Rehabilitation Practice and Science

Volume 41
Issue 2 *Taiwan Journal of Physical Medicine and Rehabilitation (TJPMR)*

Article 2

12-31-2013

Lipoma Arborescens on MR Imaging and the Associated Lesions: A reviewarticle of 78 Cases

Cheng-Yuan Lin

Cheng-Ming Chiu

Tsung-Ching Lin

Shun-Lung Li

Chia-Yi Shang

See next page for additional authors

Recommended Citation

Lin, Cheng-Yuan; Chiu, Cheng-Ming; Lin, Tsung-Ching; Li, Shun-Lung; Shang, Chia-Yi; and Chen, Yu-Chiang (2013) "Lipoma Arborescens on MR Imaging and the Associated Lesions: A reviewarticle of 78 Cases," *Rehabilitation Practice and Science*: Vol. 41: Iss. 2, Article 2.
DOI: https://doi.org/10.6315/2013.41(2)02
Available at: https://rps.researchcommons.org/journal/vol41/iss2/2

Lipoma Arborescens on MR Imaging and the Associated Lesions: A reviewarticle of 78 Cases

Authors

Cheng-Yuan Lin, Cheng-Ming Chiu, Tsung-Ching Lin, Shun-Lung Li, Chia-Yi Shang, and Yu-Chiang Chen

Original Article

Lipoma Arborescens on MR Imaging and the Associated Lesions: A Review of 78 Cases

Cheng-Yuan Lin, Cheng-Ming Chiu, Tsung-Ching Lin, Shun-Lung Li, Chia-Yi Shang, Yu-Chiang Chen[1]

Departments of Physical Medicine and Rehabilitation, and [1]Division of Medical Imaging, Department of Radiology, Far Eastern Memorial Hospital, New Taipei City.

Objective: To identify the different morphologic patterns of lipoma arborescens (LA) and the associated lesions on magnetic resonance (MR) imaging and to evaluate their clinical implication.

Methods: We conducted a retrospective review of the MR images and medical records of 78 patients diagnosed with LA of the knee (n=73) and shoulder (n=5). The diagnosis of LA was confirmed by the histologic findings in two cases and by the characteristic MR imaging features in the other 76.

Results: A typical pattern of villous lipomatous proliferation of the synovium was identified on MR imaging in all cases, as a typical frond-like pattern in 38% (30/78) of cases, a dominant mass-like lesion in 41% (32/78) of cases and mixed type presentation in 21% (16/78) of cases. The associated MR lesions in the knee (n=73) were: joint effusion (97%), posterior cruciate ligament tear (69%), anterior cruciate ligament tear (43%), degenerative changes (40%), bone marrow edema (34%), meniscal tear (32%), synovial cysts (15%), medial collateral ligament tear (13%), osteochondral defect (12%), chondromatosis (6%), patellar subluxation (4%) and discoid meniscus (4%). All cases except two had associated pathologies of the knee. The associated MR pathologies in the shoulder (n=5) were: rotator cuff tear (100%), joint effusion (100%), degenerative changes (80%), subcromial enthesophyte (80%), biceps tendon tenosynovitis (40%) and probable adhesive capsulitis (40%). LA appeared to be an incidental diagnosis in all cases. The two cases of LA of the knee managed by synovectomy reported symptomatic recurrence.

Conclusion: The pathognomonic appearance of LA on MR imaging provides for a precise and early detection of this uncommon lesion. Trauma, degenerative or inflammatory conditions may predispose a joint to this synovial disorder. Early intervention may be crucial for proper healing and avoidance of joint deterioration. (Tw J Phys Med Rehabil 2013; 41(2): 93 - 104)

Key Words: lipoma arborescens, MR imaging, synovium, joint pathology

INTRODUCTION

Lipoma arborescens (LA) is a rare benign intraarticular synovial disorder[1,2] characterized by lipomatous proliferation and infiltration of the subsynovial tissue and the formation of hypertrophic villi.[3] This hypertrophied synovium demonstrates a distinctive frond-like pattern

Submitted date: 26 June 2013 Revised date: 24 July 2013 Accepted date: 29 July 2013

Correspondence to: Dr. Yu-Chiang Chen, Division of Medical Imaging, Department of Radiology, Far Eastern Memorial Hospital, No. 21, Section 2, Nan-Ya South Road, Panchiao District, New Taipei City 220, Taiwan.

Tel：(02) 89667000 ext 2214 E-mail：yccfemh@ms8.hinet.net

that is described by the term arborescens, from the Latin word *arbor* meaning tree.[4] The knee joint is most commonly involved, although occasionally cases have also been reported in multiple other synovial joints or locations. Although the etiology is undetermined, a common association with trauma, degenerative or inflammatory conditions of the joint has long been observed.[3-5] Clinically, patients with this condition usually present with slowly progressive and painless swelling of the joint for many years, accompanied by intermittent effusion.

The magnetic resonance (MR) imaging appearance of LA corresponds to the fatty proliferation of the synovial lesion, enabling a prompt and specific diagnosis.[5,6] The widespread use of MR imaging has also led to the description of an increasing number of LA diagnoses. The objective of this article is to describe the different morphologic patterns of LA and the associated lesions on MR imaging and to evaluate the clinical implication of these findings.

MATERIALS AND METHODS

Between November 2010 and December 2012, a total of 1529 MR images of unilateral or bilateral extremity joints including 601 of the knee, 540 of the shoulder and the remainder of the hip, ankle, foot, elbow, wrist and hand were made at the Far Eastern Memorial Hospital in New Taipei City, Taiwan for diagnostic purposes. Of these, 78 MR diagnoses of LA from unilateral joint examinations were made in 73 instances (31 females, 42 males) of the knee (*n*=73) and five instances (2 females, 3 males) of the shoulder (*n*=5). The mean age of the patients was 42 years (range 17-78 years) in the knee group and 61 years (range 54-70 years) in the shoulder group. The final diagnosis was confirmed by pathologic findings in two cases with LA of the knee and by the characteristic MR imaging features in the other 76.

