

Osteochondrolipoma Presenting as a Popliteal Cyst

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Here, we describe a popliteal mass that was initially misdiagnosed as a simple popliteal cyst, which finally turned out to be osteochondrolipoma. A 63-year-old housewife presented with sustained knee pain in association with a palpable mass on the popliteal fossa. The mass was in the posteromedial area and soft, non-tender, non-movable in the posteromedial area. Using plain radiography, the mass appeared as a round, soft tissue density lesion containing bony fragments. We performed an ultrasound-guided needle biopsy in conjunction with magnetic resonance imaging, followed by an open excisional biopsy. Microscopically, histological sections showed a lipoma with cartilaginous and osseous differentiation, finally diagnosed as osteochondrolipoma. In conclusion, popliteal masses are not always simple cysts, and the evaluation of masses in the popliteal fossa is always necessary.

Keywords: Popliteal cyst, Neoplasm, Biopsy

A popliteal cyst, also known as a Baker's cyst, is the most common tumorous mass found around the popliteal fossa of the knee joint, and is usually treated conservatively with the identification of underlying conditions.¹⁾ However, other tumorous masses such as lipoma, synovial sarcoma, meniscal cysts, muscular herniation, bursae of biceps and semitendinosus tendons mimic the appearance of popliteal cysts.²⁾ Furthermore, some papers in the literature also report a vascular problem, namely popliteal artery and vein aneurysm, that also present as a popliteal mass.³⁾ Therefore, careful differential diagnosis of popliteal masses is needed because occasionally popliteal masses require surgical intervention.

The case presented here describes a patient with a soft tissue tumor of the popliteal fossa, which was diagnosed as osteochondrolipoma. To our knowledge, a popliteal mass of this pathology has never been reported,

suggesting that it is exceptional.

CASE REPORT

A 63-year-old housewife presented with sustained knee pain and a palpable mass on her popliteal fossa that had lasted more than a year. After failed control of the pain with medication, a primary physician referred this patient to our clinic after taking an ultrasonography with the impression of an 'unusual soft tissue tumor in the popliteal fossa.' Physical examination revealed a soft, non-tender mass in the posteromedial area of the left knee. The mass was non-movable, without evidence of palpable pulsation, erythema or venous congestion. Overall alignment of the lower extremity was varus by a finger breadth, and the left knee joint had a mild effusion without any instability or tenderness. The range of motion of the knee was slightly decreased, and the patient complained of some discomfort with forced flexion.

Lateral plain radiography of the left knee revealed a round, soft tissue density lesion containing bony fragments on the popliteal fossa (Fig. 1). Ultrasonography showed a solid mass of the dimensions 4 × 5 × 3 cm, well-encapsulated with heterogeneous echogenicity in the popliteal fossa (Fig. 2). A magnetic resonance imaging (MRI) investigation showed

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a well-defined round mass located just behind the posterior capsule, in close proximity to the popliteal neurovascular bundle (Fig. 3). The mass was mixed with hypointense and hyperintense lesions on both T1-weighted and T2-weighted images, and heterogeneous enhancement of the lesion was observed.

Due to the fact that the mass was located relatively far from the tibial nerve, but near to the joint capsule, and contained both fat and bone components, a tumor of neural origin or a vascular mass, can be excluded. With a tentative diagnosis of malignant mesenchymoma, synovial sarcoma, or teratoma, an ultrasound-guided needle bi-

opsy was performed, and five pieces of whitish gray linear specimen obtained. A cytological examination revealed fragments of fibro-collagenous tissue with myxoid stromal change of a benign nature.

An open excisional biopsy was performed using a posterior approach. The mass was located near the medial head of the gastrocnemius, under a superficial fascia. The joint capsule was adhered to the mass in certain areas, otherwise separation from the surrounding soft tissue was relatively easy. Finally, a moderately solid and yellowish mass was excised and sent to a pathologist.

The mass was well-circumscribed and the cut surface was yellow and fatty with traversing whitish fibro-chondroid bands and nodules (Fig. 4). Microscopically, the



Fig. 1. The plain radiograph of the left knee shows a mass-like lesion containing fat (long arrow) and internal ossifications (short arrows) in the posterior area of the left knee.

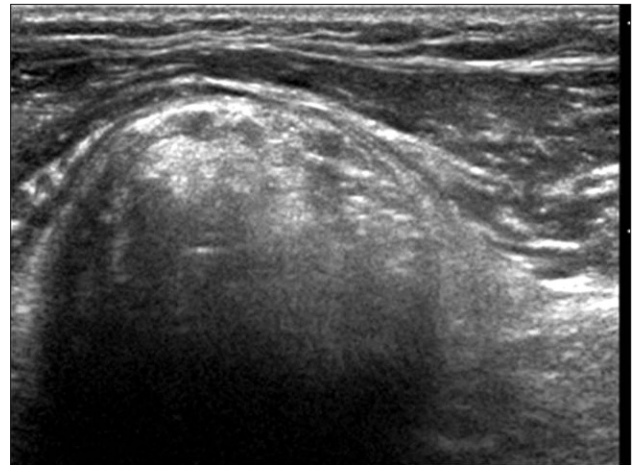


Fig. 2. The ultrasound (US) scan of US-guided biopsy reveals a well-defined soft tissue mass and prominent acoustic shadowing caused by internal ossifications.



