

Assessment of Infections Occurring in Patients Undergoing Treatment with Locking Reconstruction Plates: An Institutional Based Study

Rajendra Rayal¹, Sanjeev Kaler², Vishal Sekhawat³, Rakesh Kumar^{4*}

¹Senior Resident, Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan, India

²Senior Resident, Department of Orthopedics, S.N Medical College Jodhpur, Rajasthan, India

³Assistant Professor, Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan, India

⁴Associate Professor, Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan, India

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Abstract

Background: The present study was conducted for assessing the incidence of infections occurring in patients undergoing treatment with locking reconstruction plates. **Materials & Methods:** The study comprised of 30 patients having distal femoral fractures attending Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan (India) were enrolled. They were randomly selected irrespective of cast, creed, age and sex. Patient having fractures with comminuting, infection, pathological fracture, continuity defect and trauma were taken. The use of a locking reconstruction plate was determined by the attending staff involved in the patient's care. Patient characteristics were noted and include smoking history, and history of previous infection. Postoperative details were enrolled. Evaluation was done will a time period of 12 weeks. All the results were recorded and analysed by SPSS software. **Results:** Mean VAS at 1st week, 3rd week, 6th week and 12th week was 1.12, 0.52, 0.12 and 0 respectively. Postoperative infections were seen in 6.67 percent of the patients. **Conclusion:** The authors concluded that absence of major complications in the study corroborates with main biological and mechanical advantages of locking plates.

Key words: Reconstruction, Locking Plates, Distal femoral.

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Introduction

Distal femoral fractures correspond to 6% of femoral fractures, have regularly a bimodal event: in youngsters generally identified with a high-vitality injury whereas in older individuals normally because of a low-vitality injury. Previous authors surveyed that distal femoral fractures representing 29% of non-proximal femoral fractures, and their frequency had been growing up. The utilization of locking screw plates is viewed as exceptionally supportive specifically in osteoporotic distal femoral fractures, considering their decencies in opposing to various collapses and having numerous purposes of obsession. In any case, it is outstanding that the complexity in fractures healing and the rate of complications are as yet imperative clinical issues[1-3].

Reconstructive techniques have been continuously developing over the years. Since the 1940s, implantable devices have been used in bony reconstruction. With increasing clinical experience, many improvements have been made in both implant materials and plate system designs. Titanium has proven to be a reliable, strong, and biocompatible metal for this use. Reconstruction plates have also progressively become slimmer and more malleable.

Locking screw technology, with its unique features, has further improved the stability of reconstruction by combining the features of both external and internal fixators[4-6]. Hence; the present study was

conducted for assessing the incidence of infections occurring in patients undergoing treatment with locking reconstruction plates.

Materials & methods

The present study was conducted for assessing the incidence of infections occurring in patients undergoing treatment with locking reconstruction plates. The study comprised of 30 patients having distal femoral fractures attending Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan (India) were enrolled. They were randomly selected irrespective of cast, creed, age and sex. Patient having fractures with comminuting, infection, pathological fracture, continuity defect and trauma were taken. The use of a locking reconstruction plate was determined by the attending staff involved in the patient's care. Patient characteristics were noted and include smoking history, and history of previous infection. Postoperative details were enrolled. Evaluation was done will a time period of 12 weeks. All the results were recorded and analysed by SPSS software.

Results

In the present study, a total of 30 subjects were analysed. 50 percent of the subjects belonged to the age group of 30 to 50 years. 26.67 percent of the subjects belonged to the age group of less than 30 years. 23.33 percent of the subjects belonged to the age group of more than 50 years. 63.33 percent of the subjects were males while the remaining were females. 60 percent of the subjects were of rural residence while the remaining was of urban residence. Mean VAS at 1st week, 3rd week, 6th week and 12th week was 1.12, 0.52, 0.12 and 0 respectively. Postoperative infections were seen in 6.67 percent of the patients.

*Correspondence

Dr. Rakesh Kumar

Associate Professor, Department of Orthopedics, Sawai Man Singh Medical College and Attached Hospital, Jaipur, Rajasthan, India.

E-mail: rdhukia@gmail.com

Table 1: Demographic variable

Variable		Number of patients	Percentage
Age group (years)	Less than 30	8	26.67
	30 to 50	15	50
	More than 50	7	23.33
Gender	Males	19	63.33
	Females	11	36.67
Residence	Rural	18	60
	Urban	12	40

Table 2: Pain as assessed by VAS at different time intervals

VAS	Mean	SD
At 1 st week	2.36	1.12
At 3 rd week	1.12	0.52
At 6 th week	0.32	0.12
At 12 th week	0	0

Table 3: Incidence of postoperative infections

Post-operative infections	Number of patients	Percentage
Present	2	6.67
Absent	28	93.33