All MR images were interpreted by the same reader, a radiologist specializing in MR musculoskeletal imaging. The following MR findings of the knee were evaluated: villous lipomatous synovial proliferation, mass-like subsynovial fat deposition, joint effusion, anterior cruciate ligament (ACL) tear, posterior cruciate ligament (PCL) tear, degenerative changes, meniscal tear, bone marrow edema, synovial cysts and other findings. The MR images with LA of the shoulder were evaluated for associated joint effusion, rotator cuff lesion, degenerative changes and other findings. The presence of degenerative changes in both joints was defined as osteophyte formation, cartilage defect (after exclusion of joint trauma within the last 6 months by history) and subchondral bone signal changes not associated with meniscal or ligamentous attachments.

MR imaging was performed on a 1.5-T MR imaging (MRI) system (Magnetom Avanto 1.5T, Siemens Healthcare, Malvern, PA) with a knee coil and shoulder array coil. The sequence included T1-weighted turbo spin-echo (T1-TSE) and proton density (PD) turbo spin-echo with fat suppression (PD-TSE-FS) sequences in the transverse, sagittal and coronal planes. In four cases, studies were enhanced due to suspected neoplastic lesion of the knee joint.

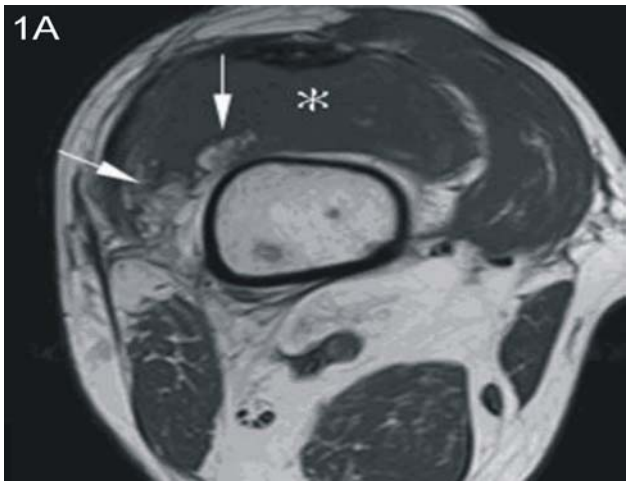
RESULTS

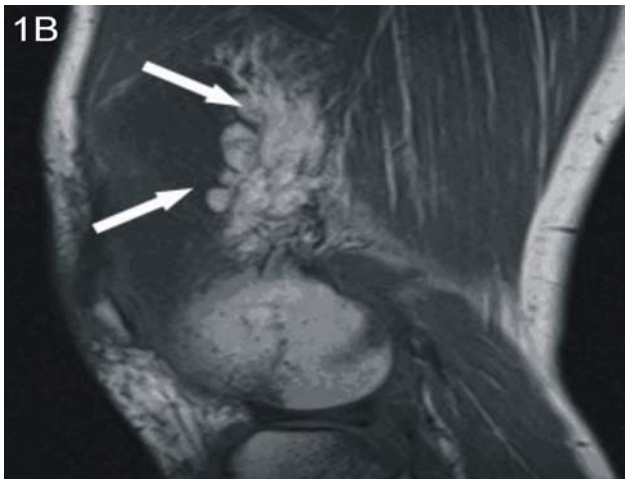
All MR studies showed the morphologic pattern of intra-articular hypertrophic synovial villi with subsynovial fat deposition. However, 30 (38%) had a typical frond-like or hypertrophic villous pattern (Figure 1), 32 (41%) had a dominant mass-like lesion (Figure 2), and 16 (11%) had a mixed type presentation (Figure 3).

The lesions of the knee (*n*=73) were located in either the lateral recess (56%) or the suprapatellar recess (44%). All shoulder lesions arose in the subacromial-subdeltoid bursa (*n*=5) and one case had a concomitant origin from a dilated cystic subcoracoid recess (Figure 4). The subsynovial components of all lesions had a high signal intensity similar to subcutaneous fat on T1-TSE images and were of low signal intensity on the PD-TSE-FS image.

The clinical presentations and indications for MR imaging of patients with LA of the knee are presented in Table 1. The duration of major symptoms ranged from two days to 8 months before MR imaging (average: 69.9 days). All of the 5 cases with LA of the shoulder were referred for MR imaging to rule out rotator cuff lesion. The clinical characteristics are shown in Table 2.

Past clinical history of the knee group included previous trauma (*n*=53), gouty arthritis (*n*=4), type 2 diabetes mellitus (*n*=3), rheumatoid arthritis (*n*=1), metastatic knee pain (*n*=1) and hemangioma of the knee post radiotherapy (*n*=1). Two patients with LA in the shoulder had hypothyroidism before the onset of symptoms.





