Osteochondral Fracture of the Knee in an Open Patellar Fracture : A case report of a piece of jean cotton found in the crater of the defect

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ABSTRACT

A patient with an open knee wound which was treated by debridement and internal fixation for the patellar fracture. Pain and swelling persisted even after the hardware were removed. Following removal of a piece of jean cotton which was found in the crater of the lateral femoral condyle, the symptoms and signs were unevenfully subsided.

Osteochondral and pure chondral fracture of the knee are often unrecoginsed rather than uncommon[1-3]. The mechanism of the injury may be caused by impaction, avulsion, shearing or twisting from a direct or indirect violencesto the knee and is also more commonly seen in athlete[4]. The lateral femoral condyle and medial surface of the patella are the most common sites[2]. Meniscal tears, patellar fracture and acute dislocation of the patella have been reported to be associated with this injury[3,4,7]. Delayed in diagnosis and treatment may lead to the chronic functional disability. The current paper reports the case of an osteochondral defect of the lateral femoral condyle following an open fracture of the patella, a piece of jean cotton was found in the osteochodral lesion. A computer search of the English language literature failed to reveal any such report.

CASE REPORT

A twenty-two year old man was seen with pain and swelling of his left knee for 6 months. Six months before admission he sustained an open vertical patellar fracture which was treated by debridement and fixed with one screw and one Kirschner wire at one provincial hospital (fig. 1,2). Pain, swelling and tenderness over the knee became progressively severe that he could not walk with-

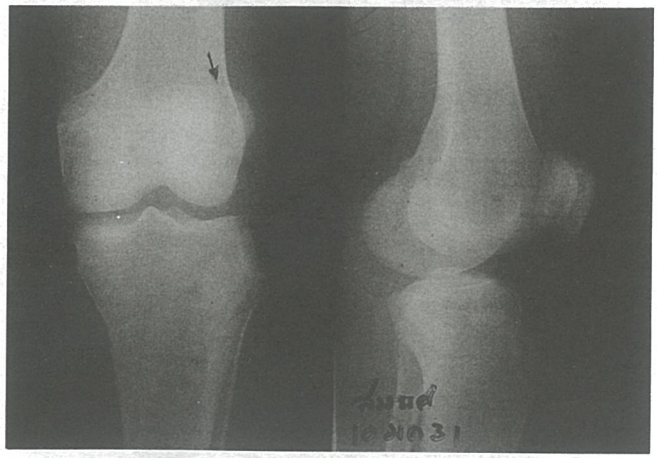


Fig. 1 Anteroposterior roentgenogram of the left knee shows vertical fracture of the lateral pole of patella. (arrow)

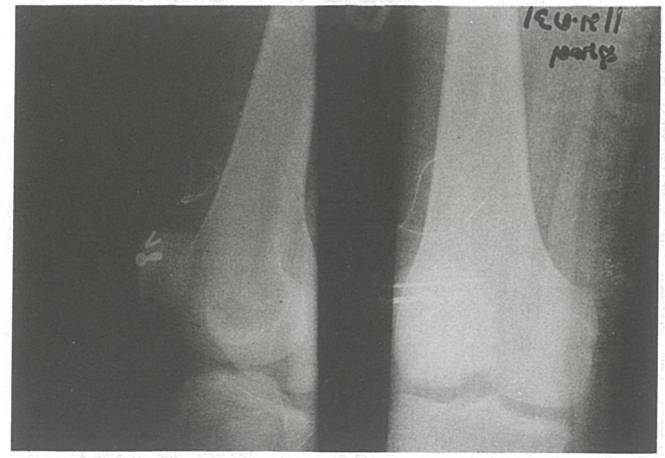


Fig. 2 Anteroposterior and lateral radiographs showing the left patella after internal fixation with one Kirschner wire and one small cancellous screw.

