



A CLINICAL STUDY OF RADIUS AND ULNA SHAFT FRACTURES IN ADULTS MANAGED BY CLOSED REDUCTION AND INTERNAL FIXATION WITH TENS

Orthopaedics

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ABSTRACT

Introduction: Intermedullary nailing has been in use for a very long time in forearm fractures in children. For adults, it is an upcoming technique. Titanium elastic nailing (TENS) has advantages compared to open reduction and internal fixation (ORIF) with plating.

Aims & Objectives:

1. To study the functional outcome of radius and ulna shaft fracture in adults treated with TENS.
2. To assess the post operative complications.

Material And Methods: A prospective interventional study conducted on 30 confirmed adults patients of both bone forearm fractures AO type 22A3 and 22B3 admitted in department of orthopaedics, basaveshwar teaching and general hospital, MRMC Gulbarga. All the 30 patients underwent closed surgical procedure using TENS. All patients assessed for functional outcome using Anderson's scoring and complication using radiological signs at postoperative 6 months. **Results:** Out of 30 patients, 20 patients had 22A3 type (66.7%) and 10 patient had 22B3 type (33.3%). Clinical and Radiological signs were evaluated at 6 months postoperatively. Four patients had tenderness (13.3%), 26 patients had callus formation (86.7%), four patients had non union (13.3%) 5 patients had angulation (16.7%). In terms of union and functional range of motions using Anderson's et al criteria 13 patients (43.3%) had excellent outcome and 11 patient (36.7%) had satisfactory outcome. **Conclusion:** We concluded that TENS in treating both bone forearm fractures in adults give good functional and radiological outcome. Hence, it should be considered as one of the options in adults with both bone forearm fractures.

KEYWORDS

Radius and ulna diaphyseal fractures, both bone forearm fractures, Titanium elastic nailing, closed reduction and internal fixation, Anderson's scoring

INTRODUCTION:

In the modern and industrialization era increasing incidence of road traffic accidents, natural disasters and industrial accidents, assault leads to varying degree of multiple fractures and higher incidence of morbidity. Of these, the fractures involving both bones forearm form an important part. Even though these fractures can be treated successfully by various surgical methods, the anatomical reduction maintaining the alignment of fracture fragments becomes absolutely essential for effective postoperative function. Delayed medical attention, use of indigenous bandages, native bone centres and associated vascular and nerve injuries contribute to increased incidence of morbidity.

For good functional range of movements to occur, the maintenance of interosseous space is mandatory while fixing these fractures involving. Increasing trends in the incidence of these fractures, accompanied with complicating factors like high degree of comminution, neurovascular injuries, antibiotic resistance of infective pathogens warrants new improvement of the fracture management too.

Better understanding of the pattern of injury, availability of better quality implants, the concept of biological flexible fixation and defined post operative protocols have significantly improved the functional outcomes in patients undergoing surgical procedure¹.

Open reduction and plate osteosynthesis is the gold standard treatment of forearm bone fracture. Closed surgical procedure with titanium elastic nailing system (TENS) has advantages of minimal tissue dissection, shorter operative time, rapid union, excellent recovery of range of motion and better cosmetic outcome compared to ORIF with plating^{2,3}.

The purpose of the present study is to evaluate the functional outcome of radius and ulna shaft fracture in adults treated with TENS.

AIMS & OBJECTIVES

1. To study the functional outcome of radius and ulna shaft fractures in adults managed by closed reduction and internal fixation with titanium elastic nailing system.
2. To assess the postoperative complications.

MATERIALS AND METHODOLOGY:

A prospective interventional study conducted on Confirmed cases of

Radius & Ulna shaft fracture among adults admitted in department of orthopaedics attached to Basaveshwara teaching and general hospital Mahadevappa Rampure Medical College, Kalaburagi in a span of 2 years. All the patients following under the inclusion criteria underwent closed reduction using TENS and assessed postoperatively for functional outcome.

Inclusion Criteria:

1. Radiologically Confirmed Radius & Ulna Shaft fracture
- 2) Age group of above 18 of all genders.
2. Patients who are medically fit and willing for surgery.
3. According to AO (ARBEITSGEMEINSCHAFT FUR OSTEOSYNTHESEFRAGEN) classification type 22A3 & 22-B3

Exclusion Criteria:

1. Open fractures
2. Fracture with neurovascular deficit

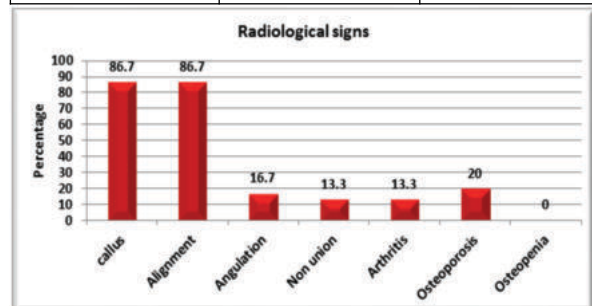
RESULTS:

We have recruited 30 participants for the purpose of the study. The mean (SD) age was 35.5 (14.) years with the minimum of 18 and maximum of 70 years. Majority of the participants (40%) belonged to 18-30 years of age, followed by 7 (23.3%) were 31-40 years, 5 (16.7%) were 51-60 years and the remaining 2 (6.7%) were more than 60 years of age and two-third of patient were men correspond to 66.7% and the remaining one-third (33.3%) were women.

