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Original Research Article.

To Compare Titanium Elastic Nailing and Conservative Management by Plaster Cast in Management of Forearm Fractures

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ABSTRACT

Background: The management of forearm fractures depends on the age, type of fracture and fracture displacement. Long arm cast immobilization remains a viable treatment option for fractures. For fracture patterns, which are unable to be closed reduced to an acceptable position, surgical management is recommended. The present study was conducted to compare the titanium elastic nailing and conservative management by plaster cast in management of forearm fractures.

Materials and Methods: The present study was conducted among 140 patients with displaced diaphyseal forearm fractures. Patients were treated with titanium elastic nail system and conservative management by Plaster cast. Patients who were included for management by conservative methods, immobilisation was done with above elbow POP cast. In surgical management by TENS, Titanium elastic nails of appropriate diameter were placed. In most of the cases, closed reduction was done. Data was collected and the data was analysed in SPSS version 21 for windows. P value less than 0.05 was considered as statistically significant.

Results: In the present study 140 patients were selected with displaced diaphyseal forearm fracture and divided into two groups with 70 patients in each group. In one group patients were treated with conservative method and in the second group patients were treated with TENS. In the TENS group, 84.28 % cases have excellent functional outcome, 8.57% have good and 5.71% has fair outcome and 1.42% had poor outcome. In patients treated conservatively with POP cast, 61.42% cases have excellent functional outcome, 21.42% have good and 12.85% have fair outcome and 4.28% had poor outcome.

Conclusion: The present study concluded that management of forearm fractures with titanium elastic nailing was better as poor outcomes was less and excellent outcomes were more than patients treated with conservative management by plaster cast.

Keywords: Diaphyseal, Forearm Fracture, Titanium Elastic Nail System, Conservative Management, Immobilisation.

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INTRODUCTION

The forearm is considered as a functional joint, as supination and pronation occur in between radius and ulna. For this reason, anatomical or near anatomical reduction after their displaced fracture is a necessity to regain normal function. Forearm fractures are the most common injuries in paediatric age group, accounting 45% of all fractures in childhood. Approximately, 75 to 84% of forearm fractures occur in the distal third, 15 to 18% occur in the middle third and 1 to 7% occurs in the proximal third of the forearm.[1] Conservative treatment remains the mainstay for long bone fractures in children below the age group of six years as the remodelling ability of the immature bone in children is excellent.[2]

Diaphyseal fractures of both-bone forearm are common in pediatric age group. The standard management of these fractures remains conservative treatment with closed manipulation and immobilization with above-elbow plaster cast for 4–6 weeks.[3] Although the fracture unites readily, malunion is quite common. Stiffness of joints and compartment syndrome are other complications of conservative management with plaster cast.[4] Other modalities of treatment have been proposed for the treatment of both-bone forearm fractures in children and adolescents such as closed reduction and K-wire fixation and open reduction with plate fixation. The advent of elastic nail

fixation has revolutionized the treatment of displaced fractures of both-bone forearm. Surgical management with elastic intramedullary nail in pediatric both-bone forearm fracture has been first described by Metaizeau and Ligier.[5] Forearm diaphyseal fractures constitute around 6% of all other children's fractures.[6] The standard management of these fractures remains conservative treatment with closed manipulation and immobilization with an above-elbow plaster cast for 4–6 weeks.[7] Indications for surgical treatment include displaced fracture with unacceptable alignment, unstable fractures, compound fractures, failure of conservative treatment.[8] Surgical treatment with TENS is a minimally invasive procedure that spares physis, provides 3 point fixation and hence mostly does not requires Plaster of Paris (POP) splint/cast, thereby allowing early mobilization to achieve excellent functional outcomes.[9-11] The present study was conducted to compare the titanium elastic nailing and conservative management by plaster cast in management of forearm fractures.

