Radiology for the surgeon: musculoskeletal case 30

Presentation

A 45-year-old man complained of left knee pain and swelling over a period of 2 years. The pain aggravated by exercise or prolonged activity. He also complained of occasional locking and limitation of movement, particularly extension. There was no definite history of trauma to this area, and tenderness could be localized to the medial aspect of the joint line. Anteroposterior (Fig. 1) and lateral (Fig. 2) radiographs of the knee were obtained in the initial assessment of this man's complaint. On the basis of these findings a magnetic resonance arthrogram was obtained for further evaluation (Fig. 3).

What is your diagnosis?

FIG. 1.

FIG. 2.

FIG. 3.

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Diagnosis

Osteochondritis dissecans of the medial femoral condyle

In this case, anteroposterior (Fig. 1) and lateral (Fig. 2) radiographs of the left knee showed an osteochondral defect on the lateral aspect of the medial femoral condyle and a bony fragment within the knee joint. These features are characteristic of osteochondritis dissecans. The arthrogram confirmed a defect of both subchondral bone and cartilage on the lateral aspect of the medial femoral condyle (Fig. 3 and Fig. 4 [arrow]) and showed 2 loose intra-articular bony fragments (Fig. 5 [arrow]).

Osteochondritis dissecans refers to the acquired fragmentation and possible separation of the articular cartilage and a segment of subchondral bone from the remaining articular surface.[1,2] The etiology relates to a subchondral fatigue fracture usually as a result of shearing, rotatory or tangentially aligned impaction forces.[2] This may relate to a single episode or multiple repetitive episodes of trauma.

Osteochondritis dissecans occurs most commonly in adolescent boys, although in our case the patient was older.[1,2] The lateral aspect of the medial femoral condyle close to the fossa intercondylaris is the commonest location, as in this case.[2] In up to 10% of cases, the lateral femoral condyle is involved, in which case the lesion tends to be larger, more fragile and often takes up the entire width of the condyle. Bilateral knee lesions are seen in 5%.[3] Other common locations include the talus, capitellum of the elbow and humeral head.[1,2] Symptoms range from none or vague complaints to clicking, locking and limitation of motion.[2] Swelling and pain may be aggravated by movement.[2] Bony fragments may be partially attached, so they are unstable and prone to displacement or they may be firmly attached with fibrous tissue. A grading system is sometimes used (Fig. 6), ranging from subchondral contusion with intact cartilage (grade 1) to frank separation of an unstable osteochondral fragment (grade 4). The diagnosis may only be established in the late stage when loosening or complete separation of the fragment has occurred.[3]

Radiologically, an irregularly outlined subchondral radiolucency is seen in the early stage, with or without a joint effusion.[2,3] A radiolucent crescentic zone separates the lesion from the slightly sclerotic base of the bony defect as the disease progresses.[3] With time, the base of the defect becomes more sclerotic and separate fragments within the defect may be seen, as in this case.[3] However, a purely cartilaginous fragment may be unrecognized on a plain film.[2] Computed tomography can delineate the lesion very well but cannot assess the healing potential.[3]

An exact assessment of cartilaginous and subchondral bony changes is mandatory for planning adequate treatment.[4] Stability, however, cannot be determined from plain radiographs or clinical examination. Magnetic resonance imaging (MRI) has been advocated as an accurate way of assessing this and characterizing osteochondral lesions, and it correlates well with arthroscopic findings.[5,6] MRI can detect occult injuries of subchondral bone and cartilage that may not be seen on routine radiographs. A high signal line behind a fragment on the T_2-weighted image is said to indicate the presence of synovial fluid and be a sign of an unstable lesion, especially if accompanied by a breach in the cartilage on the T_1-weighted image.[5] MRI can directly visualize loosening and fragment displacement. Magnetic resonance arthrography, employing the intra-articular injection of gadolinium, can be advantageous in delineating the chondral surface and detecting intra-articular bodies. It can also differentiate between partial and

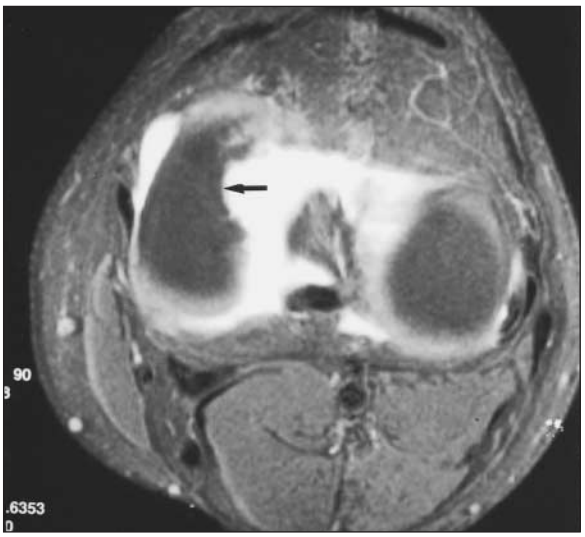

FIG. 4.

