

## Synovial lipoma in intra-patellar fat pad of the knee joint

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### ABSTRACT

Intra-articular synovial lipoma is an unusual tumorous pathologically benign condition and only a small number of case reports have been published to date. This manuscript describes the case of a 19-year-old adolescent who presented with right knee pain and loss of movement caused by an intra-articular synovial lipoma of the knee joint. A MRI scan revealed an intra-articular soft tissue neoplasm within the lateral compartment of the joint. Arthroscopy confirmed an encapsulated neoplasm that arose from the intra-patellar fat pad, and extended to the lateral compartment and trochlear groove. Additionally, histological analysis revealed synovial lipoma.

**KEY WORDS:** Intra-articular synovial lipoma; Arthroscopy; Knee joint; Benign neoplasm.

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### INTRODUCTION

Intra-articular synovial lipoma is an unusual disease, and limited case reports have been published to date. Intra-articular synovial lipomas are mostly found in the knee joint, from locations that include the intra-patellar fat pad, the supra-patellar pouch, and the inter-condylar notch.

The clinical manifestations of intra-articular synovial lipomas are affected by the size and location of the neoplasm. The clinical symptoms are caused by the impingement of nearby structures by the lipoma, which include pain, crepitus, limitation of motion, and joint effusion.

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### CASE REPORT

This manuscript reports a case of a 19-year-old male with persistent right-sided knee pain associated with a limitation of motion. The patient reported that the sudden onset of knee pain with decreased joint movement had occurred 20 days prior to admission. Furthermore, he had previously slightly sprained his right knee joint six months prior to admission, but reported no residual discomfort. Physical examination showed moderate swelling of the right knee joint with a positive floating patellar test. The patient had tenderness over the lateral joint space, however, no obvious soft tissue mass was palpable over the right knee joint. The range of motion was limited from 0° to 120°. Laboratory investigations revealed no abnormalities, including blood cell count, rheumatoid factor, serum uric acid levels, erythrocyte sedimentation rate, C-reactive protein, PPD-IgG, and IgM. The assessment of the synovial fluid was normal, and bacteria were not found in the synovial fluid culture.

Plain radiographs of the right knee joint showed no evidence of pathology. An MRI scan revealed an intra-articular soft tissue neoplasm that arose from the intra-patellar fat pad, and extended into the lateral compartment and the trochlear groove. A large effusion was present in the joint, but no signs



Fig.1: A MRI scan revealed an intra-articular mass arising from the intra-patellar fat pad and extending to the lateral compartment and the trochlear groove.

of damage to the knee structures were evident on MRI (Fig. 1a, 1b). Arthroscopy revealed a smooth, gourd-shaped, yellowish, encapsulated neoplasm (Fig. 2a). The neoplasm, measuring approximately 25 x 15 x 8 mm (Fig. 2b), had a peduncle at the fat pad, which was approximately 1.5 cm long.

The neoplasm was resected completely under arthroscopic guidance. The histological diagnosis was synovial lipoma (Fig 3a). The postoperative rehabilitation was successful, and the patient could participate in daily activities freely with the operated knee joint. Follow-up over 15 months demonstrated no recurrence since the surgery.

### DISCUSSION

Intra-articular synovial lipoma of the knee joint is extremely rare. According to our knowledge, only a few cases have been reported on intra-articular

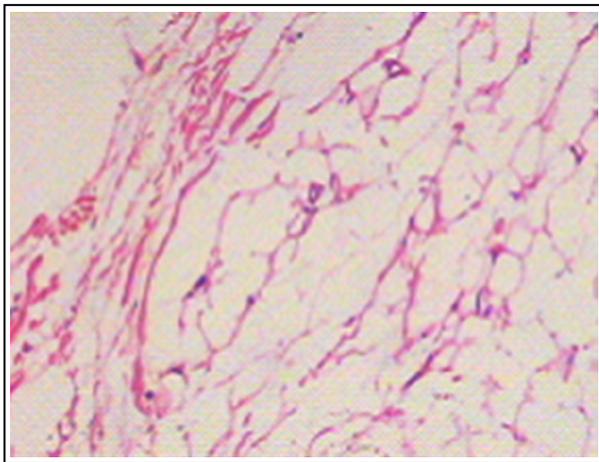


Fig.3: Microscopic photograph showing the histologic appearance of the neoplasm at a high magnification. The neoplasm is mainly composed of mature adipose cells covered by a fibrous layer with normal synovial-lining cells. The histological diagnosis was intra-articular synovial lipoma.