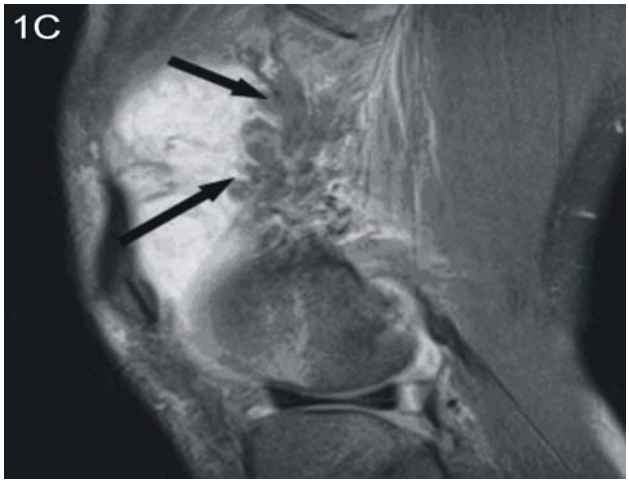
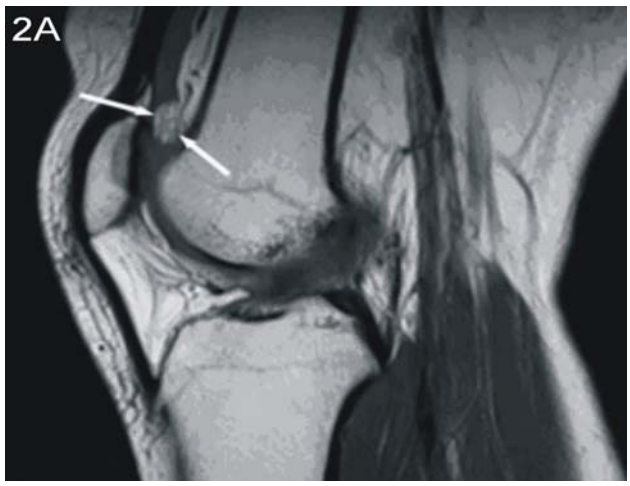
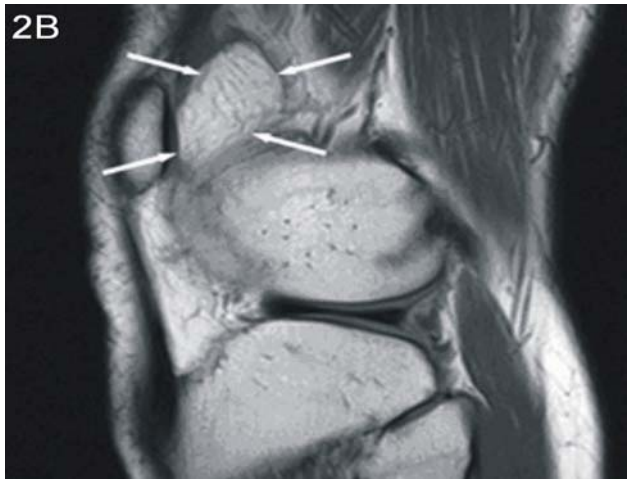


Figure 1. (A)Axial T1-TSE image showing distended suprapatellar bursa containing fluid (*asterisk*) and a diffuse villous proliferation of the synovium from the lateral bursal recess (*white arrows*) with the same signal intensity as subcutaneous fat. (B)Sagittal T1-TSE images depicts the villous frond-like nature (*white arrows*) of the fatty tissue. (C)Corresponding sagittal PD-TSE with fat suppression image confirms the low signal intensity of the lesion similar to subcutaneous fat (*black arrows*).





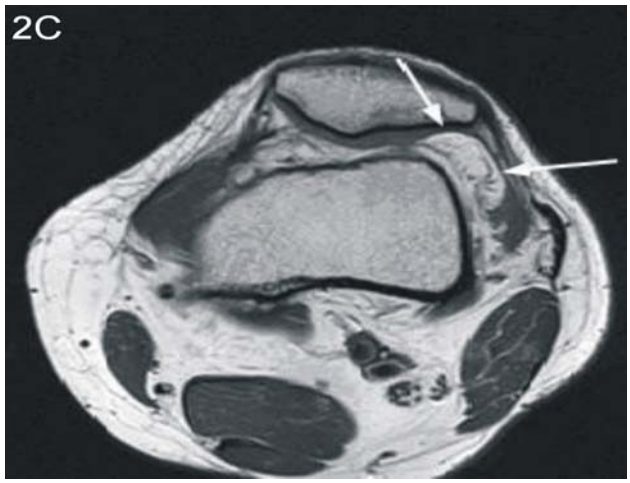


Figure 2. (A)Sagittal T1-TSE image showing a small nodular mass-like lesion in the suprapatellar pouch (*arrows*) with similar signal to fat. (B)Sagittal T1-TSE image and the corresponding axial T1-TSE image (C)of another patient showing a larger mass lesion in the lateral bursal recess (*arrows*) with similar signal to fat.

