



Case Report

Primary Lipoma Arborescence of Bilateral Knees in an Adolescent Patient: A Case Report

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Abstract

Introduction: Lipoma Arborescens is benign lesion presenting with deposits of adipose tissue forming villous, frond-like synovial growths, with the knee most commonly affected. **Case:** An adolescent male presented with bilateral knee pain and was found to possess lipoma arborescens in both knees. He underwent bilateral arthroscopic synovectomy after the failure of nonoperative modalities. Synovectomy was successful, and the patient was able to return to full activities after three months of physical therapy. **Conclusion:** This case study investigates the rare case of a pediatric bilateral lipoma arborescens patient treated successfully with arthroscopic synovectomy, and the usage a GraftNet device in obtaining tissue for histological analysis.

Introduction

Lipoma Arborescens (LA) is a rare, synovial proliferation characterized by a dense, villous appearance involving the synovial joints [1]. A handful of cases can be seen throughout medical literature, but since its discovery in the early 20th century, LA remains poorly understood. The term originates from "arbor" meaning "tree" in latin illustrating the gross and "frond-like" appearance that the synovial mass commonly presents [2]. The suprapatellar recess of the knee is the most frequent location but the shoulder is also an occasional site [3-5]. In the majority of cases, synovectomy is the recommended treatment for improvement in pain and function. Rarely, non-operative means can manage symptoms. Along with advanced imaging, characterization via pathology is important to most accurately determine morphology.

We present a brief case of bilateral LA in a 15- year-old male and the role of the GraftNet™ Autologous Tissue Collector (Arthrex, Naples, FL) in capturing adequate pathological sampling for this uncommon tumor-like lesion.

Case Report

A 14-year-old male presented to pediatric orthopedic clinic complaining of bilateral knee pain for several years. He had seen

another partner in the office for this concern and had completed more than 20 sessions of physical therapy over the previous few months with no significant relief. He endorsed pain on the right greater than the left and stated the pain had been going on for approximately seven years and noticed it most with activities such as squatting and running. The patient was simultaneously being worked on by another pediatric specialist for problems with chronic constipation as well as bilateral testalgia of unknown cause.

Initial knee exam revealed palpable grinding in flexion and extension along with mechanical symptoms associated with meniscal provocative maneuvers. Initial plain films of both knees showed slight lateral patellar tilt but no other evidence of abnormality such as fractures or dislocations. On physical examination there were palpable protuberant masses in the bilateral suprapatellar pouches with baseline knee effusions. Investigation with bilateral knee MRIs was pursued.

MRI of bilateral knees demonstrated synovitis along with diffuse lipomatous disease consistent with LA (Figure 1). After a thorough review of the MRI findings with the patient and his mother concerning surgical versus nonsurgical options, a decision was made to trial physical therapy for an additional 6 weeks before considering surgery. On follow-up, the patient continued to report

worsening bilateral knee pain despite continued physical therapy. After repeat discussion about surgical options the decision was made to pursue exploratory arthroscopy as well as synovectomy of the right knee first, per patient request (Figure 2).

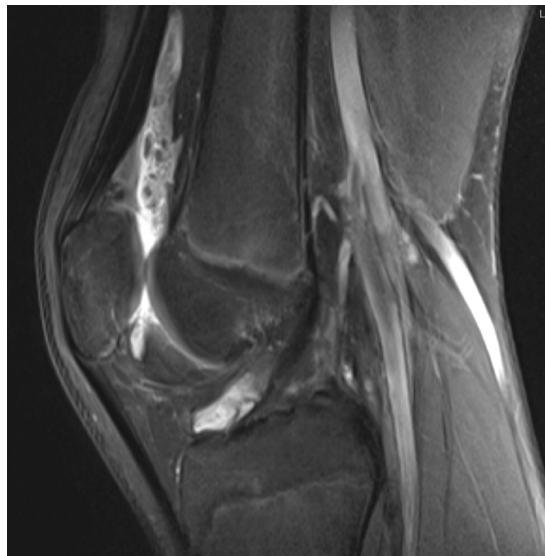


Figure 1: Sagittal T2 MRI demonstrating lipoma arborescens in the suprapatellar pouch.

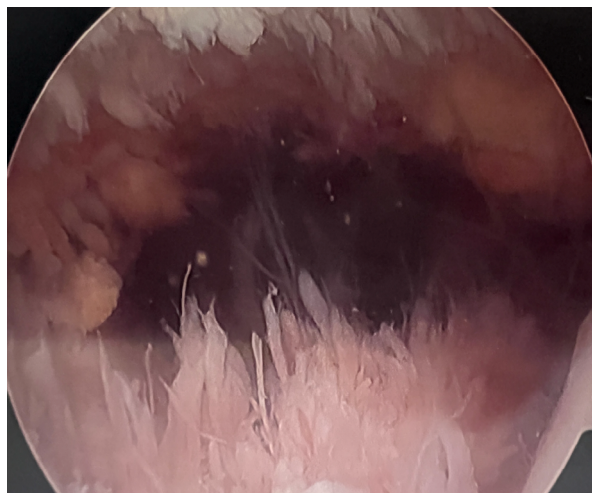


Figure 2: Lipoma arborescens seen in suprapatellar pouch during arthroscopy.

