



Endoscopic Resection of Lipoma of the Patellar Tendon

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Abstract: Synovial lipoma of the patellar tendon is a very rare entity. It can be associated with rupture of the patellar tendon. We present a case of synovial lipoma that was successfully resected endoscopically. The other indications for patellar tendoscopy include chronic patellar tendinitis and tendinosis, recalcitrant bursitis around the tendon, Osgood-Schlatter disease, and jumper's knee. The major potential danger of this endoscopic procedure is iatrogenic damage to the patellar insertion during endoscopic debridement in patients with jumper's knee or the tibial insertion during endoscopic debridement in patients with Osgood-Schlatter disease.

Lipoma is a benign tumor composed of mature adipocytes. It is the most common tumor of mesenchymal origin in orthopaedic practice and accounts for almost 50% of all soft-tissue tumors.^{1,2} Although it can occur almost anywhere in the body, its occurrence inside the joint, bursa, or tendon sheath is very rare.³⁻⁷ There are 2 types of this kind of lipoma: synovial lipoma and lipoma arborescens.^{3,8} Lipoma arborescens is more frequently reported.⁸ We report a case of synovial lipoma of the patellar tendon that was successfully resected endoscopically.

Patient

A 51-year-old woman noticed the presence of a mass over her left knee for 1 year without any preceding trauma. There was no pain over the mass, and the size of the mass was static. There was no similar mass over other parts of her body. Clinically, there was a 3-cm soft mass attached to the anterolateral part of the patellar tendon (Fig 1). There was no effusion of the left knee. Radiographs of the left knee did not show any abnormality.

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Magnetic resonance imaging (MRI) of the left knee (Fig 2) showed a lobulated soft-tissue lesion along the anterolateral aspect of the patellar tendon. It measured about 3.5 × 2.5 × 1.2 cm (height × width × anteroposterior length) in size. The lesion showed isointensity on T1-weighted images with focal areas of hyperintensity. It showed mixed intensity on T2-weighted images. No perilesional edema was noted. The underlying patellar tendon showed normal signal intensity. No signal change at the Hoffa fat pad or significant joint effusion was found. The MRI features could have represented internal synovial proliferation and may have been due to bursitis with proteinaceous content, hemorrhage, or lipomatous deposit.⁷ The differential diagnoses included lipoma arborescens (villous lipomatous proliferation of the synovial membrane), synovial lipoma, infective bursitis, gouty bursitis, pigmented villonodular synovitis, hemangioma, and synovial chondromatosis. The radiologist commented that the MRI features could indicate synovial thickening with fatty tissue inside but the nature of the lesion could not be determined. Anatomically, the lesion was likely to have arisen from the superficial or deep infrapatellar bursa. Ultrasound-guided biopsy was performed. The histologic examination only showed benign fibrofatty tissue, and no histologic diagnosis could be concluded. Patellar tendoscopy was performed, and the mass was resected endoscopically.

Technique

The patient was placed in the supine position. A thigh tourniquet was applied to provide a bloodless surgical field. Patellar tendoscopy was performed through proximal- and distal-lateral portals (Fig 3). The portals were

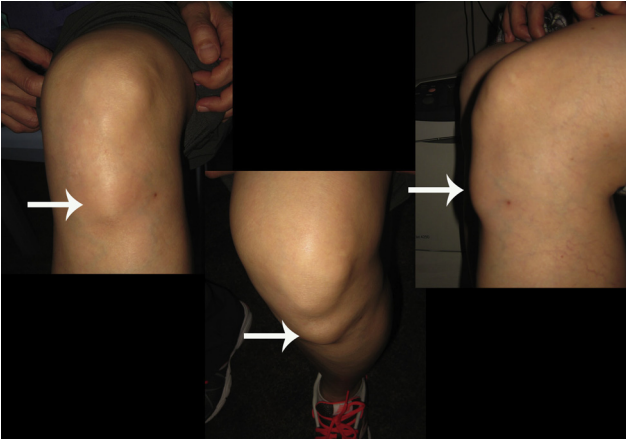


Fig 1. Clinical photographs showed the mass (arrows) anterolateral to the patellar tendon.

