CASE REPORT

Knee pain: a cautionary tale of lipoma arborescens

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SUMMARY

We report a case of a 51-year-old man, presenting with non-specific symptoms of unilateral knee pain and swelling, who had experienced a 1-year period of multiple misdiagnoses. He was finally diagnosed with lipoma arborescens only after a MRI of the knee was performed, with postoperative histological confirmation after treatment with joint replacement surgery. The possible pathophysiology, diagnostic modalities and treatment of lipoma arborescens are discussed. The authors hope that our experience with this rare condition can be of learning value to fellow clinicians who frequently encounter patients with arthritis, as an accurate diagnosis and management of lipoma arborescens can give rise to a better clinical outcome for the patient.

BACKGROUND

Knee pain is a common presentation in an orthopaedics or rheumatology practice. Unlike the commonly seen osteoarthritis of the knee due to degeneration associated with age, our patient presented with advanced joint degeneration at a relatively young age. While the initial differentials of inflammatory and degenerative causes were explored, the journey to the final diagnosis of a rare synovial condition was a learning experience that we hope to share with fellow clinicians.

CASE PRESENTATION

A 51-year-old man first presented to the rheumatology clinic, with a 2-year history of isolated monoarticular right knee joint swelling and pain. He had no history of trauma or family history of similar joint swelling and pain. The pain was exacerbated by ambulation. On physical examination, there was marked unilateral right knee joint swelling and effusion, with tenderness at the medial joint line. Range of motion was limited to 0°–110° flexion.

INVESTIGATIONS**Radiographs of bilateral knees including skyline views**

Bilateral tricompartmental narrowing, worse at the right medial femorotibial compartment, and right knee suprapatellar effusion, were seen (figure 1).

Ultrasound of the right knee

Moderate right knee effusion and femoral fat pad enlargement with increased echogenicity were noted.

Joint fluid microscopic analysis

No birefringent crystals were seen on polarised light microscopy. The direct smear preparations

contained some synovial cells and small numbers of macrophages, lymphocytes and neutrophils, and some chondrocytes. There was no suppuration nor were there malignant cells. There was no growth of acid-fast Bacilli.

MRI of the right knee

MRI showed extensive fatty villous proliferation of the synovium (figure 2), hence providing a definitive diagnosis of lipoma arborescens. Advanced tricompartmental osteoarthritis and extensive soft tissue damage including medial meniscus tear, lateral meniscus degeneration, myxoid degeneration of anterior cruciate ligament (ACL) and high-grade partial tear of posterior cruciate ligament (PCL), were noted.

MRI is the investigation modality of choice for lipoma arborescens; MRI can demonstrate high signal intensity of fat in lipoma arborescens on both, T-1 and T-2 weighted images. Characteristic MRI findings including a frond-like synovial mass, fat signal intensity on all imaging sequences, suppression of signal with fat-selective presaturation, joint effusion, potential chemical shift artefact and absence of magnetic susceptibility effects from hemosiderin, are pathognomonic for lipoma arborescens.¹

Histological examination of synovial tissue sent postoperatively

Postoperative histological studies showed synovial hyperplasia and hypertrophy with distinct lobules of mature adipocytes replacing a significant portion of subsynovial tissue, in keeping with the diagnosis of lipoma arborescens.

DIFFERENTIAL DIAGNOSIS

Plain radiographs at the initial visit were suggestive of tricompartmental osteoarthritis.

Soon after this initial diagnosis of degenerative osteoarthritis, the patient presented with new-onset bilateral wrist, metacarpophalangeal and proximal interphalangeal joint pain and swelling. Tenosynovitis of bilateral tibialis posterior tendon was also noted during physical examination. With normal laboratory investigation results (rheumatoid factor and anticyclic citrullinated peptide antibodies), the diagnosis was changed to inflammatory polyarthritis and oral prednisolone was started. Right knee aspiration yielded 160 mL of clear fluid and intra-articular triamcinolone was administered.

The patient's joint pains and swellings improved and the knee was less painful. However, the right knee joint swelling persisted. The diagnosis was changed to inflammatory oligoarthritis, with addition of sulfasalazine to the prednisolone therapy.

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Figure 1 X-ray imaging of the patient's knees, suggestive of tricompartmental osteoarthritis of the right knee.

For the next 7 months, the patient was treated with sulfasalazine and prednisolone for a diagnosis that was further changed to refractory right knee monoarthritis and, later, to seronegative rheumatoid arthritis. During this period, two further knee joint aspirations were performed, yielding 60 and 150 mL of turbid fluid. Microscopic analysis of the fluid suggested joint inflammation. Neither birefringent crystals nor acid-fast bacilli were identified.

The persistent gross swelling led to a period of 1 year of uncertain differential diagnoses, as described earlier, with the patient continuing to experience refractory knee swelling and pain. Several different diagnoses were considered over this period (figure 3).

