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Case Report

Management of infected gap non-union of the tibia with bone transport over plate

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ABSTRACT

Compound tibia fracture with bone loss is common presentation in Orthopaedics, treatment for which is well described in the literature. Ilizarov technique is commonly used to fill the bone defect with its different modifications which include additional stabilization with IMIL or Plate. We report a case of infected gap nonunion of proximal tibia shaft which was managed with Ilizarov technique along with a stabilizing plate. The purpose of this report is to provide an alternative mode of management for infected of tibia shaft fracture with bone defect.

Keywords: Compound tibia fracture, Bone defect, Ilizarov technique

INTRODUCTION

Tibia being the subcutaneous bone is prone to compound fracture with reported rates varying from 12% to 47% depending on the patient population.[1-3] Compound fracture of the tibia is the most common lower extremity compound fracture.[4,5] The chances of bone loss and the overlying skin lose is high with compound tibia fracture. Treatment for varying degree of compound tibia fracture includes intramedullary nailing, external fixator application or in extreme cases amputation. In case of skin and bone lose the treatment for the same is needed. Infection is relatively low in closed or type 1 compound tibia fracture, but occur in up to 8% to 16% of type 3 injuries.[6-8] We here report a case of 22 years old gentlemen who presented to us with compound type 3b tibia shaft fracture with skin lose, bone loss and infection which was managed with distraction osteogenesis over plate.

CASE REPORT

The patient has given his informed consent for the case report to be published. A 22-year-old gentleman presented to our outpatient department with history of road traffic accident while riding a 2-wheeler 6 weeks ago following which he sustained injury to his left leg and was operated in an outside hospital for debridement of the wound and external fixator application for the tibia shaft fracture. At the time of the presentation there were signs of infection of the wound which was present over the anteromedial side of the leg and pin loosening along with pin tract infection, there was also bone lose of about 8 cm felt below the tibial tuberosity. We removed the external fixator and debrided the infected wound pin tracts and kept patient in an above knee slab (Figure 1), till the wound over anteromedial side of the leg and pin tracts heal, along with culture sensitive intravenous antibiotics, after adequate coverage with healthy granulation tissue skin grafting was done over the anteromedial aspect of the leg along with LRS over medial side and a locking anatomical plate on the lateral side for bone transport to manage the bone gap.

Two pins and clamps were placed in the proximal fracture fragment and 4 pins and clamps in the distal fracture fragment for distraction as the proximal fragment was not adequate for the bone transport the corticotomy was done in distal fragment for bone transport, a lateral anatomical

plate was slided from a minimal incision over lateral aspect of proximal tibia and locked with 2 screws proximally and 2 distally (Figure 2).

Figure 1: X-ray on presentation.

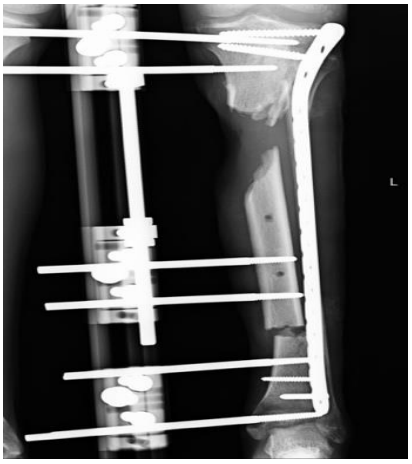

Figure 2: LRS with Lateral plate.

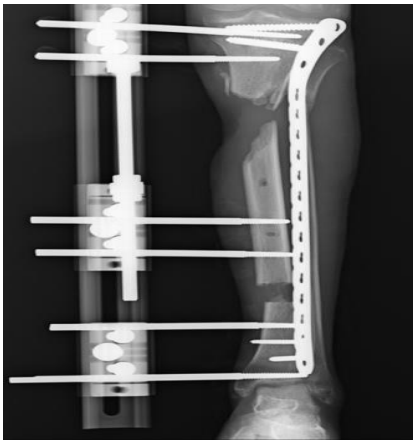

Figure 3: Distraction phase week 1.

After 7 days of latency phase distraction at the rate of 1mm per day divided into 0.25 mm 4 times a day was started (Figure 3), Initially treating doctors did the distraction. After few days patient was taught and was asked to do it under supervision. After confidence of patient, he was discharged with weekly follow up in OPD.

