



# The complete type of suprapatellar plica and lipoma arborescens: a case report

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Lipoma arborescens is a rare intra-articular benign lesion. It is characterized by villous lipomatous proliferation of the synovial tissue and its etiology is not certain. Clinical presentation is usually long-standing, painless and slowly progressive swelling of the related joint. Magnetic resonance imaging plays an important role in diagnosis. Diagnosis can be determined by hypertrophied synovial tissue with synovial lining cells containing adipose tissue on examination using a light microscope. The synovial plica of the knee is formed during the embryogenic phase of development. This development is incomplete in many individuals. When the synovial plica of the knee persists, it is transformed into an embryonic relic that is located in either the suprapatellar or midpatellar region of the knee.

We present a rare case with both a complete type of suprapatellar plica and a symptomatic lipoma arborescens in the suprapatellar recess.

**Key words:** Arthroscopy; knee; lipoma arborescens; suprapatellar plica; villous lipomatous proliferation.

Lipoma arborescens is a rare, benign intra-articular lesion usually seen in adults between the ages of 30 and 50.<sup>[1-4]</sup> It is characterized by diffuse replacement of the subsynovial tissue into mature fat cells, producing villous transformation of the synovium. The etiology of lipomas remains uncertain but is mostly thought to be a secondary reactive process associated with chronic joint inflammation, similar to degenerative arthritis. Other reported mechanisms include inflammatory arthritis, diabetes, steroids, trauma and spontaneous occurrences.<sup>[1-3]</sup> Synovectomy is the recommended treatment for lipoma arborescens.

The synovial plica of the knee is formed during the embryogenic phase of development. In the fetal stage at

10 weeks, the developing knee joint consists of a single cavity with a synovial lining. In some regions, the mesenchymal tissue remains and these tissue bands may then later become plica. This is observed in 20% of the population. The synovial plica of the knee can be named according to the origin such as suprapatellar, mediopatellar and infrapatellar plica.

We report a case of lipoma arborescens located in the suprapatellar pouch not related with the intra-articular cavity.

## Case report

A 28-year-old female patient presented to our outpatient clinic with complaints of occasional pain and progressive

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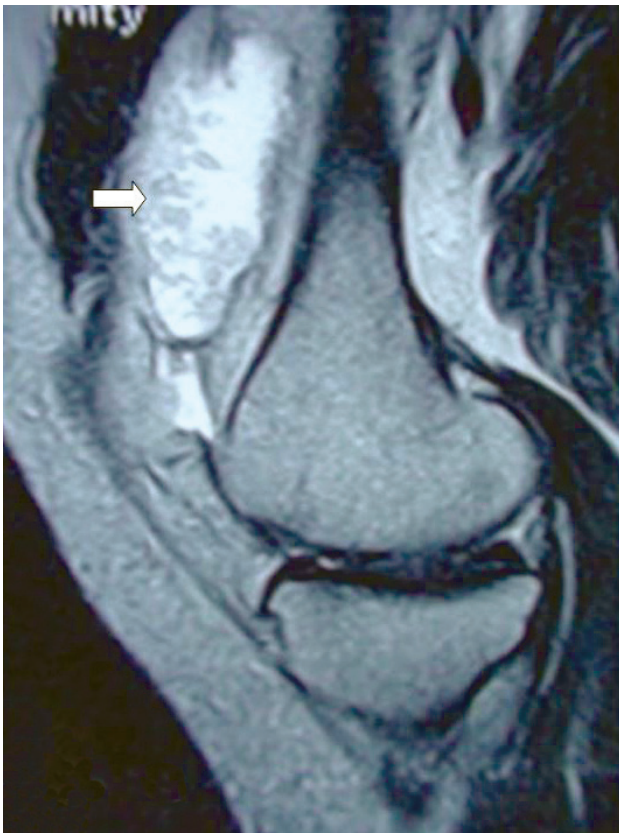
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**Fig. 1.** Magnetic resonance image showing the villous-like projections (arrow) of the lipoma arborescens in the suprapatellar pouch. [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

swelling of her right knee for one year. There was no history of trauma or any constitutional or systemic symptoms.

Physical examination revealed effusion and soft tissue swelling in the suprapatellar region of the right knee. There was no accompanying motion limitation. Palpation of the swelling was painful. No abnormal meniscal or ligamentous findings were examined. Laboratory tests as well as biochemical and microscopic investigations of the knee joint fluid were all within normal limits.