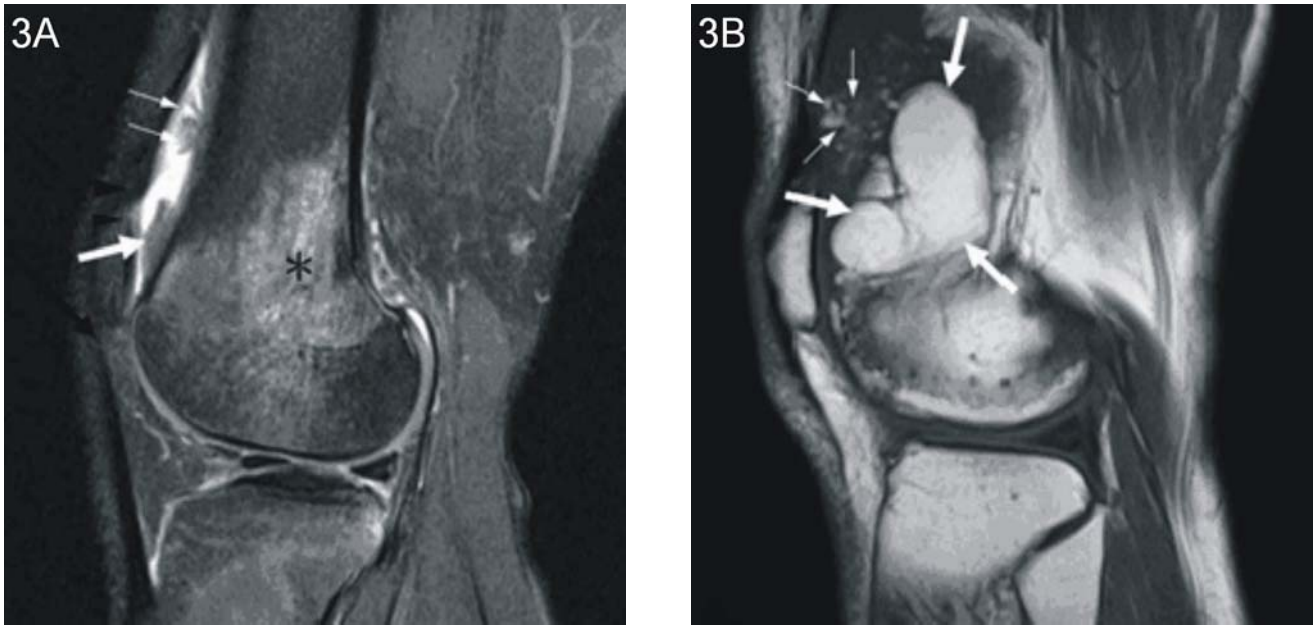


Figure 3. (A)Sagittal PD-TSE with fat suppression image showing mixed mass-like (*large arrows*) and frond-like (*small arrows*) lesions in the suprapatellar pouch similar to fat with concomitant bone marrow edematous change (*asterisk*). (B) Sagittal T1-TSE image of another patient showing a large well-marginated mass lesion (*large arrows*) coexisting with frond-like morphology (*small arrows*) in the lateral bursal recess similar to fat.

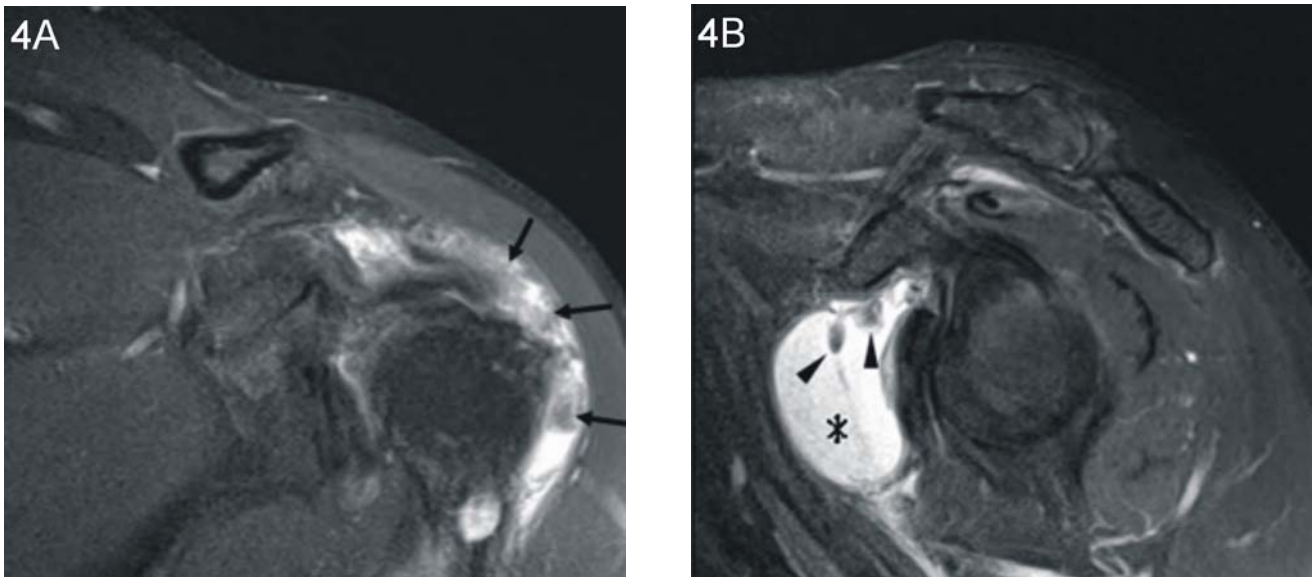


Figure 4. (A)Coronal PD-TSE with fat suppression image showing a frond-like villous proliferation of the **s**ubacromial-subdeltoid bursa (*arrows*) with similar signal to fat. (B)Sagittal PD-TSE with fat suppression image showing prominent subcoracoid recess with cystic dilatation (*asterisk*), containing nodular hypertrophic synovial villi with fatty metaplasia (*arrowheads*).

Table 1. Clinical presentations and indications for MR imaging of 73 patients with lipoma arborescens of the knee

Clinical presentations	Number of patients (%)
Joint pain	66(90.4)
Restricted movement	19(26.0)
Palpable effusion	18(24.7)
Chronic or recurrent effusion	13(17.8)
Acute hemorrhagic effusion	4(5.5)
Chronic hemorrhagic effusion	1(1.4)
Soft tissue swelling without effusion	14(19.2)
Instability/giving way	14(19.2)
Intermittent locking	8(11.0)
Palpable mass	7(9.6)
Morning stiffness	5(6.8)
Muscle atrophy/weakness	4(5.5)
Crepitus	4(5.5)
Deformity	2(2.7)
Spasm	2(2.7)
Intermittent clunking	1(1.4)
Trauma prior to knee pain	53(72.7)
Fall, twist or sprain	20(27.4)
Sports-related injury	18(24.7)
Motor vehicle accident	17(23.3)
Prior surgery on the affected knee	8(11.0)
Fracture	4(5.5)
Indications for MR imaging	**Number of patients (%)**
Suspected meniscal tear	17(23.3)
Suspected ACL injury	16(21.9)
Suspected PCL injury	13(17.8)
Suspected OCD or osteonecrosis	8(11.0)
Suspected soft tissue tumor	5(6.8)
Residual or new symptoms following surgery	3(4.1)
Prolonged, refractory or unexplained knee pain	3(4.1)
Suspected multiligamentous injury	2(2.7)
Suspected bone tumor	2(2.7)
Suspected intra-articular loose body	1(1.4)
Suspected lateral collateral ligament injury	1(1.4)
Suspected metastatic lesion	1(1.4)
Acute pain secondary to trauma	1(1.4)

ACL: anterior cruciate ligament; PCL: posterior cruciate ligament; OCD: osteochondritis dissecans.

