

Arthroscopic Synovectomy in Bilateral Lipoma Arborescens

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What to Learn from this Article?

Lipoma arborescens is a cause of recurrent knee joint effusions that can be treated, with good long lasting results, through arthroscopic synovectomy after thorough analysis of the magnetic resonance imaging to optimize the portals localization.

Abstract

Introduction: Lipoma arborescens (LA) is an uncommon condition that consists of a villous lipomatous proliferation of the synovial membrane. Open synovectomy has been previously selected as a curative treatment option. In recent years, some authors have published good results with arthroscopic interventions. We describe a well-documented case of bilateral LA of the knees treated with staged arthroscopic synovectomy.

Case Report: A 48-year-old North American woman without a history of trauma presented with recurrent effusions and mild pain in both knee joints for many years. Magnetic resonance imaging examinations confirmed the diagnosis of bilateral LA with multiple villous lipomatous synovial proliferations pattern. Degenerative changes of the medial meniscus were detected bilaterally. The patient underwent bilateral arthroscopic anterior synovectomy and partial medial meniscectomy of the knee with three portal techniques. Arthroscopic the knee joint contained a large number of finger-shaped synovial proliferations with yellowish good vascularized diffuse villous masses in the suprapatellar bursa and intercondylar fossa. The cartilage showed degenerative changes with Outerbridge Grade II to III, which was particularly severe in the femoropatellar compartment. Histopathological examination of the villous masses demonstrated papillary hypertrophy, slight hyperplasia, vascular hyperplasia with a slight degree of stromal fibrosis, and interstitial lymphoplasmacytic inflammation. The adipose cells were reduced in number in relation to a normal finding but had a normal aspect without any pathological changes. 25 months after the first operation, the patient reported pain relief with the preserved function. Magnetic resonance examination of both knee joints at the last follow-up showed no relapse of the disease. The Knee injury and Osteoarthritis Outcome Score improved on the right knee joint from 39.3 preoperatively to 85.1 at the last follow-up, and on the left knee joint from 54.2 preoperatively to 86.3 at the last follow-up.

Conclusion: Arthroscopic anterior synovectomy is an efficient method of achieving good results in LA with multiple villous lipomatous synovial proliferations pattern.

Keywords: Lipoma arborescens, villous lipomatous proliferation, synovial membrane, knee arthroscopy.

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Introduction

Lipoma arborescens (LA) is an uncommon, poorly understood condition that consists of a villous lipomatous proliferation of the synovial membrane [1]. The term “arborescens” originated from the latin word arbor meaning tree, describing the macroscopic morphology of the lesion. It usually affects adults with a slight predilection for males [2]. Although typically monoarticular and found in the suprapatellar pouch of knee joints, involvement of other joints and bursae is known [3, 4]. Bilateral disease is extremely rare and has been reported in 20% of cases [5]. LA usually presents with painless swelling and recurrent joint effusion. An increasing number of cases have recently been described, attributable to the increased use and diagnostic sensitivity of magnetic resonance imaging, revealing the pathognomonic findings of LA [6]. Laboratory findings and joint fluid analysis are mostly unremarkable.

The macroscopic aspect is characterized by a large number of finger-shaped synovial proliferations, histologically composed of adipose tissue.

The etiologies most frequently advocated are developmental, traumatic, inflammatory, and neoplastic [7].

Three distinct patterns of LA have been identified; the most common of which is a diffuse villous proliferation, although a frond-like fat synovial mass lesion and a mixed pattern have also been observed [8].

LA has been associated to many comorbidities: Rheumatoid arthritis, osteoarthritis, psoriasis, uveitis, juvenile ankylosing spondylitis [9], gout [8], trauma [9], and hypothyroidism [2].

Open synovectomy was previously selected as curative treatment option [10]. In recent years, many authors have published good results with arthroscopic interventions [11, 12, 13].

We describe and illustrate the clinical, histological and radiological results of a case of bilateral LA of the knees treated with staged arthroscopic synovectomy with 2-year follow-up.

