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A rare case of traumatic posterior tibial artery pseudoaneurysm post interlocking nail tibia

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Abstract
Pseudoaneurysm of posterior tibial artery is a rare complication of tibial surgery. It can occur due to a high velocity trauma, open fractures or can be iatrogenic in nature. We hereby report a case of a 22 years of male who sustained close comminuted fracture proximal third shaft of left tibia which was fixed with an interlocking nail. Post operatively patient developed posterior tibial artery pseudoaneurysm which was detected via computed tomography angiogram of bilateral lower limb. To our best knowledge, this is the first reported case of pseudoaneurysm of posterior tibial artery following interlocking nailing of tibia in an otherwise healthy young individual which is successfully treated.

Keywords: Pseudoaneurysm, posterior tibial artery, interlocking nail tibia

Introduction
Interlocking nail fixation for tibia shaft fractures is one of the commonest procedures in orthopaedic trauma practices. Various complications can arise with the use of interlocking nail of tibia namely infection, injury to popliteal artery, injury to common peroneal nerve, malalignment, patella tendinitis, nonunion and malunion. Injury to posterior tibial artery following interlocking nail tibia is rare. It deserves attention as the consequences may be disastrous. High index of suspicion is required in patients with unusual swelling near major vessels following long bone injuries and utmost care should to be taken while performing interlocking nail tibia.

Case Presentation
A 22 years old male with no underlying illness sustained close comminuted fracture proximal third shaft of left tibia and fibula following an alleged motor vehicle accident. Patient had pain and swelling over left leg and unable to ambulate. On examination, left leg was swollen with no wounds. Left leg compartment was soft. Neurovascular examinations were unremarkable. One week post trauma, patient underwent suprapatellar nailing of left tibia. Post operatively, patient was able to ambulate with wheelchair. Left lower limb examinations revealed clean surgical wound with good distal pulses.
Five weeks after surgery, patient had sudden onset of painful swelling over left calf. Physical examinations revealed markedly swollen left proximal leg with firm, nonpulsatile, tender swelling measuring 10 cm x 10cm. Peripheral pulsations were present and normal. Features mimicked compartment syndrome as passive stretch test was positive.
Ultrasound doppler revealed non liquefied left calf collection and suspicious aneurysm. Computed tomography angiography showed large left posterior tibial artery pseudoaneurysm surrounding multiages hematoma.
Patient was then referred to a vascular surgeon and underwent left posterior tibial artery pseudoaneurysm coiling. Intraoperatively, posterior tibial artery pseudoaneurysm occluded and there was good restitution of distal posterior tibial artery from peroneal artery branches. The post operative course was uncomplicated, with no symptoms and signs of vascular insufficiency.
During follow up, patient had improved left leg pain and swelling. Patient was able to ambulate with crutches and post operative xrays showed evidence of fracture healing.

Discussion
Post traumatic pseudoaneurysm is a rare complication following close orthopaedics injury. An injury to artery due to perforation of bone fragment can lead to perivascular haemorrhage [1]. This eventually leads to a circumscribed hematoma within soft tissue. The hematoma then enveloped by inflammatory membrane and endothelial tissue forming pseudoaneurysm. Thus, a pseudoaneurysm arise from fibrous tissue wall instead of a regular artery wall that is found in true aneurysm. They develop when arterial wall forms a rent and slowly bleeds into surrounding tissues which results in an expanding hematoma. Physical examinations usually reveal patent distal pulses as the blood flow is maintained via parent artery. In most cases, the diagnosis is delayed initially owing to slow progression in sign and symptoms [2]. The posterior tibial artery is the largest of the terminal branches of the popliteal artery which travels with the tibial nerve in the deep posterior compartment of the leg along its fascial border with the superficial compartment. The posterior tibial artery supplies blood to the posterior crural compartment [3].
Traumatic injury to posterior tibial artery can present as an acute arterial injury or a delayed presentation with pseudoaneurysm, occlusion, thrombosis or arteriovenous fistula.
Pseudoaneurysm of the posterior tibial artery may present early as a pulsatile mass or remains undetected for a long time. False aneurysms are more common and are commonly associated with trauma [4].
Mechanism of injury to posterior tibial artery can be direct trauma such as penetrating or and indirect blunt injury. In this case, pseudoaneurysm of posterior tibial artery can be attribute to several factors. First of all, the high energy trauma with comminuted proximal tibia fracture could have