Table 2. Characteristics of 5 patients with lipoma arborescens of the shoulder

	Case				
	1	2	3	4	5
Age(yr)/Sex	59/M	58/M	54/F	70/M	63/F
Side	Left	Left	Right	Right	Right
Symptoms/ signs					
Weakness of elevation	+	+	+	+	+
Pain with movement	+	+	-	+	-
Pain at night	+	+	-	+	-
Stiffness	-	-	-	+	-
Crepitus	-	-	-	+	-
Duration	Several months	Few weeks	6 months	2 weeks	3 weeks
Associated MR lesions					
SST tear	+	+	+[a]	+[b]	+
SA/SD-B effusion	+	+*	+	+	+
Degenerative changes	-	+	+	+	+
Subcromial enthesophyte	+	+	+	+	-
SCT tear	-	+	+	+	-
IST tear	-	-	-	+	-
LHBT tenosynovitis	-	-	+	+	-
Probable adhesive capsulitis[‡]	+	+	-	-	-
Additional conditions	Hyperlipidemia Hypothyroidism	None	History of shoulder contusion	Hyperlipidemia	Hypothyroidism

SST: supraspinatus tendon; SA/SD-B: subacromial/subdeltoid bursal; SCT: subscapularis tendon.
IST: infraspinatus tendon; LHBT: long head of the biceps tendon.
[a]: Impending rupture; [b]: Complete rupture; *: Presented with concomitant subcoracoid effusion.
[‡]: Defined as thickened inferior glenoid recess synovial wall and coracohumeral ligament.

Table 3. Associated MR lesions of 73 patients with lipoma arborescens of the knee

MR findings	Number of patients (%)
Joint effusion	71(97.2)
Posterior cruciate ligament tear	51(69.9)
Anterior cruciate ligament tear	32(43.8)
Degenerative changes	29(39.7)
Bone marrow edema	29(39.7)
Meniscal tear	24(32.9)
Synovial cyst (Baker's cyst)	11(15.1)
Osteochondral defect	9(12.3)
Medial or lateral collateral ligament tear	6(8.2)
Chondromatosis	5(6.8)
Patellar subluxation	3(4.1)
Discoid meniscus	3(4.1)

The associated MR findings in the knee from the 78 patients are listed in Table 3. All cases except two had associated pathology of the knee. In all cases but one, in which diagnostic arthroscopy revealed the lesion prior to MR imaging, the findings of LA were incidental.

After MRI assessment, 16 patients received conservative treatment, including pain medication, bracing and rehabilitation program. Some underwent surgery including arthroscopic surgery on the meniscal or ligamentous injury (*n=8*), total knee replacement *(n=6*) and Baker's cyst excision (*n=1*). The two cases which underwent arthroscopic synovectomy both showed a frond-like yellow mass in the suprapatellar pouch. Histological examination showed papillary growth of synovial epithelia with extensive subsynovial lipomatous proliferation and focal chronic inflammation (Figure 5).

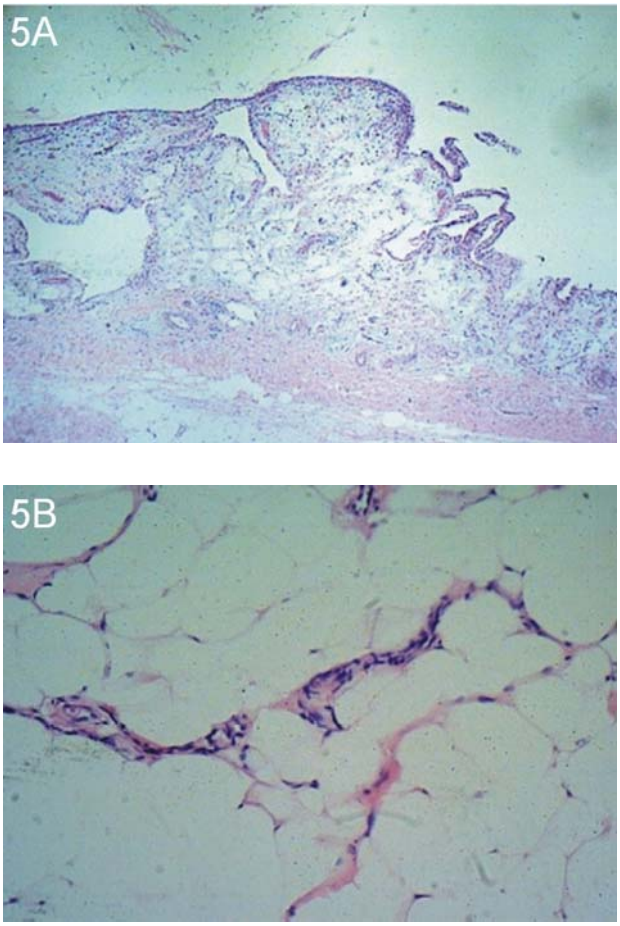


Figure 5. (A) Histological examination showing papillary growth of synovium with extensive subsynovial lipomatous proliferation. (Hematoxylin and eosin,×100). (B) A mild mononuclear inflammatory cell infiltration is present between the adipocytes. (Hematoxylin and eosin,×200)

DISCUSSION

LA is a diffuse villous proliferation of the synovium characterized by replacement of subsynovial tissue by mature adipocytes. Hallel et al[3] suggested the more descriptive term of villous lipomatous proliferation of the synovial membrane, to avoid the implication that this is a neoplastic disorder.

In 1998, a case series of six patients reported a mean age at diagnosis for LA of 43 years (range 9-68 years) and found the condition more common in males than in females.[4] Our results were similar: a mean age of 42 years (range 17-78 years) and a slight predilection for males (females to males: 33:45). A 2013 systemic literature review of 51 patients by Xue et al showed similar results (mean age: 37.8 years, range 10-80 years; females to males: 22:29).[7]

We described associations of LA with osteoarthritis, joint trauma, popliteal cysts, diabetes mellitus, gouty arthritis, rheumatoid arthritis, hypothyroidism, and neoplastic conditions, all of which have been reported before.[3,4,8-10] Other associations have included psoriatic arthritis,[11]Turner syndrome,[4] congenital short bowel syndrome,[12] uveitis[13] and juvenile spondyloarthropathy.[7]

Although the etiology of LA is not clearly defined, the most commonly accepted hypothesis is a nonspecific synovial reaction to inflammatory or traumatic stimuli which contributes to secondary LA; the primary type is both idiopathic and rarer.