Case Report

The patient, a physically active, otherwise healthy 48-year-old North American woman, presented with recurrent effusions and mild pain for almost 10 years in both knee joints. By increasing her sporting activity (ski mountaineering) pain and swelling worsened. No history of knee trauma was reported. Local examination revealed a swelling of the knee joints with fullness in the suprapatellar region. Tenderness on palpation and medial meniscal tear signs were elicited in both knee joints. Flexion was slightly limited for the right knee and normal on the left knee.

The symptoms on the right knee were more pronounced. Routine laboratory tests were unremarkable, and plain radiographs of both knee joints showed moderate degenerative changes with physiological tibiofemoral axes. With the working diagnosis of bilateral gonarthrosis and persistent swelling, the patient was referred for magnetic resonance investigation of both knees to select the appropriate therapy (Fig. 1a, b).

T1 and T2 weighted images showed high signal intensity of the villous projections similar to subcutaneous fat in the suprapatellar pouch. Fat-suppressed proton density images revealed complete suppression of signal intensity. Degenerative changes of the medial meniscus were present in both knee joints. The diagnosis of LA was made. The patient underwent arthroscopic anterior synovectomy and partial medial meniscectomy of the right knee with the three portal techniques. With the use of punches and graspers, fragments of the proliferating lesion were collected from different compartments of the knee for histopathological examination. All villous projections were then resected under direct visual control using a synovial shaver 5 mm and coblation device. We first addressed the medial compartment with a craniocaudal resection from the anteromedial portal and afterward the lateral compartment in the same way using the shaver in the anterolateral portal. Following synovectomy, arthroscopic inspection confirmed complete excision of the lesion. The operation was completed with electrosurgical arthroscopic patellar denervation. 2 days postoperatively, after reabsorbing of swelling, early *full weight-bearing* and functional treatment were implemented. The arthroscopic synovectomy



Figure 1: (a and b) Pre-operative magnetic resonance imaging findings of lipoma arborescens in our patient ([a] right knee I: EPDW_SPIR coronal, II: ET1W_TSE sagittal, III: EPDW_SPAIR axial, IV: EPDW_SPAIR sagittal; [b] left knee upper left clockwise I: EPDW_SPIR coronal, II: EPDW_SPAIR axial, III: EPDW_SPAIR sagittal, IV: ET1W_TSE sagittal). There are several soft tissue excrescences (white arrows). These lesions demonstrated a high signal, similar to subcutaneous fat. Further findings: moderate joint effusion; marrow signal of reconversion.

of the contralateral knee was performed 4 months later with the same procedure including partial medial meniscectomy. The Knee injury and

Osteoarthritis Outcome Score (KOOS) was collected preoperatively and at the last follow-up.

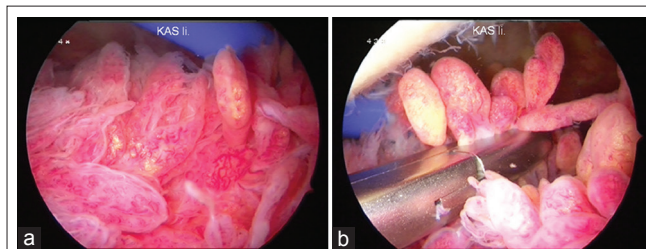


Figure 2: (a and b) Arthroscopic appearance of bilateral lipoma arborescens in our patient (left knee). The patient in dorsal decubitus with arthroscopic leg holder. Arthroscope in the recessus suprapatellaris through the anterolateral portal; instrumentation in the anteromedial portal. There are numerous finger-shaped synovial proliferations with yellowish, well vascularized, diffuse villous masses.

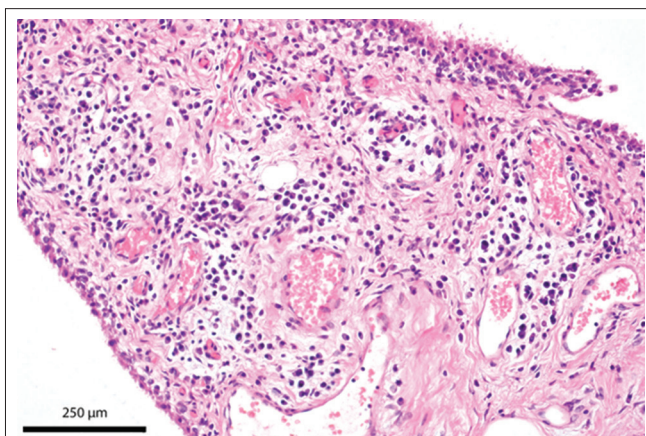


Figure 3: Histopathological examination HE ($\times 20$), demonstrating vascular hyperplasia with a slight degree of stromal fibrosis, moderate degree of interstitial lymphoplasmacytic inflammation, and mature adipose cells.

