

Management of Pathological Fracture Neck of the Femur Following Recent Osteomyelitis in a Child

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ABSTRACT

Fracture neck of the femur is rare in children and occurs following severe trauma⁽¹⁻⁵⁾. Several recommendations have been made for the treatment of displaced transcervical fracture type II (Delbet classification)^(1,2,5-8). However there are no recommendations when such a fracture occurs after recent acute osteomyelitis of the neck of the femur. The management of a case is described with the outcome after 36 months.

Keywords: child, fracture neck of femur, post-osteomyelitis

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CASE REPORT

A boy aged 11 years was admitted with pain in the right hip after he stood on the right leg and tried to scare a cat away with the left leg. Two months earlier he had an anterior arthrotomy of the right hip for acute septic arthritis. Frank pus was drained. The involvement of the femoral neck was shown by roughening and minor erosions on its anterior surface at surgery. The cortex of the femoral neck was neither drilled nor a window was made on the neck during the arthrotomy. The blood as well as the pus culture grew staphylococci sensitive to cloxacillin. Antibiotics were given for eight weeks. The arthrotomy wound healed primarily. At one month, there was no pain or tenderness and the hip joint had a good range of movements. Radiographs showed osteomyelitis of the femoral neck but there was no distal involvement of the femur. The patient was discharged and advised to continue with non-weight bearing crutch walking. He regularly attended the follow-up clinic.

At the latest admission, the patient was afebrile, the right leg appeared short and movements at the hip were extremely painful. Radiographs of the right hip showed a displaced transcervical fracture of the neck of the femur, type II (Delbet)^(1,2,5,8) (Fig. 1). The white cell count was not raised, ESR was 70 mm/hr and the blood culture was negative.



Fig. 1 Radiograph at the time of second admission showing a displaced trans-cervical fracture of the neck of the right femur. Two months earlier, the patient had septic arthritis of the right hip with osteomyelitis of the femoral neck.

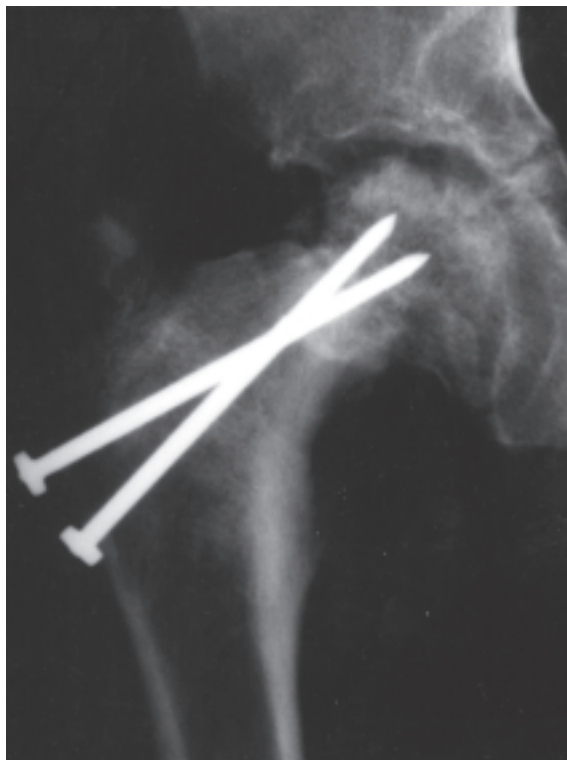


Fig. 2 Radiograph at six months after internal fixation of the fracture. The Austin-Moore's pins had crossed the epiphyseal line at the time of the operation. The fracture line is still visible but the Moore's pins are still holding the fracture. The avascular necrosis involves the entire femoral head.

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Fig. 3 Radiograph at 22 months shows that the fracture has united. The femoral head has re-formed with some deformity. The greater trochanteric epiphysis as well as the capital femoral epiphysis are still open on both sides. There is coxa vara on the right side as compared with the left.

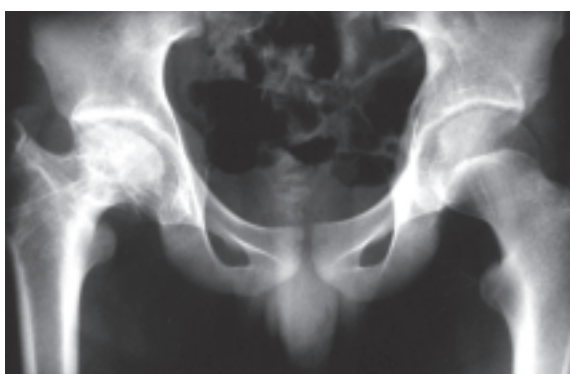


Fig. 4 Radiograph at 36 months shows that the femoral head has revascularised with minor irregularity.



Fig. 5 Clinical photograph showing comparable range of flexion of the hips at 12 months following removal of the Moore's pins.

A week later, under the cover of intravenous cloxacillin the fracture was reduced gently closed and fixed with two Austin Moore's pins. Post-operatively the leg was rested on a pillow with a 1 kg skin traction. Oral Cloxacillin was continued for a further six weeks. The operation wound healed primarily and there was no flare-up of the infection in the hip. At eight weeks he was discharged and advised to continue non-weight bearing crutch walking.