In a large series of 33 LA diagnoses by Vilanova et al,[5] LA was almost always associated with other pathologies. They found degenerative changes in 87% of cases and meniscal tears in 72%. The present study found greater variety of presentation, with a completely different predominance of PCL and ACL tears, trauma seldom described as an origin of LA.[14] Furthermore, we identified 18 patients younger than 30 years who presented with only MR ligamentous and meniscal injury in correlation with trauma history. Some of these were given an MR diagnosis of LA as soon as a few days after an acute episode of sports injury. Given the reported previous minor sports injuries among this cohort, we postulate that either major trauma or chronic minor mechanical insult can predispose to LA.

On the other hand, the relationship between osteoarthritis and LA seemed unclear, since primary LA has also been suggested to cause secondary osteoarthritis of the joint.[15,16] To further clarify this connection, among the 22 cases with associated degenerative changes of the knee, we excluded the eight cases with coexisting history of trauma and the two with neoplastic conditions. The remaining 12 cases presented with other associated lesions including meniscus tear (100%), bone marrow edema (75%), PCL tear (67%), ACL tear (58%), and Baker's cyst (33%), all of which (except PCL tear) have been frequently found on MR imaging in advanced osteoarthritis.[17] Moreover, unlike in previous case reports of primary LA causing secondary osteoarthri-

tis,[15,16] the 12 cases here presented with LA lesions no bigger than normal. Therefore, our results might be suggestive that LA is more associated with advanced rather than early osteoarthritis.

Despite the lack of associated lesions in two cases, both reported a history of trauma. Taken together, our series of cases represents a group of adults of widely ranging age with secondary LA attributable predominately to trauma or osteoarthritis or both, associations which were not simply coincidental. Furthermore, among the five cases of LA involving the shoulder joint which is even rarer, a common association with rotator cuff tear, joint effusion, and possible impingement resulting from degenerative joint alterations and enthesophytes has been described, thus corroborating the hypothesis that this entity is a reactive process in the synovium.

LA is a synovial disorder that can arises from the synovial lining of joint, bursa and tendon sheath of various locations. This process is usually monoarticular, most frequently affecting the suprapatellar pouch of the knee, although cases have been reported in the hand, wrist, elbow, shoulder, hip, ankle and foot.[6,12,18-20] Bilateral involvement,[15,21,22] multi-joint disease[12,23] and extra-articular presentation[24,25] have also been identified.

Our study revealed a slight predilection (56%) for the lateral synovial recess of the knee joint, a characteristic seldom mentioned in the published literature on LA. In addition, although a variety of morphological appearances of LA on MR imaging and a predominance of a diffuse pattern have been described,[5,26] our study found a somewhat different category of three distinct patterns, most of which involved a dominant mass-like pattern. Given that the majority of our patients were younger than 40 years (50%) and had a history of trauma (73%), either sports or motor vehicle accident related, corresponding to the associated lesions on MR imaging, these differences may be attributed to diverse biomechanical changes in the joint resulting from chronic mechanical insult in a young population.

Patients with LA typically present with long-standing, slowly progressive swelling of the affected joint, which may be associated with intermittent effusion, limited range of motion and pain.[4] Depending on the anatomical site of the disease, some may present with exacerbations related to trapping of hypertrophied villi between the moving joint; mechanical symptoms such as locking and instability of the knee have been described by the same mechanism.[23] Physical examination findings include a prominent suprapatellar pouch and joint effusion. Rarely, a soft-tissue mass may be identified on palpation. Aspirated synovial fluid is negative for crystals, and cultures of fluid are sterile. However, the superimposed ligamentous or meniscal injury of the knee joint and rotator cuff tear or degenerative changes of the shoulder in most of our cases made the clinical manifestation more complex so that it was easy to overlook the diagnosis of LA.

LA has many characteristic imaging findings that allow for a confident diagnosis. Radiographs often appear normal or show radiolucent areas suggestive of fat in the suprapatellar pouch. There can also be underlying degenerative changes or nonspecific bone erosion. Subchondral bone erosions may indicate synovial invasion.[27] Ultrasonography shows a hyperechoic, frond-like mass with a wavelike motion upon dynamic compression and manipulation, but it is limited in its ability to show the nature of the content and the relationship with the joint space.[28]

MR imaging is the modality of choice for diagnosis of LA.[4,6,29] The characteristic subsynovial hypertrophic adipose proliferation allows for a precise diagnosis to be made, especially when T1-weighted and fat-suppressed sequences are used, since the lesion has fat signal intensity with all pulse sequences. The lesion does not enhance with intravenous gadolinium. Associated joint effusion or other pathology is usually seen. The morphological presentation may be frond-like, mass-like or mixed, depending on the underlying clinical history and duration of the disease.

Radiographs help to narrow the differential diagnosis, which includes pigmented villonodular synovitis (PVNS), synovial hemangioma, synovial lipoma and synovial chondromatosis. PVNS has areas of low intensity on T1- and T2-weighted MR imaging, and it enhances with contrast, unlike the MR imaging characteristics of LA. Synovial hemangioma has a low signal on T1-weighted images, a high signal on T2-weighted images, and characteristic hypointense linear fibrous septa. Synovial lipoma tends to be infrapatellar, whereas LA has a predilection for the suprapatellar pouch. Synovial chondromatosis is associated with loose body formation, a charac-

teristic not seen in LA.

The LA lesion we identified seemed smaller than most reported cases in the literature, a difference we attribute to the large case series in our study. Since a minor degree of fatty infiltration of the subsynovial space is normal in certain parts of the synovial membrane, particularly in the knee joint, and slight nodular thickening is a nonspecific finding in the synovium of osteoarthritic joints,[30,31] some cases in our study with one small single nodular lesion might be interpreted as an equivocal or insignificant finding. However, these lesions were found in predominantly younger patients with no osteoarthritis.