Arthroscopic the knee joint contained a large number of finger-shaped synovial proliferations with yellowish good vascularized diffuse villous masses in the suprapatellar bursa and intercondylar fossa (Fig. 2a). The cartilage showed degenerative changes with Outerbridge Grade II to III which was particularly severe in the femoropatellar compartment. Histopathological examination of the villous masses demonstrated papillary hypertrophy, slight hyperplasia, vascular hyperplasia with a slight degree of stromal fibrosis, and interstitial lymphoplasmacytic inflammation. The adipose cells were reduced in number in relation to a normal finding but had a normal aspect without any pathological changes (Fig. 3). 25 months after the first operation, the patient reported pain relief with preserved function. Magnetic resonance examination of both knee joints at the last follow-up showed no relapse of the disease (Fig. 4a and b). The KOOS improved on the right knee joint from 39.3 preoperatively to 85.1 at the last follow-up, and on the left knee joint from 54.2 preoperatively to 86.3 at the last follow-up.

Discussion

Hoffa was the first author to describe the presented condition, [14] underlining the non-neoplastic nature of the lesion. In 1988, Hallel *et al.* reporting on five patients, discarded the name of LA in favor of “villous lipomatous proliferation of the synovial membrane” to avoid the misleading concept of neoplasm [7].

In our histological findings, although a few residual fat cells were present, the degree of fatty change of the synovium was actually reduced relative to the normal condition, and certainly did not give the impression of fatty hypertrophy, neoplastic or otherwise.

Sola and Wright, in 1998, were the first authors reporting good results with 2-year follow-up after arthroscopic synovectomy in LA [11]. Due to the rarity of the condition and the few reports in the literature the best arthroscopic approach remains unknown.

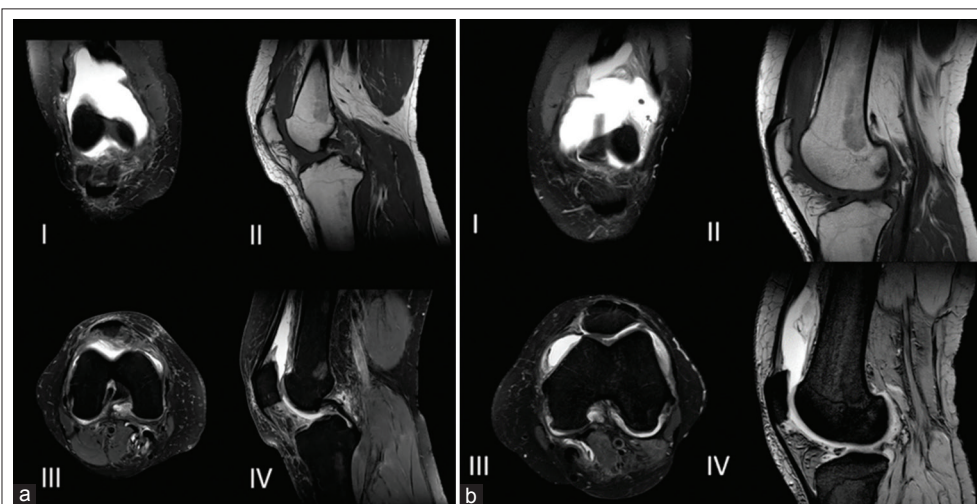


Figure 4: (a and b) Magnetic resonance imaging findings at the last follow-up ([a] right knee I: EPDW_SPIR coronal, II: ET1W_TSE sagittal; III: EPDW_SPAIR axial, and IV: EPDW_SPAIR sagittal; [b] left knee I: EPDW_SPIR coronal, II: ET1W_TSE sagittal; III: EPDW_SPAIR axial, and IV: EPDW_SPAIR sagittal): Post-operative complete ablation of the papillary formations; persistence of bone marrow reconversion.

