Traumatic Popliteal Artery Occlusion Following Lower Extremity Crush Injury Presenting with Isolated Patellar Dislocation

Chris Amro, MD, Akshat T. Parekh, MD, Keith Diamond, MD, Matthew E. Lissauer, MD, Christopher A. Butts, PhD DO
Department of Surgery, Division of Acute Care Surgery, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ
Email: cb1027@rwjms.rutgers.edu; ca542@rwjms.rutgers.edu

RUTGERS Robert Wood Johnson Medical School

Background

Blunt trauma to the lower extremity is one of the leading causes of popliteal artery injury (PAI), with some form of vascular involvement seen in 28%-46% of cases. Relative to penetrating trauma, blunt trauma injury to the popliteal artery is not only, more common, but also associated with high rates of limb amputation. Thus, clinical suspicion and prompt diagnosis are paramount to promote limb salvage.

This report describes a rare case of a lower extremity crush injury, presenting with isolated patellar dislocation and traumatic occlusion of the popliteal artery.

Case Description

A 71-year-old male presented with left lower extremity pain in setting of a crush injury working underneath a vehicle resulting in an isolated lateral dislocation of his patella and complete occlusion of the distal popliteal artery. On exam, there was visible deformity to the left patella with diminished sensation, motor strength, and absence of left dorsalis pedis and posterior tibial pulses on palpation and doppler ultrasound. Radiographs confirmed an isolated lateral dislocation of the left patella (Figure 1A). The patella was reduced at bedside with restoration of proper position confirmed on X-ray (Figure 1B). Distal pulses remained absent on repeat doppler ultrasound, and the patient underwent CT-Angiography of the left lower extremity, which showed complete occlusion of the left distal popliteal artery below the level of the knee, with no contrast opacification of the distal vessels (Figure 2). He was taken to the operating room for a below-knee popliteal artery in-situ venous bypass which revealed significant soft tissue and muscular damage, particularly in the superficial posterior compartment of the lower leg, where intramuscular tearing of the gastrocnemius vein was discovered as well as an above the knee popliteal arterial thrombus. With consideration to the acuity and severity of leg ischemia and the presence of a large hematoma in the gastrocnemius, the surgical team proceeded with a four-compartment fasciotomy. His hospital stay included three staged washouts/debridements with eventual closure. He was discharged after 38 days to a rehabilitation facility with ability to self-ambulate with assistance within one month.

Clinical Images

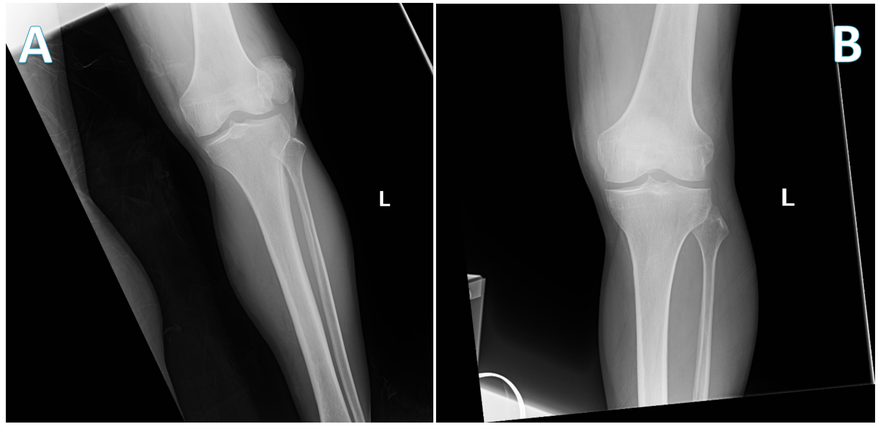

Figure 1: (A) Left Knee Patellar dislocation. This image was obtained on arrival, pre-reduction. **(B)** Left knee post reduction of patellar dislocation.

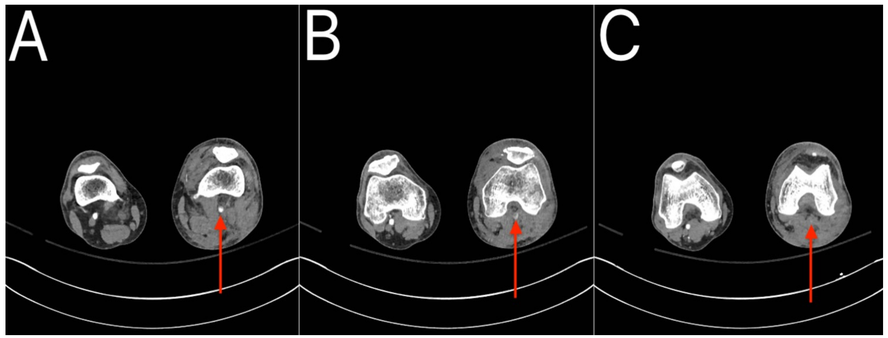

Figure 2: CT Angiography of lower extremities. (A) Complete patency of the popliteal artery is appreciated above the knee (B) High level of occlusion of the popliteal artery is appreciated at the knee (C) Complete occlusion of the popliteal artery is below the knee

Discussion

In the lower extremity, the popliteal artery is the second most common vessel to be injured however, its overall rate of injury remains low with injury seen in less than 0.2% of traumas. Its presentation can follow different mechanisms, including blunt trauma and penetration injuries. Blunt traumatic popliteal injuries are significantly more frequent compared to penetrating injury and are associated with higher amputation rates, lower motor functionality, and longer length of hospital and ICU stays. In the setting of blunt trauma, vascular intimal injury can lead to thrombus formation progressing to popliteal artery occlusion as demonstrated by the vascular ecchymosis up to the superficial femoral artery and a thrombus in the popliteal artery superior to the knee, despite direct blunt trauma only occurring inferior to the knee. As this patient's case shows, mechanism and initial presentation cannot be solely relied upon to exclude vascular injury, but rather physical exam maneuvers can adequately assess for normal vascular status.

Conclusions

This patient initially presented with a patellar dislocation during a crush injury infrequently associated with vascular injury. However, rapid identification of signs of ischemia allowed the team to successfully identify and treat the vascular insult in order to prevent amputation. This patient's lack of prominent dislocation or fracture serves to remind providers of the importance of complete physical examination, especially a detailed vascular assessment, in the setting of blunt trauma.

References

1. Imerci A, Özaksar K, Gürbüz Y, Sügün TS, Canbek U, Savran A. Popliteal Artery Injury Associated with Blunt Trauma to the Knee without Fracture or Dislocation. Western Journal of Emergency Medicine. 2014;15:145-
2. Kim J-W, Sung C-M, Cho S-H, Hwang S-C. Vascular Injury Associated with Blunt Trauma without Dislocation of the Knee. Yonsei Med J. 2010;51:790.
3. Steele HL, Singh A. Vascular Injury After Occult Knee Dislocation Presenting as Compartment Syndrome. J Emerg Med. 2012;42:271-4.
4. Mullenix PS, Steele SR, Andersen CA, Starnes BW, Salim A, Martin MJ. Limb salvage and outcomes among patients with traumatic popliteal vascular injury: An analysis of the National Trauma Data Bank. Journal of Vascular Surgery. 2006;44:94-100.

RUTGERS