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Lipoma arborescence following knee arthroscopy: A case report and literature review

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Abstract
Lipoma arborescence is a rare, reactive disease process which commonly occurs due to chronic inflammation or repeated trauma. A limited number of cases have been documented in the literature and little is known regarding the pathogenesis of this condition. Fortunately, it is a benign condition with no known cases of neoplastic conversion. Here, we present the unique case of a lipoma arborescence occurring in a patient who was one year status post arthroscopic medial meniscectomy.

Keywords: Lipoma arborescence, chronic inflammation, arthroscopy, meniscectomy

Introduction
Since its first discovery in 1904 by German surgeon Albert Hoffa and its description in the Journal of Bone and Joint Surgery in 1957, lipoma arborescence (LA) remains a rare and poorly understood condition [1, 2]. It most frequently presents in a unilateral manner within the suprapatellar pouch of the knee, but has also been described in the hip, wrist, and shoulder [3, 4]. Currently, only eleven cases of bilateral LA have been recorded in the literature [2–12]. The majority of lipoma arborescences effect men 40-60 years of age [13, 14], with only a few pediatric cases reported. The exact pathogenesis of a LA is not currently known, but is hypothesized to consist of nonspecific reactive synovial proliferation secondary to chronic inflammation or repeated trauma [3, 9, 15]. Here we examine the incidence of a lipoma arborescence in a middle-aged female who, only years prior, received arthroscopic surgery in the same joint as her now new reactive synovial proliferation.

Case Report
The patient was a 56-year-old female who presented in the orthopedic surgery clinic for reoccurring medial left knee pain. She had a pertinent past medical and surgical history of fractured right wrist, right shoulder sprain, fractured coccyx, and placement of a spinal stimulator.

Two years prior, the patient presented to the same orthopedic surgery clinic with left knee pain secondary to a work-related injury. At that time, she was diagnosed with a medial meniscal tear of the left knee, extending from the posterior horn attachment to the junction of the posterior and middle third with osteochondral lesions of the medical femoral condyle. She was treated operatively with a left knee arthroscopy and partial medial meniscectomy. The patient was discharged from care three months post operation and was not seen again in the clinic until her presentation for reoccurring media left knee pain.

Upon her most recent presentation, the patient was experiencing medial left knee pain upon walking. She stated the pain began one year prior in an insidious manner without acute injury or trauma. Physical examination of the left knee showed well healed scars from her previous surgical intervention. No effusions, erythema, edema, ecchymosis, or warmth were noted. Her knee was stable to varus and valgus testing with a negative Lachman's test and posterior drawer test. Her range of motion was full for flexion and extension. She had tenderness to palpation over her medial knee without tenderness laterally or over her gastrocnemius muscle. The initial impression of the patient was medial joint line tenderness and she was subsequently referred to obtain radiographs of the left knee.

AP and lateral radiographs of the patient's left knee showed a small subarticular cyst within the medial femoral condyle and a small suprapatellar joint space effusion. Bony architecture was found to be intact and there was no evidence of fractures or loose bodies (Figure 1).

Upon her one month follow-up, the patient presented with a new complaint of posterior left knee pain. Her physical exam showed minimal effusion with tenderness to palpation posteromedially. There was no evidence of erythema, warmth, or ecchymosis. Her range of motion was normal and all ligaments were intact. The patient was referred for a left knee MRI with arthrogram for suspected recurrent medial meniscal tear.

MRI with arthrogram of the left knee was subsequently denied and converted to CT with contrast due to the presence of the patient's spinal stimulator. CT with the contrast of the patient's left knee showed post-surgical changes from prior partial medial meniscectomy without evidence of recurrent medial meniscal tear, mild fraying along the undersurface of the posterior horn lateral meniscus, osteophytic changes with grade 2 chondral wear, cortical flattening with cystic changes at the posterior surface of the medial femoral condyle, and the presence of a suprapatellar lipoma arborescence (Figures 2, 3, 4).

Based upon the patient's symptomology and imaging, the attending surgeon determined that surgical intervention was not required and the patient would be treated conservatively. She was prescribed a tapered corticosteroid pack and was seen back two weeks later with significant improvement in her symptoms.

