CASE REPORT

Sleeve Fracture of the Patella in a Child

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Summary

Sleeve fracture of the inferior pole of the patella is a rare and distinctive fracture in children with few published reports. These fractures are frequently misdiagnosed and neglected. We highlight a case of a neglected and misdiagnosed sleeve fracture of the patella in an eleven-year-old boy. This was initially diagnosed as an avulsion fracture of the tibial tubercle. A good outcome was achieved after open reduction and internal fixation.

Case Report

An eleven-year-old boy presented with a history of a fall while playing football and landed on his knee. He was brought to a nearby hospital and treated as a right knee haemarthrosis before being seen in our hospital six weeks later.

Local examination showed on examination the right knee was found to be held in extension with only 10 degrees of passive flexion possible. There was atrophy of the quadriceps muscle with a large gap palpable at the lower end of the patella. Radiographs showed patella positioned proximally with a large patch of ossification at the inferior pole of the patella. This appeared as an avulsion fracture of the tibial tuberosity. (Figure 1)

At surgery, it was noted that a large portion of the cartilage of the lower pole of the patella together with a small fragment of bone were avulsed. The gap was filled with fibrous and ossified tissue. After debridement, the avulsed fragment was reduced and fixed with a tension band and circumferential wire. As the avulsed fragment was small, fixation was inadequate; a cylinder cast was applied with the knee in full extension. Static quadriceps and straight leg raising exercises were gradually introduced. Five weeks later the cast was removed and active knee flexion was started. (Figure 2)

Eight weeks post-surgery, he had regained full range of motion of his knee and had good quadriceps power. He was able to walk normally at four months. The implants were removed after ten months when healing had been achieved.

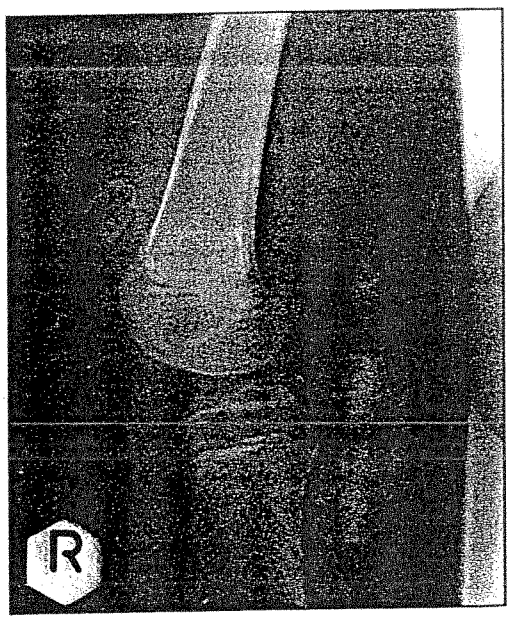

Fig. 1

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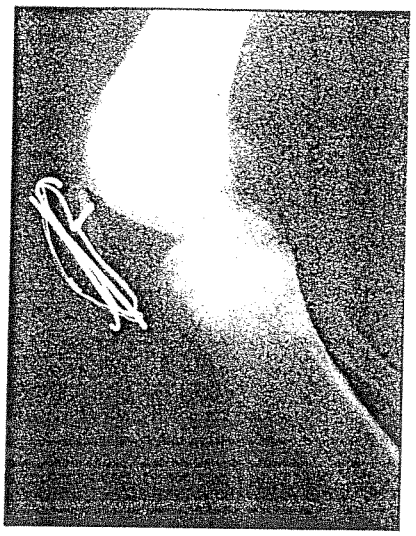

Fig. 2

Discussion

Sleeve fracture of the patella is defined as an extensive sleeve of cartilage that is pulled off the main body of the bony patella, together with a bony fragment from the distal pole. This is an uncommon type of fracture in children. Because of its rarity, sleeve fracture of the patella has received little attention and very few reports have been found in the literature [1,2].

Sleeve fractures are classified as superior, inferior, medial or lateral. A sleeve fracture of the inferior pole of the patella results from an indirect injury: powerful contraction of the quadriceps muscle while the knee is flexed.

Houghton and Ackroyd [2] described the relationship between high jumping and lower pole sleeve fractures with the same mechanism of injury. This uncommon fracture usually occurs in children who participate in sports activities that require forceful extension of the knee; with the quadriceps contracting against resistance.

The diagnosis of an avulsion or a sleeve fracture of the patella is suggested by a history of sudden pain and giving-way of the knee and difficulty in bearing weight on the extremity. The knee is usually swollen and tender and there is haemarthrosis. Active extension of the knee may be difficult or impossible, especially against resistance. The patella may be displaced proximally and a gap in the extensor mechanism may be palpable [2,3].

The diagnosis may be missed or delayed because of the painful swelling and tense haemarthrosis, masking the gap in the extensor mechanism. The fragment of avulsed bone is also often too small to be detected radiologically in the younger child.

The avulsed patellar fragment always includes an important "sleeve" of cartilage and this must be accurately reduced in order to re-establish the articular surface of the patella. Accurate reduction, along with rigid internal fixation and repair of the extensor apparatus, is the key to regaining a properly functioning knee. Conservative management, along with splinting the knee in full extension, could lead to restoration of the extensor mechanism, but may also result in irregularity of the patellar articular surface and a limited range of motion. In our patient, active movement was encouraged immediately after removing the cast and full range of movement of the knee was restored after two months.

Acknowledgements

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