It is also important to distinguish the small, single nodular type of LA from intraarticular synovial lipoma, which is similar in appearance but even rarer, since it is often difficult to discriminate between the two. Grossly, intraarticular lipoma may be small, solitary polyp-like masses, round to ovoid in shape, which usually appear with a short stalk giving a remarkable appearance.[32] Microscopically, the surface of intraarticular lipoma may be normal or they may lack synovial lining cells. Matsumoto et al[33] described many vessels present beneath the capsule of the tumor, accounting for capsular enhancement of the tumor on MR imaging. Neither villous proliferation of the synovium nor fatty replacement of the underlying connective tissue was found. Furthermore, unlike lipoma arborescens, true intraarticular lipomas arise de novo in that they are unrelated to other joint disease.

Although characteristic imaging findings can be sufficient to make the diagnosis, biopsy is required for a definitive diagnosis. We are aware that a major flaw of our study is the obtaining of histopathological diagnosis in only two cases.

The symptoms of LA can be temporarily relieved by local steroid or intra-articular radioisotope injections (e.g.,Y-90),[34,35] but complete, open synovectomy is the treatment of choice.[35,36] Successful arthroscopic synovectomy for LA has been described, particularly in patients in whom the disease is confined to the anterior compartment of the knee.[35,36] This minimally invasive method not only reduces soft tissue trauma but also facilitates post-operative rehabilitation.[37] Postoperative recurrence is uncommon.

Since most of the patients in this series were lost to follow up, the correlation of treatment and prognosis to lesion size of our patients is not conclusive. We also found that recurrent effusion was frequent in those patients who had undergone arthroscopic repair of a meniscal or ligamentous tear, and excision of Baker's cyst, despite their having regained range of motion. One of the patients who had undergone arthroscopic synovectomy reported persistent joint effusion and received a second arthroscopic synovectomy due to residual LA. Since rehabilitation plays a key role in the treatment of ligamentous injury, meniscal injury, osteoarthritis and rotator cuff tear regardless of surgery, LA may cause focal impingement, chronic inflammation, arthritic changes[15,16] and reactive bone erosions[38] which may hinder rehabilitation. A treatment plan incorporating early management of the LA lesion should optimize recovery for those with associated injuries of the affected joint.

CONCLUSION

Although LA is rare, its distinctive features on MR imaging enable an early and accurate diagnosis. Our study supports the assertion that trauma and osteoarthritis may predispose a joint to LA. Clinicians and physical therapists should be aware of the potential for this condition, particularly in cases of delay in therapeutic response, because early treatment may be the key to preventing destruction of the affected joint. Once LA is diagnosed, a prompt, in-depth historical correlation is essential to determine the exact diagnosis, which may be crucial to long-term recovery.

REFERENCES

1. Adelani MA, Wupperman RM, Holt GE. Benign synovial disorders. J Am Acad Orthop Surg 2008; 16:268-75.
2. Sheldon PJ, Forrester DM, Learch TJ. Imaging of intraarticular masses. Radiographics 2005;25:105-19.
3. Hallel T, Lew S, Bansal M. Villous lipomatous proliferation of the synovial membrane (lipoma arborescens). J Bone Joint Surg Am 1988;70:264-70.
4. Kloen P, Keel SB, Chandler HP, et al. Lipoma arborescens of the knee. J Bone Joint Surg Br 1998; 80:298-301.

5. Vilanova JC, Barcelo J, Villalon M, et al. MR imaging of lipoma arborescens and the associated lesions. Skeletal Radiol 2003;32:504-9.
6. Martin S, Hernandez L, Romero J, et al. Diagnostic imaging of lipoma arborescens. Skeletal Radiol 1998;27:325-9.
7. Xue J, Alario AJ, Nelson SD, et al. Progressive bilateral lipoma arborescens of the knee complicated by juvenile spondyloarthropathy: A case report and review of the literature. Semin Arthritis Rheum 2013. (pii: S0049-0172(12)00304-6. doi: 10.1016/j.semarthrit.2012.12.022)
8. Martinez D, Millner PA, Coral A, et al. Case report 745: Synovial lipoma arborescens. Skeletal Radiol 1992;21:393-5.
9. Yan CH, Wong JW, Yip DK. Bilateral knee lipoma arborescens: a case report. J Orthop Surg (Hong Kong) 2008;16:107-10.
10. Coll JP, Ragsdale BD, Chow B, et al. Best cases from the AFIP: lipoma arborescens of the knees in a patient with rheumatoid arthritis. Radiographics 2011; 31:333-7.
11. Fraser AR, Perry ME, Crilly A, et al. Lipoma arborescens co-existing with psoriatic arthritis releases tumour necrosis factor alpha and matrix metalloproteinase 3. Ann Rheum Dis 2010;69:776-7.
12. Siva C, Brasington R, Totty W, et al. Synovial lipomatosis (lipoma arborescens) affecting multiple joints in a patient with congenital short bowel syndrome. J Rheumatol 2002;29:1088-92.
13. Sharma SD, Bagri DR, Gupta RK, et al. Lipoma arborescens. Indian J Pediatr 2011;78:1016-8.
14. D'Mello Z, Neogi DS, Punit AS, et al. Lipoma arborescens of the knee joint after anterior cruciate ligament injury. Orthop Surg 2013;5:142-5.
15. Al-Ismail K, Torreggiani WC, Al-Sheikh F, et al. Bilateral lipoma arborescens associated with early osteoarthritis. Eur Radiol 2002;12:2799-802.
16. In Y, Chun KA, Chang ED, et al. Lipoma arborescens of the glenohumeral joint: a possible cause of osteoarthritis. Knee Surg Sports Traumatol Arthrosc 2008;16:794-6.
17. Link TM, Steinbach LS, Ghosh S, et al. Osteoarthritis: MR imaging findings in different stages of disease and correlation with clinical findings. Radiology 2003; 226:373-81.
18. Napolitano A. Lipoma arborescens of the synovial fluid; clinical contribution to a case located at the synovia of the wrist. Progr Med(Napoli) 1957;13: 109-18.
19. Le Corroller T, Gaubert JY, Champsaur P, et al. Lipoma arborescens in the bicipitoradial bursa of the elbow: sonographic findings. J Ultrasound Med 2011;30:116-8.
20. Babar SA, Sandison A, Mitchell AW. Synovial and tenosynovial lipoma arborescens of the ankle in an adult: a case report. Skeletal Radiol 2008;37:75-7.
21. Pandey T, Alkhulaifi Y. Bilateral lipoma arborescens of the subdeltoid bursa. Australas Radiol 2006;50: 487-9.
22. Sailhan F, Hautefort P, Coulomb A, et al. Bilateral lipoma arborescens of the knee: a case report. J Bone Joint Surg Am 2011;93:195-8.
23. Silva L, Terroso G, Sampaio L, et al. Polyarticular lipoma arborescens-a clinical and aesthetical case. Rheumatol Int 2013;33:1601-4.
24. Dogramaci Y, Kalaci A, Sevinc TT, et al. Lipoma arborescens of the peroneus longus and peroneus brevis tendon sheath: case report. J Am Podiatr Med Assoc 2009;99:153-6.
25. Moukaddam H, Smitaman E, Haims AH. Lipoma arborescens of the peroneal tendon sheath. J Magn Reson Imaging 2011;33:221-4.
26. Soler T, Rodriguez E, Bargiela A, et al. Lipoma arborescens of the Knee: MR characteristics in 13 joints. J Comput Assist Tomogr 1998;22:605-09.
27. Kim RS, Song JS, Park SW, et al. Lipoma arborescens of the knee. Arthroscopy 2004;20:e95-9.
28. Senocak E, Gurel K, Gurel S, et al. Lipoma arborescens of the suprapatellar bursa and extensor digitorum longus tendon sheath: report of 2 cases. J Ultrasound Med 2007;26:1427-33.
29. Iovane A, Sorrentino F, Pace L, et al. MR findings in lipoma arborescens of the knee: our experience. Radio Med 2005;109:540-6.
30. O'Connell JX. Pathology of the Synovium. Am J Clin Pathol 2000;114:773-84.
31. Loeuille D, Chary-Valckenaere I, Champigneulle J, et al. Macroscopic and microscopic features of synovial membrane inflammation in the osteoarthritic knee: correlating magnetic resonance imaging findings with

