



Comparison of Various Modes of Fixation in Fracture Shaft of Both Bones Forearm

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Abstract

The Study compares the outcomes of fracture shaft of both bones forearm treated by either intra medullary nailing or dynamic compression plating.

Objectives: *To compare the functional outcome of 2 different conventional treatment modalities for fracture shaft of both bones forearm.*

Materials and Methods: *This was a prospective study of 40 cases at Government Medical College, Thiruvananthapuram. 20 patient were treated by dynamic compression plating (group A) and 20 patient by intra medullary nailing (Group B) Results were compared by clinico radiological and functional assessment.*

Result: *Dynamic compression plating gave consistently superior results when compared to intra medullary nailing.*

Conclusion: *Dynamic compression plating gave more anatomical restoration of fracture fragments and resultant better functional results.*

Keywords: *Dynamic compression plating, endosteal union, rotational alignment.*

Background

Fractures of the forearm bones have become one of the most common injuries in the emergency services of the orthopaedic department due to increasing density of road traffic, industrialisation and ever growing geriatric population.

Diaphyseal shaft fractures of radius and ulna pose specific problems not encountered in the treatment of fractures of shaft of other long bones. Here, in addition to restoration of length, apposition and normal axial alignment, correct rotational alignment must also be achieved for a good range of pronation and supination to be restored.

The main operative method in vogue was the intramedullary nailing of such fractures. Recently

dynamic compression plating of such fractures was propounded by AO Group. In this study a comparison between the results of medullary nailing and dynamic compression plating was carried out.

Materials and Method

This was a prospective study of 40 cases at Government Medical College, Thiruvananthapuram. 20 patients were treated by dynamic compression plating (group A) and 20 patient by intra medullary nailing (Group B) Results were compared by clinico radiological and functional assessment.

Cases were allotted to either group at random. Dynamic compression plating was done using AO 3.5 plates and screws. Intra medullary nailing was done using square nails. Average follow up was for a period of 10 months to asses clinical and radiological union.

Results

Age and sex incidence showed that the active young male around 25 years of age was the commonest patient. Mostly, both the of the forearm bones were fractured in both groups.

Table. 1 Bone Affected

| Bone | Group A | Group B |
|--------------------|---------|---------|
| Radius | 6 | 6 |
| Ulna | 4 | 5 |
| Both Radius & Ulna | 10 | 9 |
| Total | 20 | 20 |

Domestic accidents was the major cause in both groups. Fracture were mostly in the middle third of the shafts

Table. 2 Nature of Trauma

| Nature of trauma | Group A | | Group B | |
|----------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| RTA | 4 | 20 | 6 | 30 |
| Industrial Accidents | 2 | 10 | 3 | 15 |
| Assault | 3 | 15 | 3 | 15 |
| Domestic Accidents | 11 | 55 | 8 | 40 |
| Total | 20 | 100 | 20 | 100 |

Table. 3 Level of fracture

| Level of fracture | Group A | | Group B | |
|-------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| Upper third | 6 | 30 | 13 | 65 |
| Middle third | 10 | 50 | 5 | 25 |
| Lower third | 4 | 20 | 2 | 10 |
| Total | 20 | 100 | 20 | 100 |

There was an even mix in the radiological type of fracture in both groups and most of the fractures were fresh at the time of beginning treatment

Table. 4 Radiological type of fracture

| Radiological type | Group A | | Group B | |
|-------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| Transverse | 10 | 50 | 9 | 45 |
| Oblique | 2 | 10 | 6 | 30 |
| Comminuted | 8 | 40 | 5 | 25 |
| Total | 20 | 100 | 20 | 100 |

Table. 5 Status of fracture

| Status of fracture at the time of surgery | Group A | | Group B | |
|---|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| Fresh | 14 | 70 | 15 | 75 |
| Delayed union | 4 | 20 | 5 | 25 |
| Non union | 2 | 10 | 0 | 0 |

The time taken for bony union was significantly lesser for group A and the complication also were much lesser in incidence

Table. 6 Time taken for union

| Time taken for union | Group A | | Group B | |
|----------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| 0-8 weeks | 15 | 75 | 2 | 10 |
| 3-12 weeks | 4 | 20 | 8 | 40 |
| 13-16 weeks | 1 | 5 | 9 | 45 |
| > 16 weeks | 0 | 0 | 1 | 5 |
| Total | 20 | 100 | 20 | 100 |

Table. 7 Complications

| Complications | Group A | | Group B | |
|----------------------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| Non Union | 1 | 5 | 2 | 10 |
| Sup. Infection | 2 | 10 | 1 | 5 |
| Malunion | 1 | 5 | 0 | 0 |
| Implant failure | 1 | 5 | 1 | 5 |
| Poster. interosseous Nerve palsy | 3 | 15 | 0 | 0 |
| Total | 8 | 40 | 4 | 20 |

The results were analysed according to the criteria of Johner R and Wrush S O

Table. 8 Final analysis of results

| Nature of trauma | Group A | | Group B | |
|------------------|-----------------|---------|-----------------|---------|
| | No. of patients | Percent | No. of patients | Percent |
| Excellent | 6 | 30 | 3 | 15 |
| Good | 10 | 50 | 10 | 50 |
| Fair | 3 | 15 | 4 | 20 |
| Poor | 1 | 5 | 3 | 15 |
| Total | 20 | 100 | 20 | 100 |

Table. 10 Results according to the status of fracture

| Status of fracture | Group A | | | | Group B | | | |
|--------------------|-----------|------|------|------|-----------|------|------|------|
| | Excellent | Good | Fair | Poor | Excellent | Good | Fair | Poor |
| Fresh | 5 | 8 | 1 | 0 | 4 | 4 | 6 | 1 |
| Delayed | 0 | 1 | 2 | 1 | 0 | 2 | 2 | 2 |
| Non union | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |

Discussion

The effective management of the fractures of the forearm is a subject of much controversy even today. The ultimate aim of fracture treatment is to get union in the anatomical position with producing any stiffness and ensuring full movements. This study attempted to compare the results of dynamic compression plating and intramedullary nailing.

High velocity injuries are increasing in the modern world causing much comminution and periosteal stripping at fracture site contributing to difficulty in obtaining union even in the presence of best of treatment. Union rates were significantly higher and faster in Group A.

The encountered complication of nonunion and infection could be addressed with the standard protocols of management. Our complication rates and time taken for union were comparable with similar series of Linden, WVD & Larson K, Kristiansen, Olesmd, Swith H, Saga FP.

Conclusion

Incidence of forearm fractures is more common in the 3rd decade and more in males.

Dynamic compression plating group united faster, and had lesser number of complication with overall higher percentage of excellent results.

Dynamic compression plating produce primary or endosteal bone union with reduced need for remodeling

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