Table 1: Summary of the literature

Year	First Author	Age (y)	Gender (m/f)	Localization	Treatment	Follow-up	Outcomes
1904	Hoffa				Arthrotomy with extirpation of the lesion		Positive follow-up with improvement of the symptoms.
1957	Arzimanoglu	19	f	bilateral	OS/capsulectomy with lateral parapatellar approach. Patellar trimming. Same surgical treatment of the right knee two months later with medial parapatellar approach.	3 years	Asymptomatic with no recurrence. Both knees had limited flexion to 80°.
1961	Gäde			bilateral	After conservative treatment and steroidal injections, the patient underwent OS and patellectomy	18 months	Good mobilisation but cracking in the knee.
1965	Weitzman	26	m		OS. Postoperative stiffness treated with manipulation under anesthesia.	6 months	Asymptomatic and activity as before the trauma.
1966	Coventry	9	f	polyarticular	Open excision twice after recidive one year after the first operation	4 years	Swelling of the thigh and occasional aching in the knee. Normal life with unrestricted activity and full ROM.
1971	Burgan	39	m		OS	5 months	Extension deficit
1980	Hermann	49	m		Diagnostic arthroscopy and OS	?	Asymptomatic.
1988	Hallel	39	m	bilateral	Open anterior synovectomy of the right knee and one year later of the left knee.	10 years	No swelling. Still slight pain with weather changes. ROM flexion/extension on the right knee 100-0-0° and on the left knee 130-0-0°. Patellar compression with tenderness.
		66	m		OS with Guepar TKA. Prosthesis revision after loosening six years later. No recidive signs.	3 years	No synovial thickening and no loosening of the prosthesis.
		56	m	bilateral	OS of the left knee	8.5 years	Pain on both knees (right more than left). No swelling of the left knee.
		56	m		OS in combination with tibial valgus osteotomy.	5 years	No pain, no swelling in the right knee. Full ROM.
		63			OS in combination with tibial valgus osteotomy with external fixation	2 years	Pin-tract infection with delayed union of the osteotomy. Mild pain and ROM for flexion/extension 90-0-0°. No knee joint swelling.
		22			OS	1 year	No clinical recurrence with normal working activity and soccer playing.
1990	Hubscher	22			OS	1 year	No clinical recurrence with normal working activity and soccer playing.
		37			OS	4 year	No clinical recurrence with normal working activity and soccer playing.
1993	Edamitsu	55	f		OS	1 year	Asymptomatic
1995	Blais	48	f		Diagnostic arthroscopy and open anterior synovectomy/capsulectomy and hoflectomy with medial parapatellar approach	6 months	Clear reduction of the pain and ROM for flexion/extension 110-0-0°
1996	Bouraoui	41	m		Treatment with steroidal injection; diagnostic arthroscopy with biopsy followed by OS		Positive follow-up with improvement of the symptoms.
1996	Mestiri	41	m		Diagnostic arthroscopy and OS	16 months	No clinical recurrence with normal working activity but slight flexion reduction.
1997	Ikushima	44	m		OS with medial parapatellar approach.	?	Positive follow-up with improvement of the symptoms but only partial improvement of the flexion to 90°.

(Contd...)

Table 1: Contd...