out crutches. Three months after the operation, screw and Kirschner wire were removed but the symptoms and signs did not improved. Physical examination revealed a afebrile healthy appearing man with a swollen knee. Generalized pain and tenderness were observed over the knee. The range of motion of the left knee from 10 to 30 degree. The left lower extremity demonstrated marked atrophy of the quadriceps and the calf. Roentgenograms of the left knee showed a 1.5 cm (in diameter) osteochondral defect with faint soft tissue calcification in the lateral femoral condyle (Fig. 3). The initial hemogram revealed a white cell count of 8200 per cubic millimeter with normal differential, a hematocrit of 33 percents, a hemoglobin of 11.3 gm. percent and a sedimentation rate of 63 mm per hour. The blood chemistry was within normal limit. Radioisotope bone scan showed increased uptake at the distal end of femur and proximal end of tibia (Fig. 4). The knee was explored through medial parapatellar incision. The synovialtissue appeared thickened and swollen, no pus was found in the knee joint. The synovium and bone from the condyle were taken for tissue biopy and culture which was negative. The histological examination revealed chronic inflammation with marked fibrosis and necrosis of bony spicules. Two weeks after the operation, the patient did not feel better so the second exploration was scheduled. This time the knee joint was approached through lateral incision over the osteochondral defect. One piece of jean cotton (1 cm in diameter) was found deeply in the large defect of lateral femoral condyle (Fig. 5). The foregin body was removed and the defect was currette out of granulating tissue. Wound was ringed and closed in layers. The patient can recall the piece of jean cotton was the same material with the jean trousser he wore the day the accident occurred (Fig. 6). Postoperatively, the surgical wound healed uneventfully, by the third month he had a full range of motion Rehabilitation had progressed so that he could walk without any aid. The patient refused any further knee reconstruction of the osteochondral defect.

At the time of writing, the patient was asymptomatic, the range of motion of the left knee was excellent. He can walk normally with occasional discomfort over the left knee.

DISCUSSION

Early symptoms of chondral and osteochondral fracture are often obscure, immediate disability is slight but the lesion can be worsed leading to a significant chronic disability. Most of an osteochondral fracture of the knee in association with patellar fracture or dislocation are closed injuries[6,7]. This is the first report of an open wound in which a pieceof jean cotton was found in the crater of the osteochondral lesion. The symptoms and signs of the patient's knee were so severe because of the retained piece of jean which was the result of inadequate debridement and inappropriate exploration of the knee joint. In open wound only 40-70 percent can be expected to have some type of bacterial contamination with just 16 percent contaminated with pathologic bacteria[8,11] Since implantation of a foreign body can lower resistance to infection but only local reactions of the synovium and articular cartilage are observed in this patients. Destruction of the articular cartilage can occur and progress under abnormal stress of the foreign body in the knee. The initial roentgenograms failed to demonstrate any chondralor osteochondral fracture but this condition can not be ruled out as the defect in the lateral femoral condyle could not always be seen but became more obvious with the passage of time. Because of

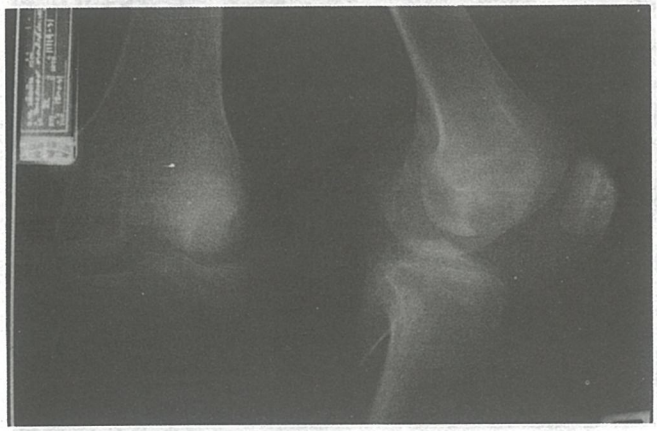


Fig. 3 Following removal of internal fixation, anteroposterior and lateral radiographs of the left knee show an osteochondral defect at the lateral femoral condyle. (arrow)

