

Case Report

Infected non-union of sub-trochanteric fracture of femur treated by Ilizarov and AO external fixation: a case report

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ABSTRACT

Infected non-union of fractures of the shaft of proximal femur in paediatric age group is rare. They pose a formidable challenge to the treating orthopaedic surgeon. Concomitant infections elsewhere in the body are a risk factor for infection of fractures treated by open reduction. In our patient the infected non-union was secondary to urinary tract infection. A 12 year old boy sustained an open pelvic injury with bladder rupture and left closed sub-trochanteric fracture. Open reduction and internal fixation (ORIF) was done initially which got infected due to concomitant urinary tract infection due to bladder injury. He was treated by Ilizarov external fixation and later by AO external fixator and the functional outcome is evaluated. This patient had to undergo multiple surgeries with external fixations to control infection & achieve union which took a long period of 8 months. Primary external fixators in complicated cases and in cases prone for infection reduce the need for multiple surgeries.

Keywords: Ilizarov, AO external fixator, Infected non-union femur sub-trochanteric

INTRODUCTION

The fracture within 10% of the total femoral length of the lesser trochanter is defined as sub-trochanteric fracture in paediatric age group. Unlike in adults, non-union of sub-trochanteric fractures in paediatric patients is less likely, except in cases where association of infection, bone loss, concomitant soft tissue problems and infective focus elsewhere in the body are present.¹⁻³

CASE REPORT

A 12 year old boy met with a road traffic accident and sustained an open pelvic injury with bladder rupture and left closed sub-trochanteric fracture (Figure 1). He was haemodynamically stabilized on the first day. The next day, exploratory laparotomy was done with bladder repair along with supra-pubic cystostomy and catheterization of

the urethra. The open pelvic injury with pubic diastasis was not operated due to high risk of infection and was managed conservatively.

After 3 days, ORIF (open reduction and internal fixation) with DCP (dynamic compression plate) of the sub-trochanteric fracture was done (Figure 2A and 2B). After 15 days there was pus discharge from the operated site. Pus was sent for culture sensitivity. The organism isolated from the wound site was *Staphylococcus aureus*. Appropriate antibiotics were given according to the culture report. Radiographs after a month showed signs of infection and no signs of bony union.

Due to persistent infection, the implant was removed, wound debrided, antibiotic beads placed and fracture stabilized by Ilizarov external fixator (Figure 3 and 4). The child was again operated for wound debridement

twice in a span of 3 months. The radiographs showed union in progress and containment of infection was seen clinically.



Figure 1: Pre-operative radiograph.

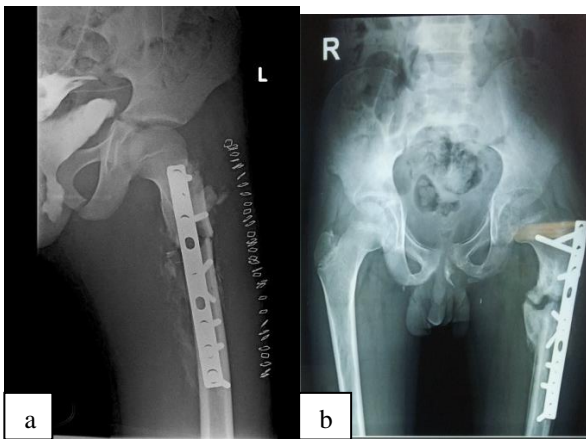


Figure 2: (A) Post-operative lateral radiograph, (B) post-operative AP radiograph.



Figure 3: Intraoperative-Ilizarov application.

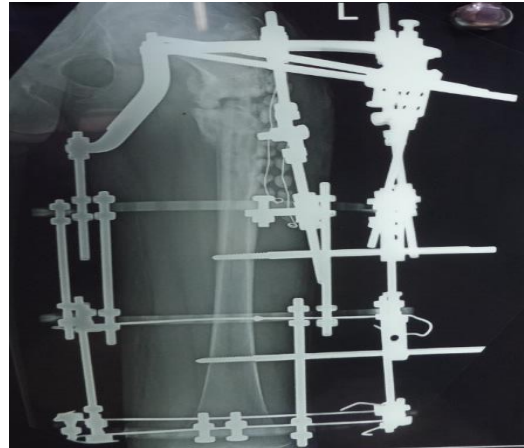


Figure 4: Radiograph after Ilizarov fixator and antibiotic beads application.