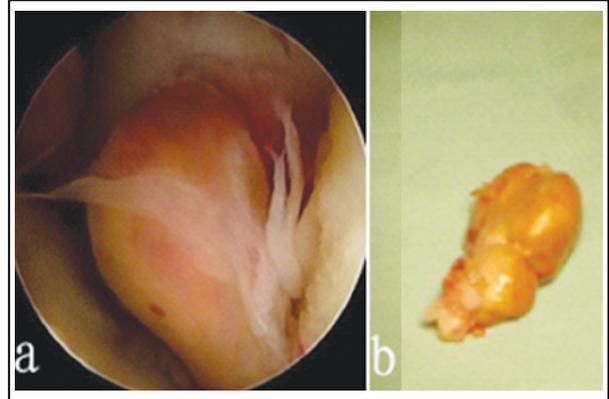


Fig.2:

a) Arthroscopy revealed a smooth, gourd-shaped, tawny, encapsulated neoplasm arising from the intra-patellar fat pad and extending to the lateral compartment and trochlear groove.

b) A smooth white fibrous envelope was seen over the external surface of the mass.

synovial lipomas in literature. Most of these cases were located within the knee,<sup>1-10</sup> one was found in the hip,<sup>11</sup> and one was in the lumbar spine.<sup>12</sup> Intra-articular synovial lipoma of the knee joint typically arises from the supra-patellar pouch,<sup>1,2</sup> or from the area of the fat pad.<sup>3-5</sup> In our patient, the intra-articular synovial lipoma was located in the intra-patellar fat pad.

The etiology of intra-articular synovial lipomas is unknown. They appear as small, yellowish, encapsulated, solitary polyp-like masses, which are usually oval in shape, and extend from the synovial membrane to the articular cavity.<sup>1-9</sup> Pudlowski et al postulated that the symptoms of intra-articular synovial lipoma could be ascribed to one of two mechanisms.<sup>1</sup> First, the tumor mass interposes between the articular surfaces, and second, the tumor becomes strangulated as it twists around its peduncle. The size of the lipoma in our patient was 25 x 15 x 8 mm; therefore, the lipoma could be caught between the anterolateral aspect of the femur, and the lateral tibial plateau or the patella because of its relatively small size.

Intra-articular synovial lipoma should be differentiated from other similar lipomatoid conditions, such as lipoma arborescens and Hoffa disease. Hallel et al described lipoma arborescens as a rare benign lesion of the synovium with villous lipomatous proliferation of the synovial membrane. Lipoma arborescens has been associated with osteoarthritis, inflammatory synovitis, rheumatoid arthritis, gout, diabetes mellitus, joint injury, and psoriatic arthri-

tis.<sup>13-17</sup> It is commonly observed macroscopically to have a frond-like appearance with numerous broad-based polypoid or thin papillary villi that are composed of fatty tissue. There are three differentiating characteristics that enable intra-articular synovial lipomas to be distinguished from lipoma arborescens.

First, MRI scans show that intra-articular synovial lipomas and fatty tissue have the same high-signal intensities on both T1- and T2-weighted images.<sup>4,6</sup> In lipoma arborescens, a villous synovial mass or mass-like subsynovial deposits are observed, which have signal intensities that are similar to fat on all pulse sequences.<sup>15</sup> Second, lipoma arborescens is characterized by a diffuse subsynovial deposition of fat and a villous appearance, which is associated with joint effusions, synovial cysts, and bone erosions, whereas, intra-articular synovial lipomas cause no obvious arthritic changes.<sup>15</sup> Finally, upon macroscopic examination, intra-articular synovial lipomas usually appear as small, yellowish, and solitary polyp-like masses, which have a round or oval shape and a short stalk, whereas, lipoma arborescens usually appear as a large, frond-like mass.<sup>9</sup>

Furthermore, Hoffa discussed a disease caused by the impingement of a hypertrophic intra-patellar fat pad in 1904.<sup>18</sup> MRI is a vital differentiating diagnostic method for this. In Hoffa's disease, low signal intensity areas on both T1- and T2-weighted images are observed as a result of hemosiderin and fibrin deposition. Hoffa's disease is caused by a protruding fat pad, which is shown to be covered by hypertrophic synovial membrane upon arthroscopy.<sup>19,20</sup> The management of Hoffa's disease is similar to that for intra-articular synovial lipoma.

In conclusion, intra-articular synovial lipoma in the knee is a rare benign neoplasm. It should not be confused for knee pain caused by other diseases. The symptoms in this case were relieved after the arthroscopic resection in our patient, and no recurrence occurred.

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