



Atraumatic haemarthrosis following total knee replacement treated with selective embolisation

Dimitrios KARATAGLIS, Duncan MARLOW, Duncan J. A. LEARMONTH

From the Royal Orthopaedic Hospital, Birmingham, United Kingdom

Spontaneous haemarthrosis in the absence of anticoagulant medication or a bleeding disorder is a very rare complication after total knee arthroplasty. A case of recurrent spontaneous haemarthrosis following total knee replacement in a 69-year-old patient is reported. Angiography was used to aid the diagnosis. It demonstrated an abnormal blush of vessels around the anterior aspect of the knee joint, that was fed by genicular branches and a recurrent branch of the anterior tibial artery. Selective embolisation of the bleeding vessels with coils led to immediate control of the bleeding. No further recurrence of haemarthrosis has been recorded.

Keywords : haemarthrosis ; total knee replacement ; embolisation.

INTRODUCTION

Spontaneous haemarthrosis is a very rare complication following total knee arthroplasty in the absence of anticoagulant medication or a bleeding disorder (6, 7). Other than associated with haemophilia or anticoagulation, it has been described in relation to proliferative synovitis, pigmented villonodular synovitis and pseudoaneurysm (1, 4-7, 10). Standard management of this rare complication consists of aspiration, cryotherapy and rest (6, 7). If repeated episodes of haemarthrosis occur, open synovectomy has been the treatment of choice for a number of years (6, 9). We report a case of spontaneous haemarthrosis following total knee replace-

ment which has been successfully treated with selective embolisation of the bleeding vessels.

CASE REPORT

A 69-year-old male patient with a history of mild peripheral vascular disease underwent a right total knee replacement for osteoarthritis. A cemented PCL-substituting AGC total knee replacement (Biomet, Swindon, UK) was used and the patella was resurfaced. At the end of the procedure the tourniquet was released and thorough haemostasis was performed according to the accepted operative protocol, but no undue bleeding was noted. The patient had an uneventful recovery and gradually returned to everyday life activities with no problems whatsoever. Four months post-operatively though, while walking he felt a sudden intense pain

■ Dimitrios Karataglis, MD, PhD, Senior Arthroscopy Fellow.

■ Duncan Marlow MRCS, Senior House Officer.

■ Duncan J. A. Learmonth FRCS, Consultant Orthopaedic Surgeon.

Royal Orthopaedic Hospital, Bristol Road South, Birmingham B31 2AP, United Kingdom.

Correspondence : Dr Dimitrios Karataglis, 8 Thiseos street, 54250 Thessaloniki, Greece.

E-mail : dkarataglis@yahoo.gr ; djal.scope@virgin.net.

© 2006, Acta Orthopædica Belgica.

in his right knee, which became swollen immediately. Peripheral pulses were palpable. Coagulation profile and platelet count were within normal limits. The knee was immobilised in a back-slab and iced, but pain and swelling failed to settle. An aspiration was carried out under sterile conditions 24 hours later ; 100 ml of blood were withdrawn from the joint. Subsequent cultures were negative. Aspiration was followed by 2 days of complete rest and cryotherapy, after which gentle range-of-movement exercises were commenced. The patient had an uneventful recovery from this incident and regained a very satisfactory range of movement and function.

Unfortunately, almost 2 months later he had a similar episode of spontaneous haemarthrosis, which was treated similarly. Following this episode an elective lower limb angiogram was performed. It revealed an abnormal blush of vessels around the anterior aspect of the knee joint, that was fed by genicular branches and a recurrent branch of the anterior tibial artery (fig 1). These four branches were embolised successfully with coils (Microcoils) ; perfusion to the blush was immediately abolished (fig 2). The patient had an uneventful recovery after this procedure and was discharged the same day. One year following embolisation he has had no further recurrences of haemarthrosis. He has regained full function and a 0-115° range of movement.

DISCUSSION

Late spontaneous haemarthrosis is a very rare complication following total knee arthroplasty (6, 7). It has been associated with haemophilia, anticoagulation, proliferative or villonodular synovitis, a prominent prosthesis and impingement of hypertrophic synovium between the prosthetic components (1, 2, 4-7, 9, 10, 13). Due to the rarity of this complication and to the fact that most cases are reported sporadically, its exact causes have not been fully elucidated and a specific treatment protocol has not been standardised.