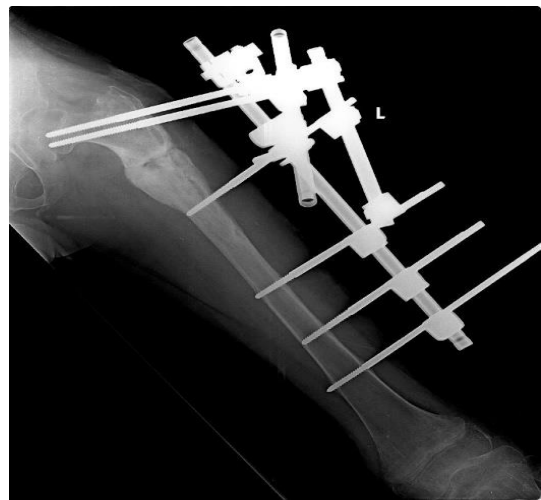


Figure 5: Radiograph with AO external fixator.



Figure 6: Patient with AO fixator.

After 2 months the patient developed pin tract infection and the pins were changed and the Ilizarov fixator was converted into a simpler AO fixator (Figure 5 and 6).

The radiographs showed good union after 3 months (Figure 7A and B) and the fixator was removed. The two

external fixator period put together was 8 months (Ilizarov external fixator was 5 months, AO external fixator was 3 months). Patient was mobilized and physiotherapy done. On last follow up after fixator removal, the patient had united fracture with no signs of infection or deformity and with less than 2 cm of limb length discrepancy with excellent clinical results and full range of hip and knee movements (Figure 8A and B).

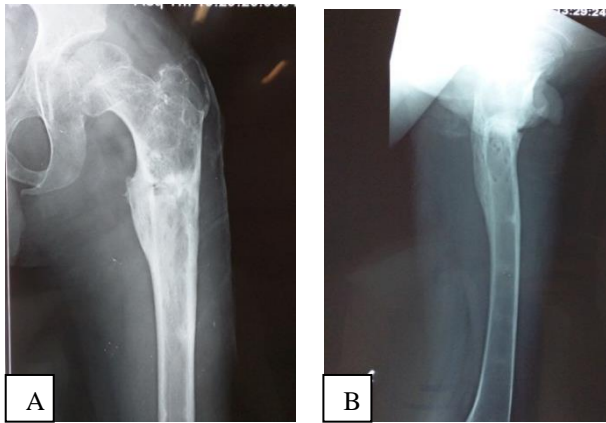


Figure 7 (A and B): Radiological results AP and LAT view showing good union.



Figure 8 (A and B): Follow up-3 years, 2 months after fixator removal. Functional results: normal hip and knee ROM, normal ADL.

DISCUSSION

Non unions of long bones with infections are difficult to treat. It is all the more difficult to treat an infected non-union of the sub-trochanteric region of the femur. Infection, Implant failure and bone defects around the implant significantly complicate the therapy, and complex surgical procedures with implant removal, extensive debridement of the non-union site, bone grafting and re-osteosynthesis usually become necessary.⁴

The results of various studies, indicate that pre-operative urinary tract infection has a high prevalence amongst those presenting with proximal femur fractures, and this is a risk factor for the later development of post-operative surgical site infection.⁵In this patient who had a

compound open pelvis fracture with a bladder tear had developed urinary tract infection. He was operated for the fracture by plating.

External fixation is an effective method for the treatment of femoral infected non-unions. Some of the advantages of the technique are decreased blood loss, decreased surgical exposure, preservation of blood supply to bone which facilitates bone healing, enhanced mechanical stability, which allows early ambulation, and the ability to perform simultaneous lengthening and deformity correction.^{6,7}

Conversion of Ilizarov fixator to AO fixator reduces the bulky frame to a much simpler configuration while at the same time protects the callus from re-fracture.⁸

CONCLUSION

Treating compound proximal femur fractures with external fixators gives good results even after complications, particularly infection and non-union of fracture after internal fixation. In this patient, external fixation has shown excellent result in treating these conditions. As an afterthought, treating all such patients with external fixation in the first place is safer, even in children. This patient had to undergo multiple surgeries with external fixations to control infection & achieve union which took a long period of 8 months. This would have probably been prevented if it was treated by primary external fixation.

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