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Large Intra-articular Synovial Lipoma of the Knee: A Case Report and Review of Literature

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This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Intra-articular synovial lipomas are a rare entity and have been reported in the knee, hip, spine, elbow, and wrist. Here we present the case of a 63-year-old female with a large intra-articular synovial lipoma of the knee joint causing restriction of range of motion. MRI showed an intra-articular lipoma arising from Hoffa's fat pad. The mass was surgically excised with no recurrence. Magnetic resonance imaging (MRI) remains the diagnostic modality of choice.

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1. INTRODUCTION

Intra-articular synovial lipoma was first described in 1958 and is a rare entity (Jaffe, 1958; Matsumoto et al., 2001) and only handful of cases have been reported in English literature. Knee is the commonest site with first case being reported in 1979 (Pudlowski et al., 1979). There was a single case report of synovial lipoma of knee in in 1999 (Hill et al., 1993). Majority of cases cases were reported between 2000-2010 (Bernstein et al., 2001; Marui et al., 2002; Matsumoto et al., 2001; Lee et al., 2001; Kidwai et al., 2005; Yilmaz et al., 2005; Bennani et al., 2008; Tudisco et al., 2008; Min et al., 2010; Yamaguchi et al., 2003: Yeomans et al., 2003 Mostis et al., 2005; Ishida, 2021; Hirano et al., 2007), 4 cases were reported between 2011-2020 (Poorteman et al., 2015; Zhu et al., 2012; Hsu & Wu, 2013 Kumar et al., 2013) and two were reported 2020 (Ishida, 2021) onwards and includes the current case. Isolated cases also being reported in hip (Margheritini et al., 1998) and spine (Husson et al., 1987) and tarsometatarsal joint (Pavithra et al., 2004). Within the knee joint the lipoma can arise from the fat pad area (Hill et al., 1993; Yamaguchi et al., 2003; Yeomans et al., 2003), Suprapatellar pouch (Hill et al., 1993; Matsumoto et al., 2001; Smillie, 1974; Yamaguchi et al., 2003; Mostis et al., 2005), medial meniscus (Yamaguchi et al., 2003; Yeomans et al., 2003; Mostis et al., 2005), lateral recess (Kumar et al., 2013; Mostis et al., 2005) or the retinaculum (Bernstein et al., 2001). The location dictates the specific symptomatology. It is imperative that the intraarticular synovial lipoma does not be confused with two other kinds of swellings which might have a similar clinical presentation. These include lipoma arborescence (Jaffe, 1958; Mostis et al., 2005; Cohen & Canoso, 1989; Das Gupta, 1983; Hubscher et al., 1990; Hoffa, 1904) and Hoffa's fat pad disease (Hoffa, 1904). We describe a case of a large intra-articular lipoma present in the antero-lateral aspect of the knee joint which was manifesting as a prominent extraarticular swelling combined with pain and locking.

2. CASE REPORT

A 63-year-old female presented to our outpatient department with complaints of swelling in the right knee joint line. She also complained of constant dull aching pain and restricted flexion of the knee joint for the past 6 months. There was no history of locking or instability of the knee joint. The patient denied any past trauma to the knee.

Physical examination revealed an 8cm by 6cm globular firm solitary mass over the antero-lateral aspect of the knee. The mass was mobile and non-tender. Patient had no fixed flexion deformity and a range of motion from 0 deg to 90 degrees (active and passive). Radiological examination of the knee joint was carried out. X rays showed no abnormality. MRI of the knee joint showed a lobulated lesion arising from Hoffa's fat and was extending antero-lateral to patellar tendon and inferior to lateral retinaculum into subcutaneous plane and measured 6.3x5.0x7.9cm on the MRI.

Considering the size and extra articular presentation Patient was counselled for open excision of the mass. Routine preoperative blood investigations were within normal limits.

Patient was placed supine on the OT table following spinal anesthesia. Under tourniquet control, an antero-lateral incision was marked centered over the swelling. The superficial part of the swelling was identified in the sub-cutaneous plane. Planes were created proximally and distally up to the extensor retinaculum. The defect in the retinaculum was extended and arthrotomy completed. The swelling was excised in-toto. Joint was inspected, no intraarticular abnormality noted. The thinned-out extensor retinaculum was repaired with number 2 fibrewire. Subcutaneous tissue and skin were closed in layers over a drain.

Histopathological examination of the mass revealed a well encapsulated benign tumor composed of mature adipocytes arranged in lobules and separated by delicate fibrovascular septae.

Post-operatively patient was placed in a bulky dressing and a knee immobilizer for 2 weeks. Following which rehabilitation was initiated under the guidance of a trained therapist. The post-op course was uneventful. Range of motion improved from pre-operative levels, but terminal 20 degrees of flexion was restricted. No recurrence noted $1^{1/2}$ years after surgery.