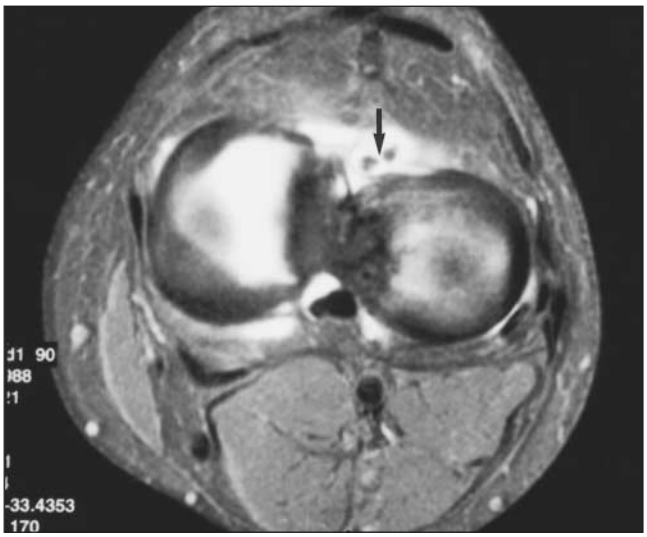

FIG. 5.

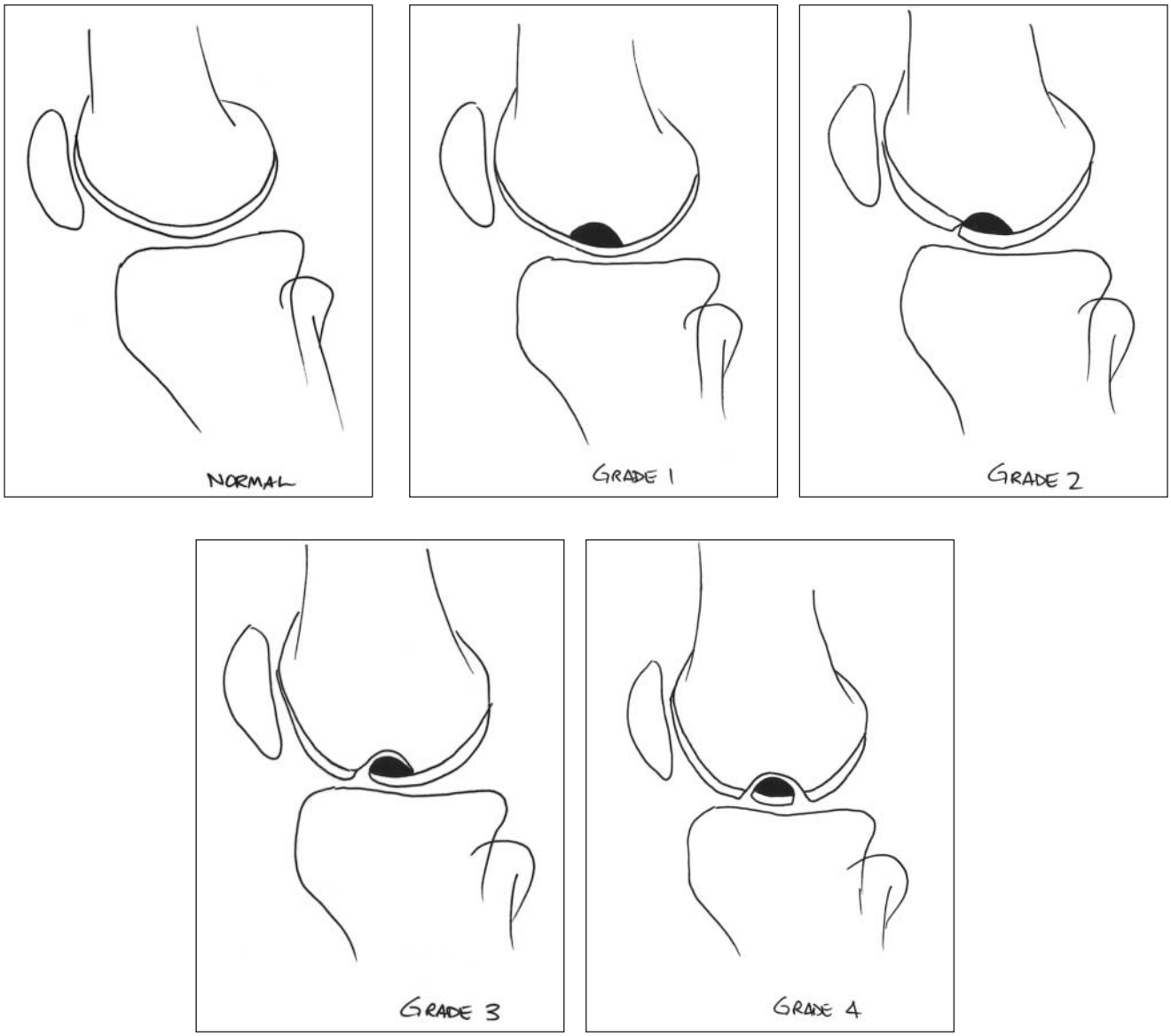

FIG. 6.

complete separation of cartilaginous or osteocartilaginous fragmentations.[4]

Treatment is typically nonoperative for stable lesions and operative for unstable lesions.[1] Unstable lesions can be treated arthroscopically by drilling, which affects bone repair, with subsequent healing. If the central bone fragments are of sufficient size they may be internally fixed with bone pegs or Herbert screws.[3]

Most patients have no long-term sequelae. However, the outcome depends on a number of factors, including the location and size of the lesion, patient age and treatment.[1] A good clinical outcome is likely when the femoral growth plate is open, when the lesion is small and is stable on MRI. When a cartilage fracture or articular defect is found on MRI, the patient is likely to have a poor outcome.

References

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