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Popliteal aneurysm after plate osteosynthesis

A case report

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A false aneurysm of the popliteal artery caused acute ischemic symptoms 23 years after plate osteosynthesis of a distal femoral fracture. The protruding tip of a screw was found in the center of the aneurysmal sac.

The majority of iatrogenic injuries to major vessels in orthopedics occur during hip and knee surgery (Hohf 1963, Schlosser et al. 1982). These vascular injuries usually result in a hemorrhagic episode during the operation or thrombosis during the immediate postoperative course. The development of a false aneurysm after an orthopedic procedure seems to be a rare event. We have found only five reports in the English literature where an internal fixation device was likely to have resulted in an arterial aneurysm. In all 5 cases the aneurysm was located in the deep femoral artery or its branch (Basset et al. 1964, Dameron 1964, Meyer et al. 1964, Saletta et al. 1970, Ahlgren et al. 1981).

To our knowledge, a false aneurysm of the popliteal artery as a complication of a plate osteosynthesis has not been reported previously.

Case report

A 40-year-old man with no previous history of arterial insufficiency was admitted on the suspicion of embolization to the right calf. At the age of 20, he sustained a distal fracture of the right femur, which was treated by internal fixation with a nail plate. This device was removed 8 years later, but some of the screws were left behind.

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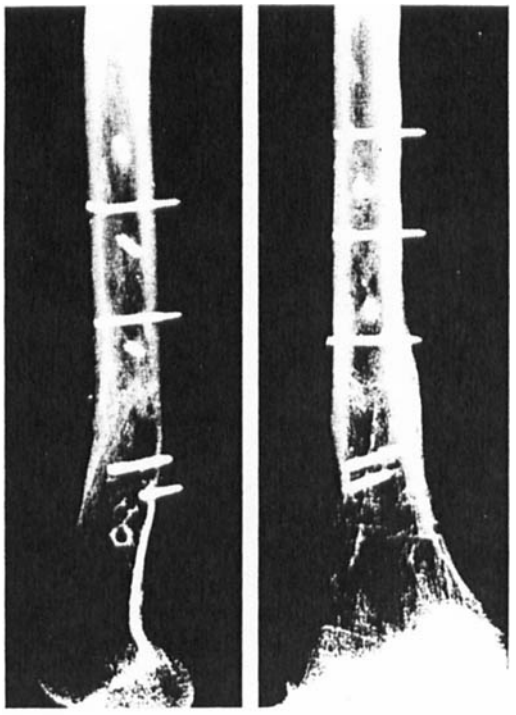
Twenty-four hours before the present admission, the subject had been working in a squatting position and suddenly felt pain in his right calf. On admission, his right foot was cold, pale, and painful with reduced sensibility. Medially in the distal thigh a pulsatile mass with a diameter of 5 cm was felt and a vascular bruit was heard. A weak pulse was palpable in the posterior tibial artery, but no pulse was felt in the dorsal pedal artery. An arteriogram exposed a popliteal aneurysm and a distal embolization.

Embolectomy was performed as an emergency procedure through the posterior tibial artery. A Fogarty catheter was guided into the arcade and small embolic masses were extracted. The following day the foot was warm with normal capillary response and improving sensibility. Three weeks later, the aneurysm was removed and the artery was repaired end-to-end (Figure 1). When the patient was seen in the outpatient department 1 year after surgery, the condition was satisfactory, with no pain at rest or claudication.

Discussion

A false aneurysm caused by trauma lacerates all three layers of the arterial wall. Through the defect in the wall, a pulsatile hematoma develops, which in time becomes encapsulated by fibrous tissue. A communication between the aneurysmal sac and the arterial lumen persists, but normally the distal blood flow is maintained. The aneurysm may be asymptomatic, but some impairment of blood flow is a fairly constant component, and in many cases ischemic changes with gangrene occur as the result of thrombosis or distal embolization (Szilagyi et al. 1981, Takolander et al. 1982).



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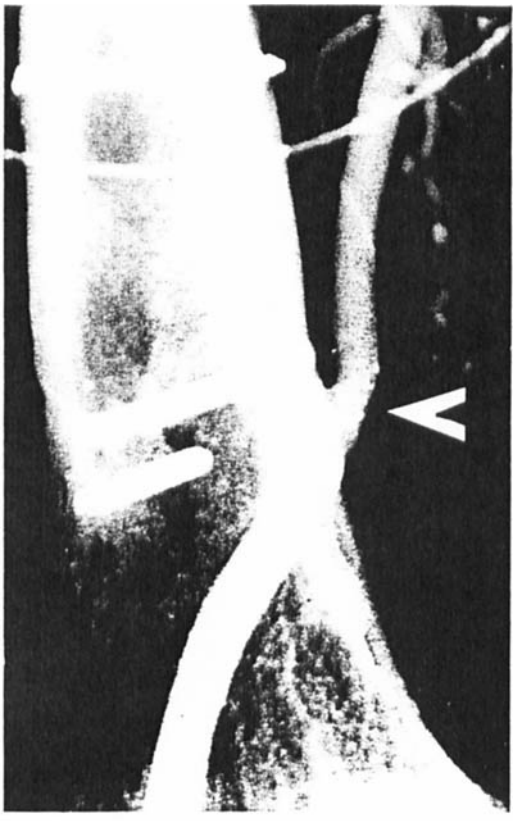

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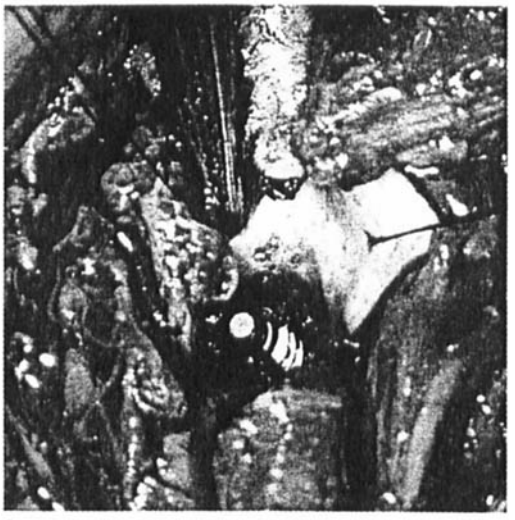

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Figure 1. A 40-year-old man was admitted because of suspected embolization in the right calf. At age 20 years, he sustained a distal fracture of the right femur that was treated with internal fixation and which was removed 8 years later, but several screws remained.
A. Several unremoved screws, all with protruding tips.
B. Arteriographic detail illustrating the proximity of the popliteal artery aneurysm and the second screw from below (arrow).
C. The aneurysmal sac has been opened unveiling the penetrating tip of the screw.

Because of the grave risk of sudden ischemic complication, the recommended treatment of false aneurysm is surgical even in asymptomatic cases. In our case a simple resection and an end-to-end anastomosis could be performed, but reconstruction is sometimes necessary (Szilagyi et al. 1981). Late embolectomy can sometimes be performed as a first procedure with a satisfying result.

The proximity of vessels to bone must always be kept in mind when performing orthopedic surgery. Our case illustrates the necessity of using screws of proper length in internal fixation. It also implies total removal of osteosynthetic material with an intimate relation to great vessels.

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