



False aneurysm of the anterior tibial artery following total knee arthroplasty

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We report a case of false aneurysm involving a branch of the anterior tibial artery following total knee arthroplasty, which presented as an enlarging swelling over the antero-lateral aspect of the leg. False aneurysms are a rare complication of total knee replacement and most of those that do occur arise from the popliteal artery. The swelling was investigated and diagnosed as a false aneurysm and the patient underwent successful percutaneous embolisation of the feeding vessel. This is currently the preferred treatment for small false aneurysms. This procedure, carried out under local anaesthesia, has a low rate of complications and avoids further surgical exploration.

Keywords : knee arthroplasty ; false aneurysm ; embolisation.

INTRODUCTION

Vascular complications following total knee arthroplasty (TKA) are uncommon, with a reported incidence ranging from 0.03% to 0.17% (3,7,16,19). They are associated with significant morbidity and can be limb-threatening. We report a rare case of a false aneurysm arising from the anterior tibial artery, presenting as an enlarging swelling over the antero-lateral aspect of the leg.

To our knowledge there has only been one previous report of a false aneurysm arising from the anterior tibial artery, however this presented as a recurrent haemarthrosis as opposed to a painless,

enlarging swelling in the anterior compartment of the leg (11).

The anterior tibial artery is the smaller of the terminal branches of the popliteal artery. It arises at the lower border of the popliteus muscle and passes into the anterior compartment of the leg through an opening in the upper part of the interosseous membrane. It gives muscular branches and anastomotic branches around the knee joint.

There have been several previous reports of false aneurysms arising from injury to the popliteal artery at the time of surgery (9,10,12,14,15,18). These have presented both as recurrent haemarthroses and as swellings in the popliteal fossa. Injury to the anterior tibial artery is rare, probably as it usually arises from the popliteal artery lower than the level of the tibial bone cut.

Percutaneous transcatheter embolisation of a false aneurysm associated with joint replacement surgery chosen as the method of choice for

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Fig. 1. — Angiogram showing the false aneurysm arising from a branch of the anterior tibial artery.



Fig. 2. — Angiogram showing the coil *in situ* before embolisation.

this patient is a useful alternative to operative excision, and allows a simple resolution of the aneurysm (1,2,5,6).

CASE REPORT

A 68-year-old woman underwent primary TKA using a Scorpio (Stryker™) prosthesis for an osteoarthritic right knee. A standard medial parapatellar approach was used followed by implant specific cutting jigs and the implants themselves. No adverse intra-operative events were noted. She made a good post-operative recovery and was discharged home on day 5 following surgery. Whilst an in-patient she received thromboprophylaxis by means of intermittent calf compression and aspirin 150 mg OD. She continued on aspirin daily for six weeks after discharge. She represented to clinic at 9 weeks following her primary total knee replace-

ment complaining of a swelling around the anterolateral aspect of her knee. Clinical examination revealed a 2 cm by 2 cm diameter fluctuant and pulsatile swelling. A duplex ultrasound scan was performed, identifying a false aneurysm arising from the anterior tibial artery. Following discussion with the vascular team, including surgeons and radiologists, it was thought that the most appropriate form of treatment would be percutaneous embolisation.

An antegrade right common femoral artery (CFA) puncture was performed under local anaesthetic and lower limb arteriography was completed. The femoral and popliteal arteries were identified. A false aneurysm was confirmed arising from a branch of the anterior tibial artery (fig 1). The feeding vessel was catheterised and a coil was deposited in the feeding branch (fig 2). Satisfactory vessel occlusion was achieved (fig 3). Distal runoff remained unchanged.



Fig. 3. — Angiogram after coiling, showing occlusion of the feeding vessel with unimpaired distal runoff.

The patient continues to be reviewed and has had no further problems with the knee, 16 months after arthroplasty and 14 months after embolisation

DISCUSSION

Vascular injury is a known complication of total knee arthroplasty ; however, the reported incidence is low. Several mechanisms of vascular injury have been described including perforation of an artery by a retractor, injury to an atherosclerotic artery with subsequent formation of a thrombus induced by perioperative manoeuvres of the joint, by a tourniquet, by direct trauma to a vessel, a vascular injury secondary to the heat of polymerisation of methylmethacrylate and a false aneurysm or arteriovenous fistula induced by repeated local trauma.

The spectrum of vascular complications following TKA includes popliteal artery thrombosis,

embolism, pseudoaneurysm, arteriovenous fistula and transection of the artery.

Pseudoaneurysm following TKA is very rare. Calligaro *et al* (4) noted only 5 pseudoaneurysms in their series of 13,618 TKA (0.03%).

The experience from penetrating trauma to the knee illustrates the late presentation of symptoms due to pseudoaneurysm. Rush *et al* (19) reported a 41% incidence of late diagnosis at 1-6 months, with 6% being diagnosed after 6 months. Of the five previous reports of pseudoaneurysm following TKA in the literature, three presented with a delay in diagnosis from 40 days to 5 months (9,10,12,15).

The signs of a false aneurysm include bruit, thrill, expanding pulsatile mass, painful mass, and haemorrhage. To prevent the late diagnosis of an arterial complication, pulses should be well documented preoperatively, examined prior to exsanguination of the extremity, and re-examined in the recovery room by the operating surgeon to identify any change in vascular status. Having the operating surgeon perform this task ensures a consistent evaluation of the pulses. Repeat daily vascular examinations should also be performed.

Colour Doppler flow ultrasound is a safe and accurate method to confirm the diagnosis. Once the diagnosis is confirmed, the treatment is usually surgical or endovascular. Other reported methods are ultra-sound guided compression and percutaneous thrombin injection (8,13,17). The use of endovascular embolisation has been successfully reported on several occasions and is the method of choice of many departments (1,2,5,6).

Embolisation is preceded by diagnostic angiography, usually using a contra lateral approach. The exact anatomy of the lesion requiring treatment must be fully identified. Once the site of haemorrhage has been demonstrated it is necessary to establish that there is blood flow distal to the lesion and that only one vessel is involved so that effective embolisation may be planned. Embolisation, carried out as selectively as possible, improves the chances of success and reduces the risk of complications such as ischaemia of neighbouring structures.

Early recognition of a vascular injury is essential, although sometimes its presentation may be

delayed. Pseudoaneurysms following TKA are rare, however if suspected they require prompt investigation, diagnosis and appropriate treatment.

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