MATERIALS AND METHODS

The present study was conducted in Department of Orthopaedics, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh (India) among 140 patients with displaced diaphyseal forearm fractures. Patients were treated with titanium elastic nail system and conservative management by Plaster cast. Before the commencement of the study ethical clearance was taken from the Ethical Committee of the institute and informed consent was obtained from the patients after explaining the study. Patients with simple fracture, fresh fracture < 1-week, Isolated forearm displaced fracture were included in the study. Patients with compound fracture, complicated fracture, Pathological fracture, Fracture, >1week, other fracture in ipsilateral limb were excluded from the study. Patients who were included for management by conservative methods were given sedation and manipulation and reduction of the fracture was carried out. Then immobilisation was done with above elbow POP cast. The POP cast was removed after 4 weeks. Patients were reviewed. In surgical management by TENS, the patient was put in the supine position on operating table with the affected arm placed on a radiolucent arm table. Titanium elastic nails of appropriate diameter were chosen. The nail diameters were about two-thirds of the medullary isthmus of each bone. Then, the awl was used to make entry point in the bones. When the nails were correctly positioned in the opposite metaphysis, protruding nail ends are cut approximately 1 cm from the bone. In most of our cases, closed reduction was done. In few cases, where closed reduction could not be achieved, mini incision was given over fracture site for the reduction of fracture and internal fixation with titanium elastic nail done. Functional outcome was assessed by price et al. Criteria.[12] Data was collected, and the data was analysed in SPSS version 21 for windows. P value less than 0.05 was considered as statistically significant.

Table 1: Functional Outcome

Functional Outcome	Conservative N(%)	TENS N(%)
Excellent	43(61.42%)	59(84.28%)
Good	15(21.42%)	6(8.57%)
Fair	9(12.85%)	4(5.71%)
Poor	3(4.28%)	1(1.42%)
Total	70(100%)	70(100%)

RESULTS

In the present study 140 patients were selected with displaced diaphyseal forearm fracture and divided into two groups with 70 patients in each group. In one group patients were treated with conservative method and in the second group patients were treated with TENS. In the TENS group, 84.28 % cases have excellent functional outcome, 8.57% have good and 5.71% has fair outcome and 1.42% had poor outcome. In patients treated conservatively with POP cast, 61.42% cases have excellent functional outcome, 21.42% have good and 12.85% have fair outcome and 4.28% had poor outcome.

DISCUSSION

Diaphyseal fracture of both bones of forearm in mature bone is now treated by open reduction and internal fixation. But it is not true for immature bones. Fractures of forearm in children and adolescent are extremely common.[13] In children nearing the adolescent age group, it is difficult to maintain the reduction in the cast. They are less tolerant of a plaster cast or traction and the residual deformity has less potential to remodel. Delayed rehabilitation due to a slower healing process as compared to younger children is also a drawback of conservative management in this age group. Femur fractures in the age group of six to 16 years have been recommended to be fixed with elastic intramedullary nails and have a good outcome with early rehabilitation.[14,15]

In the present study 140 patients were selected with displaced diaphyseal forearm fracture and divided into two groups with 70 patients in each group. In one group patients were treated with conservative method and in the second group patients were treated with TENS. In the TENS group, 84.28 % cases have excellent functional outcome, 8.57% have good and 5.71% has fair outcome and 1.42% had poor outcome. In patients treated conservatively with POP cast, 61.42% cases have excellent functional outcome, 21.42% have good and 12.85% have fair outcome and 4.28% had poor outcome.

Vishwanath C and Satheesh GS obtained excellent functional results in most patients of diaphyseal forearm fractures treated with TENS.[16]

Shalimar Abdullah et al. conducted a study in which he managed forearm fractures in children with cast out of which he got 80% excellent and thus concluded conservative treatment to be a

satisfactory form of treatment in children with steady type forearm fractures in children achieving excellent outcomes.[17]

In a study conducted by Biswajit Sahu et al. conducted a study in patients with fracture of both radius and ulna who were managed by internal fixation with titanium elastic nail, in which, 87.5% of patients showed excellent, 10% showed good, and 2.5% showed fair outcome and concluded operative method to be better than conservative for these fractures.[18]

Allen et al. in his study compared the outcome of plating versus TENs for femur fracture in children between five to 12 years and reported that plates resulted in a longer operative time, increased costs, and equivalent pain compared with TENs and favoured the use of TENs.[19]

Imam MA compares the outcome of spica cast versus TENS in pediatric femoral fractures in patients younger than 16 years and recommended use of TENS for fixation of such fractures.[20]

CONCLUSION

The present study concluded that management of forearm fractures with titanium elastic nailing was better as poor outcomes was less and excellent outcomes were more than patients treated with conservative management by plaster cast.

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