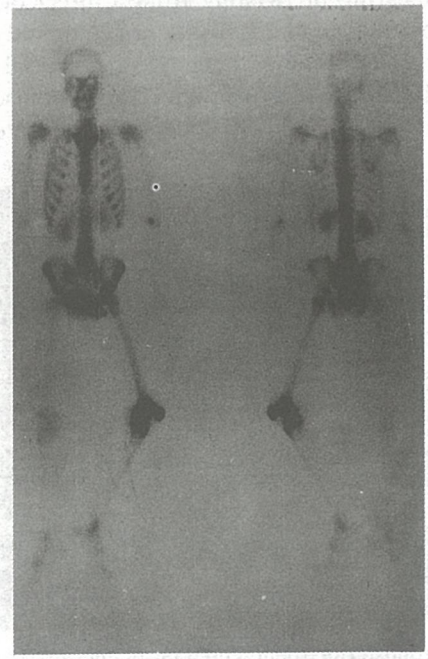


Fig. 4 Bone scan demonstrates increase vascularity of the left knee.

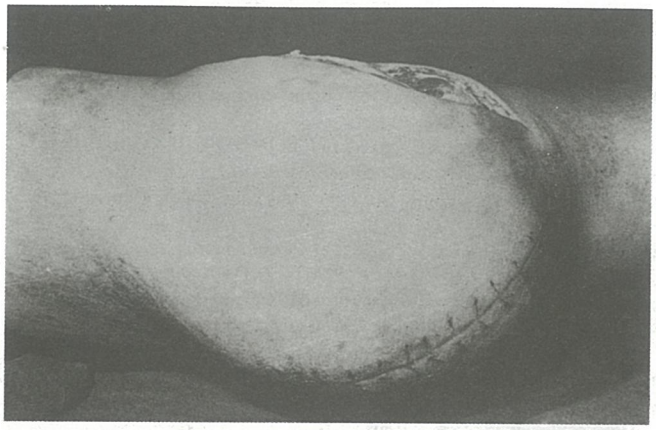
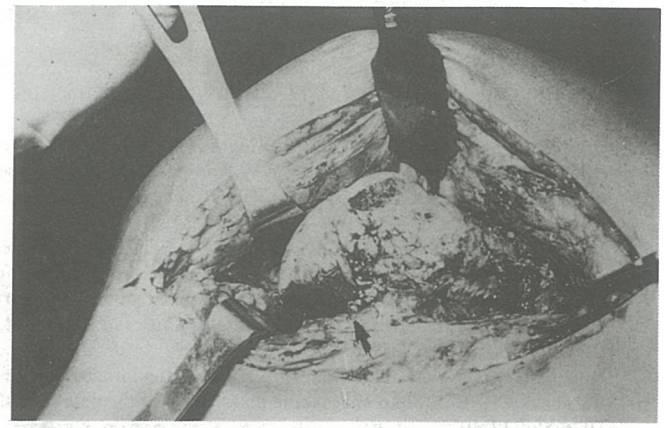
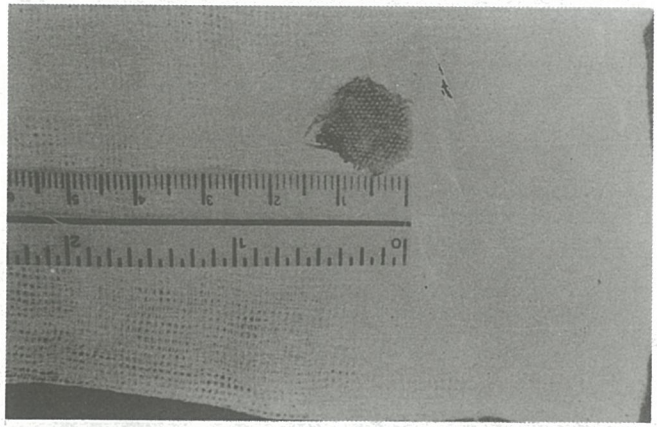


Fig.5-A At the time of lateral approach, the left knee looks like a balloon.



5-B Through lateral approach, an osteochondral defect is visible in the left lateral femoral condyle.(arrow)



5-C Photograph demonstrates a piece of jean cotton (1 cm. in diameter)

Fig.6 Photograph showing the same material for the foreign body and the jean trousser.

