Comparative Study of Plating Versus Closed Square Nailing in Forearm Fractures in Andhra Pradesh Population

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Abstract

Background: Fracture of forearm bones impair the supination and pronation movements of proximal and distal end of the forearm. Restriction of these movements leads to difficulty in activities of daily living.

Method: 60 patients were included in the study out of which 30 were treated with plating and screws and 30 were treated with closed square nailing method. The functional outcomes of both patients were compared.

Results: 32 (53.3%) had right side forearm fracture, 28 (46.6%) had left side fracture, 28 (46.6%) had RTA, 32 (53.3%) had indirect injuries, 16 (53.6%) Nailing, 21 (70%) DCP had excellent results, 7 (23.3%) nailing and 2 (6.6%) DCP had poor results.

Conclusion: In the present study it was concluded that plating has good functional end results and is the best technique to treat fracture of forearm bones. Bone is a highly elastic tissue with good healing potential and hence it requires proper tightening and moulding to facilitate proper movements.

Keywords: Road Traffic Accident (RTA), Dynamic compression plate (DCP), Hadden criteria, Nailing, Andhra Pradesh

Introduction

The forearm bones radius and ulna, in combination with proximal and distal radio-ulnar joints allows supination and pronation movements that are important to all of us in usual activities of daily living. Fracture of forearm bones may result in severe loss of function unless properly treated (1). Severe loss of function may result even though adequate healing of the fracture occurs. Hence proper and ideal method of treatment is necessary to get back stability as well as normal range of function. It is difficult to achieve a satisfactory closed reduction of displaced fractures of the forearm bones and if achieved, it is hard to maintain. Unsatisfactory results of closed treatment have been reported to range from 38% to 74%. For this reason, open reduction with internal fixation is routine except for un-displaced fractures. Fractures of both bones or displaced isolated fracture of radius or ulna should be treated by open reduction, plate fixation and cancellous bone grafting whenever there is bone loss(4). Hence attempt was made to evaluate the functional out come in plating versus inter medullary nailing and compare the results considering the bony union and functional range of movements.

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**Material and Methods**

60 (sixty) patients aged between 20 to 40 years who suffered fracture of both bones forearm and visited to department of orthopaedics at Vishwa Bharathi Medical College hospital penkhalapadu RT Nagar, Kurnool, Andhra Pradesh were studied.

**Inclusive Criteria:** Patients aged above 18 years and below 70 years. Diaphyseal fracture of ulna and radius patients fit for surgery and given the consent in writing.

**Exclusion Criteria:**
- Fracture of forearm bones in children and adolescents,
- Pathological fractures.
- Patients unfit for surgery and significant co-morbidities affecting bone healing.
- With associated dislocation or intra-articular extensions.
- Open fracture patients
- Segmental fractures

**Method:** Every patient underwent clinical and radiological examination at the time of admission. Type, site, displacement, rotation and angulations of fractures were determined.

Open reduction and internal fixation by plates and screws was the choice of treatment for all unstable diaphyseal fractures but some of the patients who refused for plating, under went well fitting intra medullary fixation by square nail.

Pre-operatively, the patients were prepared and operative procedures were carried out under strict aseptic precautions. Tourniquet was used in all the cases.

Patient lies on his back with limb resting on the side table. One shot of injectable antibiotic was given half an hour before skin incision. For plating in both bones separate incisions were made, for ulna subcutaneous incision was made and for radius both henry’s and Thompson approach was used. Intra medullary-square Nails were used for fixation in the nailing group.

Follow up – At follow up, examination was recorded, then clinical and radiological examination was carried out.

It was a prospective study between May-2018 to March-2022

**Statistical analysis:** Functional End results of fractures were studied and classified with percentage. The statistical analysis was carried out in SPSS software.

**Observation and Results**

**Table-1:** Demographic profile

<table>
<thead>
<tr>
<th>Details</th>
<th>Total No. of patients: 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side of forearm fractures</td>
<td></td>
</tr>
<tr>
<td>Right side</td>
<td></td>
</tr>
<tr>
<td>Left side</td>
<td></td>
</tr>
<tr>
<td>Mode of Injuries</td>
<td></td>
</tr>
<tr>
<td>(a) RTA (Road Traffic Accident)</td>
<td></td>
</tr>
<tr>
<td>(b) Indirect Injuries</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2:** Functional End results of present study (As per Haddan etal criteria)

<table>
<thead>
<tr>
<th>Results</th>
<th>Present study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nailing</td>
<td>DCP</td>
</tr>
<tr>
<td>Excellent</td>
<td>16 (33.6%)</td>
</tr>
<tr>
<td>Good</td>
<td>7 (23.3%)</td>
</tr>
<tr>
<td>Fair</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Poor</td>
<td>4 (13.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>30 (100%)</td>
</tr>
</tbody>
</table>

DCP = Dynamic compression plate
Discussion

Present study of plating versus closed square nailing in forearm bone fracture in Andhra Pradesh Population. The demographic profile had 32 (53.3%) right side, 28 (46.6%) left side. The mode of injury was 28 (46.6%) RTA, 32 (53.3%) indirect injuries (Table-1). The functional end results of present study was 16 (53.3%) Nailing, 21 (70%) DCP had excellent, 7 (23.3%) nailing, 4 (13.3%) DCP had good, 3 (10%) nailing, 3 (10%) DCP had fair, 4 (13.3%) Nailing, 2 (6.6%) DCP had poor results (Table-2). These findings were more or less in agreement with previous studies (5)(6)(7).

The disadvantage for nailing was more immobilization time required than plating, range of motion was observed after 2 months. After 2 months supination and pronation movements were possible with continuous physiotherapy in nailing patients (8).

If canal is narrow and nail could not be inserted then open reduction was done (9). Olecranon bursitis was observed in patients when the nail was left more than 5mm outside. Radiation exposure to surgeon is more in single nailing procedure than plating fixation (10).

The chances of re-fracture are less in nailing as compared to plating. Removal of implant nail could be done on local injection and also cost effective. Two nails could be inserted in a single fractured bone of forearm.

Intra medullary nails are subjected to smaller bending loads than plates and are likely to fail by fatigue. The reason is that, they are closer to mechanical axis than usual plate position which is on the external surface of the bone (11).

Intermedullary nails act as a load sharing device in fractures with cortical contact. Stress shielding with resultant osteopenia commonly seen with plate and screws, is minimised with intramedullary nails.

It is reported that, open reduction and compression plate fixation have become treatment of choice for diaphyseal fractures of forearm bones in adults (12)(13). Compression plate fixation gives a high rate of union, low rate of complications and the satisfactory return of rotation of forearm. Thus excellent results were observed in plating technique. The advantages of the screw fixation are the reduction

Summary and Conclusion

In the present study it was observed that, plating gives rigid fixation ensures early return of function, less immobilisation time and avoids use of external bracing.

Operative technique of plating is more demanding due to meticulous soft tissue dissection required for exposure.

Nailing is more biological fixation, gives smaller surgical scar, cost effective and could be easy implant removed. It requires image guidance and more radiation exposure to surgeon in multiple nailing.

Ultimately the surgeon is an ideal person to decide the methods to treat the fracture of elbow joint.

Limitation of Study: Owing to the small number of patients, the results are limited and need further larger studies. Long term follow up is need.

This research paper work approved by Ethical committee of Vishwa Bharathi Medical College Penchikalapadu RT Nagar, Kurnool, Andhra Pradesh-518467

Conflict of Interest: No

Funding: No

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