Year	First Author	Age (y)	Gender (m/f)	Localization	Treatment	Follow-up	Outcomes
1998	Sola	58	m	bilateral	Conservative treatment with steroidal injection; Clinical recurrence treated with arthroscopic meniscectomy and synovectomy of both knee joints.	2 years	Asymptomatic.
1998	Haasbeek	10	m	bilateral	Bilateral arthroscopic synovectomies	>1 year	Asymptomatic with no recurrence.
1998	Kloen	50	m		Diagnostic arthroscopy; five months later OS; postoperative stiffness treated with manipulation under anesthesia.	20 years	Severe movement limitations but neither pain nor swelling.
		28	f		Diagnostic arthroscopy and open synovectomy	4 years	No pain but occasionally swelling.
		50	m	bilateral	OS with median parapatellar incision of the right knee. Two years later OS of the left knee.	?	Persistent swelling and pain of both knees after the operation. The patient died few time later of malignant lymphome.
		19	f		Diagnostic arthroscopy and open synovectomy	1 year	Painfree but slight swelling and ROM for flexion/extension 125-0-0°.
		68	f		Diagnostic arthroscopy and five years later OS	1 year	Asymptomatic.
1998	Nisolle	13	m		Diagnostic arthroscopy with biopsy; Treatment with osmic acid injection.	1 year	Asymptomatic with a normal examination of the knee.
2002	Franco	48	f		Diagnostic arthroscopy and open anterior synovectomy	2 years	Asymptomatic.
2003	Erselcan	36	f		Diagnostic arthroscopy with biopsy; 185MBq Yttrium 90 with 40mg of Methylprednisolone	16 months	Asymptomatic.
2003	Yildiz	47	m		AS	3 years	Asymptomatic.
		16	m		AS	2 years	Asymptomatic.
2004	Kim	44	f		AS	1 year	Asymptomatic.
2005	Çil	13	f	bilateral	AS with mini-transquadriceptal incision as described by Doral et al.	3 years	Asymptomatic.
2005	Davies	32		bilateral	Right knee treated with OS; left knee treated after the left knee with 200 MBq of Yttrium 90, 40 mg Triamcinolone and 5 ml 1% lignocaine (improvement of symptoms for two years); relapse treated with intra-articular steroidal injections; and at the end with OS.	?	Positive follow-up with improvement of the symptoms after surgery.
2008	Azzouz	37	m		OS	1 year	Asymptomatic.
2008	Yan	45	m	bilateral	AS of the right knee joint; associated treatment for gout.	7 years	Asymptomatic.
2009	Santiago	29	f	bilateral (polyarticular)	AS of one side.	?	Positive follow-up with improvement of the symptoms.
2010	Checa	69	f		Conservative treatment with steroidal injection and physiotherapy; Clinical recurrence treated with AS.	14 months	Asymptomatic.
2010	Ji	60	f		AS	1 year	Symptoms improved with normal ROM but beginning clinical and radiological osteoarthritis of the knee joint.
		56	f		AS	1 year	Asymptomatic.
2010	Utkan	37	m		AS	3 years	Asymptomatic.
2011	Sailhan	13	m	bilateral	AS of the left knee joint.	1 year	Asymptomatic.
2011	Xiao	66	f	bilateral	Total knee arthroplasty with synovectomy of the left knee joint	18 months	Pain free

(Contd...)

Table 1: Contd...

Year	First Author	Age (y)	Gender (m/f)	Localization	Treatment	Follow-up	Outcomes
		68	f	bilateral	Total knee arthroplasty with synovectomy of the right knee joint.	1 year	Asymptomatic with no findings of recurrence at the MRI.
		50	f	bilateral	Bilateral TKA with synovectomy of the knee joint.	6 months	Asymptomatic with no findings of recurrence at the MRI.
2013	Jurkiewicz	24	f		AS	16 months	Asymptomatic.
2013	Xue	16	f	bilateral	AS. Concomitant treatment of the juvenile spondyloarthropathy.	6 months	Asymptomatic.

ROM: range of motion; AS: arthroscopic synovectomy; OS: open synovectomy; TKA: total knee arthroplasty

About 73 articles on LA of the knee have been found after research in PubMed and references of the articles. Articles in English, German, French, Italian, and Portuguese languages have been selected. 34 articles describing treatment and clinical follow-up are reported in Table 1 [14, 15, 16, 17, 18, 19, 20, 7, 21, 22, 23, 24, 25, 26, 11, 27, 2, 1, 28, 29, 30, 31, 32, 33, 10, 12, 34, 13, 35, 36, 5, 37, 38, 9].

Davies and Blewitt reported a case was radiosynoviorthesis with yttrium 90 was used with relapse after 2 years [33]. Nisolle *et al.* described one juvenile treated with osmic acid with good results but with a limited follow-up time of 1-year [1]. From the analysis of this table can be sustained that the arthroscopic synovectomy gets good long lasting results with less cases of flexion deficit than open synovectomy.