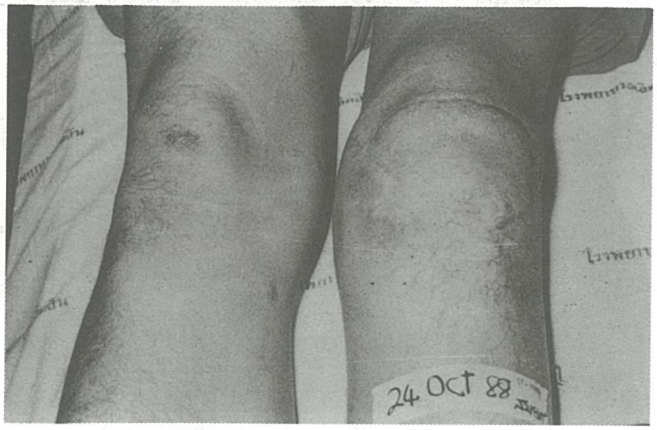


Fig.7 Clinical appearance two weeks following removal of the foreign body, the left knee appears nearly normal and the surgical wound heals uneventfully.

the marked swelling of the knee persisted even after all implante were removed, the knee joint was explored medially. The thickening of the synovial membrane and the wrong approach were the causes of negative exploration. According to Noyes'grading system[9], the osteochondral lesion was classified as Grade 3B (cavitation or erosion of the exposed bone), 15 mm in diameter, and was located in the middle third of lateral femoral condyle.The deep defects that were less than 3 mm in diameter showed complete repair while none that were 9 mm in diameter or larger showed complete healing[10]. The ultimate repair tissue closely resembles a hyaline cartilage but may not be normal and may under go localized deganeration over time. It is important that the orthopaedic surgeon should be fully aware of an osteochondral fracture in any traumatic injuries of the knee especially in the presence of hemarthrosis or associated injuries. Radiographs should be examined meticulously. Thorough exploration of the knee joint in open wound is recommended. More recently, magnetic resonane imaging (MRI) has been shown to be an effective way for the detection of traumatic knee pathology[5,6].

References

1. Benson D R, Riggins RS; Lawrence RM et al. Treatment of open fractures:A prospective study. J Trauma 1983;23:25-30.
2. GilleyJS, Gelman MI, Edson M, Metcalf RW. Chondral fractures of the knee. Arthrographic, arthroscopic and clinical manifestations. Diagn Radiol 1981;138:51-4.
3. Grewe SR, Stephens BO, Perlino C, Riggins RS. Influence of internal fixation on wound infections. J Trauma 1987;27:1051-53.
4. Hopkinson WJ, Mjtchell WA, Curl WW. Chondral fractures of the knee, cause for confusion. Am J Sports Med 1987;13:309-12.
5. Mah ET, Langlois, SL, Lott CW, Lee WK, Brown G. Detection of articular defects using magnetic resonance imaging : an experimental study. Aust. N.Z. J. Surg 1990;65:977-81.
6. Mandelbaum BR, Finerman GA, Reicher MA, Hartzman S, Bassett LW, Rauschning W, Dorey F. Magnetic resonance imaging as a tool for evaluation of traumatic knee injuries. Anatomical and pathoanatomica correlations. Am J sports Med 1986;14:361-70.
7. Mankin HJ. Current concept review. The response of articular cartilage to mechanical injury. J Bone Joint Surg (Am) 1982;64:460-66.
8. Matthewson MH, Dandy DJ. Osteochondral fractures of the lateral femoral condyle. A result of indirect violence of the knee. J Bone Joint Surg (Br) 1978;60:199-202.
9. Noyes FR, Stabler CL. A system for grading articular cartilage lesions at arthroscopy. Am J Sports Med 1989;17:505-13.
10. Rorabeck CH, Bobechko WP. Acute dislocation of the patella with osteochondral fracture. A review of eighteen case. J Bone Joint Surg (Br) 1976;58:237-40.
11. Terry GC, Flandry F, Van Manen JW, Norwood LA. Isolated chondral fractures of the knee. Clin Orthop 1988;234:170-77.