some degree on injury to the posterior tibia artery. During initial trauma, perforation of posterior tibial artery by the multiple bone fragment may lead to formation of pseudoaneurysm. Apart from that, thermal injury during reaming of the intramedullary canal may have injured the posterior tibial artery due to loss of posterior tibial cortex integrity.

Various precautions have to be taken to prevent such vascular complications. In comminuted fractures of tibia shaft, unreamed nail can be an option of treatment. Furthermore, continuous C -arm monitoring is advised to prevent misplacement of guidewire or nail posterior to tibia bone. The diagnosis pseudoaneurysm is often difficult to make. Thus, surgeon should have high index of suspicion for early diagnosis and treatment.

Pseudoaneurysm can be detected via radiological assistance such as doppler ultrasound or computed tomography. To avoid the consequences of rupture or fast enlargement with resulting pressure on the surrounding nerves, surgical repair of a pseudo aneurysm should be undertaken as soon as the diagnosis is confirmed. The decision on whether to ligate or anastomose the posterior tibial artery depends on the patient's comorbidities, vascular status, and presence of collaterals [5]. The classical treatment for posterior tibial artery injury consists of excision of the aneurysmal sac and arterial reconstruction or through a bypass [6].

Appendix

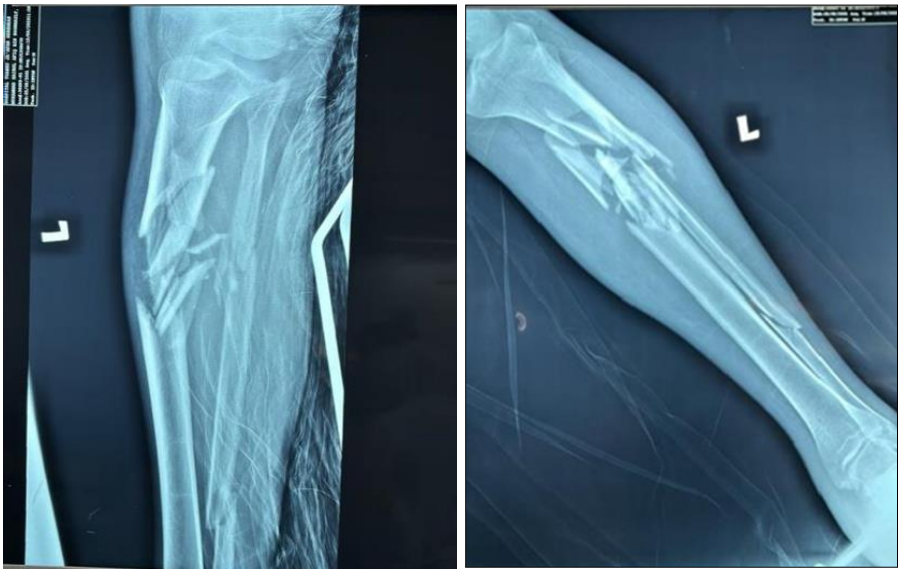

Fig 1: Plain Radiograph Showing comminuted Fracture proximal third left tibia and fibula

Fig 2: Plain radiograph showing fracture left tibia fixed with interlocking nail

Conclusion

Although interlocking nailing of tibia shaft fracture is a commonly performed procedure, it can lead to disastrous vascular complications if the procedure is not performed with care. Thus, any localized swelling in the proximal leg following the interlocking tibia nail should be dealt meticulously and requires liberal use of angiography for early diagnosis before any interventions.

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