At three months the hip had regained nearly all the movements except rotation, which was still limited. Plain radiographs of the hip showed avascular necrosis of the femoral head. He was advised to persist with non-weight bearing crutch walking. By six months, the hip had regained 20° of internal and 40° of external rotation. There was neither pain nor spasm. Plain radiographs showed avascular changes involving the whole femoral head and the fracture line was still visible (Fig. 2). He was advised to continue with non-weight bearing crutch walking. At 10 months, all the movements including rotation were full and pain free. Radiographs showed that the fracture had healed. The femoral head was re-forming. However it had an irregular shape. The patient was advised to continue non-weight bearing crutch walking. At 22 months, the radiographs showed some coxa vara and minor deformity of the femoral head (Fig. 3). The Austin-Moore's pins were removed at 24 months. At the last follow-up, at 36 months, radiographs showed that there was coxa vara but a completely formed femoral head (Fig. 4). Both hips had comparable range of motion (Fig. 5) and there was no pain on full weight bearing.

DISCUSSION

Management of a pathological fracture of the neck of the femur following a recent acute osteomyelitis has not been previously described. Apart from the risk of the usual complications of avascular necrosis of the femoral head, premature closure of the capital epiphysis, coxa vara and non-union, this patient had the added risk of flare-up of the infection in the hip.

The choice of treatment by closed reduction and hip spica⁽⁶⁾ would have avoided surgery and the possible risk of flare-up of infection, but the probability of non-union would be high especially in a displaced Type II (Delbet) pathological fracture⁽³⁻⁵⁾. After making sure that there were no signs of active infection, under the cover of antibiotics, closed reduction of the fracture and internal fixation with two Moore's pins was done.

The internal fixation was not supplemented by hip spica cast as recommended by some authors^(1,4,9), for it was important to closely monitor the hip region for any signs of infection. Fortunately, there was no recurrence of infection and the fracture went on to unite.

In the event of recurrence of infection, antibiotics would be administered as indicated by blood and hip aspirate culture. The hip would be drained and the stability of the fracture determined. The Moore's pins should be retained if the fracture fixation is stable. After thorough irrigation the wound is closed and the limb placed in skin traction. Fracture healing may be achieved with hip spica immobilisation or a subtrochanteric osteotomy⁽⁷⁾.

Canale et al⁽³⁾ reported a case of non-union of a femoral neck fracture following infection in a nine-year-old child who was treated with an adult-sized hip compression screw. The patient developed low-grade infection post-operatively. This was treated with antibiotics. The patient failed to attend follow-up but returned seven months later when a radiograph of the hip joint revealed spontaneous fusion. In contrast our patient had a full range of motion (Fig. 5).

The reported incidence of avascular necrosis (AVN) of the femoral head following type II fractures is between 20 to 50 per cent⁽¹⁻⁴⁾. AVN develops irrespective of treatment, with a higher incidence with displaced fractures and in children older than five years of age^(2,3). There are conflicting reports^(3,5,8-11) about the benefit of early decompression of the hip joint in the prevention of the development of AVN. Both, Cheng et al⁽⁴⁾ and Ng et al⁽⁹⁾ noted marked reduction in the occurrence of AVN following early decompression. In contrast Gerber et al⁽¹²⁾ reported that seven out of 14 patients with type II fractures developed AVN despite early open reduction and internal fixation. Some authors^(3,8) have suggested that the development of AVN is related to the degree of displacement of the fracture rather than the early decompression. This patient had no decompression of the hip joint following the fracture. The avascular necrosis of the femoral head was noticed at three months and was managed by prolonged non-weight bearing crutch walking^(3,8). The head re-formed with some residual deformity (Fig. 4). It is difficult to state whether osteomyelitis in anyway contributed to avascular necrosis, as the head did revascularise in the usual time with non-weight bearing⁽³⁾. Perhaps early decompression could have prevented AVN.

The classification system of Delbet is most widely accepted for fractures of the femoral neck in children^(1,2,5,8). The trans-epiphyseal separation or Type I fracture, though least common, may at times

be mistaken for a slipped capital femoral epiphysis. The recommended treatment for children above two years of age is gentle closed reduction followed by internal fixation with smooth pins^(1-3,8). Moreover, when the closed reduction is unsuccessful, open reduction is advised⁽¹⁻³⁾. Type I fractures are reportedly associated with the highest risk of complications of AVN and premature physeal closure especially when the femoral head is also dislocated^(1-3,5,8). No recommendations are made on how to improve the results.

Coxa vara develops in 20 to 30 percent of Delbet Type II fractures^(1,8), with a lower incidence seen after internal fixation. Imperfect reduction, avascular necrosis or premature epiphyseal closure with overgrowth of the greater trochanter can result in a varus deformity⁽⁸⁾. In this patient even though the pins had crossed the epiphyseal plate, it was still open at 22 months after the operation (Fig. 3). Probably avascular necrosis as well as less than perfect reduction contributed to the development of coxa vara. Corrective valgus osteotomy⁽²⁾ was advised and is under consideration by the patient.

CONCLUSION

A child with a displaced transcervical fracture of the neck of the femur, following recent acute osteomyelitis, was successfully treated by closed reduction and internal fixation with Moore's pins under the cover of antibiotics. The fracture united with mild coxa vara following AVN of the whole femoral head. The hip had good range of painless motion at 36 months of follow-up.

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