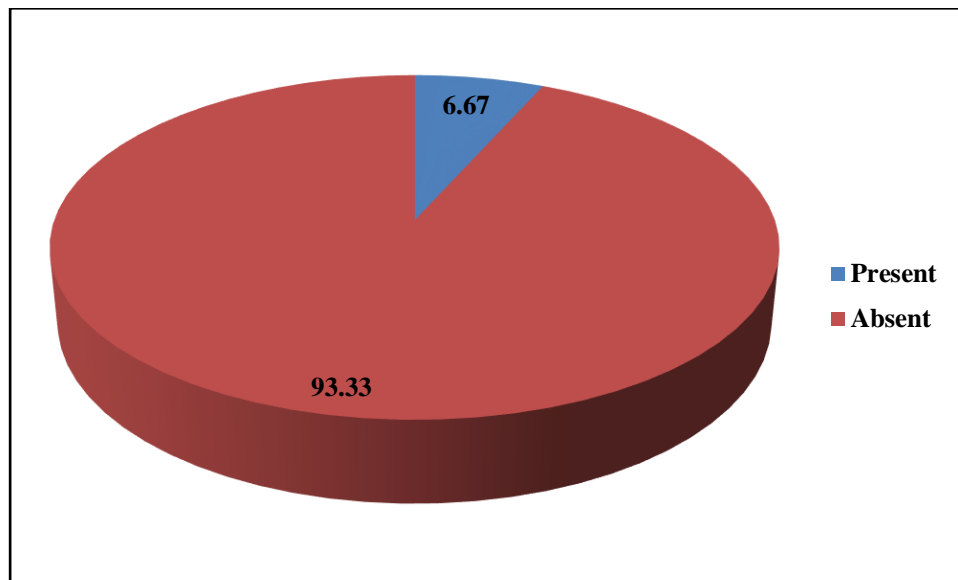


Fig. 1: Incidence of postoperative infections

Discussion

In cases complicated by deep infection after limb-threatening injury, a bone defect may occur as a result of debridement. Operative procedures often adopted for such bone defects are free cortical/cancellous bone grafting in cases with a narrow defect, free vascularized bone grafting if the defect is segmental, affecting a range of 50 mm or more, and lengthening by callus destruction in cases with bone defects of intermediate sizes (20-50 mm). According to previous reports, the time needed for bone union after treatment of deep infection accompanied by defects of long bones of the extremities is 6-10 months after vascularized fibular grafting, about 5 months after callus lengthening, and 7-10 months after free bone grafting. However, when vascularized bone grafting or lengthening by callus destruction is planned, it is not common for surgeons to encounter difficulty in selecting the optimal method of bone grafting because such bone defects are morphologically diverse. If the fractured area is bridged and fixed with a locking plate and free cancellous bone is grafted into the space, it may be possible to achieve firm and flexible fixation and thereby good reconstruction of the bone defect[6-9]. Hence; the present study was conducted for assessing the incidence of

infections occurring in patients undergoing treatment with locking reconstruction plates.

In the present study, a total of 30 subjects were analysed. 50 percent of the subjects belonged to the age group of 30 to 50 years. 26.67 percent of the subjects belonged to the age group of less than 30 years. 23.33 percent of the subjects belonged to the age group of more than 50 years. 63.33 percent of the subjects were males while the remaining were females. 60 percent of the subjects were of rural residence while the remaining was of urban residence. Our results were in concordance with the results obtained by previous author who also reported similar findings. Kumar GNK et al reviewed 46 distal femoral fractures treated with distal femoral locking compression plates. There were 36 men and 10 women with mean age of 35 years (range 20–72). More than half of the patients were of type C3 (AO classification) and had been caused by high energy trauma with associated injuries. 2 patients were lost to follow-up. Of the remaining 44 patients, the mean follow-up period was 25 months (range 18–36). The mean time for radiological union was 12 weeks (range 10–18) except 2 patients which had gone for nonunion. At the latest follow up ROM >120° is noted in 32 patients, 90–120 in 10 patients, and 70–90 in 2 patients. 38 patients (86%) had good/excellent outcome. Use of

standard lateral approach for simple intra-articular distal femoral fractures (C1) and transarticular/minimally invasive techniques for complex intra-articular fractures (C2/C3) results in improved exposure of the knee joint and better union rates with low incidence of bone grafting[10].

In the present study, mean VAS at 1st week, 3rd week, 6th week and 12th week was 1.12, 0.52, 0.12 and 0 respectively. Postoperative infections were seen in 6.67 percent of the patients. Kawakami R et al studied 6 patients who underwent surgical treatment for deep infection occurring after extremity trauma (2004 through 2009). Ages at surgery ranged from 29 to 59 years (largest age group: 30 s). Mean follow-up was 50.7 months (minimum/maximum: 36/72 months). One patient had complete amputation of the upper extremity, 3 open forearm fractures, 1 closed supracondylar femur fracture, and 1 open tibia fracture. In all patients, bone defects were filled with antibiotic-containing cement beads after infected site debridement. If bacterial culture of infected sites during curettage was positive, surgery was repeated to refill bone defects with antibiotic-containing cement beads. After confirmation of negative bacterial culture, osteosynthesis was performed, in which bone defects were bridged and fixed with locking plates. Concomitantly, crushed cancellous bone grafts harvested from the autogenous ilium was placed in the bone defects. Time from bone grafting and plate fixation to bone union was at least 3 and at most 6 months, 4 months on average. Infection relapsed in one patient with methicillin-resistant *Staphylococcus aureus*, necessitating vascularized fibular grafting which achieved bone union. No patients showed implant loosening or breakage or infection relapse after the last surgery during follow-up. The advantage of cancellous bone grafting include applicability to relatively large bone defects, simple surgical procedure, bone graft adjustability to bone defect morphology, rapid bone graft revascularization resulting in high resistance to infection, and excellent osteogenesis[11].

Conclusion

From the above results, the authors concluded that absence of major complications in the study corroborates with main biological and mechanical advantages of locking plates.

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