

Radiology for the surgeon

Musculoskeletal case 41

Presentation

A 29-year-old man presented with right knee pain with possible meniscal injury. The patient had suffered a hockey injury 6 years previously, and magnetic resonance imaging (MRI) at that time showed an osteochondral defect of the lateral facet of the patellar cartilage but no other abnormality. Images from the follow-up MRI are shown (Fig. 1).

What is the most likely diagnosis?

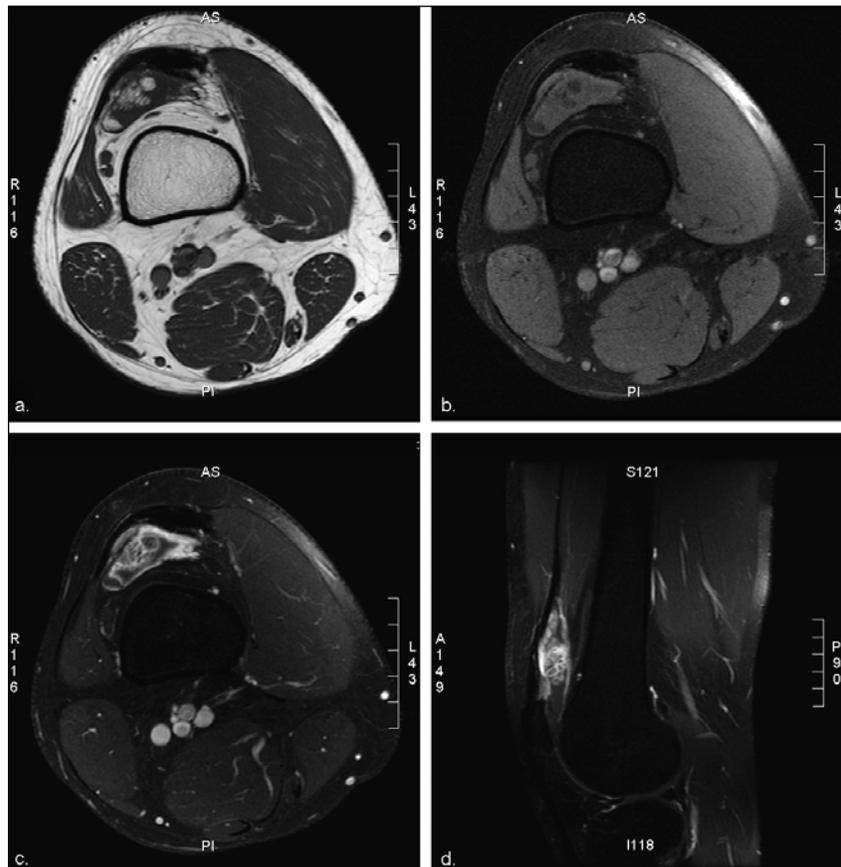


FIG. 1. Magnetic resonance imaging views of the right knee: (a) axial T_1 -weighted, (b) axial T_1 -weighted with fat saturation, and axial (c) and sagittal (d) T_1 -weighted postgadolinium with fat saturation.

Submitted by Fahad O. Alkubaidan, MD; Eric J. Heffernan, MB, BCh; and Peter L. Munk, MD, from the Department of Radiology, Vancouver General Hospital, Vancouver, BC

Inquiries about this section should be directed to the section editor: Dr. Peter L. Munk, Professor, Department of Radiology, Vancouver General Hospital and Health Sciences Centre, 855 W 12th Ave., Vancouver BC V5Z 1M9; fax 604 875-4723; peter.munk@vch.ca

Correspondence to: Dr. F.O. Alkubaidan, Department of Radiology, Vancouver General Hospital and University of British Columbia, Jimmy Pattison Pavilion South, 899 W 12th Ave., Vancouver BC V5Z 1M9; f_alkubaidan@yahoo.com

Diagnosis

Lipoma arborescens

The MRI of the knee shows an intra-articular soft tissue mass with poly-poid frond-like projections located in the suprapatellar bursa. Areas within the mass follow the signal intensity of fat on all imaging sequences: high T_1 signal intensity (Fig. 1A), intermediate-to-high T_2 signal intensity (not shown) and signal suppression on fat saturation sequences (Fig. 1B). The mass enhances on post-gadolinium images, and there is also diffuse enhancement of the synovium (Fig. 1C, 1D). A moderate-sized joint effusion is seen. There is no low signal intensity within the synovium on any of the imaging sequences to suggest the presence of hemosiderin.

