

Case Report

An Unusual Cause of Popliteal Cyst

Valerio Sansone, M.D., Corrado Sosio, M.D., Marco da Gama Malchér, M.D., and
Alessandro De Ponti, M.D.

Abstract: We describe a surgical treatment for popliteal cyst in a 41-year-old woman affected by diffuse pigmented villonodular synovitis (PVNS) of the knee with extra-articular spreading. The treatment consists of an arthroscopic synovectomy followed immediately by an open removal of the cyst. At 28-month follow-up, the patient is asymptomatic and no evidence of recurrence of PVNS has been seen. We believe that this double surgical approach may reduce the probability of recurrence of PVNS. **Key Words:** Popliteal cyst—Pigmented villonodular synovitis—Knee—Arthroscopy.

Popliteal cysts occur frequently in adults and are often accompanied by symptoms such as pain after activities and hindered movements. Because surgical removal is often followed by recurrence, several studies about the pathogenesis of popliteal cyst had been performed, leading to the conclusion that the key of a successful therapy is the treatment of the associated intra-articular lesions of the knee.^{1,2} Nevertheless, in a few cases, the cause of pathology may be found in the cyst itself, requiring a different therapeutic approach.

The extra-articular spread of pigmented villonodular synovitis (PVNS) has been reported scarcely in the literature,^{3,4} and treatment appears to be controversial.

We describe the case of an adult affected by a popliteal cyst as an uncommon presentation of PVNS of the knee. We believe that the peculiar presentation of the pathology and the implications about its treatment are worthy of description.

From the Orthopaedic Department of the University of Milano (V.S., M.G.M.), Istituto Ortopedico Galeazzi; and the Orthopaedic Department (C.S., A.D.P.), Ospedale San Raffaele, Milano, Italy.

Address correspondence and reprint requests to Valerio Sansone, M.D., Orthopaedic Department of the University of Milano, Istituto Ortopedico Galeazzi, Milano, Italy. E-mail: valerio.sansone@unimi.it

© 2004 by the Arthroscopy Association of North America
0749-8063/04/2004-3649\$30.00/0
doi:10.1016/j.arthro.2004.01.015

CASE REPORT

A 41-year-old woman described a 5-year history of a symptomatic enlarging mass in the right popliteal fossa. At the first evaluation, 4 years before the patient was referred to us, she was treated elsewhere with a complete removal of a popliteal cyst using an open posterior approach. A histologic examination was performed, showing a chronic synovitis compatible with PVNS. The patient was symptom-free for about 24 months.

In February 2000, the patient presented with recurrence of the popliteal mass. She complained about pain after physical activity, though not at rest, and reduced range of motion with subject sensations of knee instability. She reported no history of knee injury. On physical examination, the knee showed a large joint effusion, a tender large mass on the popliteal fossa, and limitation of the articular range (0° to 100°). No joint instability or meniscal pain was noted.

Radiographs were normal. Magnetic resonance imaging (MRI) of the knee (Fig 1) showed the presence of a popliteal cyst measuring 5 × 11 cm, extending caudally down to the level of the upper leg. Images showed multiple linear septations, an amount of synovial effusion was noted, and the synovial membrane appeared thick and contained deposits of ferromagnetic material. The knee had been aspirated several



FIGURE 1. MRI scan of the right knee (repetition time [TR] = 650 ms; TE = 14 msec; FA = 90°) (A) Axial plane and (B) sagittal plane images show a heterogeneous mass extending in the popliteal fossa.

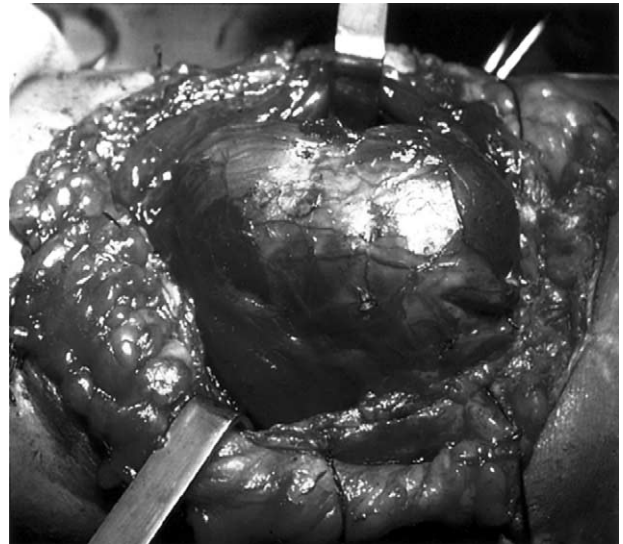


FIGURE 2. Posterior approach to the popliteal fossa. The popliteal mass has been isolated.

times previously, and the aspirate was found to be hemorrhagic, with a rapid reaccumulation of fluid.