That month, the patient underwent a right knee synovectomy due to worsening pain secondary to LA. After a diagnostic arthroscopy was performed on each knee, the patellofemoral compartment was investigated for articular injury. Upon exploration, there was immediate visualization of lipomatous fronds in the supra-patellar pouch. The medial and lateral compartments were pristine without injury or evidence of loose

bodies. The supra-patellar pouch was debrided using a combination of the two existing antero-medial and antero-lateral portals along with the lateral supra-patellar portal. Utilizing the GraftNet device, we sent two separate samples to pathology from the supra-patellar region in addition to samples obtained using a biter. Due to the extensiveness of the diseased synovium, we then made a postero-medial portal under scope guidance and then debrided the villous lipomas in the back of the knee. All wounds were then copiously irrigated with saline, and the incisions were closed. The samples of the synovial villiform projections taken using both the GraftNet device and a manual biter and sent to pathology for histological examination (Figure 3) were consistent with LA.



Figure 3: Sample of lipoma arborescens taken using Graftnet device.

The patient had two follow-ups after right knee arthroscopy, the first one month after and the next three months after surgery. At four months post right knee synovectomy he denied any right knee stiffness or pain but continued to complain of pain in the left knee. Due to the favorable outcome on the right knee patient and mother elected to have the same procedure performed on the left knee.

The diagnostic and therapeutic arthroscopy of the left knee was performed in similar fashion to that of the right knee. Again, there was no evidence of either chondral or articular injury and the GraftNet tissue sampling tool in addition to a manual biter were used to collect a small amount of the synovial projections and send them for histological examination. The pathology report was again consistent with LA.

The patient's continued recovery was uneventful with only initial complaints of stiffness and soreness 6 weeks after left knee arthroscopy. On return to clinic 8 months after right knee

synovectomy and 4 months after left knee synovectomy he stated he had been doing well and had returned to full activities. He denied any knee pain no matter the activity, and at that point was cleared to return to full, unobstructed activities. He was seen for a final exam one year after left knee synovectomy and one year and four months after right knee synovectomy, and had full painless range of motion of both knees and had returned to full activities.

GraftNet Surgical Device

The GraftNet™ Autologous Tissue Collector (Arthrex Inc, Naples, FL) has recently been used to obtain bone reamings where autologous tissue collection and grafting is important in the success of the case. This has been seen in quadriceps tendon all-inside ACL reconstructions that are fertilized with bone marrow concentrate, and autograft bone [6]. For the purposes of our case, the GraftNet tissue collector can be used to easily and efficiently collect tissue needed for biopsy without changing instruments. A wider sample of debrided tissue can also be sent to pathology than when a biter is used to take a single sample. As there can be other pathologic findings due to the inflammatory milieu in a LA knee, such as rice bodies, the ability to easily collect samples from a variety of locations may be important.

Pathology

Tissue samples demonstrated extensive proliferative synovial changes with patchy chronic inflammation and focal fibrinous change. These findings, in addition to MRI findings, confirmed extensive synovitis consistent with LA. The samples obtained via GraftNet were as effective at providing a pathological diagnosis as the sampled obtained via pituitary sampling.

Discussion

Within known literature, recovery status post arthroscopy for LA is typically very favorable especially in young patients [7]. Typical postoperative symptoms include refractory knee effusion which is likely due to the increased surface area of the synovial membrane [8]. This symptom can be compounded by the presence of degenerative joint disease as well as any rheumatological conditions such as psoriatic arthritis which may be encountered in younger patients [9]. Additionally, there have also been reports on potential predisposition to genetic conditions such as short gut syndrome however, any genetic associations to LA would require a wide range of further investigation [10].

The etiology of LA has previously been differentiated into a primary idiopathic type and a secondary type termed synovial lipomatosis thought to originate from chronic inflammation [3]. LA is generally found to present equally in men and women and presents typically in the fourth and fifth decade [11]. Regarding potential loci of LA in the body, regardless of age, monoarticular

LA appears to be more common than poly-articular LA and upper extremities are more rarely affected [12,13]. Based on other case reports, it would be reasonable to consider advanced imaging sooner with patients with a history of LA when additional and relatively unprovoked joint pain presents [14].

As discussed in the pathology section, inflammatory histologic findings are not uncommon [15]. These have previously been categorized into villous lipomatous synovial, “frond-like” fat sub-synovial and mixed presentations where etiology ranged from chronic inflammation to idiopathic [15]. In one report, it was concluded that sub-synovial giant cells appear to predominate histologically when patients have a concomitant inflammatory condition such as rheumatoid arthritis [14]. However, in regards to our patient, this did not appear to be the case. Nevertheless, further investigation into diagnosing possible chronic inflammatory conditions in conjunction with the presence of LA should be undertaken.

LA continues to be a recognized pathognomonic articular condition. More research is required to elucidate the correlation of chronic inflammatory conditions and specific age groups compared to purely degenerative joint conditions in older age groups. Pathologic evaluation will continue to be important in differentiation between mechanical and inflammatory disorders. Therefore, appropriate sampling of synovial proliferations should be undertaken with care to enable optimal pathologic examination.

Statement of Informed Consent

We have obtained the patient’s and family’s informed consent for print and electronic publication.

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