

Outcome of ILIZAROV Technique in Closed Fracture Shaft of Tibia in Elderly Patients.

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Abstract:

Background: Tibial diaphyseal fractures are most common long bone fractures⁶. Complex comminuted and segmental fracture of shaft of tibia are high energy injuries that are difficult to treat¹. Soft tissue damage at time of injury and further soft tissue disruption during internal fixation can disturb the blood supply, with a detrimental effect in fracture healing¹. High rates of complications like compartment syndrome, deep tissue infection, delayed union etc have been associated with these types of fractures¹. There is no consensus on the best treatment¹. The method of ilizarov have many advantages over existing operative techniques². This method using a percutaneous approach, minimizes the intraoperative trauma and avoids the additional compromising of biological environment at the fracture site². The aim of the study is to analyse clinical, radiological and functional outcome of ilizarov in fracture shaft of tibia in elderly patients.

Materials and Methods: This prospective study was carried out in 14 cases (8 male and 6 female) of fracture shaft of tibia in elderly patients all aged above 50 years irrespective of sex. The complex comminuted and segmental fracture shaft of tibia are also included in the study. The study was conducted for a period of 12 months and cases were followed up for a period of 6 months.

Results: Out of 14 cases 10 cases were healed completely without the necessity of any bone healing stimulating procedure. Out of 4 delayed union cases 2 patients required bone marrow aspiration injection and in 2 patients bone grafting was done later at 6 months. Average union time was 24 weeks. There were no signs of deep infections were observed in any patient secondary to pin tract infection.

Conclusion: The ilizarov technique is an excellent and safe treatment modality for acute closed fracture shaft of tibia in elderly patients if the bone is not severely osteoporotic and patient is not malnourished. This technique can also be well applied even in closed complex comminute and segmental fracture of tibia. This technique reduces the rates of complications and provide satisfactory functional outcome in elderly patients. The immediate postoperative weight bearing and early mobilization helps in fracture healing and also reduce psychological stress in patients.

Key words: Ilizarov ring, Fracture shaft of tibia, Elderly patients, complex comminuted and segmental fracture.

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I. Introduction:

Tibial diaphyseal fractures are most common long bone fractures⁶. Complex comminuted and segmental fracture shaft of tibia caused by high energy trauma most commonly by road traffic accidents². Due to their specific fracture pattern, extensive soft tissue damage and a significant degree of complications these type of fractures represents a great challenge in treatment². Out of many operating technique most attention is given to intramedullary nailing, however due to unstable fragments fracture reduction is a great concern². Soft tissue damage at time of injury and further soft tissue disruption during internal fixation can disturb the blood supply, with a detrimental effect in fracture healing¹. High rates of complications like compartment syndrome, deep tissue infection, delayed union etc have been associated with these types of fractures¹. The naturally scarce vascularisation of the tibia at junction of middle 3rd and distal 3rd is additionally disrupted in the case of fracture². The management of tibial fractures complicated by compartment syndrome can result in poor clinical and functional outcome³. The effort to maintain vascularisation of fracture fragments represents a determining factor in the healing of these fractures². The exposure of the fracture site leads to disturbance of the biological environment which has a negative effect on the bone union². The method of ilizarov with its characteristics offer

many advantages over the existing operative techniques². This method , using a percutaneous approach, minimizes the intraoperative trauma and avoids the additional compromising of biological environment at the fracture site². The ilizarov apparatus is a universal , stable yet dynamic construct that permits axial loading of the injured limb⁷. This in turn stimulate bone angiogenesis and promotes osteogenesis, leading to quiker bone remodelling⁷. Its versatility allows correction of any residual deformity⁷. Indirect close reduction is possible by using a circular frame with thin tensioned wire². The early weight bearing and initiation of movements in adjacent joints have great importance². The aim of this study is to evaluate the clinical, functional and radiological outcome of closed tibial diaphyseal fractures in elderly patients.

Surgical Procedure: All surgeries are done under spinal anaesthesia. The length and alignment of the limb were maintained by continuous traction and visualization under an image intensifier. The proximal ring of the ilizarov apparatus was fixed to the proximal tibia 1.5 cm from knee joint line roughly at level of fibular head and parallel to knee joint , with six point purchase to the bone(3 wires). Second ring was fixed at the lower 3rd of tibia with atleast 4 point purchase on the bone. Third ring was fixed in between the proximal and distal ring with 4 point purchase on the bone. Sometimes the stability of the apparatus was further enhanced by adding a schanz pins to the ring. A 4th ring is applied in cases of complex comminuted or segmental fracture shaft of tibia.