We decided to treat the patient with simultaneous arthroscopy,⁵ followed by an open resection of the popliteal cyst. First, to allow proper treatment of the intra-articular lesion, an arthroscopy was performed. The abnormal synovial tissue found in all compartments of the knee was removed. Subsequently, an open posterior approach (Fig 2) was performed to remove the entire popliteal cyst (Fig 3).

At histologic examination, the intra-articular synovial membrane showed typical PVNS alterations and the synovial membrane of the cyst. The postoperative course was characterized by a rapid return to full range of motion and physical activity, symptom free.

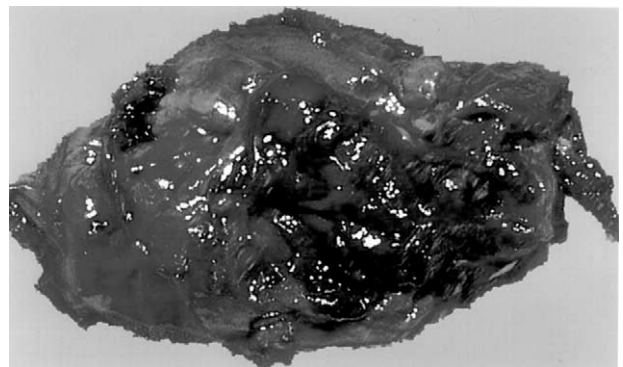


FIGURE 3. The excised popliteal cyst is shown.

DISCUSSION

Popliteal cysts are believed to represent an enlargement of the gastrocnemio-semimembranosus bursa.⁶ This bursa has been shown to communicate with the joint space of the knee in 50% of normal adult subjects. Recent studies of the pathogenesis of popliteal cysts have shown that they are dependant on a valvular mechanism. The presence of a valve, along with the existence of an effusion, allows a unidirectional flow of the synovial fluid from the articular cavity to the bursa, determining the appearance and persistence of the cyst.¹⁻⁶

In this case, the effusion was determined by an altered synovial membrane, typical of PVNS. The synovitis occurred in its diffuse form, involving the entire synovium, and it is possible that some synovial flap in the posteromedial capsule caused the valvular mechanism responsible for the unidirectional flow. However, the histologic examination of the cyst removed during the first surgery showed the presence of typical alterations compatible with PVNS, probably indicating a spreading of the pathology into the popliteal cyst. Our histologic examination confirmed the suspicion of PVNS intra-articularly and extra-articularly. Suspecting that the disease process had originated in the knee and subsequently spread into the popliteal space, and that the first, posterior-only surgery had not completely removed the origin of the disease, we decided to treat the lesion with a simultaneous double surgical approach. In fact, although the arthroscopic synovectomy allowed solution of the valve mechanism, it did not remove the extra-articular pathologic tissue, making recurrence highly probable.

We believe that the approach of using arthroscopic

synovectomy and open removal of the popliteal cyst ensured appropriate surgical margins. We believe that temporally separating the 2 procedures, as previously reported by other authors,^{4,7} is ineffective because the PVNS could spread from the intra-articular to the extra-articular space, or vice versa, in the interim, increasing the probability of recurrence. Furthermore, we do not see any technical reason to justify delaying treatment.

This case suggests the need for a preoperative diagnosis of the etiology of a popliteal cyst. In cases in which previously identifying the nature of the cyst was not possible, the surgeon should recognize the need to modify the surgical plan and perform both an arthroscopic and open procedure if the intraoperative diagnosis generates the suspicion of PVNS.

REFERENCES

1. Sansone V, De Ponti A. Arthroscopic treatment of popliteal cyst and associated intra-articular knee disorders in adults. *Arthroscopy* 1999;15:368-372.
2. Sansone V, De Ponti A, Paluello GB, Del Maschio A. Popliteal cysts and associated disorders of the knee: Critical review with MR imaging. *Int Orthop* 1995;19:275-279.
3. Folman J, Reis D. Pigmented villonodular synovitis presenting as a popliteal cyst. *Isr J Med Sci* 1980;16:735-738.
4. Tatari H, Baran O, Lebe B, et al. Pigmented villonodular synovitis of the knee presenting as a popliteal cyst. *Arthroscopy* 2000;16:E13.
5. De Ponti A, Sansone V, da Gama Malchér M. Results of arthroscopic treatment of pigmented villonodular synovitis of the knee. *Arthroscopy* 2003;19:602-607.
6. Rausching W. Anatomy and function of the communication between the knee joint and popliteal bursae. *Ann Rheum Dis* 1980;39:356-358.
7. Meehan PL, Daftari T. Pigmented villonodular synovitis presenting as a popliteal cyst in a child. *J Bone Joint Surg Am* 1994;76:593-595.