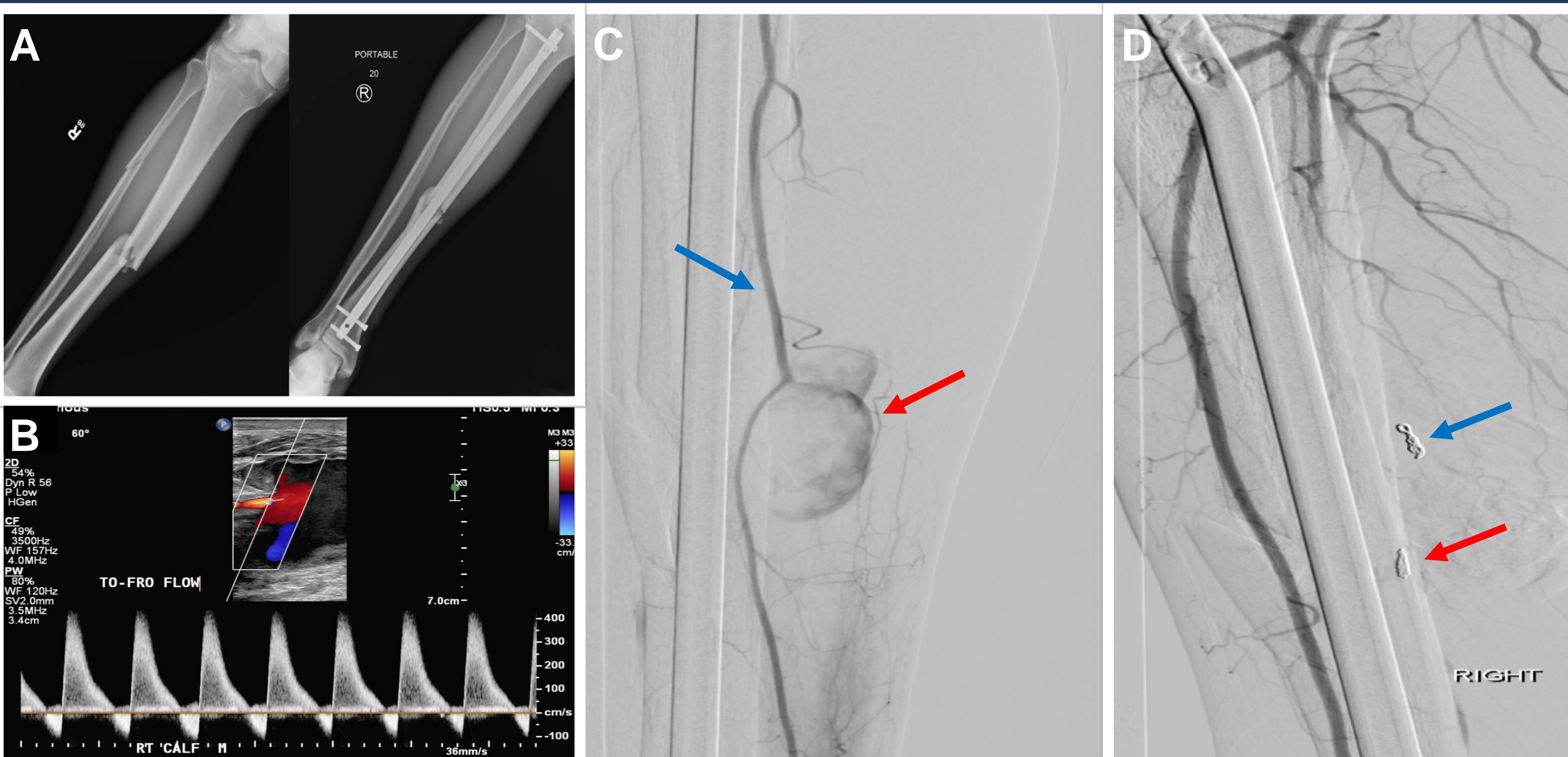


Figure 2: Summary of Case Report 1: **A:** X-ray of a tibia-fibula fracture from blunt trauma (left) and after completion of intramedullary nail stabilization (right). **B:** Diagnostic duplex ultrasound of the posterior tibial artery displaying antegrade and retrograde flow waveforms indicative of a pseudoaneurysm. **C:** Angiogram confirming the presence of a pseudoaneurysm (red arrow, right) secondary to blunt trauma of the posterior tibial artery (blue arrow, left). **D:** Angiogram displaying an occluded posterior tibial artery after coil embolization proximal (blue arrow) and distal (red arrow) of the damaged artery.

