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Case report

Pseudoaneurysm of the medial inferior genicular artery following anterior cruciate ligament reconstruction

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Pseudoaneurysm is a rare complication of surgery or trauma around the knee. A 30-year-old man presented 10 days following anterior cruciate ligament repair with a 2 cm pulsatile swelling on the medial side of the knee. Angiography demonstrated a pseudoaneurysm of the medial inferior genicular artery. Surgical exploration and ligation of the feeding vessel to the aneurysm was performed and the patient made a full recovery. Vascular injury must be suspected in patients presenting with a haemarthrosis or pulsatile swelling following surgery on the knee.

Key words: Aneurysm – Medial inferior genicular artery – Anterior cruciate ligament – Knee

Vascular injuries are a well recognised but very rare complication of surgery or trauma around the knee. Most reported cases have occurred following arthroscopy and involve the popliteal vessels.[1] This is the first reported case of pseudoaneurysm of the medial inferior genicular artery following anterior cruciate ligament (ACL) repair. We discuss the diagnostic modalities and treatment options available for the management of this rare complication.

Case report

A 30-year-old, previously fit, gentleman who had sustained an ACL rupture 18 months previously, underwent ACL reconstruction using a central third patella tendon graft fixed with interference screws into the tibia and femur. He presented 5 weeks postoperatively with a 10 day history of a swelling on the medial side of his right knee. Examination demonstrated a 2 cm expansile

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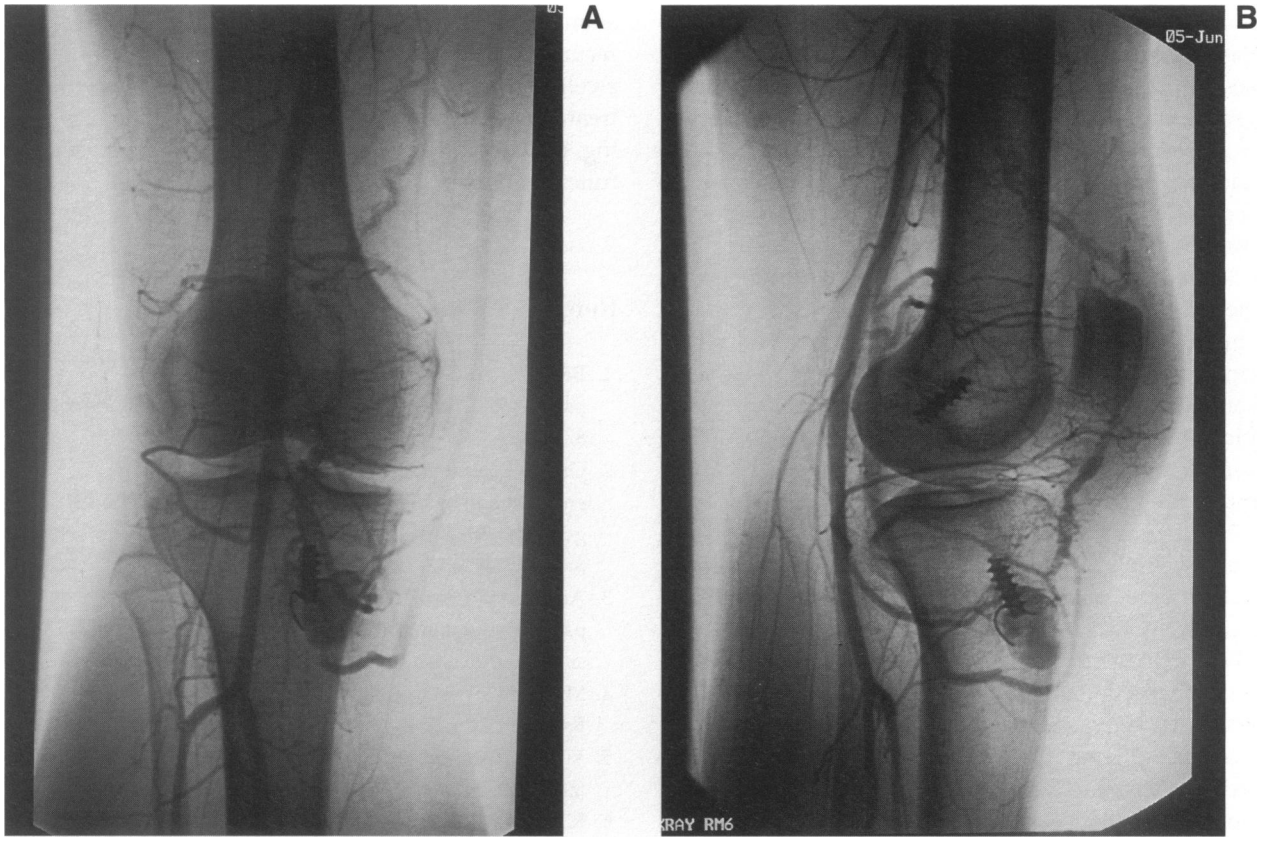