It is universally accepted that conservative management should be preferred in the first instance (6, 7). This consists of aspiration, rest, cryotherapy and



Fig. 1. — Angiogram : abnormal blush of vessels fed by genicular branches and a recurrent branch of anterior tibial artery.

limb elevation, followed by gradual return to normal activities. Conservative management is successful in one third of the cases, while open synovectomy has been reported to prevent further recurrences in up to 93% of patients in whom conservative management has failed (6). Arthroscopic evaluation of the joint and subsequent synovectomy, although minimally invasive and therefore more appealing, has not been as successful as open synovectomy (9).

In cases though where spontaneous haemarthrosis recurs and does not respond to non-invasive treatment, further investigation with angiography should be carried out in an effort to clarify its exact



Fig. 2. — Angiogram following embolisation : no blush is seen.

cause. It may reveal a pseudoaneurysm, an arteriovenous fistula, or a hypertrophic and hypervascular synovial mass as the cause of bleeding (3-5, 8, 11, 12). In the presence of a suitable lesion, as in this case, selective arterial embolisation can be performed on day-case basis (5, 7, 8, 11, 12).

In conclusion, we would like to emphasise the importance of angiography as a diagnostic and treatment modality in cases of recurrent spontaneous haemarthrosis following total knee replacement, where conservative management has failed.

Selective arterial embolisation of suitable lesions is a safe and effective minimally invasive procedure that carries a far lower risk of infection and delay in patient rehabilitation compared to open or even arthroscopic synovectomy.

REFERENCES

1. **Ballard WT, Clark CR, Callaghan JJ.** Recurrent spontaneous hemarthrosis nine years after a total knee arthroplasty. A presentation with pigmented villonodular synovitis. *J Bone Joint Surg* 1993 ; 75-A : 764-767.
2. **Cunningham RB, Mariani EM.** Spontaneous hemarthrosis 6 years after total knee arthroplasty. *J Arthroplasty* 2001 ; 16 : 133-135.
3. **Haddad FS, Prendergast CM, Dorrell JH, Platts AD.** Arteriovenous fistula after fibular osteotomy leading to recurrent haemarthroses in a total knee replacement. *J Bone Joint Surg* 1996 ; 78-B : 458-460.
4. **Ibrahim M, Booth RE Jr, Clark TW.** Embolization of traumatic pseudoaneurysms after total knee arthroplasty. *J Arthroplasty* 2004 ; 19 : 123-128.
5. **Katsimihis M, Robinson D, Thornton M, Langkamer VG.** Therapeutic embolization of the genicular arteries for recurrent hemarthrosis after total knee arthroplasty. *J Arthroplasty* 2001 ; 16 : 935-937.
6. **Kindsfater K, Scott R.** Recurrent hemarthrosis after total knee arthroplasty. *J Arthroplasty* 1995 ; 10 (Suppl) : S52-S55.
7. **Langkamer VG.** Local vascular complications after knee replacement : a review with illustrative case reports. *Knee* 2001 ; 8 : 259-264.
8. **Maheshwari R, Kelley SP, Langkamer VG, Loveday E.** Spontaneous recurrent haemarthrosis following unicompartmental knee arthroplasty and its successful treatment by coil embolisation. *Knee* 2004 ; 11 : 413-415.
9. **Ohdera T, Tokunaga M, Hiroshima S et al.** Recurrent hemarthrosis after knee joint arthroplasty. Etiology and treatment. *J Arthroplasty* 2004 ; 19 : 157-161.
10. **Oishi CS, Elliott ML, Colwell CW Jr.** Recurrent hemarthrosis following a total knee arthroplasty. *J Arthroplasty* 1995 ; 10 (Suppl) : S56-S58.
11. **Pham TT, Bouloudian S, Moreau PE et al.** Recurrent hemarthrosis following total knee arthroplasty. Report of a case treated with arterial embolization. *Joint Bone Spine* 2003 ; 70 : 58-60.
12. **Pritsch T, Pritsch M, Halperin N.** Therapeutic embolization for late hemarthrosis after total knee arthroplasty. A case report. *J Bone Joint Surg* 2003 ; 85-A : 1802-1804.
13. **Worland RL, Jessup DE.** Recurrent hemarthrosis after total knee arthroplasty. *J Arthroplasty* 1996 ; 11 : 977-978.