on the lateral side of the patellar tendon. The proximal-lateral portal was located at the joint-line level, and the distal-lateral portal was located at the distal end of the mass just proximal to the tibial tuberosity. A well-encapsulated fibrofatty tumor encasing the distal-lateral part of the patellar tendon was noted, with patchy areas of inflamed tissue. There was no fluid collection within the mass. The mass was resected endoscopically with arthroscopic biopsy forceps and an arthroscopic shaver (Smith & Nephew Dyonics, Andover, MA) (*Video 1*). The underlying patellar tendon was found to be normal (*Fig 4*). Histologic examination showed lipoma without any synovial lining detected. The patient was able to resume work and sports activity 2 weeks after the operation. There was no complication noted. At 23 months' follow-up, no local recurrence was noted.

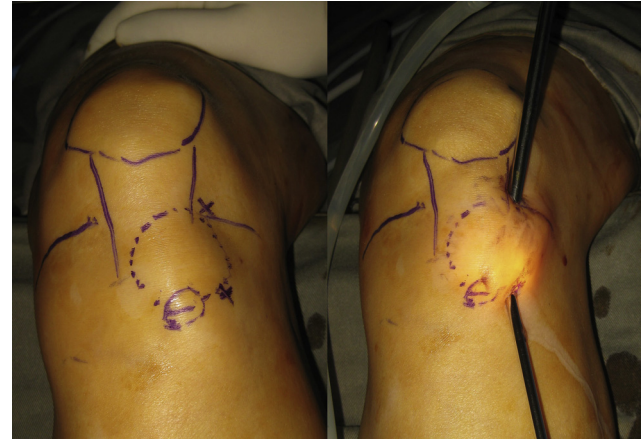


Fig 3. Patellar tendoscopy with proximal- and distal-lateral portals.

Discussion

Synovial lipoma of the patellar tendon is very rare^{1,9,10} and has been reported to be associated with tendon rupture.^{9,10} Our patient did not have any pain over the mass or the patellar tendon. Moreover, the patellar tendon was noted to be normal on MRI and during tendoscopy.

All the differential diagnoses listed previously are rare entities and cannot be differentiated clinically because of the nonspecificity of the symptoms and physical examination. Non-fatty lesions usually can be excluded by MRI. Pigmented villonodular synovitis shows low intensity on T1- and T2-weighted images and enhances with gadolinium. Synovial hemangioma shows low signal on T1-weighted images and high signal on T2-weighted images and shows characteristic hypointense

