



Case Report

Case report: Localized nodular synovitis of knee joint

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Abstract

Localized nodular synovitis is an uncommon entity with different presentations. It is a benign proliferative disorder that originates from a small area of the synovium. This disorder is found most frequently in the tendon sheaths of the small joints of the fingers and toes. We reported here a case of localized nodular synovitis in a 30 years young man who came with complaints of discomfort in the knee joint. Swelling in the infrapatellar region was diagnosed on physical examination. On MR imaging, a solitary ovoid mass lesion was identified in the infrapatellar region involving the infrapatellar fat of pad. Mild enhancement within the lesion was observed after administration of intravenous gadolinium. There was mild to moderate joint effusions in the suprapatellar bursa. Mild synovial enhancement was demonstrated. No meniscal or ligament tear was identified. Prospective diagnosis based on MR imaging was localized nodular synovitis.

Key words

Localized nodular synovitis, Knee joint, MRI.

Introduction

Localized nodular synovitis is a rare disorder with different presentations. It is a benign proliferative disorder that originates from a small area of the synovium. This disorder is found most frequently in the tendon sheaths of the small joints of the fingers and toes. We reported here a case of localized nodular synovitis in a 30 years young man diagnosed by MRI.

Case report

A 30 years young man complaining of discomfort in the knee joint region since 6 months came to our hospital. At physical examination, there was swelling in the infrapatellar region. Antero-posterior (AP) and lateral radiographs of left knee joint were taken. The radiograph was reported as within normal limits. **(Photo – 1)** Then after MR imaging was performed on 1.5-T siemens scanners with dedicated extremity coil. The examinations consisted principally of a



combination of spin-echo T1-weighted (TR range/TE range, 450–650/15–20), spin-echo proton density-weighted (1800–2200/20–30), fast spin-echo T2-weighted (2500–3300/55–80), and fat-suppressed fast spin-echo proton density-weighted (1800–2200/20–30) and gradient-echo (TR/TE, 650/15; flip angle, 20°) sequence in the axial plane was performed. Variable combinations of sequences and imaging planes were used. After these basic sequences which were routinely performed in our institute, fat-suppressed T1-weighted (TR range/TE range, 450–650/15–20) spin-echo imaging was performed after intravenous (IV) administration of gadolinium (0.1 mmol/kg of body weight). The field of view varied between 14 and 16 cm, the slice thickness ranged from 3 to 5 mm, and the inter slice gap was from 0 to 1 mm. The number of acquisitions was either one or two. The imaging matrix ranged from 192 × 256 to 256 × 256.

Photo – 1: X-ray knee radiograph.



MR imaging findings

On MR imaging, a solitary ovoid mass lesion was identified in the infrapatellar region involving the infra patellar fat of pad. **(Photo - 2)** It has well defined margins. The maximal diameters of the lesion were 4 x 5 cm.

Photo – 2: Coronal T2 shows well defined lobulated T2 hypo intense mass lesion infra patellar fat region.



The lesion showed intermediate signal intensity relative to that of skeletal muscle on the T1-weighted images. On the T2-weighted images, all lesions showed inhomogeneous hypointense signal. With fat suppression, lesion showed inhomogeneous and relatively high signal intensity. Mild enhancement within the lesion was observed after administration of intravenous gadolinium. There was mild to moderate joint effusions in the suprapatellar bursa. Mild synovial enhancement was demonstrated. No meniscal or ligament tear was identified. Prospective diagnosis based on MR imaging was localized nodular synovitis. **(Photo – 3, Photo – 4, Photo – 5)**

Discussion

Localized nodular synovitis is a benign proliferative disorder that originates from a small area of the synovium. This disorder is found most frequently in the tendon sheaths of the small joints of the fingers and toes [1, 2, 3, 4, 5, 6, 7]. A focal intraarticular mass is an uncommon presentation, but when it is seen, the most typical site of involvement is the knee



joint [8]. The cause of localized nodular synovitis is unclear. Although Jaffe, et al. [9] and Granowitz, et al. [10] suggested that localized nodular synovitis is an inflammatory process, more recent studies have characterized the lesion as a benign neoplasm of the synovium [11, 12]. Traumatic, toxic, allergic, and genetic factors have also been reported to be responsible for development of this lesion [5]. Patient had a discrete history of knee trauma before the onset of knee pain. The infra patellar fat pad was the most common site of involvement [5, 6, 7, 8].

[4, 13, 14]. The clinical manifestations of localized nodular synovitis of the knee are nonspecific.

Photo – 3: Sagittal STIR image reveal lobulated soft tissue lesion in infra patellar fat showing hyper intense signal.

Photo – 4: Axial STIR image revealed lobulated hyper intense soft tissue lesion in infra patellar fat.