Road traffic accidents was the most common mode of injury noticed in 19 (63.3%) of the participants followed by work place injury was seen in 4 (13.3%). Other mode of injury was assault which was seen in 4 (13.3%) and fall in 3 (10%). Of all the patients 20 (6.7%) were having 22-A3 type fracture and the remaining 10 (33.3%) were having 22-B3 type fracture. Time interval between trauma and surgery was <5 days for majority of the patients (table 1). At 6 months postoperative, Of all the patients, tenderness was present in 4 (13.3%) and 26 (86.7%) did not have tenderness. Of all the patients callus formation was seen in 26 (86.7%). Alignment was present in 26 (86.7%) followed by angulation was present in 5 (16.7%). Non-union was the problem in 4 (13.3%) and arthritis was seen in 4 (13.3%). 6 (20%) had osteoporosis (graph 1). Functional outcome evaluation was carried out using Anderson's scoring after six months. Our evaluation revealed that of all the recruited patients, 13 (43.3%) had excellent outcome followed by 11 (36.7%) had satisfactory, 2 (6.7%) had unsatisfactory outcome. About 4 (13.3%) had failure in our functional evaluation.

Table 1 : Time Interval Between Trauma And Surgery

Time of injury	Number	Percentage
<5 days	22	73.3
5-10 days	6	20.0
>10 days	2	6.7
Total	30	100.0

**Graph 1 :** radiological signs at 6 months postoperatively**DISCUSSION :**

Intramedullary nailing has been in use for a very long time in forearm fractures in children. For adults, it is an upcoming technique. It is a minimally invasive technique. These days inclination is more towards biological fixation and Intramedullary nailing remains at forefront of it⁴. It leads to the preservation of fracture hematoma, and periosteum, and results in good callus formation because of its load-sharing properties^{5,6}. It has added benefits such as less operative time, and low chances of infection⁷.

In our study, a total of 27 patients were included . According to AO classification of both bone forearm fractures ,there are six types of fractures . We considered 22A3 and 22B3 types of fracture cases in our study . where 22A3 is simple diaphyseal fractures and 22B3 is wedge diaphyseal fractures . Majority of our cases where falling under 22A3 type(n=20,66.7%) . In our study, 22 patients were operated within first five days of trauma(73%) , six patients operated in 5-10 days (20%) and 2 patients were operated in 10-14 days period. Mixed results were obtained postoperatively irrespective of time of intervention , this might be explained by the quality of bone in patients and age factor.

We evaluated clinical signs like tenderness and radiological signs like callus formation ,union ,alignment and angulation at 6 months postoperatively. Out of 30 patients , only 4 patients had tenderness postoperatively(13.3%) which correlates with the study done by Hany YC et al¹¹. Most of the patients had callus formation (n=26,86.7%) which indicates good outcome of the TENS procedure in our study group and our results correlates with the study done by Bhuria et al¹².We encountered few complications like non union (n=4,13.3%) , angulation (n=5, 16.7%),arthritis (n=4,13.3%),osteoporosis (n=6,20%)(figure 1,2).

**Fig 1 :** Radiograph at the time of injury**Fig 2 :** Radiograph at 6 months post op

In our study we assessed functional outcome of forearm at postoperatively at 6th month using Anderson's scoring sytem¹³.In our study most of the patients had excellent outcome (n=13,43.3%) , 11 patients had satisfactory outcome (36.7%), 2 patients had unsatisfactory outcome (6.7%) and 4 patients had failure in functional outcome (13.3%). Probable explanation for failure in functional outcome in 4 patients is age factor, poor quality of bone, improper physiotherapy. Our results correlates with the study done by Sanik et al¹⁴. In literature there are only few studies where they have assessed

functional outcome using Aderson's scoring for closed reduction in both bone forearm fractures. In most of the studies they used Anderson's scoring to assess functional outcome in open reduction cases.

CONCLUSION:

In our study we found that the TENS to be a versatile implant . We conclude that Titanium elastic nailing in treating diaphyseal both bone forearm fractures in adults gives good functional and radiological outcomes .TENS should be considered as one of the options in the planning and treatment of bothbone forearm fractures.

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