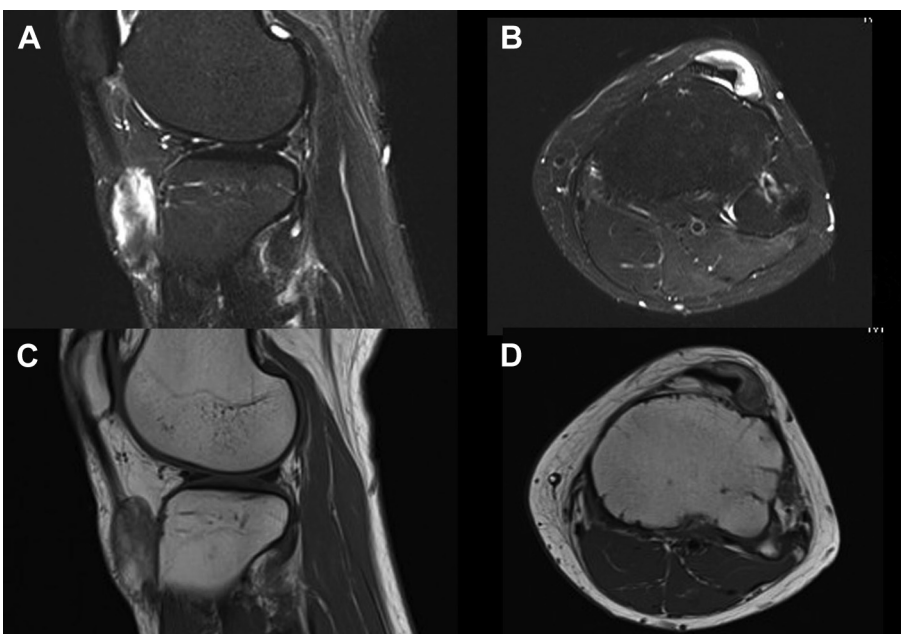
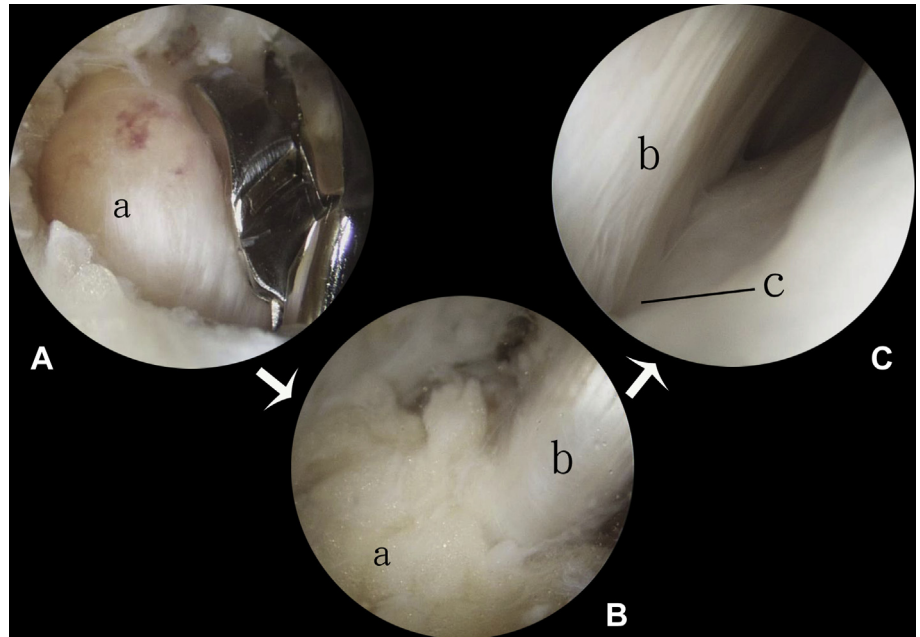


Fig 2. MRI showed a lobulated soft-tissue lesion encasing the lateral aspect of the patellar tendon. The lesion showed isointensity on T1-weighted images with focal areas of hyperintensity. It showed mixed intensity on T2-weighted images.

Fig 4. Arthroscopic views. (A) Encapsulated fatty mass (a). (B) The proximal part of the lesion was resected to expose the patellar tendon (b). (C) After complete endoscopic resection, the whole patellar tendon was exposed down to the tibial insertion (c).



linear fibrous septa. Synovial chondromatosis is associated with loose body formation.^{7,11}