The pathological villous projections are usually strictly localized in the anterior compartments not affecting the posterior joint [17], justifying a treatment with sole employment of arthroscopy with anterior portals. The massive involvement of the patellofemoral joint represents a good reason to address this compartment with additional patellar denervation.

Conclusions

The arthroscopic treatment, if performed thoroughly in all knee compartments, has the same efficacy as the open surgery but with less cases of post-operative flexion deficit. Arthroscopy is less aggressive and permits early mobilization. We consider arthroscopic anterior synovectomy an efficient method of achieving lasting results in LA with diffuse villous proliferation pattern.

Clinical Message

LA should be included in the differential diagnosis of patients with recurrent knee joint effusions. In respect of the literature, arthroscopic synovectomy gives the good long lasting results compared to other techniques. A thorough analysis of the MRI is decisive to optimize the portals localization during knee arthroscopy.

References

- Nisolle JF, Boutsen Y, Legaye J, Bodart E, Parmentier JM, Esselinckx W. Monoarticular chronic synovitis in a child. *Br J Rheumatol* 1998;37(11):1243-1246.
- Kloen P, Keel SB, Chandler HP, Geiger RH, Zarins B, Rosenberg AE. Lipoma arborescens of the knee. *J Bone Joint Surg Br* 1998;80(2):298-301.
- Martinez D, Millner PA, Coral A, Newman RJ, Hardy GJ, Butt WP. Case report 745: Synovial lipoma arborescens. *Skeletal Radiol* 1992;21(6):393-395.
- Dawson JS, Dowling F, Preston BJ, Neumann L. Case report: Lipoma arborescens of the sub-deltoid bursa. *Br J Radiol* 1995;68(806):197-199.
- Sailhan F, Hautefort P, Coulomb A, Mary P, Damsin JP. Bilateral lipoma arborescens of the knee: A case report. *J Bone Joint Surg Am* 2011;93(2):195-198.
- Feller JF, Rishi M, Hughes EC. Lipoma arborescens of the knee: MR demonstration. *AJR Am J Roentgenol* 1994;163(1):162-164.
- Halle T, Lew S, Bansal M. Villous lipomatous proliferation of the synovial membrane (lipoma arborescens). *J Bone Joint Surg Am* 1988;70(2):264-270.
- Soler T, Rodríguez E, Bargiela A, Da Riba M. Lipoma arborescens of the knee: MR characteristics in 13 joints. *J Comput Assist Tomogr* 1998;22(4):605-609.
- Xue J, Alario AJ, Nelson SD, Wu H. Progressive bilateral lipoma arborescens of the knee complicated by juvenile spondyloarthropathy: A case report and review of the literature. *Semin Arthritis Rheum* 2013;43(2):259-263.
- Azzouz D, Tekaya R, Hamdi W, Montacer Kchir M. Lipoma arborescens of the knee. *J Clin Rheumatol* 2008;14(6):370-372.
- Sola JB, Wright RW. Arthroscopic treatment for lipoma arborescens of the knee: A case report. *J Bone Joint Surg Am* 1998;80(1):99-103.
- Yan CH, Wong JW, Yip DK. Bilateral knee lipoma arborescens: A case report. *J Orthop Surg (Hong Kong)* 2008;16(1):107-110.
- Checa A, O'Connor CR. Lipoma arborescens as an unusual cause of recurrent effusion in knee osteoarthritis: Sonographic and arthroscopic appearance. *J Clin Rheumatol* 2010;16(2):102-103.
- Hoffa A. The influence of the adipose tissue with regard to the pathology of the knee joint. *JAMA* 1904;43:795-796.
- Arzimanoglu A. Bilateral arborescent lipoma of the knee. *J Bone Joint Surg Am* 1957;39-A(4):976-979.
- Gäde E. Ein fall von synovitis chronica villosa generalisata. *Arch Orthop Unfallchir* 1961;53:315-319.
- Weitzman G. Lipoma arborescens of the knee. Report of a case. *J Bone Joint Surg Am* 1965;47:1030-1033.
- Coventry MB, Harrison EG Jr, Martin JF. Benign synovial tumors of the knee: A diagnostic problem. *J Bone Joint Surg Am* 1966;48(7):1350-1358.