Lipoma arborescens (LA) is a rare, benign intra-articular lesion characterized by lipomatous villous proliferation of the synovium secondary to replacement of the subsynovial tissue by mature fat cells.¹⁻⁸ There is associated chronic inflammation of the synovium.¹⁻⁴ The disorder typically affects the knee as a monoarticular process and is most commonly located in the suprapatellar pouch; however, other joints and bilateral involvement have been described.^{1,4,5}

LA appears to develop *de novo* in most instances, although in some cases it is associated with osteoarthritis, rheumatoid arthritis or trauma.^{2,3,5-7} Al-Ismail and colleagues⁶ postulate that LA may induce a secondary osteoarthritis. It has also been suggested that the severity of os-

teoarthritis changes is related to the duration of the synovial disease.⁷

Affected patients usually present with chronic painless swelling accompanied by recurrent joint effusions.^{1-5,7} The clinical course is typically marked by intermittent exacerbations.^{1,7} Laboratory tests are unhelpful, and joint aspiration is typically negative for crystals and cells.⁷

LA derives its name from the Latin word *arbor*, meaning tree, which appropriately describes its branching architecture.⁵

Radiographs may show fullness of the joint and soft tissue swelling that may or may not be radiolucent. These findings are nonspecific.^{1-4,6} Ultrasound is a good imaging modality for detecting the joint effusion and can also demonstrate the hyperechoic frond-like architecture of the lesion.^{1,3,6} Computed tomography also shows a frond-like lesion of fat attenuation; however, the villous appearance may be difficult to appreciate.^{1,2,6}

MRI is the best imaging modality and the cornerstone of the preoperative diagnosis of LA. The typical MRI features have been well described in the literature. These features include 1) a frond-like synovial mass that is similar to fat signal intensity on all imaging sequences, 2) potential chemical shift artifact at fat-fluid interfaces, 3) absence of susceptibility artifacts owing to absence of hemosiderin deposition, which helps to exclude pigmented villonodular synovitis, and 4) associated joint effusion.¹⁻⁸

Diffuse enhancement of the overlying inflamed synovium following gadolinium administration has been reported.¹

The characteristic MRI findings of LA enable confident preoperative diagnosis

and can exclude other possible clinical and radiologic mimickers such as synovial osteochondromatosis, pigmented villonodular synovitis, synovial hemangioma and synovial lipoma.^{2,4-7}

Typically, LA is treated by total synovectomy, and postoperative recurrence is uncommon.^{1-6,8}

Competing interests: None declared.

References

1. Murphey MD, Carroll JF, Flemming DJ, et al. From the archives of the AFIP: benign musculoskeletal lipomatous lesions [review]. *Radiographics* 2004;24:1433-66.
2. Martin S, Hernandez L, Romero J, et al. Diagnostic imaging of lipoma arborescens. *Skeletal Radiol* 1998;27:325-9.
3. Sheldon PJ, Forrester DM, Learch TJ. Imaging of intraarticular masses [review]. *Radiographics* 2005;25:105-19.
4. Narvaez JA, Narvaez J, Aguilera C, et al. MR imaging of synovial tumors and tumor-like lesions. *Eur Radiol* 2001;11:2549-60.
5. Vilanova JC, Barcelo J, Villalon M, et al. MR imaging of lipoma arborescens and the associated lesions. *Skeletal Radiol* 2003;32:504-9.
6. Al-Ismail K, Torreggiani WC, Al-Sheikh F, et al. Bilateral lipoma arborescens associated with early osteoarthritis. *Eur Radiol* 2002;12:2799-802.
7. Ryu KN, Jaovisidha S, Schweitzer M, et al. MR imaging of lipoma arborescens of the knee joint. *AJR Am J Roentgenol* 1996;167:1229-32.
8. Feller JF, Rishi M, Hughes EC. Lipoma arborescens of the knee: MR demonstration. *AJR Am J Roentgenol* 1994;163:162-4.