disease severity. Arthritis Rheum 2005;52:3492-501.

32. Hirano K, Deguchi M, Kanamono T. Intra-articular synovial lipoma of the knee joint (located in the lateral recess): a case report and review of the literature. Knee 2007;14:63-7.
33. Matsumoto K, Okabe H, Ishizawa M, et al. Intra-articular lipoma of the knee joint. A case report. J Bone Joint Surg Am 2001;83:101-5.
34. Erselcan T, Bulut O, Bulut S, et al. Lipoma arborescens; successfully treated by yttrium-90 radiosynovectomy. Ann Nucl Med 2003;17:593-6.
35. Davies AP, Blewitt N. Lipoma arborescens of the knee. Knee 2005;12:394-6.
36. Franco M, Puch JM, Carayon MJ, et al. Lipoma arborescens of the knee: report of a case managed by arthroscopic synovectomy. Joint Bone Spine 2004;71:73-5.
37. 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;18:1352-5.
38. Chae EY, Chung HW, Shin MJ, et al. Lipoma arborescens of the glenohumeral joint causing bone erosion: MRI features with gadolinium enhancement. Skeletal Radiol 2009;38:815-8.

樹狀關節脂肪瘤之磁振造影表現及相關病灶：七十八病例之回顧

林政遠　邱正民　林宗慶　李順龍　沈家億　陳友強[1]

亞東紀念醫院　復健科　放射部影像醫學科[1]

目的：識別樹狀關節脂肪瘤於磁振造影上之不同形態表現及相關病灶，並探討其臨床意涵。

方法：本研究收集共 78 個樹狀關節脂肪瘤之案例，並回顧其影像表現及病歷紀錄。其中包括 73 個位於膝關節及 5 個肩關節之案例。2 個案例經病理檢查確定診斷，其餘 76 個案例為磁振造影診斷。

結果：所有案例於磁振造影上皆表現出典型之滑膜脂肪性增生，其中 38%呈現典型之樹枝狀型態，41%為腫塊狀表現，另 10%混合此兩種表現。樹狀關節脂肪瘤於膝關節內之相關病灶包括：關節積液(97%)、後十字韌帶損傷(69%)、前十字韌帶損傷(43%)、退行性變化(40%)、骨髓水腫(34%)、半月軟骨損傷(32%)、滑膜囊腫(15%)、內側韌帶損傷(13%)、軟骨破損(12%)、軟骨瘤病(6%)、臏骨半脫位(4%)及圓盤狀半月板(4%)，除兩位案例外，所有案例皆伴隨相關病灶；5 個肩關節案例之相關病灶包括：旋轉肌撕裂傷(100%)、關節積液(100%)、退行性變化(80%)、肱二頭肌長頭腱鞘炎(40%)及可能之沾黏性關節囊炎(40%)。所有案例之樹狀關節脂肪瘤表現皆為意外發現。當中只有兩位接受關節鏡滑膜切除術，但後續皆有症狀復發之情形。

結論：樹狀關節脂肪瘤雖為罕見病灶，其磁振造影上之特有形態表現可提供正確及早期之診斷。本研究之結果顯示關節創傷後或退化性關節炎皆可能導致此病灶之形成。及早的介入治療應有助於關節損傷之復原及避免症狀進展及惡化。（台灣復健醫誌 2013；41(2)：93 - 104）

關鍵詞：樹狀關節脂肪瘤(lipoma arborescens)，磁振造影(MR imaging)，滑膜(synovium)，關節病變(joint pathology)

通訊作者：陳友強醫師，亞東紀念醫院放射部影像醫學科，新北市 220 板橋區南雅南路二段 21 號
電話：(02) 89667000 轉 2214　　E-mail：yccfemh@ms8.hinet.net