Dear Editor,

We would like to share an uncommon problem of pseudoaneurysm associated with an open comminuted fracture that was complicated with bone defect and infection.

A 49-year-old gentleman presented to our hospital with purulent discharge from his left leg for two months duration after sustaining an open fracture grade IIIA of left tibia and fibula in January 2016. He had a fall from 20 feet height while working and was admitted to another medical facility on 12/1/16. There were no other injuries reported. He underwent wound debridement initially and was put on an external fixator on 16/2/16. There was substantial bone loss at the fracture site which was bridged using an external fixator. Subsequently, he developed purulent discharge from his wound and was admitted with a diagnosis of osteomyelitis of his left tibia.

On admission to our facility, he was noted to have minimal pus discharge from his wound and there was a uniplanar external fixator on his left leg. There were no swelling around the wound and no pulsatile mass felt. He was comfortable and there was no fever. Vital signs on admission were stable. Neurovascular examination of his left leg was normal. Radiographs on admission of the left tibia and fibula did not show signs of osteomyelitis but there was a bone gap of 2cm at the fracture site. (Figure 1a)

During his stay in the ward, he was noted to have persistent bleeding from wound side. His Haemoglobin (Hb) levels dropped from 9.1g/dL to 8.4 g/dL. He required blood transfusions up to 4 pints to stabilize his Hb levels. We initially suspected a vascular injury around the fracture site, possibly caused by the sharp tips of the Schantz pins of the external fixator. However, radiographs did not indicate this. The positions of the pins were adequate and would not have damaged the vessels. As we could not identify any reason for his persistent bleeding, we suspected a pseudoaneurysm.

An ultrasound scan was done on his left leg and a pseudoaneurysm was found. (Figure 1b). We then proceeded with computed tomography angiogram. It was confirmed that the pseudoaneurysm was situated at the left distal tibial artery, adjacent to the fracture site, measuring 1.6cm x 1.4cm x 1.6cm. The left anterior tibial artery and other collateral arteries were patent.

He was then treated with dissection of pseudoaneurysm (Figure 1c), ligation of the artery and acute docking of his fracture site using Ilizarov external fixator (IEF). (Figure 1d). Intra-operatively, the pseudoaneurysm was found to be larger than was measured radiologically. On subsequent follow-up, his wound healed well and there was no further bleeding. He decided to accept the shortening and currently is awaiting union of the bone.

**DISCUSSION**

A pseudoaneurysm is a hematoma that forms as the result of a leak in an artery. The hematoma forms outside the arterial wall, so it is contained by the surrounding tissues while still communicating with the artery. By comparison, a true aneurysm is a localised dilatation of an artery including all the layers of the arterial wall.

An incomplete rupture of an artery with leakage of blood to surrounding tissue following trauma has been shown to develop a traumatic pseudoaneurysm. The uninjured part of the vessel prevents constriction of the vessel after trauma. This will subsequently cause an uncontrolled bleed, leading to hematoma formation. The pseudoaneurysm forms due to the reorganization of the haemoma.

Turbulent blood flow continues through the abnormal vessel and distal pulses are usually present. As such, distal pulse insufficiency is a rare occurrence in cases of pseudoaneurysm.

Pseudoaneurysms can present as a soft tissue mass that often mimics an abscess, neoplasm or ganglion. Clinicians have to have a high index of suspicion in cases which have vague presentations, but has persistent bleeding at the site of injury. Bleeding from a fracture will eventually resolve, however, in the presence of a pseudoaneurysm, the bleeding may be persistent and may cause hypovolaemia.
A Case of undiagnosed Pseudoaneurysm caused by an open tibial fracture

**Fig. 1a:** Initial X-ray on presentation with external fixator in-situ and bone loss over left tibia. Shuntz pins placed adequately and not deep beyond the far cortex of the tibia.

**Fig. 1b:** Ultrasound scan showing the pseudoaneurysm. The dilatation filled with blood and good dynamic flow.

**Fig. 1c:** Intra-operative image of the pseudoaneurysm at the posterior tibial artery. White arrows indicating the extent of the dilatation of the artery and the pseudoaneurysm. This was clinically larger than the measurements obtained using imaging techniques.

**Fig. 1d:** Radiograph after dissection of aneurysm, acute docking of the fracture site and application of Ilizarov external fixator.

**REFERENCES**