CASE REPORT

Synovial osteochondroma originating from the synovium of the anterior cruciate ligament

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SUMMARY

Primary synovial osteochondromatosis is a rarely seen disorder of the synovium in any joints. Among reported cases of knee osteochondromatosis, those originating from the anterior cruciate ligament (ACL) are very rare. We report an unusual case of primary synovial osteochondromatosis. A 27-year-old woman complained of a restricted range of right-knee motion and pain when walking. With locking symptoms similar to those associated with a meniscus bucket handle tear. Although plain radiograph and MRI showed normal appearance, diagnostic arthroscopy revealed the curious appearance of a huge mass seated on ACL. In addition, the sign of proliferation of synovium and cartilaginous tissues were apparent. The ACL mass has been removed while preserving the ACL fibres. Histological examination confirmed a diagnosis of osteochondromatosis. To the best of our knowledge, this is the first report to describe synovial osteochondromatosis originating from ACL fibres and has been resected while preserving the ACL.

BACKGROUND

Synovial chondromatosis, also known as synovial osteochondromatosis or synovial chondrometaplasia, represents an idiopathic synovial proliferation.¹ Foci of cartilage are the characteristic feature of this rare condition. Primary synovial osteochondromatosis is an even more rarely encountered disorder of the synovium in any joint. This condition is most often seen in the knee and hip joints.²⁻³ Among reported cases of knee osteochondromatosis, those originating from the anterior cruciate ligament (ACL) are very rare, with, to our knowledge, only one case being reported to date.⁴⁻⁵ We report a case of primary synovial osteochondromatosis originating from the ACL, which was only diagnosed after histopathological analysis.⁶⁻⁷ It is most often reported in the larger joints of the body, including the knee, hip, elbow and the temporomandibular joints.⁸ The aetiology of primary synovial osteochondromatosis is unclear; however, some experts have investigated the possible role of fibroblast growth factor receptors 3 and 9 in its pathology.⁹

CASE PRESENTATION

A 27-year-old woman of Mediterranean descent was admitted after presenting with a 1 year history of right knee pain with associated swelling and a 'locking' sensation during motion of the knee. The locking symptoms were similar to those associated with a bucket handle meniscus tear. The symptoms progressively worsened during the 3 months prior to

her admission. The patient reported pain at rest that worsened with walking, thus consequently restricting her to short walk distances. Over time, she became unable to bear weight on her right leg. She denied any night pain, or experiencing giving way of her knee. The patient denied any history of trauma to the knee, systemic disease, weight loss or fever.

Her medical history was unremarkable and she took ibuprofen for pain relief.

On examination, the patient was found to have a normal alignment; however, the right knee was fixed in a flexed position. She ambulated on two axillary crutches. Wasting of the quadriceps muscles was apparent, and diffused tenderness was present. On examination, the knee was swollen and a synovial thickening was detected on palpation. There was restriction to her range of motion (ROM), with an extension of 75–80° and a flexion of 110°. Forceful extension of the knee was possible but induced severe pain. Although no gross ligamentous instability was present, the McMurray, Lachman, anterior drawer and posterior drawer tests were not performed because of severe pain. An examination of the hip revealed no abnormality.

INVESTIGATIONS

Subsequent arthrocentesis yielded 7 ml of clear yellow fluid that contained a mixture of numerous inflammatory and synovial cells. Serological tests did not reveal any abnormalities except for a high C reactive protein level (14 mg/l) and an erythrocyte sedimentation rate of 53 mm/h. A plain radiograph of the knee did not reveal any abnormality and no calcifications were found within the joint (figure 1). An MRI study was performed, but was suboptimal due to the flexed position of the knee. The MRI study revealed joint effusion with synovial enhancement and thickening, but no clear evidence of any soft tissue or definite ligament injury, or osseous mass lesions (figure 2). Although some ACL lesions were detected on the MRI scan, no definitive diagnosis could be made; therefore, arthroscopy was performed.

DIFFERENTIAL DIAGNOSIS

A 27-year-old woman of Mediterranean descent was admitted after presenting with a 1 year history of right knee pain with associated swelling and a 'locking' sensation during motion of the knee. The patient was found to have normal alignment; however, the right knee was fixed in a flexed position. Our differential diagnosis were meniscus bucket handle tear, para-articular chondroma/osteochondroma, focal pigmented villonodular synovitis,

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Figure 1 Lateral radiograph with the knee at 45° flexion on presentation, no sign of calcification.

synovial lipoma, trauma and surgery, synovial chondromatosis, synovial haemangioma and ganglia/cysts. Particular historical details and investigations separate these diagnoses. But the final diagnosis is reached by a diagnostic arthroscopy that is confirmed by histology examination (video 1).

