



CLINICAL OUTCOME OF ILIZAROV RING FIXATOR IN TREATMENT OF SEGMENTAL LOSS OF BONE IN TIBIA.

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ABSTRACT

Aims and Objective: To analyse the effectiveness of distraction osteogenesis in case of segmental bone loss by the virtue of ilizarov ring fixator. **Methodology:** 23 patients were enrolled over the duration of 30 months (2.5 years) under prospective design. The patients were managed by debridement and resection of infected portion followed by stabilization with ilizarov ring fixator. **Results:** The fractures in all 23 patients showed clinical union along with complete eradication of infection. The results were excellent for 7 patients. Meanwhile 9 patients showed good results and 5 patients had average results. Pin site inflammation was the most commonly (80%) reported complication. **Conclusion:** We conclude that debridement combined with ilizarov ring fixator is a safe, simple and economical method of treatment of infected and segmental bone defects.

KEYWORDS : Ilizarov, Infected, corticotomy, Tibia.

INTRODUCTION:

The tibia is the commonly fractured bone of lower extremity. Due to its location and scanty soft tissue covering, open fractures are common in the tibia than in any other bone.¹ Open tibial fractures are showing an increasing trend due to road traffic accidents, firearm injuries and sports related injuries.¹ Earlier, the availability of treatment options for non-united, open, infected and bone loss fractures were few, with most of the cases ending up on amputation. The treatment of such conditions was transformed by Dr. Gavril Ilizarov. The ilizarov frame takes its name from Dr. Gavril Abramovich Ilizarov.²

Even as each and every methods has their own pros and cons, ilizarov's modular circular fixator is a flexible technique that is used for variety of problems like infection control, bone transport in loss, fracture stabilization, to promote bone growth and healing by compression and distraction, to correct angular deformities.³ The ilizarov methods works on distraction neohistogenesis and are used to correct malalignment with minimal surgery and to overcome shortening.^{4,5}

In our hospital, as in most centres in the less developed regions, open tibial fractures have been traditionally managed by external fixators. The high rate of failure associated with this management protocol made us to look to the ilizarov external fixator (IEF) as an alternative. IEF is a step ahead in the management of open tibial fractures wherein patients are referred late and have bone loss, infection, non-union or malunion and facilities for emergency nailing are not available. The IEF is a minimally invasive method which permits excellent wound management, early weight bearing and bone lengthening. The objective of this study is to look at the clinical outcomes of early IEF as definitive management in open tibial fractures, were there is bone loss.

METHODOLOGY:

The hospital-based prospective study was conducted in department of orthopaedics. The duration of study was 30 months (two and half years). A total of 23 patients with infected wounds with bone loss of tibia were included in the study. The study protocol was approved by the college Ethical Committee and an informed consent was obtained from all patients.

Operative Procedure:

All routine blood investigations including TLC, CRP and ESR were also done prior to surgery. Radiological evaluation was

done using X-ray. Wound swab from the discharge was sent for culture and treated prior to surgery. The ilizarov frame was constructed pre operatively in all the patients. All patients had debridement followed by ilizarov ring fixator application. Sclerotic bone from fracture ends was excised and freshened, aligned and stabilized with the ring fixator. Final adjustments were done using C Arm guidance. Corticotomy was done to help improve blood supply.

RESULTS:

In our study 23 patients were evaluated and 2 patients were lost in follow up. All 21 patients had full follow up and had good union. The number of male patients were 18 (20 years – 54 years) with a mean age of 31.4 years. Meanwhile, the number of females were 5 (24 years – 62 years) with a mean age of 39.6 years. The right side was involved in 18 patients and left side in 5 patients. The most common mode of injury was road traffic accidents. Out of 23 cases, 8 cases were of infected non-union with bone loss and 15 cases were of open fracture with bone loss. The range of bone loss was from 4cm to 9cm with an average of 6.5cm. Bone losses in all cases were either during trauma or due to debridement and removal of necrotic bone.

An excellent result was defined as union with absence of infection, deformity less than 7°, and leg-length inequality of less than 2.5 cm; a good result was defined as union plus any two of the other three criteria; meanwhile, an average result was union plus any one of the other criteria; and a poor result as union but none of the other three criteria, or non-union or refracture, according to ASAMI SCORE. In our study there were 7 excellent, 9 good and 5 average results. The most common complication was pin tract infection (in 17 i.e 80%) of cases.

Deformity (>7 degree) was present in 2 out of 21 cases. 4 patients had knee stiffness and 6 patients had ankle stiffness. Limb oedema was noted in 7 patients. There was no complication of neurovascular injury, mal-union or breakage of wires, or limb length discrepancy.

DISCUSSION:

The management of infected non-union of the tibia with segmental bone loss, necrotic soft tissue is a challenging task. It can result in permanent functional deficits, prolonged recovery times and even amputation.^{6,7,8} Earlier several methods have been applied successfully in the treatment of infected non-union of tibia including bone grafts, extensive debridement and local soft tissue rotational flaps, packing of

the defects with grafting.^{9,10} However these surgeries have their own limitations.¹¹

Ilizarov evolved the procedure of "tension stress" allowing bone and soft tissue regeneration to replace defects after excision of infection and in treatment of non-union.^{12,13}

In study conducted on conventional all wire ilizarov fixator by Rohilla R et al¹⁴ in 2016 the bone results were excellent and good in 91.5%, fair and poor bone results in 8.5% of cases.

Cattaneo R. et. al.¹⁵ in their study found application of circular fixator to diphyseal infected non-union and segmental defects very motivating. They used combination of both internal transport and compression distraction, but in our cases only external transport technique was used.

Yokoyama K. et.al¹⁶ attempted to discern differences between free vascularised fibular grafts and callus distraction. They found that both the cost and functional outcomes between the two groups did not significantly differ other than a need of an expert in free fibular graft technique. Even though the defects were larger, we have not attempted free fibular graft in any of the cases.

CONCLUSION:

The Ilizarov technique is very versatile and rewarding. The IER fixation and distraction osteogenesis is the safest, simplest, most economical and effective method for the management of segmental bone defects which cannot be dealt with conventional methods.

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