II. Results:

The average age of patient was 54 years with 8 male and 6 were female. The average time period between day of trauma and surgery was 5 days(1 to 7 days). Out of 14 cases 10 cases were healed completely without the necessity of any bone healing stimulating procedure. Out of 4 delayed union cases 2 patients required bone marrow aspiration injection and in 2 patients bone grafting was done later at 6 months. In our study average union time was 24 weeks. There were no signs of deep infections were observed in any patient secondary to pin tract infection. Adequate tibial alignment was noted on standing radiograph in all 14 cases. No rotational deformities were noted. The bone results were excellent in 8 cases, good in 3 cases and fair in 3 cases. Out of the 3 cases with fair results 2 had shortening of lower leg. The functional result were excellent in 7 patients , good in 4 patients and fair in 3 patients. 5 patients had reduced ankle dorsiflexion.

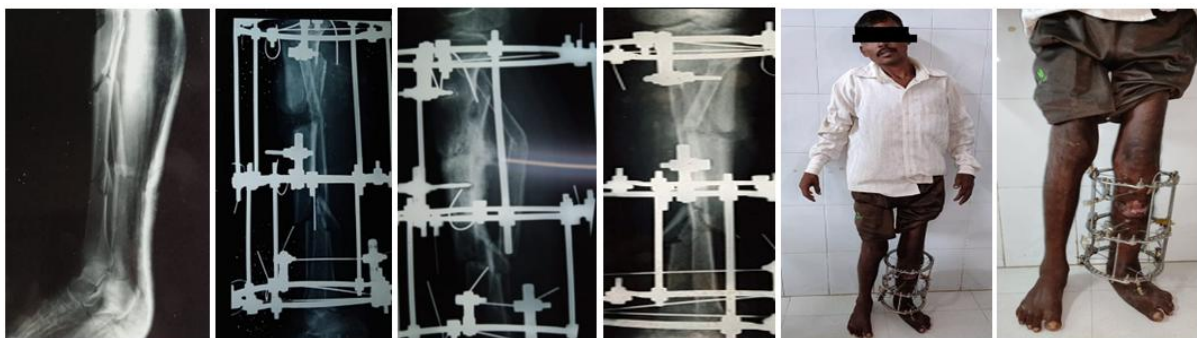
Preoperative patient details and surgery outcome:

Case No.	Age	Sex	Mode of Injury	Fixation Time	ASAMI Score	ASAMI Score
					Bone	Function
1	54	M	RTA	5	Excellent	Excellent
2	51	F	RTA	6	Excellent	Excellent
3	56	M	RTA	7	Good	Good
4	52	M	RTA	4	Excellent	Excellent
5	57	F	RTA	2	Fair	Fair
6	51	F	RTA	5	Excellent	Excellent
7	56	M	RTA	4	Fair	Fair
8	53	M	RTA	6	Excellent	Good
9	54	M	RTA	5	Fair	Fair
10	51	M	RTA	5	Excellent	Excellent
11	52	F	RTA	6	Good	Good
12	53	F	RTA	7	Excellent	Excellent
13	51	M	RTA	3	Excellent	Excellent
14	65	F	RTA	5	Good	Good

CASE 1: 65 years old female with distal both bone leg fracture(with proper consent).



CASE 2: 56 years male with segmental tibia fracture(with proper consent):



III. Discussion:

P. A. L. Foster and S. B. barton et al. in their study done in 40 patients they have found that primary union after application og ring was 90% (36 out of 40). Their study have shown that the ilizarov method is safe in terms of avoiding major complications such as deep infection , compartment syndrome and amputation. Slavko Tomic and Nemanja Slavkovic et al. in their study done in 30 patients have found that ilizarov method is a safe and efficient treatment modality for segmental tibial fracture. Their study shown that ilizarov technique provide a high rate of bone union with predictable functional outcome and low rate of complications. Kaushik Bhowmick and Chandrasekaran et al in their study done in 19 patients have found that fixation with the ilizarov apparatus in the tibia fracture with impending compartment syndrome results in improved outcome with low rates of infection and soft tissue complications. Taher Abdelsatar and Mohammad Elsaywy et alin their retrospective study found that through ilizarov multilevel stability can be achieved and there is a good mean time of union with good functional outcome. Bari M.M. and Shahidul islam et al in their study found that ilizarov technique can be used to treat the most complex tibia fractures including open fractures, fracture with bone loss, segmental fractures.

IV. Conclusion:

The ilizarov technique is an excellent and safe treatment modality for acute closed fracture shaft of tibia in elderly patients if the bone is not severely osteoporotic and patient is not malnourished. This technique can also be well applied even in closed complex comminute and segmental fracture of tibia. This technique provide good union rate of bone although fracture union capacity and soft tissue healing power decreases with increase of age thus the outcome decreases with increase in age of patients as bone become osteoporotic specially in female. This is a less invasive technique which reduces the rates of complications of already compromised soft tissue due to injury and provide satisfactory functional outcome in elderly patients. The immediate postoperative weight bearing by the patients and early mobilization not only helps in fracture healing but also reduce psychological stress in patients. with good union rate of bone.

Conflict of interest: None

Fund received for the study: None

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