Standard radiographs were normal. Magnetic resonance imaging (MRI) examination revealed the suprapatellar pouch to be divided into two parts by a complete type of suprapatellar plica. Joint effusion in the suprapatellar pouch and a villous lipomatous mass in the superior part of the suprapatellar pouch were observed (Fig. 1).

Arthroscopic investigation was planned. The joint was observed to be completely normal. After performing diagnostic arthroscopy, a fibrous window was opened just over the suprapatellar plica according to the MRI findings (Fig. 2a). The scope was then introduced through the second pouch which was behind the suprapatellar plica and

a brilliant, yellowish fatty adipose mass was observed. A piece of the mass was removed for biopsy and the remaining mass was shaved and the complete plica was excised (Fig. 2b). The villous architecture of the synovium in the suprapatellar are shown in Figures 2c and d.

Pathologic investigation revealed a villous synovial tissue surrounded by intensive fat cells and mononuclear inflammatory cells with capillary proliferations. Diagnosis of lipoma arborescens was made (Fig. 3).

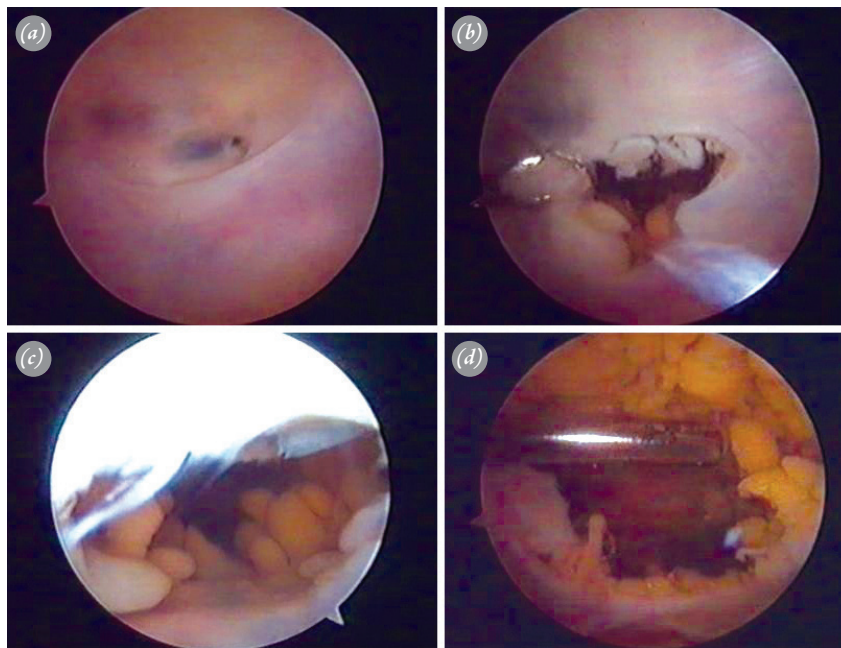
Recurrence was not determined in the patient two years after the operation and her complaints disappeared completely. Lysholm knee score was 95 points at the two year follow-up.

### Discussion

Lipoma arborescens is an uncommon intra-articular lesion of unknown etiology. Peak incidence for lipoma arborescens is between the third and fifth decades and is more common in males.<sup>[1]</sup> It has been reported that synovial lipoma arborescence may be developmental, traumatic, neoplastic (malignant lymphoma, breast cancer), inflammatory (psoriasis, rheumatoid arthritis, degenerative joint disease), metabolic (hypothyroidism, diabetes mellitus) and genetic (congenital short bowel syndrome, Turner syndrome) although etiology is generally unclear.<sup>[2,3]</sup> Our patient's etiology was also unclear. As there was no history of trauma, spontaneous lipoma arborescens was suspected.

Slowly progressive swelling of the involved joint is common. In the current case, there was minimal effusion in the right knee. Laboratory findings of the blood tests are not diagnostic at these cases. The aspirated joint fluid was typically yellow and clear and negative in terms of inflammatory cells, crystals and culture. Many diseases causing synovial thickening and painless effusion such as synovial chondromatosis, intra-articular lipoma, pigmented villonodular synovitis, synovial hemangiectasis, rheumatoid arthritis, amyloid arthropathy, xanthoma can be considered in the distinctive diagnosis of lipoma arborescens.<sup>[2]</sup>

Lipoma arborescens can be diagnosed on MRI with a mass showing fatty signal intensity in all sequences. Diagnostic MRI results for lipoma arborescens may include leaf-like villous projections with the signal intensity of fat on all pulse sequences, suppression of signal on fat-suppressed proton density sequence and absence of evidence of hemosiderin depositions. The appearance of lipoma arborescens can be different in MRI sequences. According to research, the differences in MRI images might be related with the stage of the disease.<sup>[4]</sup> Differential diagnosis must be carried out between synovial



