

Original Article

Assessment of functional outcome of interlock intramedullary fixation in the fracture forearm bones

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ABSTRACT:

Background: Intramedullary nailing is a technique that has been used and proven in the treatment of diaphyseal fractures of almost all long bones. The present study was conducted to assess the functional outcome of interlock intramedullary fixation in the fracture forearm bones. **Materials & Methods:** 80 patients of forearm fracture bones of both genders. Evaluation was done using DASH score and Grace and Eversman score. Grace & Eversmans score was based on the union of the fracture and rotation of the forearm as Excellent, Good, Acceptable and Unacceptable. **Results:** Out of 80 patients, males were 50 and females were 30. Mode of injury was RTA in 46, fall in 24 and assault in 10. Nature of injury was open in 48 and closed in 32. Side involved was left in 30 and right in 50. DASH score <5 was seen in 4, 5-10 in 35, 10-15 in 30, 15-20 in 6 and >20 in 5. Grace and Eversmann. Score was excellent in 32, good in 30, acceptable in 16 and not acceptable in 2 cases. Complications were superficial infections in 2, K wire site pain in 5, tourniquet palsy in 3, scar on ulnar side of forearm in 1 and proximal screw back out in 2 patients. The difference was significant ($P < 0.05$). **Conclusion:** Interlock nailing in forearm fracture patients proved to be beneficial.

Key words: interlock intramedullary fixation, forearm fracture, DASH

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INTRODUCTION

Forearm fractures are as important as articular fractures as slight deviations in the spatial orientation of the radius and ulna will decrease the forearms rotational amplitude and thereby impair the positioning and function of the hand.¹ Thus, the management of these fractures and their associated injuries deserve special attention, imperfect treatment of fractures of the radius and ulna diaphyses leads to a loss of motion as well as muscle imbalance and poor hand function.²

Intramedullary nailing is a technique that has been used and proven in the treatment of diaphyseal fractures of almost all long bones.³ The exception to this rule is in the forearm area, where plating is considered as the gold standard.⁴ Intramedullary (IM) nails are not routinely used in the surgical treatment of forearm fractures because they cannot provide sufficient rotational and linear stability in this region.⁵ High nonunion rates and the need for additional long-

term fixation have limited their use. However, newly designed interlocking IM nails that provide control of rotational malalignment at the fracture line have recently been introduced.⁶ In addition to providing rotational stability, these nails can be inserted more easily and safely and have more options for proximal and distal locking.⁷ The present study was conducted to assess the functional outcome of interlock intramedullary fixation in the fracture forearm bones.

MATERIALS & METHODS

The present study comprised of 80 patients of forearm fracture bones of both genders. The consent was obtained from all patients.

Data such as name, age, gender etc. was recorded. Patients were planned for surgery. With the patient supine on a radiolucent table, and under general or regional anaesthesia the extremity was prepared and the surgery was performed using a standard procedure. If secure rigid fixation is required forearm

POP splint is applied and kept in place for 2 weeks, thereafter a removable sugar-tong orthosis was worn until bridging callus is present, and the orthosis is removed frequently for exercise. Evaluation was done using DASH score and Grace and Eversman score.

Grace & Eversmans score was based on the union of the fracture and rotation of the forearm as Excellent, Good, Acceptable and Unacceptable. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 80		
Gender	Males	Females
Number	50	30

Table I shows that out of 80 patients, males were 50 and females were 30.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Mode of injury	RTA	46	
	Fall	24	
	Assault	10	
Nature of injury	Open	48	
	Closed	32	
Side involved	Left	30	
	Right	50	
DASH score	<5	4	
	5-10	35	
	10-15	30	
	15-20	6	
	>20	5	
Grace and Eversmann score	Excellent	32	
	Good	30	
	Acceptable	16	
	Not acceptable	2	

Table II, graph I shows that mode of injury was RTA in 46, fall in 24 and assault in 10. Nature of injury was open in 48 and closed in 32. Side involved was left in 30 and right in 50. DASH score <5 was seen in 4, 5-10 in 35, 10-15 in 30, 15-20 in 6 and >20 in 5. Grace and Eversmann Score was excellent in 32, good in 30, acceptable in 16 and not acceptable in 2 cases. The difference was significant (P< 0.05).

