

## Case report

# A bleeding pseudoaneurysm of the lateral genicular artery after total knee arthroplasty—a case report

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A 64-year-old man with a history of hypertension, benign prostatic hypertrophy, chronic obstructive pulmonary disease and a dilated aorta had undergone total knee replacement of his left knee due to severe disabling osteoarthritis. The preoperative physical examination revealed mild effusion, a varus deformity of 20 degrees, and a normal but painful range of motion and mediolateral instability of both knees. Laxity was present in his shoulder, elbow and wrist joints. Plain radiographs of the knees demonstrated advanced degenerative changes with severe narrowing of the medial joint spaces bilaterally. The left knee was chosen for surgery, since it was the more painful and disabling. A posterior stabilizer prosthesis was implanted and lateral release of the patellar retinaculum was carried out. There were no intraoperative complications and the alignment and stability of the prosthesis was satisfactory. The course during the first postoperative month was uneventful, except for a hematoma on the anterolateral side of the knee where the lateral release had been performed: the hematoma appeared one day postoperatively and gradually dissolved spontaneously.

4 weeks after surgery, the patient started to complain of increasing pain and gradual swelling of his operated knee. He presented to the emergency room due to agonizing knee pain 2 weeks later. His left knee was very swollen, especially on the anterolateral side. It was warm and tender and any passive or active motion aggravated the pain. The hemoglobin level was 7.8 mg/dL, the white blood count was  $7.6 \times 10^3/\mu\text{L}$ , the coagulation profile was normal and the sedimentation rate was 42 mm/hr (the sedimentation rate before surgery being 41 mm/hr).

The patient was admitted to the orthopedic department and arthroscopy was performed 2 days afterwards. The knee was lavaged and several blood clots were drained. No active bleeding was detected. Improvement in the pain and swelling lasted for 5 days. On the 6th day after the arthroscopy, the patient complained of an acute, sharp agonizing pain and a sudden worsening of the swelling of the operated knee. The findings of the physical examination were similar to those on the day of admission. The knee was again swollen and tender and the pain was aggravated by any motion. An angiographic examination was performed because of suspected recurrent bleeding, and a bleeding pseudoaneurysm of the superior lateral genicular artery was demonstrated (Figure 1A). Using a microcatheter, a superselective catheterization of the lateral genicular artery was performed and the artery was embolized by means of 3-mm coils (Figure 1B). During a

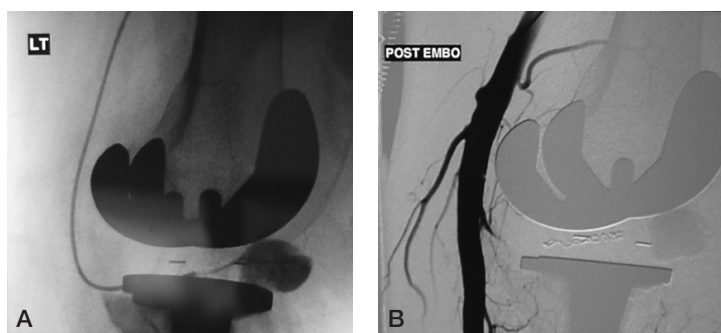


Figure 1. Angiography (A) of the lateral genicular artery demonstrating a pseudoaneurysm and obliteration of the pseudoaneurysm by embolization (B).

second arthroscopy several hours after the embolization, blood clots were drained and the prosthetic joint was lavaged. The patient experienced instant relief and there was a major improvement in the extent of pain, swelling and range of motion. 24 hours after the embolization, a pseudoaneurysm in the puncture site of the femoral artery was diagnosed by ultrasonography and treated successfully with external pressure. The patient was discharged 2 days later.

There was a marked improvement in the range of motion and functional capabilities, with no evidence of recurrent bleeding noted at the follow-up visits in the outpatient clinic at 3, 6 and 12 months after the embolization.

## Discussion

Spontaneous hemarthrosis after total knee arthroplasty is a rare complication, occurring in 0.3%–1% of cases (Kindsfater and Scott 1995, Oishi et al. 1995). In a study of 30 cases of spontaneous hemarthrosis, Kindsfater and Scott (1995) reported that the mean interval between arthroplasty and the first occurrence of bleeding was 2 years, with a range of 2 weeks to 12 years. After excluding the obvious causes of coagulopathy, the commonest reported cause of spontaneous hemarthrosis after total knee arthroplasty is impingement of the hypertrophic vascular synovium or fat pad between the articulating components of the artificial joint (Oishi et al. 1995, Haddad et al. 1996, Worland and Jessup 1996, Hendel and Valan 1997, Katsimihas et al. 2001). Other less common etiologies are pigmented villonodular synovitis (Ballard et al. 1993, Cunningham and Mariani 2001), arteriovenous fistula (Haddad et al. 1996), and bleeding from a genicular artery (Katsimihas et al. 2001).

There are few reports in the English-based literature which describe bleeding from a false aneurysm of a genicular artery after total knee replacement surgery (Noorpuri et al. 1999, Pai 1999, Barriga et al. 2001, Moran et al. 2002). The possible mechanisms of vascular injury during total knee arthroplasty are: 1. perforation by a retractor, 2. injury to an atherosclerotic artery, 3. tourniquet injury, 4. direct trauma to a vessel, 5. vascular injury secondary to the heat of the cement, and

6. vascular injury due to repeated local trauma (Langkamer 2001). The inferior genicular artery is at risk during the subperiosteal release of the medial structures along the proximal tibia. The superior lateral genicular artery supplies the lateral retinaculum and is at risk during the performance of a lateral retinacular release. Injury to this artery during a lateral release causes local swelling and hematoma, as well as a decrease in the blood supply to the patella (Hughes et al. 1998). Some authors have attributed patellar fractures after total knee arthroplasty and a lateral release to the sacrifice of this artery (Windsor et al. 1989, Weber et al. 2003), whereas others have found that preservation of the superior lateral geniculate artery had no effect on patellar dislocation, radiolucency, loosening, or fracture (Ritter and Campbell 1987, Ritter et al. 1996). The superior lateral genicular artery of our patient was probably compromised during the lateral release of the patellar retinaculum. The physical findings of joint laxity, the presence of a dilated aorta and the appearance of a pseudoaneurysm of the femoral artery following angiography may all suggest an underlying connective tissue disorder, which might make the patient susceptible to the formation of false aneurysms after minor vascular injury.

The literature on angiography and embolization for the diagnosis and treatment of hemarthrosis after total knee arthroplasty is also anecdotal (Noorpuri et al. 1999, Barriga et al. 2001, Katsimihas et al. 2001, Pritsch et al. 2003). In all the cases reported, as in our case, it turned out to be an excellent diagnostic and therapeutic tool. Due to its ability to definitively stop the bleeding and because of its minimal invasiveness, angiography and genicular artery embolization might be considered one of the first-line invasive choices for the treatment of patients with spontaneous hemarthrosis after total knee arthroplasty, especially if there are signs of active bleeding.

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