19. Burgan DW. Lipoma arborescens of the knee: Another cause of filling defects on a knee arthrogram. *Radiology* 1971;101(3):583-584.
20. Hermann G, Hochberg F. Lipoma arborescens: Arthrographic findings. *Orthopedics* 1980;3(1):19-21.
21. Hubscher O, Costanza E, Elsner B. Chronic monoarthritis due to lipoma arborescens. *J Rheumatol* 1990;17(6):861-862.
22. Edamitsu S, Mizuta H, Kubota K, Matsukawa A, Takagi K. Lipoma arborescens with hemarthrosis of the knee. A case report. *Acta Orthop Scand* 1993;64(5):601-602.
23. Blais RE, LaPrade RF, Chaljub G, Adesokan A. The arthroscopic appearance of lipoma arborescens of the knee. *Arthroscopy* 1995;11(5):623-627.
24. Bouraoui S, Haouet S, Mestiri H, Ennaifar E, Chatti S, Kchir N, *et al.* Synovial lipoma arborescens. *Ann Pathol* 1996;16(2):120-123.
25. Mestiri M, Kooli M, Charfi F, Ezzaouia K, Robbana A, Zlitni M. Lipoma arborescens of the knee: Contribution of x-ray computed tomography. Apropos of a new case. *Rev Chir Orthop Reparatrice Appar Mot* 1996;82(4):340-343.
26. Ikushima K, Ueda T, Kudawara I, Yoshikawa H. Lipoma arborescens of the knee as a possible cause of osteoarthritis. *Orthopedics* 2001;24(6):603-605.
27. Haasbeek JF, Alvillar RE. Childhood lipoma arborescens presenting as bilateral suprapatellar masses. *J Rheumatol* 1999;26(3):683-686.
28. Franco M, Puch JM, Carayon MJ, Bortolotti D, Albano L, Lallemand A. Lipoma arborescens of the knee: Report of a case managed by arthroscopic synovectomy. *Joint Bone Spine* 2004;71(1):73-75.
29. Erselcan T, Bulut O, Bulut S, Dogan D, Turgut B, Ozdemir S, *et al.* Lipoma arborescens; Successfully treated by yttrium-90 radiosynovectomy. *Ann Nucl Med* 2003;17(7):593-596.
30. Yildiz C, Deveci MS, Ozcan A, Saraçoglu HI, Erler K, Basbozkurt M. Lipoma arborescens (diffuse articular lipomatosis). *J South Orthop Assoc* 2003;12(3):163-166.
31. Kim RS, Song JS, Park SW, Kim L, Park SR, Jung JH, *et al.* Lipoma arborescens of the knee. *Arthroscopy* 2004;20(8):e95-e99.
32. Cil A, Atay OA, Aydingöz U, Tetik O, Gedikoglu G, Doral MN. Bilateral lipoma arborescens of the knee in a child: A case report. *Knee Surg Sports Traumatol Arthrosc* 2005;13(6):463-467.
33. Davies AP, Blewitt N. Lipoma arborescens of the knee. *Knee* 2005;12(5):394-396.
34. Santiago M, Passos AS, Medeiros AF, Sá D, Correia Silva TM, Fernandes JL. Polyarticular lipoma arborescens with inflammatory synovitis. *J Clin Rheumatol* 2009;15(6):306-308.
35. Ji JH, Lee YS, Shafi M. Spontaneous recurrent hemarthrosis of the knee joint in elderly patients with osteoarthritis: An infrequent presentation of synovial lipoma arborescens. *Knee Surg Sports Traumatol Arthrosc* 2010;18(10):1352-1355.
36. Utkan A, Ozkan G, Köse CC, Ciliz DS, Albayrak AL. Congenital absence of the medial meniscus associated with lipoma arborescens. *Knee* 2010;17(3):258-260.
37. Xiao J, Xu Y, Wang J, Feng J, Shi Z. Bilateral knee lipoma arborescens combined with osteoarthritis in elderly patients. *J Int Med Res* 2011;39(4):1563-1569.
38. Jurkiewicz A. Lipoma arborescens of the knee treated with arthroscopic synovectomy a case report and review of the literature. *JBJS Case Connect* 2013;2:e53.

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