Graph I Assessment of parameters

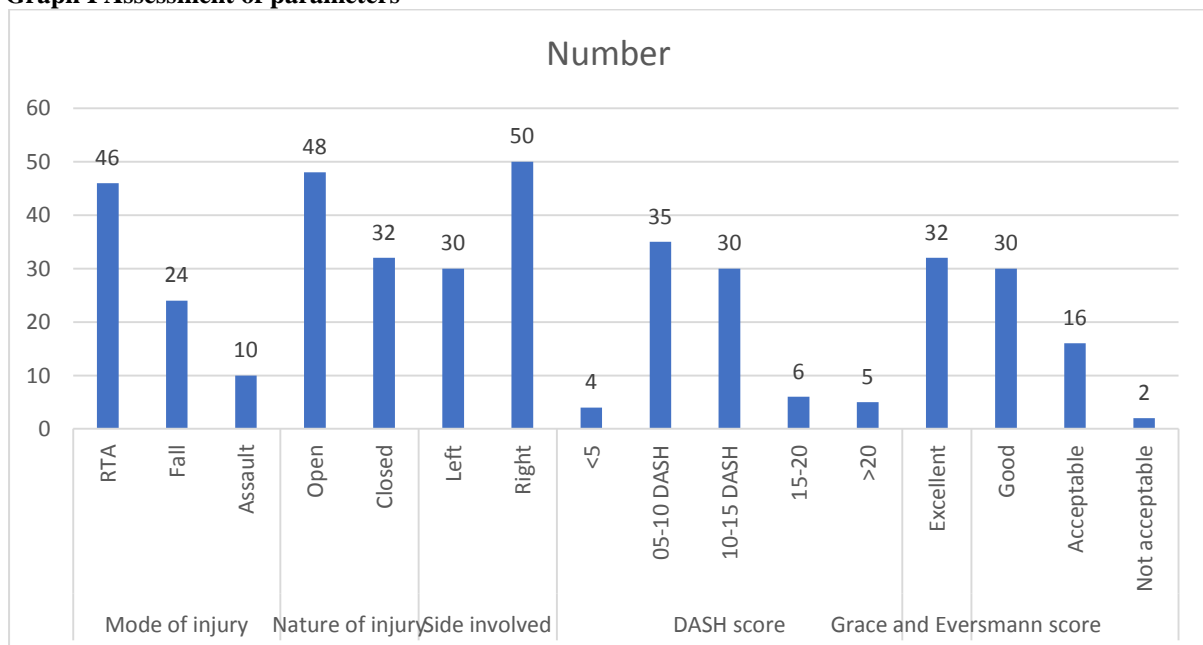


Table III Complications

Complications	Number	P value
Superficial infections	2	0.05
K wire site pain	5	
Tourniquet palsy	3	
Scar on ulnar side of forearm	1	
Proximal screw back out	2	

Table III shows that complications were superficial infections in 2, K wire site pain in 5, tourniquet palsy in 3, scar on ulnar side of forearm in 1 and proximal screw back out in 2 patients. The difference was significant ($P < 0.05$).

DISCUSSION

Mechanism of injury of forearm fracture may be blunt trauma mainly road traffic accident assault and industrial injuries.⁸ In diaphyseal fractures of radius and ulna normal rotational alignment is necessary if a good range of pronation and supination is to be restored and in addition to regaining of length, apposition and axial alignment. Any axial or rotatory malalignment or change of interosseous space or encroachment of callus into it or loss of normal configuration of radius especially the lateral bow leads to proportionate loss of supination and pronation.⁹ The radius and ulna function as a unit but come into contact with each other only at the two ends. During rotational movements, the radius rotates around the relatively immobile ulna. Besides coordinated muscle action, these movements also rely on the normal function of five articulations.¹⁰ At the elbow, the two bones articulate directly with the humerus to form the ulnohumeral and the radiocapitellar joints. At the wrist, only the radius articulates directly with the carpal bones to form the radiocarpal joint. The two bones also articulate with each other proximally and distally at the proximal and distal radioulnar joints.¹¹ The present study was conducted to assess the functional outcome of interlock intramedullary fixation in the fracture forearm bones.

In present study, out of 80 patients, males were 50 and females were 30. Shivakumar et al¹² in their study 32 patients included after their consent. There was statistically significant difference in the surgical time and duration of post-operative immobilization differed statistically significantly between the group of patients in whom locking was done and not done. The average DASH score was 9.95 and functional outcome of the patients undergone interlock nailing was excellent and good in 40.91% of patients whereas not acceptable in 4.54% of patients as per Grace and Eversmann score.

We found that mode of injury was RTA in 46, fall in 24 and assault in 10. Nature of injury was open in 48 and closed in 32. Side involved was left in 30 and right in 50. DASH score < 5 was seen in 4, 5-10 in 35, 10-15 in 30, 15-20 in 6 and > 20 in 5. Grace and Eversmann score was excellent in 32, good in 30, acceptable in 16 and not acceptable in 2 cases. We observed that complications were superficial infections in 2, K wire site pain in 5, tourniquet palsy

in 3, scar on ulnar side of forearm in 1 and proximal screw back out in 2 patients. Saka et al¹³ retrospectively reviewed adult patients with isolated unilateral or bilateral fractures of the radius, ulna, or both, who were treated with closed or mini open reduction with a new IM nail between May 2008 and January 2012 and who were followed for a least 1 year. Patients with a Galeazzi fracture, a pathological fracture or patients with non-union after previous surgeries were excluded. All patients were allowed full range of motion without any external support. Primary outcomes were Grace and Eversmann rating, Disabilities of the Arm, Shoulder and Hand (DASH) scores. The 43 enrolled patients (mean age, 37 years; 32 men) had 59 forearm fractures: 14 isolated radius fractures, 17 isolated ulna fractures (2 bilateral), and 28 fractures of both the radius and ulna. Mean time to fracture union was 13 weeks (range 10–14 weeks) for ulnar fractures and 12 weeks (range 10–13 weeks) for radial fractures. No patient had nonunion, deep infections, or radioulnar synostosis. Follow up ranged from 12 to 44 months. Grace and Eversmann ratings were excellent in 38 patients and good in 5. Mean DASH score was 6.5 points.

CONCLUSION

Authors found that interlock nailing in forearm fracture patients proved to be beneficial.

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