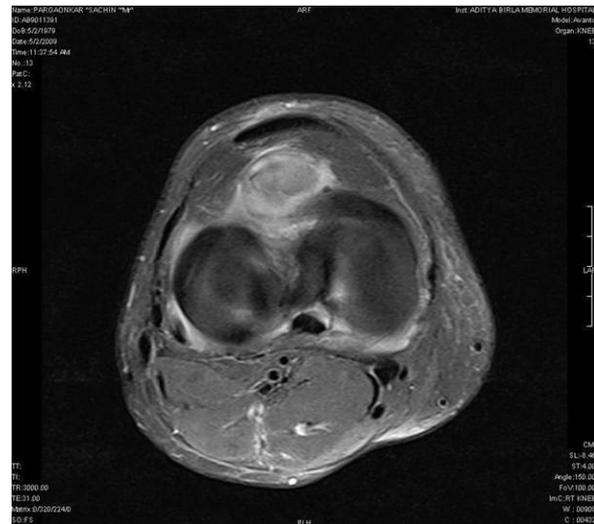
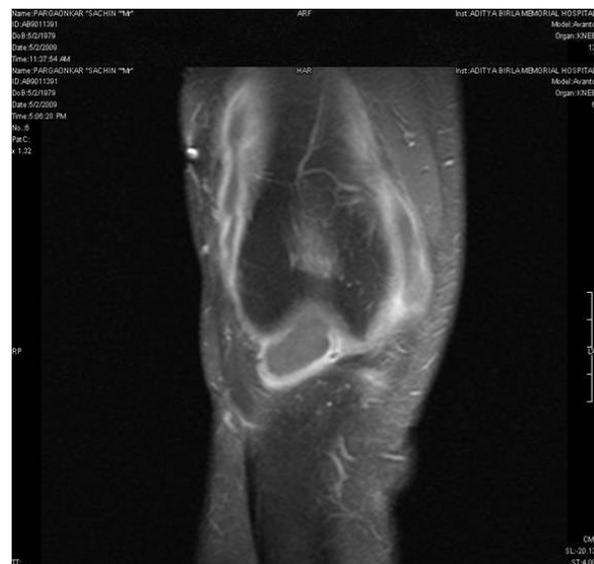


Photo – 5: Coronal T1 post contrast image revealed lobulated soft tissue lesion in infra patellar fat showing peripheral enhancement.

The suprapatellar pouch was the second most common site of involvement, although to our knowledge, involvement in this area has not been previously reported. Involvement of the intercondylar notch, is relatively uncommon, having been previously reported [1, 4, 13, 14]. When the cruciate ligaments are involved, localized nodular synovitis tends to more commonly affect the posterior cruciate ligament



The symptoms may include pain, swelling or fullness, joint-line tenderness, restricted knee motion, and a palpable mass. Reportedly, localized nodular synovitis may rarely present



with locking of the knee, having been cited as the cause in four patients with lesions in the infrapatellar fat pad [5, 6, 7]. When the maximal diameter of the lesion in the infrapatellar pad exceeded 5 cm, it was likely to restrict terminal knee extension. Mechanical impingement may also stimulate the release of chemical substance P, which is rich in the synovial lining of the infrapatellar fat pad, inducing pain. The observation of a pedicle is relevant because torsion of this pedicle can produce acute knee pain, which was seen in one of our patients. However, this condition can be difficult to diagnose unless images are carefully inspected. The MR imaging appearance of intraarticular localized nodular synovitis is variable. Typically, intraarticular localized nodular synovitis appears either as a well-defined, small ovoid lesion or as a large polylobulated soft-tissue mass with iso- or hyper intense signal intensity relative to skeletal muscle on T1-weighted images and variable signal intensity on T2-weighted images. Circular regions of intermixed low signal intensity corresponded to regions of high hemosiderin concentration, and the conspicuity of this pattern increased on gradient-echo images. In addition, an internal cleft like or linear high-signal intensity region of the lesion in T2-weighted images was identified. We speculate that this finding may relate to tissue necrosis. Enhancement of localized nodular synovitis is presumably related to the presence of numerous proliferative capillaries in the collagenous stroma [13]. Although intra articular localized nodular synovitis shares similar histologic characteristics with pigmented villonodular synovitis, these entities have been considered to represent different manifestations of synovial proliferation [9, 11, 15, 16, 17, 18]. Characteristic features of pigmented villonodular synovitis, not found in localized nodular synovitis, are the presence of diffuse frondlike projections of synovium and an abundance of hemosiderin deposition, which

serve as distinguishing observations. Furthermore, the macroscopic appearances of pigmented villonodular synovitis and localized nodular synovitis also reflect the differing amounts of hemosiderin deposition [11, 15, 16, 17, 18]. Another important distinguishing feature between pigmented villonodular synovitis and localized nodular synovitis is in their growth. As pigmented villonodular synovitis becomes more involved, the synovial masses constrict the joint, whereas localized nodular synovitis tends to grow outward, becoming pedunculated. The differential diagnoses of a mass in the infrapatellar fat pad include several pathologic processes. Hoffa's disease is an entity characterized by inflammation and fibrosis of the infrapatellar fat body. The ill-defined margin of the lesion, often associated with edema, is characteristic of the posttraumatic process. Chondroma or osteochondroma of the infrapatellar fat pad has a signal intensity pattern consistent with either cartilage or bone marrow and lacks the deposition of hemosiderin. Other lesions such as a tophus from gout and focal arthrofibrosis do not typically have the same characteristics as localized nodular synovitis. Surgical intervention is the best therapeutic choice for patients with localized nodular synovitis. Complete excision of the lesion usually is accomplished by either arthroscopy or open arthrotomy, and the decision for which procedure to perform depends on the location and size of the lesion. Recurrence is rare unless the lesion is not excised completely, and to our knowledge, recurrence has been described only twice in the literature [6, 11].

Conclusion

In summary, intra articular localized nodular synovitis most commonly involves the infrapatellar fat pad. The clinical presentation is variable but may mimic mechanical



derangement of the knee. MR imaging can facilitate preoperative diagnosis and provide information important for surgical planning. Many features help to distinguish localized nodular synovitis from pigmented villonodular synovitis, including the appearance of a smooth surface, involvement of a small region of synovium, small tumoral volume of hemosiderin, and the absence of a hemorrhagic joint effusion.

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