Benign lipomatous lesions of the soft tissue are classified into 9 distinct diagnoses: lipoma, lipomatosis, lipomatosis of the nerve, lipoblastoma or lipoblastomatosis, angioliipoma, myoliipoma of the soft tissue, chondroid lipoma, spindle cell lipoma or pleomorphic lipoma, and hibernoma.² Benign lipomatous lesions affecting the bone, joint, or tendon sheath are much rarer and include intraosseous lipoma, parosteal lipoma, liposclerosing myxofibrous tumor, synovial lipoma of the joint or tendon sheath, and lipoma arborescens.² Lipoma arborescens is the main differential diagnosis for synovial lipoma. It has been defined as a benign collection of fat replacing the subsynovial layer, resulting in diffuse villonodular proliferation in the synovium that has a frond-like architecture.^{2,3,12} This microscopic appearance distinguishes it from a synovial lipoma, which usually presents as a round to oval discrete mass of mature adipose tissue encased by a thin fibrous capsule.^{8,13,14} The arthroscopic findings of a discrete encapsulated fatty lesion in this case made the diagnosis of lipoma arborescens unlikely.¹⁵ This distinction was important because lipoma arborescens is typically treated by complete synovectomy as opposed to the localized excision used to treat a discrete synovial lipoma. Preoperative MRI, especially using the T1 and fat-suppressed sequences, may allow differentiation of the 2 entities. A synovial lipoma is a discrete round or oval mass that is isointense with fat on all sequences, whereas lipoma arborescens has a villous appearance.^{7,12} Histologically, lipoma arborescens is

identified by the location of a fat deposit. It is characterized by a diffuse replacement of the subsynovial layer by mature fat cells with a moderate infiltration of mononuclear inflammatory cells. On the other hand, a synovial lipoma may be covered by synovium but it is not arisen from or replaced by the subsynovial layer. Moreover, infiltration of mononuclear inflammatory cells is not commonly seen in synovial lipoma.^{1,9} We could not identify any synovium in the specimens obtained in our patient. This may be because the lesions were removed in piecemeal fashion and the lesion was not examined en bloc. Synovial lipoma of the knee has been reported to be arisen from the Hoffa infrapatellar fat pad.¹³ However, this is unlikely to be the origin in our case because no communication between the lesion and the knee joint proper was detected arthroscopically. We believe that the lipoma had arisen from either the superficial or deep infrapatellar bursa.

Synovial lipoma of the patellar tendon is a very rare entity and can be associated with rupture of the patellar tendon.^{9,10} Synovial endoscopic resection was performed in view of the better cosmetic and likely superior functional results. There are 4 portals for patellar tendoscopy: proximal medial, proximal lateral, distal medial, and distal lateral. The proximal portals are identical to the standard anteromedial and anterolateral portals used in knee arthroscopy. The distal portals are on the medial and lateral sides of the tendon just proximal to its insertion in the tibial tuberosity. The whole circumference of the tendon from the patellar insertion to the tibial insertion can be approached. Because of the pyramidal shape of the infrapatellar

(Hoffa) fat pad,¹⁶ the proximal part of the patellar tendon can be approached from intra-articularly outward. Standard knee arthroscopy is performed through the proximal portals, and then the apex of the Hoffa fat pad can be resected together with the anterior capsule to reach the patellar insertion and proximal part of the tendon.^{6,17} For the distal part of the tendon, a pure endoscopic approach is used. Although an approach to the distal part of the tendon and its tibial insertion through the proximal portals has been described,¹⁸ the freedom of motion of the arthroscopic instruments can be hindered by the patella. This may partly be solved by flexion of the knee. However, the patella and the patellar tendon will become immobile. Tensing up of the tendon will affect the ability to reach the deep infrapatellar space. The inferior part of the tendon can be easily reached through the distal portal, as shown in this case. Patellar tendoscopy can be used to treat pathologies of the tendon and its patellar and tibial insertions. The indications include chronic patellar tendinitis and tendinosis,^{19,20} recalcitrant bursitis around the tendon,²¹ Osgood-Schlatter disease,¹⁸ and jumper's knee.^{6,17} The major potential danger of this endoscopic procedure is iatrogenic damage to the patellar insertion during endoscopic debridement in patients with jumper's knee or the tibial insertion during endoscopic debridement in patients with Osgood-Schlatter disease.^{6,15,17} Synovial lipoma of the patellar tendon can be resected endoscopically. The whole circumference of the tendon from its patellar insertion to its tibial insertion can be approached through patellar tendoscopy.

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