Fig. 3. Sagittal plane magnetic resonance imaging scans: (A) T1-weighted image, (B) T2-weighted image, (C) fat-suppressed gadolinium-enhanced image, and (D) axial T1-weighted image. The contents of the mass are presumed to be fat (arrows), enhancing fibrous tissue (arrow heads), and ossifications. The tibial nerve (curved arrow) is shown separately.

specimen showed chondroid matrix and chondrocytes arising in the fibromyxoid band, as well as lamellar bone with osteoblasts and osteoclasts within the chondroid nodule (Fig. 5).

There were no abnormal neurological or vascular symptoms postoperatively. Two months postoperative, the patient had showed improvement of the chronic discomfort, and no calcified density remained on a plain radiograph.



Fig. 4. Photograph of the popliteal mass. The mass is well-circumscribed and the cut surface is yellow and fatty with traversing whitish fibrochondroid bands and nodules.

DISCUSSION

The common evaluation steps of a popliteal mass are physical examination, plain radiography, and aspiration of cystic fluid. The most common popliteal mass is a Baker's cyst, and the prevalence rate is between 5% and 19% in a large series of knee MRI studies.^{4,5} The diagnosis of a Baker's cyst is easily made using these procedures. However, many papers in the literature have reported unpredictable disease of the popliteal area, therefore differential diagnosis and evaluation of a popliteal mass should be performed in some cases. Physical examination can give important clues. In the case of a lipoma in the popliteal area, it is generally less renitent on palpation compared with the tightness of a popliteal cyst. When the popliteal mass is accompanied by erythema with leg edema, deep vein thrombosis or popliteal vein aneurysm can be considered as a diagnosis. In addition, a pulsatile popliteal mass may be caused by pseudoaneurysm of the popliteal artery. Tseng et al.⁶ reported a nerve sheath ganglion of the tibial nerve in the popliteal area. Due to the fact that their case showed a positive Tinel's sign and a moderate degree of paresthesia, they decided to perform an MRI, and found an unexpected ganglion. If the character of the mass appears unusual upon physical examination, the next step should include ultrasonography or MRI.

Ultrasonography is a very useful imaging method to identify the nature of a cystic or solid mass, and arterial or venous origin, however sometimes it is not sufficient. Fiori et al.³ reported that a popliteal venous aneurysm in the

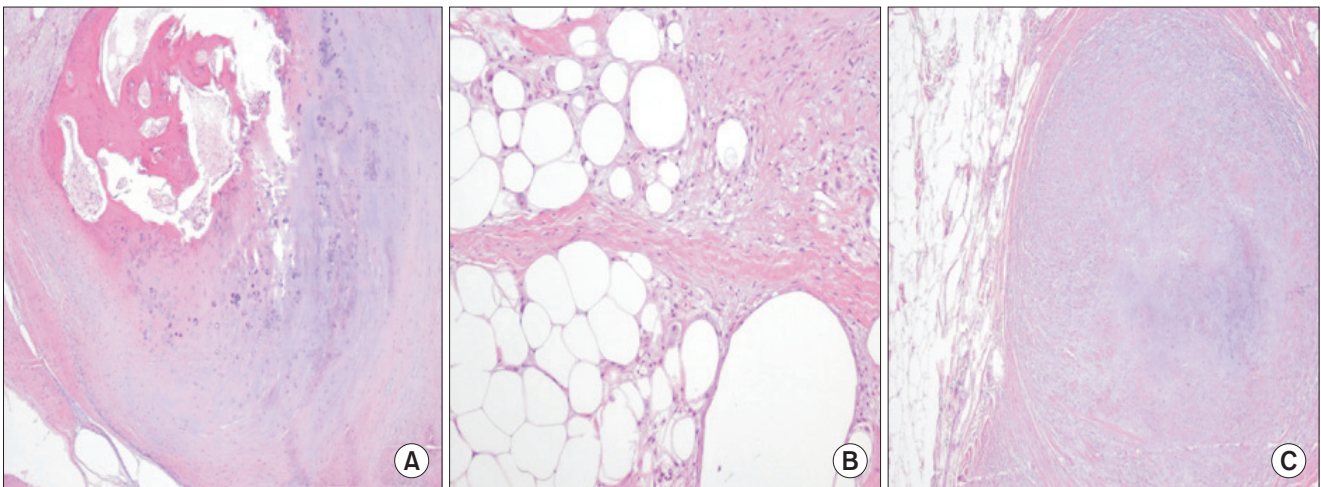


Fig. 5. Histological sections of the tumor specimen show lipoma with cartilaginous and osseous differentiation. (A) Ossification in the chondroid nodule. Lamellar bone with osteoblasts and osteoclasts is being formed in the chondroid nodule (H&E, $\times 40$). (B) Fibroblast proliferation and fibrous band is intimately apposed to the fat necrosis area of lipoma (H&E, $\times 100$). (C) A chondroid nodule in the lipoma. Chondroid matrix and chondrocytes are arising in the fibromyxoid band (H&E, $\times 40$).

popliteal fossa demonstrated only a mixed echogenicity mass, with no evidence of an arterial or venous nature, using color-Doppler ultrasonography. Tatari et al.⁷⁾ reported a well-circumscribed mass, resembling a Baker's cyst, using ultrasonography; however, it was finally confirmed to be pigmented villonodular synovitis. Additional investigation such as needle biopsy in conjunction with ultrasonography can prevent misdiagnosis. Needle biopsy of the mass described in our study was performed with a view to uncovering important information about the nature of mass.