Figure 2 Sagittal T2-weighted fast spin echo image (TR/TE=500/15) showing signs of joint effusion with synovial enhancement and thickening.

Video 1 Diagnostic arthroscopy of knee joint and removal of primary synovial osteochondromatosis originated from ACL.

TREATMENT

Standard anterolateral and anteromedial portals were made to access the joint. Arthroscopy revealed the curious appearance of a large, inelastic ossified body approximately 3 cm in size situated on the ACL; the rest of the synovium appeared to be inflamed. There were neither definite cartilage defects in the femorotibial or patellofemoral joints, nor were any meniscal tears present. The ACL mass was observed to have impinged on the femoral intercondylar notch during flexion and on the tibial intercondylar eminence during extension, which explained the knee locking (figure 3). The ACL mass was excised using scissors and a motorised shaver (figure 4). The excised ACL mass was examined histologically (haematoxylin-eosin stain) and revealed a thin fibrin layer surrounding disorganised chondrocytes. There was evidence of calcification and ossified matrix,

Figure 3 Arthroscopic view via the anterolateral portal showing the mass on the front of the anterior cruciate ligament. Note the blocking of the intercondylar area at flexion.

Figure 4 Intercondylar notch after removal of the synovial osteochondroma mass.

thus confirming the diagnosis of primary synovial osteochondromatosis (figure 5).

OUTCOME AND FOLLOW-UP

Postoperatively, a compression bandage was applied for 48 h, and the patient was given analgesics and intravenous cefazolin

Figure 5 Lower-power photomicrographs (original magnification $\times 20$), with haematoxylin-eosin stain showing the cartilaginous component and early bone trabecular formation.

for 48 h, with the knee placed on continuous passive motion with a range of 0–90°. She was placed in a knee immobiliser in extension and was allowed normal activity and weight bearing. The patient was seen 6-months postoperatively and found to be free from pain and had returned to normal activities. Clinically, no knee effusion or tenderness was apparent. She had regained full ROM and the ACL was found to be stable.

DISCUSSION

The present case illustrates a curious cause of a mechanical block to knee extension. A unique feature of this case was that the osteochondromatosis originated from the synovium of the ACL. The restricted ROM appeared to be due to a large synovial osteochondromatosis that was seated on the ACL and was caught in the intercondylar notch space. The presence of osteochondromatosis in the intercondylar notch caused loss of extension ROM due to mechanical blockage. Synovial osteochondromatosis is a rare but well-recognised condition and, to our knowledge, only five cases of synovial chondromatosis originating from the cruciate ligaments of the knee have been reported. Three reported cases originated from the posterior cruciate ligament^{5–7} while two cases originated from the ACL. A similar case of synovial osteochondromatosis on the ACL was reported and excised arthroscopically, but the ACL could not be preserved.¹⁰ The differential diagnosis of a cystic lesion arising from the ACL includes ganglion, meniscal cyst, parameniscal cyst, pigmented villonodular synovitis, synovial sarcoma, malignant fibrous histiocytomas, lipoma and synovial osteochondromatosis.¹¹ In primary synovial osteochondromatosis, there is more disorganised growth of cartilage cells and the increased numbers of chondrocytes are often crowded with an irregular spatial distribution.¹² These conditions may cause pain, swelling, tenderness and loss of joint function.^{5–7} In the present case, locking symptoms in the knee joint mimicked those of a bucket handle meniscus tear. Radiographs may show multiple loose bodies, but routine films are often normal and studies, such as arthrography, MRI or arthroscopy, may be required to establish the diagnosis.¹² According to the stage classification of synovial chondromatosis reported by Milgram¹³: phase 1 represents a stage with synovial lesions; phase 2 represents a stage with a combination of synovial lesions and free bodies; and phase 3 involves the presence of numerous free bodies, which are usually treated by removing the loose body or synovial mass, or completely excising the abnormal synovium. Many series report that complete synovectomy is only considered if active synovial proliferation is present.^{4 5 14} In the present case, a complete synovectomy was not performed, and an arthroscopic procedure was sufficient to remove and excise the synovial osteochondromatosis mass. This patient will undergo continued follow-up to monitor for recurrence.

Learning points

- ▶ Consider synovial osteochondromatosis as a cause of knee pain and locking.
- ▶ Arthroscopy is diagnostic and therapeutic as treatment of synovial osteochondromatosis.
- ▶ Synovial chondromatosis can present as acute presentation on top of chronic knee pain and locking.

Competing interests None.

Patient consent Obtained.

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