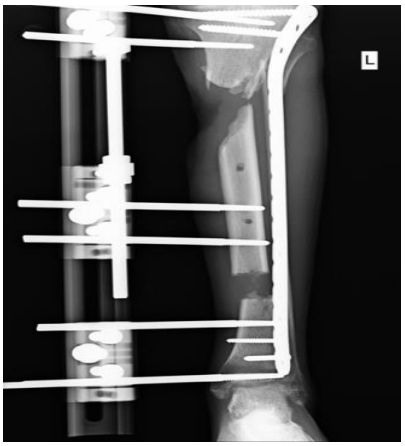

Figure 4: Distraction phase week 2.

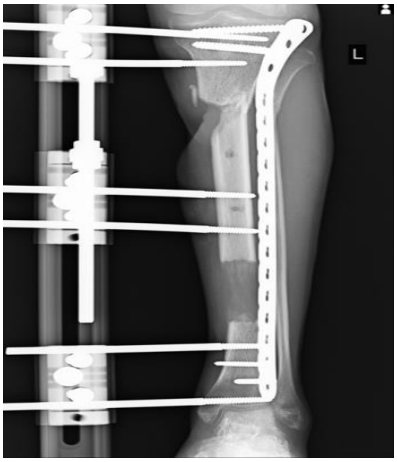

Figure 5: Complete bone transport with bone gap regenerate.

Figure 6: LRS removed with complete bone regenerate.

After fifteen days radiological assessment was done to see progress of distraction and overall alignment of tibia. X-

ray at one month post distraction showed signs of regenerate at corticotomy site (Figure 4). Patient was made to walk partial weight bearing with support. After completion of 2.5 months the X-ray showed full transport of bone filling the gap touching the proximal fragment. There was about eight cm regenerate to fill the gap of same. There was a bone gap on medial side due to soft tissue interposition (Figure 5). At this stage we stopped the distraction phase and allowed the regenerate to consolidate for 5 months. Removal of the LRS was done after 5 months (Figure 6) and patient was allowed to walk with support, by the end of 10 months patient started walking full weight bearing without any support and any signs of infection from the pin tract or the wound.

Figure 7: 2 years follow up with consolidated bone gap.

Figure 8: Clinical picture.

DISCUSSION

Ilizarov technique of bone transport for distraction osteogenesis is popularly used for bone lengthening, management of non-unions.[9] Multiple techniques using ilizarov's principle have developed over time in an effort to reduce the complication rate and patient compliance to the hefty hardware.[10,11] One such technique is lengthening over an intramedullary nail developed by Larsen et al this technique has an advantage of potentially reducing the time needed for external fixator it allows earlier and more aggressive physical therapy, protects against fractures of the newly formed bone and helps prevent deformation of the regenerate while lengthening the bone.[12-16] Lengthening over an intramedullary nail though reduces the duration of the external fixator and protects the distracted bone during the consolidation phase, but is also associated with deep intramedullary infection of up to 22%.[12,13] Plating with external fixator is another such technique using the same ilizarov principle, the locking plate can be inserted percutaneously at the time of fixator application and will provide stabilization and protection to the regenerate bone throughout the consolidation phase after the removal of the external fixator. It has the biomechanical advantage of angular stability, multiple fixation options preserving the periosteal and endosteal blood supply.[14] The lengthening over a locking plate can be done in any age group in virtually any bone without concerns of causing avascular necrosis, fat embolism, or physeal injury. This technique does not disturb the endosteal blood supply of the bone which is damaged by the reaming necessary for insertion of the intramedullary nail.

Clinical message

Ilizarov technique with plate can be used to manage infective nonunion with bone loss without any complication.

CONCLUSION

There are many treatments option available in literature to treat such complex fracture like Ilizarov or conventional treatment. Ilizarov is an ideal way of treatment in complex deformities with non-union of fractures. Long duration of treatment, cumbersome framework, frequent supervision of frame, pin tract infection all these factors make the conventional ilizarov ring fixator less patient compliant. LRS is more doctor and patient friendly in less complex situation. Additional plating reduces duration of fixator. There is no need for dynamization of fixator. It can be removed early as plate takes mechanical strength to protect the callus till its consolidation. Satisfactory limb function is the goal of treatment. This can be very well be achieved by using LRS over plate. We recommend this in open fractures with bone loss as it gives good functional results with minimum complications, also it is cost effective.

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