MRI is widely considered the best imaging technique for the examination of popliteal masses. Shin et al.⁸⁾ reported a case of synovial sarcoma that was located at the popliteal fossa, adjacent to the proximal tibia, and which failed to show any abnormalities on a plain radiograph. The soft tissue mass accompanied by bony lesions in close proximity to the neurovascular structure was uncovered during an MRI scan. MRI has the additional advantage of being able to show the anatomical orientation, important for excision of the mass.

In this case, histological findings were a well-encapsulated mass containing a mixture of adipose, fibrous, and chondroid tissue, with bone formation. The lipoma area is composed of mature fat, and there is no atypical adipocyte or lipoblast to be concerned with liposarcoma, including any dedifferentiated cells. On the basis of fat necrosis adjacent to the chondroid and osseous differentiation, this osteochondroid feature is thought to be metaplasia, related to fat necrosis in a longstanding lipoma. Certain authors regard this tumor as a benign mesenchymoma, due to the presence of various cell types. However, the predominant components encapsulated within the lipoma are fat tis-

sue, cartilage and bone, thus it was finally diagnosed as osteochondrolipoma. Differentiation into a diverse set of mesenchymal elements, such as blood vessels, fibrous tissue or muscle is relatively common. Nevertheless, mature cartilage and bone arising within a lipoma is extremely rare. Only a few cases of osteochondrolipoma have been reported, particularly in the thigh and chest wall, but never in the popliteal fossa.^{9,10)}

It is apparent from this case that popliteal masses are not always popliteal cysts, and careful evaluation of any mass in the popliteal fossa is essential. The following are a few suggestions to keep in mind when being presented with a popliteal mass. Careful physical examination is essential to check the nature of the mass including tenderness, pulsation and a tingling sensation that do not usually exist with a simple cyst. If there are any abnormal findings upon the physical examination or plain radiography, do not hesitate to perform further imaging investigations such as ultrasonography or MRI. Needle biopsy should be chosen primarily over open excisional biopsy if a malignant lesion is suspected from the imaging investigation.

As described earlier, the popliteal mass that was initially misdiagnosed as a simple popliteal cyst, finally turned out to be osteochondrolipoma. Therefore, whenever we encounter a popliteal mass, being open to all diagnostic possibilities and evaluation procedures is paramount.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Baker WM. On the formation of synovial cysts in the leg in connection with disease of the knee-joint. 1877. *Clin Orthop Relat Res.* 1994;(299):2-10.
2. Fritschy D, Fasel J, Imbert JC, Bianchi S, Verdonk R, Wirth CJ. The popliteal cyst. *Knee Surg Sports Traumatol Arthrosc.* 2006;14(7):623-8.
3. Fiori R, Chiappa R, Gaspari E, Simonetti G. A rare case of popliteal venous aneurysm. *Case Rep Med.* 2010;2010:579256.
4. Miller TT, Staron RB, Koenigsberg T, Levin TL, Feldman F. MR imaging of Baker cysts: association with internal derangement, effusion, and degenerative arthropathy. *Radiology.* 1996;201(1):247-50.
5. Sansone V, De Ponti A. Arthroscopic treatment of popliteal cyst and associated intra-articular knee disorders in adults. *Arthroscopy.* 1999;15(4):368-72.
6. Tseng KF, Hsu HC, Wang FC, Fong YC. Nerve sheath ganglion of the tibial nerve presenting as a Baker's cyst: a case report. *Knee Surg Sports Traumatol Arthrosc.* 2006;14(9):880-4.
7. Tatari H, Baran O, Lebe B, Kilic S, Manisali M, Havtcioglu H. Pigmented villonodular synovitis of the knee presenting as a popliteal cyst. *Arthroscopy.* 2000;16(6):13.
8. Shin DS, Kwack BH, Ahn JC. Treatment of synovial sarcoma in popliteal fossa adjacent to tibia. *J Korean Bone Joint Tumor Soc.* 2007;13(2):201-6.

9. Gru AA, Santa Cruz DJ. Osteochondrolipoma: a subcutaneous lipoma with chondroid and bone differentiation of the chest wall. *J Cutan Pathol*. 2012;39(4):461-3.
10. Rau T, Soeder S, Olk A, Aigner T. Parosteal lipoma of the thigh with cartilaginous and osseous differentiation: an osteochondrolipoma. *Ann Diagn Pathol*. 2006;10(5):279-82.