3. DISCUSSION

Although lipomas are the most common benign soft tissue tumor, intra-articular lipomas are extremely rare (Shuman & Anderson, 1977; Cohen & Canoso, 1989). A thorough review of written English literature that a total of 22 cases of intra-articular synovial lipoma have been reported out of which 19 have been reported in the knee joint (Pudlowski et al., 1979; Hill et al., 1993; Bernstein et al., 2001; Jaffe, 1958 Marui et al., 2002; Matsumoto et al., 2001; Lee et al., 2001; Kidwai et al., 2005; Poorteman et al., 2015; Yilmaz et al., 2005; Bennani et al., 2008; Tudisco et al., 2008: Min et al., 2010: Hsu & Wu, 2013; Yamaguchi et al., 2003; Yeomans et al., 2003; Kumar et al., 2013; Mostis et al., 2005; Ishida, 2021; Hirano et al., 2007) and includes the case being currently presented. The remaining 3 sites include the hip joint

(Margheritini et al., 1998), spine (Husson et al., 1987) and Tarsometatarsal joint (Pavithra et al., 2004). Within the knee joint the lipoma can arise from the fat pad area (Hill et al., 1993; Yamaguchi et al., 2003; Yeomans et al., 2003), Suprapatellar pouch (Hill et al., 1993; Matsumoto et al., 2001; Smillie, 1974; Yamaguchi et al., 2003; Mostis et al., 2005), medial meniscus (Yamaguchi et al., 2003; Yeomans et al., 2003; Mostis et al., 2005), lateral recess (Kumar et al., 2013; Mostis et al., 2005) or the retinaculum (Bernstein et al., 2001). In the current case the lipoma had stretched the lateral capsule of the knee joint and was presenting in the extraarticular fashion which has previously not been reported in literature. Proposed etiologies of the origin of the lipoma include fat ingrowth from intra-articular synovial membrane (Das Gupta, 1983). Another theory suggests sub synovial fat to be the site of origin (Hubscher et al., 1990).



Fig. 1. Axial, Sagittal and Coronal images of knee showing lobulated lesion arising from Hoffa's fat extending antero-laterally, lateral to patellar tendon and inferior to lateral retinaculum into subcutaneous plane, measuring 6.3x5.0x7.9cm

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Fig. 2. Pre-operative images of the knee showing a swelling over the antero-lateral aspect of the knee and marking for skin incision

Symptoms are dictated by the intra-articular location of the lipoma. Pudlowski et al., (1979) has attributed the symptoms of the IASL to 2 possible etiologies which includes possible interposition between the articular surfaces and secondly the strangulation of the lesion as it branches out from the stalk of the lesion. Strangulation as cause of pain was also reported by Kumar et al., (2013). Patients can present with pain with or without effusion (Hill et al., 1993). They might present with restricted range of motion (Marui et al., 2002; Yeomans et al., 2003). Locking has been reported in in previous

case reports (Hill et al., 1993; Kidwai et al., 2005; Smillie, 1974; Yamaguchi et al., 2003). There have been two previous case reports of swelling manifesting in an extra-articular fashion (Bernstein et al., 2001; Marui et al., 2002). Our patient presented with complaints of swelling, restricted flexion and a prominent extraarticular swelling. Similar findings have been reported by Kumar et al., (2013.

The differential diagnosis for an intra-articular lipoma is Hoffa disease (Hoffa, 1904) and lipoma arborescence (Hill et al., 1993; Bernstein et al.,

2001; Husson et al., 1987; Jaffe, 1958; Cohen & Canoso, 1989; Das Gupta, 1983; Hubscher et al., 1990; Hoffa, 1904; Rodrigues & Serfaty, 2022). Hoffa's disease or infrapatellar fat pad a condition predominantly svndrome is seen in women and is result of repetitive trauma resulting in enlargement of the fat pad impingement in the tibiofemoral and or patellofemoral joints. If the lesion becomes chronic and because of hemorrhage, fat necrosis and fibrosis this can mimic like a tumor (Hoffa, 1904).

Second differential is Lipoma arborescence which is a benign lesion of unknown etiology and is characterized by villous proliferation of the synovial membrane which is replaced by adipose tissue. It is difficult to distinguish the lipoma from Lipoma arborescence on clinical grounds however lipomas are usually small polyp-like lesions while a wider larger frond like mass is usually lipoma arborescence (Hill et al., 1993; Bernstein et al., 2001; Husson et al., 1987; Jaffe, 1958; Cohen & Canoso, 1989; Das Gupta, 1983; Hubscher et al., 1990; Hoffa, 1904; Rodrigues & Serfaty, 2022).

Prior to surgery MRI remains the diagnostic modality of choice for intra-articular lesions of knee including lipomas and lipomatous proliferation (Rodrigues & Serfaty, 2022). For the patient with symptomatic intra-articular moss complete resection either via arthroscopic surgery/open surgery provides symptomatic relief and the recurrence rate is low (Yilmaz et al., 2005).



Fig. 3. Intra-operative images showing the extent of the swelling arising from Hoffa's fat and the excised, well-encapsulated mass

4. CONCLUSION

Intra-articular lipomas are a rare and detailed clinical examination is key to management of this lesion. MRI is the gold standard radiological investigation for preoperative planning. Arthroscopic or Open excision is the treatment of choice with a low probability of recurrence.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative Al technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS DISCLAIMER

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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