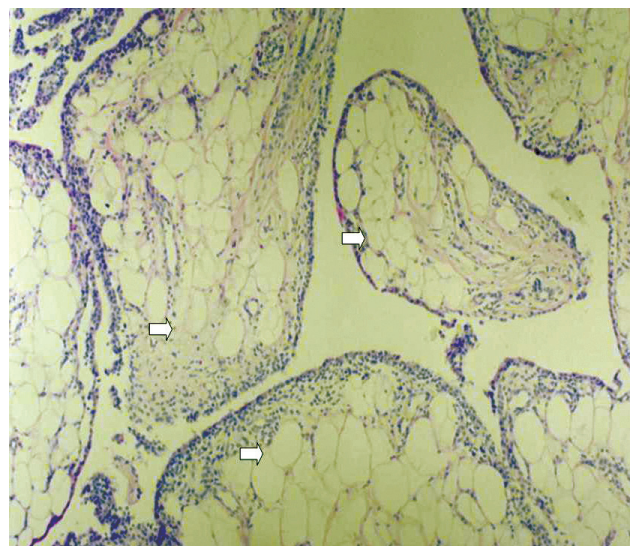
**Fig. 2.** (a) Complete type of suprapatellar plica. (b) A window was opened inside the complete suprapatellar plica. (c, d) Clinical view showing the villous architecture of the synovium in the suprapatellar fossa. [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

proliferative disorders and synovial processes with a fatty tissue component, such as synovial lipoma, pigmented villonodular synovitis, synovial osteochondromatosis and synovial hemangioma. Lipoma arborescens is mostly mixed with synovial lipoma. However, it appears as a penetrating mass through the synovial membrane, results in some fatty overgrowth within the intra-articular synovial tissue. Whereas lipoma arborescens appears as a leaf-like mass without subsynovial fat deposition, the villous appearance of the lesion, joint effusion and synovial cyst formation help in differentiating synovial lipoma from lipoma arborescence. Our patient also had a villous lipomatous proliferation-mass in the superior part of the suprapatellar pouch and joint effusion.

Macroscopically, lipoma arborescens has a frond-like appearance with numerous broad-based polypoid or thin papillary villi composed of fatty yellow tissue. Microscopically, mature fat cells are deposited on the synovial membrane to form villous projections. Our microscopic investigation showed a villous synovial tissue surrounded by intensive fat cells and mononuclear inflammatory cells and capillary proliferations.

The most appropriate treatment for lipoma arborescens is open or arthroscopic intervention and synovectomy. Arthroscopic synovectomy is suggested in cases with limitation within the anterior compartment. Due to its easy accessibility, the lesion can be excised completely, allowing for a more successful postoperative rehabilitation.

The synovial plica of the knee is formed during the embryogenic phase of development. When the synovial plica of the knee persists, it is transformed into an embryonic relic that is located in either the suprapatellar or midpatellar region of the knee.<sup>[2]</sup> Adhesions may be observed in the suprapatellar recess after trauma or surgery for arthrofibrosis. Neoplasms can develop within



**Fig. 3.** Sheets of adipocytes (arrows) beneath the synovial membrane causing villous expansion (HE, x30). [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]



this recess. Pathological structures may be overlooked in patients with complete type of suprapatellar plica, as in our patient. Rarely pigmented villonodular synovitis, giant cell tumor, hemangioma, synovial chondromatosis and synovial cysts can be symptomatic in the recess.<sup>[2,5]</sup> The differential diagnosis of lipoma arborescence may be confirmed with histological examination.

In the literature, only two cases of total suprapatellar plica with coexistent lipoma arborescens have been reported. In the first case, the lipoma arborescence was located in the knee joint and inside the mediopatellar (midpatellar) plica.<sup>[2]</sup> The second case was a 10-year-old child with bilateral lipoma arborescens.<sup>[3]</sup> Lipoma arborescence was found by chance during investigation of motion restriction and effusion. A complicated bilateral complete type of suprapatellar plica similar to that of our patient was also reported in this case. Differential diagnoses of rheumatic diseases were considered and arthroscopic synovectomy was applied.

In conclusion, complete type of suprapatellar plica may hide other pathological situations and attending surgeons must be aware of such conditions. Lipoma ar-

borescens must be kept in mind in differential diagnosis of masses in the synovial pouch. Careful investigation allows for a definitive treatment and prevents misdiagnosis.

**Conflicts of Interest:** No conflicts declared.

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