Fig 1: Sagittal x-ray of left knee

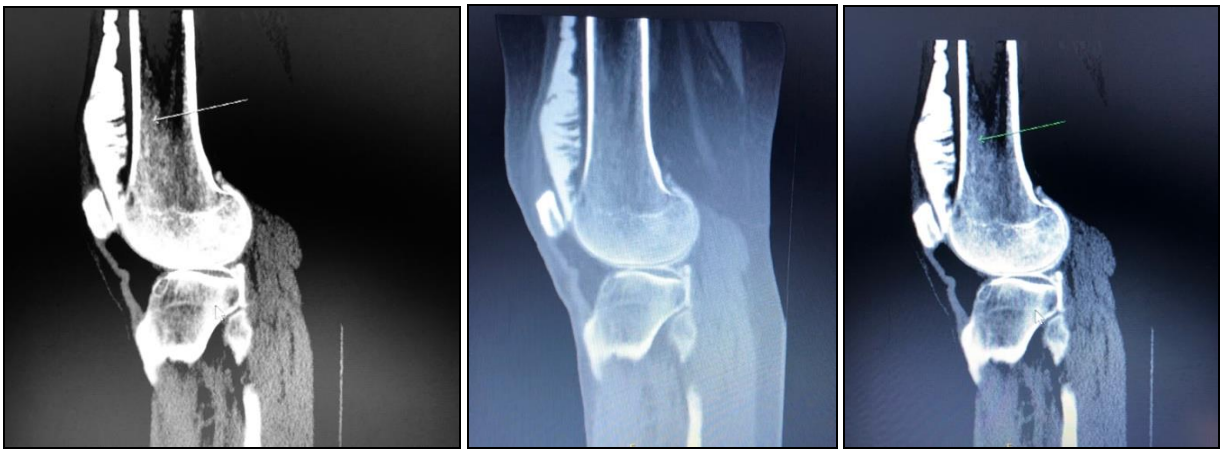

Fig 2, 3, 4: Sagittal CT left knee

Discussion

A lipoma arborescence is a reactive disease process which most commonly occurs in individuals with evidence of repeated trauma or chronic inflammation. Common comorbid conditions include rheumatoid arthritis, osteoarthritis, and type II diabetes mellitus. There is also evidence in the literature that individuals with the HLA subtype B-27 are more prone to developing a LA. This finding explains the prevalence of this condition in patients with psoriatic arthritis and ankylosing spondylitis, both of which are HLA B-27 associated conditions [13, 14, 16, 17].

The clinical symptoms of a LA include slowly developing knee effusion [18], reoccurring knee effusion, and painful exacerbations due to the lipomatous villi becoming caught between the bony surfaces of the respective joint [9].

Pathogenesis of this disease process involves non-neoplastic villous polyploid synovial proliferation. The sub-synovial tissue of the joint space is slowly replaced by mature fat cells as well as synovial cells, both of which come together to produce a polyploid mass which is attached to the synovium itself. As a result, the histological description given to this pathogenesis is often described as a villous lipomatous proliferation of the synovial membrane [4, 9, 19, 20].

There are currently two different subtypes of lipoma arborescence: primary and secondary. Primary tends to be less common and occurs in younger individuals, typically during the second and third decades of life, due to unknown etiology [21–23]. The more common subtype of LA, secondary, occurs in older individuals with a history of repeated traumas, chronic inflammatory disease, or meniscal injury. Secondary LA is described as synovial lipomatosis [3, 5, 21, 22].

Imaging is the foundation of diagnosing a LA. Plain radiography, though not the supreme method of diagnosis, typically shows soft tissue density in the suprapatellar pouch of the knee, cyst formation, subchondral bone erosions, and osteoarthritic changes [15, 24, 25]. Ultrasonography is an additional method used to aid in diagnosis. High resolution ultrasound imaging will show hyperechoic synovial proliferation in a frond-like pattern [26]. Computer tomography, as used in this case, shows a low-attenuation mass of fat density, outlined by synovial fronds. However, the ideal diagnosis is made via T1 or T2 weighted magnetic resonance imaging, which shows a synovial mass with villous structure, frond-like proliferation, and signal intensity similar to fat [5, 15, 27]. Typically, magnetic resonance imaging is the first imaging modality used to diagnosis this condition when it is suspected. The frond-like appearance of LA is characteristic and the most common imaging finding, but

presentation as a focal pseudo mass is possible as well [3]. In cases where imaging is not sufficient to make a diagnosis, arthroscopy can be utilized as a last resort to confirm the presence of a lipoma arborescence [21].

Microscopic examination of a LA shows mature adipocytes with hypertrophied villi surrounded by sub-synovial tissue [3].

The differential diagnosis of a lipoma arborescence includes pigmented villonodular synovitis, xanthoma, chrondromatosis, rheumatoid arthritis, synovial hemangioma, osteoarthritis, and amyloid arthropathy [17].

Treatment of this condition is dependent on the patient's ability to tolerate symptoms. Once conservative measures have failed, the only known definitive treatment is arthroscopic total synovectomy [28–32]. Reoccurrence is uncommon, with only one documented case of lipoma arborescence reoccuring following surgical intervention [28, 29, 32]. But, considering the etiology and pathogenesis of this disease process, reoccurrence is plausible in patients with the chronic inflammatory disease or continued traumatic insult to the effected joint [33].

Disclosures

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This study followed all ethical guidelines as listed in the Declaration of Helsinki.

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