The patient was subsequently referred to an orthopaedic surgeon for synovectomy, to rule out synovial tuberculosis as a possible cause of the joint swelling. At the orthopaedic clinic review, assessment revealed a large right knee effusion with positive patellar tap and a unilateral genu varus deformity of 15°. Range of motion had worsened, with a passive range of 10°–95°.

MRI of the joint was performed, providing a definitive diagnosis of lipoma arborescens.

TREATMENT

Partial synovectomy, either open or performed arthroscopically, is often curative. Postoperative recurrence is rare.² Alternative therapy such as radiation synovectomy using yttrium-90 has been described in the literature.³

In view of the advanced osteoarthritic changes of the knee in our patient, total knee arthroplasty with synovectomy was performed as curative management. Surgery was eventually undertaken 3 years after MRI diagnosis was made.

OUTCOME AND FOLLOW-UP

After surgery, the patient underwent a 4-week inpatient rehabilitation programme at a community hospital. He was able to return to work and regained his premorbid functional state 8 weeks postsurgery, with no recurrence of symptoms on 1-year postoperative review.

DISCUSSION

Lipoma arborescens is rare and its incidence is still unknown. Less than 60 cases have been published in the English language medical literature.⁴ Based on a study by Vilanova *et al*,⁵ in a cohort of 12 578 knee MRIs, only 32 (0.25%) presented with lipoma arborescens while Iovane *et al*⁶ noted the presence of lipoma arborescens in 9 of the 6387 knee MRIs (0.14%). The condition can occur in both the young and old, with the youngest patient reported at 9 years and oldest at 90 years of age.⁷ With its non-specific symptoms, it may be disguised as other more common joint conditions.⁸

Lipoma arborescens, or villous lipomatous proliferation of synovium, is a benign synovial condition of unknown aetiology. It is characterised by a diffuse replacement of subsynovial tissue by mature fat cells, giving rise to villous transformation of the joint synovium.⁹

While primary cases without underlying chronic intra-articular pathological conditions have been reported, lipoma arborescens can be a secondary reactive process associated with degenerative joint disease, chronic rheumatoid arthritis, or prior trauma.¹⁰ It has been reported that lipoma arborescens can be associated with systemic inflammatory disease with elevated anticyclic citrullinated peptide antibodies.¹¹ In our patient, in view of the normal rheumatological investigation findings and absence of further recurrence of pain

Figure 2 MRI of the right knee. Presence of extensive fatty villous proliferation of the synovium (indicated by white arrows) is diagnostic of lipoma arborescens. Image sequence descriptions: (1) Coronal cut; fast spin echo proton density fat saturated. (2) Axial cut; fast spin echo T2-weighted. (3) Axial cut; fast spin echo T1-weighted fat saturated+contrast. (4) Sagittal cut; fast spin echo T2-weighted fat saturated. (5) Coronal cut; fast spin echo T1-weighted fat saturated+contrast. (6) Coronal cut; fast spin echo T1-weighted fat saturated+contrast.

and swelling of other joints, the differential diagnosis of systemic inflammatory disease such as rheumatoid arthritis was later excluded as a secondary cause of lipoma arborescens in the right knee. The cause of the polyarticular inflammation was initially thought to be seronegative rheumatoid arthritis. However, after follow-up for 4 years since MRI diagnosis, there have been no recurrent arthritic flares (while off steroids and sulfasalazine). Thus a diagnosis of rheumatoid arthritis is unlikely and the exact cause of those symptoms is unclear. Thus we currently hold the view that this patient suffered from primary lipoma arborescens.

Lipoma arborescens can be monoarticular, biarticular or polyarticular, and it commonly affects the knee joint, especially at the suprapatellar pouch.^{5 12} Symptoms of lipoma arborescens

include refractory joint swelling, crepitations and restricted range of motion.

As the symptoms of lipoma arborescens are often non-specific, the condition is a diagnostic challenge for clinicians. It masquerades well as one of the more common joint diseases and can be easily misdiagnosed. This difficulty in the accurate diagnosis is well highlighted in our case. The delayed diagnosis

Patient's perspective

When the doctors were able to identify the actual reason why my knee was constantly swelling up, I was relieved. But I was concerned as well, knowing that I was diagnosed with something rare. But the team was encouraging and decisive in their plan to offer knee replacement surgery. I am 1 year postsurgery (at time of submission of this case report) and I have not had any recurrence of the knee swelling or the pain. I am able to return to my job and enjoy life.

Learning points

- ▶ When treating a patient with refractory joint swelling, clinicians should consider less common synovial conditions such as lipoma arborescens.
- ▶ MRI should be considered early in such cases to better assess for soft tissue involvement.
- ▶ Although synovectomy will be able to resolve the underlying cause of the symptoms experienced by the patient, the clinician may have to consider total joint replacement in view of the extensive joint damage that can be associated with lipoma arborescens.

Figure 3 Changes in diagnosis in view of the clinical findings and investigation results over 1 year.

impeded the prompt provision of definitive treatment, subjecting the patient to unnecessary treatment and high healthcare costs.

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Competing interests None declared.

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