

RADIOLOGICAL CONFERENCE

Clinical History:

A 14-year-old boy complained of pain over the tibial prominence of his right knee. He recalled that the onset of symptom started 6 months previously. A knee radiograph (**Figure 1**) was performed.

Figure 1: Lateral radiograph of the right knee



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What is the diagnosis?

- a) Cartilage-capped exostosis
- b) Osteochondritis dissecans
- c) Sinding-Larsen's disease
- d) Chondroblastoma
- e) Osgood-Schlatter's disease

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Answer:

- e) Osgood-Schlatter's disease

Radiological findings

Lateral radiograph of the right knee (**Figure 2**) shows that the tibial tuberosity is irregular and fragmented. The distal portion of the apophyseal plate is abnormally wide. A localised soft-tissue prominence with thickening of patellar tendon is seen, corresponding to a palpable focal tender area. These features are typical of Osgood-Schlatter's disease.

Figure 2: Same radiograph as Figure 1 with addition of arrows. Irregularity and fragmentation is seen in the tibial tuberosity. Abnormal widening is present in the distal apophyseal plate. Soft tissue swelling is detected anterior to the fragmented tibial tuberosity (arrows)



disease typically affects children and adolescents 10 to 15 years of age, and is more common in boys. The injury is attributed to sudden, traumatic episodes involving violent muscular spasm. The bony prominences at the growing apophyses of the lower limbs in the immature skeleton are particularly susceptible to avulsive injury. The growth plates are weaker than the ligamentous insertions and are hence more liable to separate from the parent bone. The most commonly affected apophysis is that of the tibial tuberosity which is the site of attachment of the patellar tendon. Clinically, acute avulsions are immediately painful at time of injury, followed by localised pain and tenderness.

Radiographically, the apophysis of the tibial tuberosity becomes frayed and irregular. Separation is often present. Anterior and proximal displacement of small dense fragments of bone may be seen. Widening of the apophyseal growth plate may also occur, with swelling of the overlying soft tissues. Complete avulsion of the patellar tendon has been reported as a complication of Osgood-Schlatter's disease. Minor injury may be difficult to detect and may be more evident when comparison is made with the unaffected side. It must be emphasized that radiographic findings should be correlated with the patient's clinical features for an accurate diagnosis.

Cartilage-capped exostosis

Cartilage-capped exostosis is a common benign tumour of bone which is usually detected in childhood or early adult life by recognition of a palpable hard bony protuberance. The tumours have a predilection for the metaphyseal portions of long bones. They are observed most frequently adjoining the knees and the proximal humerus. If several lesions are present in the same individual, the label of diaphyseal aclasia or multiple exostosis is given. Clinically, the majority of these tumours are asymptomatic. Larger lesions may cause cosmetic defects and provoke symptoms by pressure on adjacent muscles and neurovascular structures, resulting in pain and paraesthesia. Rare complications of this condition include fracture and sarcomatous transformation.

Discussion

Osgood-Schlatter's disease

Osgood-Schlatter's disease occurs as a result of chronic avulsion injury of the tibial tuberosity. This

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Radiographically, a cartilage-capped exostosis is seen as a bony excrescence projecting from its parent bone into the adjacent soft tissues. The tumours are usually pedunculated, being long and slender. They tend to grow towards the middle of the shaft from the metaphysis. Although the cartilage cap is radiologically invisible in young individuals, it may calcify and ultimately be replaced partially by bone. Absence of the above-mentioned features excludes the diagnosis of exostosis in our patient.

Osteochondritis dissecans

Osteochondritis dissecans are a form of avascular necrosis. It is often attributed to chronic trauma, although many believe that it is idiopathic. It occurs mainly in adolescents and young adults, often male athletes. The joints of the lower limbs are especially vulnerable. In the knee, the medial femoral condyle is affected most commonly, followed by the lateral femoral condyle. The dome of the talus is another frequently-affected site. The whole bony fragment may separate into the joint as a loose body, becoming a so-called "joint mouse". Clinically, patients may have vague complaints. Symptoms attributed to loose bodies such as clicking, locking, and limitation of motion may occur.

Radiographically, an intra-articular fragment of bone may lie in the intercondylar notch of the femur and is related closely to an irregular defect in the medial or lateral femoral condyle. The margins of the fragment is usually smooth. Special radiographic projections, such as the tunnel view, may be helpful in better showing the bone fragment. As none of these radiographical features are present in our case, this diagnosis can be excluded.

Sinding-Larsen's disease

Sinding-Larsen's disease is similar to Osgood-Schlatter's disease except that it involves a different anatomical site, i.e. the lower pole of patella. As the

patellar tendon also inserts at the distal pole of patella, persistent traction at the cartilaginous junction of the inferior pole may give rise to an avulsion injury. The disease usually occurs in the pre-teen or teenage years with a greater incidence in boys. An increase in incidence is also seen in children with cerebral palsy and other spastic disorders of the lower limb. Radiographically, fragmentation of the inferior pole of the patella is seen, often associated with soft tissue swelling. Recurrent dislocation of the patellofemoral joint is a known association. This diagnosis can be excluded as the inferior pole of patella is normal in our patient.

Chondroblastoma

Chondroblastoma is a benign cartilaginous tumour which occurs most commonly in the epiphyses or apophyses of long bones, and is directly related to the growth plate. The proximal ends of the femur, tibia and humerus are affected most commonly. It has a peak incidence in the 2nd decade, and occurs more frequently in males. Clinically, patients complain of mild joint pain, tenderness and swelling. Radiographically, the lesion is seen as a well-demarcated, spherical or oval radiolucency in the epiphysis or apophysis. It often has a sclerotic margin, and ranges in size from 1 cm to 8 cm. Generally, it tends to be relatively small and clearly defined with a narrow zone of transition. The adjacent metaphysis is involved when aggressive lesions cross the growth plate. None of the above radiological features are present in our patient. ■

References

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