A case of intra-articular metaplasia

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A 55-year-old woman suffering from chronic back pain was referred to the physiotherapy department by her general practitioner. During the course of physiotherapy her knees were flexed by the physiotherapist and since then her left knee had been locked in 30 degrees of flexion. She gave a history of having problems with her left knee for a number of years in the way of intermittent locking, swelling and increasing pain. She had no other relevant medical history and on examination, she was unable to weight bear and her knee was locked in 30 degrees of flexion with further flexion possible to 110 degrees. There was a grade 2 effusion and easily palpable nodules. Examination of her other joints were normal. Her knee X-ray is shown in the figure.

Questions
1. What does the X-ray show?
2. What is the differential diagnosis?
3. What is the aetiology of this condition?

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Figure  Knee X-ray (lateral view)
Answers

QUESTION 1
There are multiple round loose bodies within the knee joint. The loose bodies are well demarcated and have a calcified periphery with a radiolucent centre and are of similar size.

QUESTION 2
The most likely diagnosis in this case from the history, X-ray appearances and the number of loose bodies is synovial chondromatosis (osteochondromatosis) from cartilage metaplasia in the synovium. The knee is the joint most commonly affected by the formation of loose bodies, which may also be produced by:
- injury: producing a cartilaginous or osteocartilaginous fragment (usually there is a clear history of the joint trauma)
- osteochondritis dissecans: may produce one or two loose bodies (these are formed by the spontaneous separation of an avascular fragment of bone and cartilage from the articular surface, usually of the femoral condyle, leaving a shallow defect; seen most frequently in adolescents)
- osteoarthritis: from detached pieces of cartilage or osteophyte (most common cause in adults)
- Charcot’s disease: this destructive arthropathy may produce large osteocartilaginous loose bodies.

QUESTION 3
Synovial chondromatosis is an uncommon disease of the synovial membrane. It is a benign self-limited condition of unknown aetiology characterised by synovial proliferation and the occurrence of multiple foci of cartilaginous metaplasia within the intimal layer of the synovial tissue. These multiple hyaline cartilage nodules may calcify and detach from the synovium where they float in the synovial fluid from which they derive their nourishment and enlarge, resulting in multiple (dozens or even hundreds) loose bodies within the affected joint or its communicating bursae.

Discussion
Regardless of the cause, the presence of the loose body within the joint leads to repeated trauma to the articular surfaces and will predispose to osteoarthritis or will aggravate any existing disease.

Synovial chondromatosis is usually mono-articular and can affect any joint or its communicating bursae, most commonly the knee joint (50% of cases) and less commonly smaller joints such as the metacarpophalangeal or the temporomandibular. Extra-articular sites such as tendon sheaths may also be involved. Typically, it affects men (male:female, 3:1) in the third to fifth decades of life, but has been reported in children.

The disease can be classified as primary (no pre-existing joint disease) or secondary (underlying degenerative joint disease where cartilaginous or osteocartilaginous fragments become detached and embedded within the synovium). The patient usually has a history of progressive pain, intermittent swelling and recurrent locking. The loose bodies may be palpable on examination.

Three phases of the disease process have been described and the calcified nodules are usually seen on plain X-ray but may not be visible in the early stages of the disease, where the only abnormality may be an apparent effusion. In such cases a CT scan is valuable as it is more sensitive to calcification; an arthrogram will detect the nodules as filling defects. However, in this condition, the bodies are not always loose. Indeed many loose bodies reported by radiologists are in fact adherent to the synovium and are therefore less likely to cause symptoms of locking. Hence, incorrect radiological reporting can cause patients to be subjected to unnecessary arthroscopy.

The commonest complication of synovial chondromatosis is secondary arthritis. Malignant transformation to a chondrosarcoma is rare (1% of cases), but it has a recurrence rate of 5%. The treatment is to remove the loose bodies from the affected joint and to perform a synovectomy. This was performed arthroscopically in this patient who was able to go home the next day and was symptom free when seen for review 6 weeks later.

Final diagnosis
Primary synovial chondromatosis.

Keywords: knee joint; loose bodies; synovial chondromatosis

Learning points
- loose bodies most commonly affect the knee joint
- symptoms are those of instability, ie, recurrent locking and giving way
- synovial chondromatosis is a rare benign disease of the synovium
- treatment is principally surgical by open or arthroscopic removal of the loose bodies and synovectomy

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