The intraarticular synovial fibroma is an extremely rare neoplastic lesion. To the best of our knowledge, there are only 14 cases reported in the literatures [1-14]. Most of these reports have focused on clinical or pathological aspects with limited descriptions and illustrations in regards to imaging features. In this report, we present a case of synovial fibroma in the knee joint which shares similar imaging features and clinical presentations with localized pigmented villonodular synovitis (PVNS). Therefore, it is important that synovial fibroma be included in the list of differential diagnosis through the process of reaching a definitive diagnosis of PVNS.

**CASE REPORT**

A 42-year-old woman presented with painful disability and tenderness over left knee for the duration of one year. The patient gave a positive history of trauma to the knee without specific details. Physical examination elicited a positive anterior drawer test and revealed a palpable mass in the medial inferior aspect of the patellofemoral space. Routine laboratory studies, including complete blood count, electrolytes, liver and renal function indices, were all within normal limits. The lateral radiograph of the knee (Fig. 1a) demonstrated a smooth-outlined intraarticular soft tissue mass along the medial aspect of patellofemoral space protruding inferiorly into Hoffa’s fat pad. Subsequent CT scan of the knee (Fig. 1b, 1c) revealed neither internal calcifications nor erosion of the surrounding bony structures. A chronic and complete tear of anterior cruciate ligament (ACL) was observed on MRI. The menisci, posterior cruciate and collateral ligaments were intact. In addition, a well-defined soft-tissue mass, about 3.5 × 1.8 × 1.1cm in size, was also confirmed along the medial facet of patellofemoral compartment with extension to Hoffa’s fat pad. This mass was characterized by low to intermediate signal intensity on T1-weighted images (Fig. 2a), heterogeneous low signal on T2-weighted images (Fig. 2b) and heterogeneous strong enhancement on post-contrast images (Fig. 2c). Even without additional gradient-echo (GRE) sequence to confirm the presence of hemosiderin deposition, the aforementioned MRI features can still allow reflexive interpretation of nodular synovitis (localized PVNS) in highest priority.

Arthroscopic examination (Fig. 3) was then performed which revealed a complete tear of ACL and a whitish, lobulated synovial mass measuring about 4x2x1cm at medial gutter. Reconstruction of ACL and complete excision of the mass were successfully performed via arthroscopy.
The histopathological examination (Fig. 4) showed well-circumscribed fibrous nodules separated by clefts. The tumor was composed of spindled fibroblasts embedded in a collagenous stroma with cellular regions, areas of relative cellular paucity, and foci consisting of myxoid change. Mitosis was scarce, and the tumor cells tested positive immunohistochemically for smooth muscle actin (SMA) and negative for S-100 and CD34. The histological diagnosis of a synovial fibroma (fibroma of the tendon sheath) was thus reached.

**DISCUSSION**

Fibroma of tendon sheath, first described by Geschickter and Copeland in 1949 [15], is a slow-growing
Intraarticular synovial fibroma

Figure 2. MRI reveals a well-defined soft-tissue mass (arrow) in the medial compartment of patellofemoral space and extending to Hoffa’s fat pad. a. Sagittal T1WI showed low to intermediate signal intensity. b. Sagittal T2WI showed heterogeneous low signal intensity. c. Gd-enhanced fat-suppressed T1WI manifested heterogeneous strong enhancement.

fibrous nodule that frequently adjoins a tendon sheath, and has a predilection for the fingers and hands.

About 9% of the cases reported in the literature had a positive history of trauma [16]. Surgical excision is the treatment of choice but local recurrence rates are reported about 24% and are thought related to incomplete tumor resection [17].

This lesion has rarely been reported to arise from the synovial membrane of a joint, and is more appropriately termed synovial fibroma. To the best of our knowledge, only 14 cases of intraarticular synovial fibroma have been reported in the currently available English literatures. Most of these reports emphasized on clinical or pathological features. The knee joint was most commonly involved (9/14 cases) [1-4, 6, 7, 9, 10, 13]. A history of prior trauma was recorded in 2 of the 14 patients [2, 13]. Out of the limited imaging descriptions of intraarticular synovial fibroma in the literature, bony erosion was present in only four cases—two in the knee, one in the ankle, and one in the temporomandibular joint [2, 5, 9, 14].