Figure 1 (**A**) Angiography demonstrating a false aneurysm of the medial inferior genicular artery (anteroposterior view). (**B**) Angiography demonstrating a false aneurysm of the medial inferior genicular artery (lateral view)

pulsatile swelling just below the joint line on the medial side of his right knee with normal femoral, popliteal and distal pulses. There was no associated skin wound or dilated veins but a palpable thrill was felt proximal to the lesion. Doppler examination demonstrated a continuous murmur throughout the long saphenous vein proximally, consistent with an arteriovenous fistula.

Subsequent angiography demonstrated a false aneurysm of the medial inferior genicular artery with late emptying into the long saphenous vein (Fig. 1). Following consideration of the treatment options, namely embolisation or surgery, the latter was felt most appropriate since the aneurysm was situated immediately beneath the skin. Exploration was performed under general anaesthetic through a transverse incision. At operation, the medial inferior genicular artery was identified and ligated behind the pseudoaneurysm. The aneurysm sac was opened, thrombus removed and following wound closure, a firm bandage was applied for 5 days to obliterate the aneurysm cavity. Postoperatively, there were no complications and the patient was discharged home the following day. Two weeks later, he was reviewed in the out-patient clinic when there was no evidence of a recurrent aneurysm and a normal venous signal on Doppler examination of the long saphenous vein. He was then able to resume physiotherapy and subsequently made an excellent recovery.

Discussion

There have been several reports of pseudoaneurysm of the popliteal,[1] superior medial genicular,[2] inferior lateral genicular[3–5] and descending genicular arteries[5,6] following arthroscopy. Pseudoaneurysms have also been reported after open synovectomy,[6] menisectomy[7] and total knee replacement.[8] There has been one reported case of a pseudoaneurysm of the inferior medial genicular following arthroscopy[9] and two cases following total knee replacement.[8,10] Our case is the first to be reported following anterior cruciate ligament repair. The cause of the aneurysm in this case was thought to be the elevation of the periosteum on

the medial side of the tibia which is necessary for the tibial tunnel to be made to enable graft insertion. Most cases of pseudoaneurysm of arteries around the knee present within days of surgery, but occasionally they can present up to 10 weeks following the procedure.[11] Typically, they are associated with a history of excessive bleeding at the time of surgery and subsequently present with a recurrent postoperative haemarthrosis of the knee. Our case, however, was not associated with either of these features.

Initial imaging investigations may involve ultrasound scanning with Duplex analysis of flow. Magnetic resonance angiography is not widely available, but is a rapidly evolving field which may be of value in the future. Conventional or digital subtraction angiography remains the gold standard and is essential in such cases, as it allows an accurate demonstration of vascular anatomy prior to surgery.[11,12] In our case, the clinical features were clearly those of a pseudoaneurysm and angiography was undertaken.

The management of popliteal pseudoaneurysms requires resection of the aneurysm and reverse long saphenous vein graft to restore continuity.[1] Pseudoaneurysms arising from smaller arteries around the knee can be treated by embolisation or open surgery. Embolisation of pseudoaneurysms has successfully been employed[2,8] and has the advantage of avoidance of general anaesthesia and the reduced risk of infection which may be important after knee replacement surgery. Despite these possible benefits, surgical exploration with excision of the aneurysm sac and ligation of the feeding vessel remains the standard management[4–7] and was successfully employed in our case with an excellent result.

Knowledge of the complex vascular anatomy around the knee joint is essential when operating on this joint in order to avoid this potentially serious complication, although the genicular artery anatomy is variable. Whilst it is not our usual practice to release the tourniquet before wound closure, this may have revealed excessive bleeding in this case alerting to the possibility of a vascular injury. This would have enabled immediate exploration to be undertaken and ligation of bleeding vessels performed thus avoiding the development of a pseudoaneurysm. The possibility of a pseudoaneurysm should always be excluded in patients presenting with recurrent postoperative haemarthrosis or a pulsatile swelling following surgery in this region. Expeditious treatment avoids the potential complications of bleeding, infection or distal embolisation and leads to a good functional result.

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