On MR images, both reported in the literatures and in our case, synovial fibroma most frequently exhibit low to intermediate T1 and low T2 signals with strong gadolinium enhancement. However, focal or homogeneous high T2 signal was seen in five cases [1-3, 7, 9], and this feature was the result of either focal myxoid change or a localized abundant of cellularity. The mixed compositions of fibrous, cellular and myxoid components may explain
Intraarticular synovial fibroma

The heterogeneity of gadolinium enhancement pattern. The treatment of intraarticular synovial fibroma is surgical excision. There has been no report of local tumor recurrence in any of the 14 cases mentioned in the literature.

Low T1 and T2 signals with strong gadolinium enhancement were observed in the lesion in our case; this feature is similar to PVNS, a much more common intraarticular lesion than synovial fibroma. Because similarities in appearances between synovial fibroma and localized PVNS on MRI studies, it is not difficult to see why the most important differential diagnosis of synovial fibroma is localized PVNS. Localized intraarticular PVNS almost always involves the knee and is primarily located in the infrapatellar region [18]. The most distinctive imagine characteristic of the PVNS is “blooming” effect on GRE images due to hemosiderin deposition, a finding which may allow for differentiation from the fibroma. However, this finding may sometimes be of limited diagnostic value, especially

Figure 3. Arthroscopy confirmed the presence of a whitish lobulated synovial mass with smooth margin at medial gutter of anterior knee.

Figure 4. The histopathological examination showed well-circumscribed fibrous nodule with an area of cellular paucity and spindled fibroblasts embedded in a collagenous stroma (H&E x40).
when a localized PVNS that reflects a more variable amount of hemosiderin than diffuse PVNS is encountered [18]. Therefore, whilst the blooming effect on GRE sequence can be helpful in establishing a diagnosis of PVNS, the possibility of a localized PVNS is still present in the absence of such a characteristic MR feature. T2*GRE is not a routine sequence in most MR protocols of the knee, as it is usually an additional procedure carried out if hemosiderin deposition is suspected. The other differential diagnostic considerations for an intraarticular focal nodules include nodular fasciitis, cyclops lesion and tophaceous gout.

Intraarticular nodular fasciitis is also extremely rare and detailed imaging findings were reported in only three cases in which the lesions arisen from the knee joints [19–21]. Unlike localized PVNS or synovial fibroma, the reported case of nodular fasciitis exhibited low or slightly high T1 signal, intermediate or high T2 signal and homogeneous contrast enhancement. A cyclops lesion is usually in the intercondylar notch abutting on anterior-inferior surface of ACL graft with characteristic MR features of low T1 and T2 signals without contrast enhancement. The typical location and characteristic MR features of cyclops lesion along with prior surgical history can allow differentiation from other intraarticular masses. Tophaceous gout can also present as an intraarticular nodule or mass with low T1 and T2 signals as well as enhancement patterns. With a typical medical history, laboratory data, increased density or T2 signals without contrast enhancement. The typical location and characteristic MR features of cyclops lesion along with prior surgical history can allow differentiation from other intraarticular masses. Tophaceous gout can also present as an intraarticular nodule or mass with low T1 and T2 signals as well as enhancement patterns. With a typical medical history, laboratory data, increased density or attenuation on plain radiographs and CT scan secondary to internal sandy calcifications, intraarticular gouty tophi are usually not a diagnostic challenge. For indeterminate cases, dual-energy CT can help with determination of gouty tophi.

In summary, intraarticular synovial fibroma is a rare disease that shares similar imaging features and clinical presentations with localized PVNS. It therefore should be considered in the list of differential diagnosis whenever the imaging diagnosis of localized PVNS is established. Other possibilities of intraarticular nodular lesions include cyclops lesion, nodular fasciitis, and tophaceous gout.

REFERENCES