

A comparative study of functional outcome of fracture shaft of humerus treated with humerus nailing vs humerus plating

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Abstract

Background: Internal fixation of fracture shaft of humerus by either dynamic compression plates and screws or interlock nails leads to full, active, pain free mobilization which results in rapid return of normal blood supply to both bone and soft tissues.

Materials and methods: The present study was a prospective randomized study consisted of 30 cases of fracture shaft humerus out of which 15 were treated with dynamic compression plating and 15 were treated with closed interlock nailing at ASRAM Medical college, Eluru, West Godavari district, Andhra Pradesh between October 2020 and October 2022. This study on . Hereby the results are compared with previous standard series.

Results: 30 available patients 15 were in group of plating and 15 were in interlock nailing group. The mean age of patients was 37.3 years with 25 males and 5

females. There were 9 excellent results in the group of plating and 4 in interlocking group. 5 good results in the group of plating and 4 in interlocking group. 5 fair results in interlocking group and none in group of plating. 2 under interlocking group and 1 under plating group got fail.

Conclusion: We therefore conclude that open reduction and internal fixation with a DCP remains a better treatment option for fractures of the shaft humerus. Fixation by IMN may be indicated for specific situations, but is technically more demanding and has a higher rate of complications.

Keywords: IMN, DCP, Humans,

Introduction

The upper limb in humans is highly functional with a long lever arm and highly exposed to external forces. Therefore, it is predisposed to injuries frequently. These

injuries result in a significant morbidity and causes marked functional impairment. Union cannot be imposed, but may have to be encouraged, and when its vascularity is damaged, it often requires the patient care and understanding. Girdlestone(1932).¹

Fracture shaft of humerus is a common occurrence in road traffic accidents, playgrounds, factory, warfield and assault.

In road traffic accidents the fracture shaft of humerus forms the bulk of trauma.

Most uncomplicated diaphyseal fractures of humerus heal by non-operative treatment in acceptable position with satisfactory function.² Operative treatment is kept reserved for complicated fractures which is much simpler than non operative.(JohnCharnley)³. The functional outcomes of fracture shaft of humerus are affected by:

- Type of fracture
- Amount of Comminution
- Quality of bone
- Choice of implant
- Stability of fixation

Internal fixation of fracture shaft of humerus by either dynamic compression plates and screws or interlock nails leads to full, active, pain free mobilization which results in rapid return of normal blood supply to both bone and soft tissues. This reduces the so called Fracture Disease' (Lucas-Championere, 1907).⁴

In the present study, fracture shaft of humerus were treated by internal fixation with Dynamic Compression Plate (DCP) (3.5 mm and 4.5 mm) and cortical screws or with Interlocking nails (Russel Taylor type) and the results were compared in terms of union rate, time to union, incidence of complications and functional outcome and classified the results as Excellent, Good,

Fair and Poor. (Stewart and Hundley's Criteria)⁵ Open Reduction and Internal Fixation with DCP gives satisfactory results but requires large incision, extensive dissection, greater blood loss and increased risk of injury to radial nerve. Plating has increased chances of mechanical failure in osteoporotic bone.

Materials & Methods

Patients attending ASRAM Medical College, Eluru, West Godavari district, Andhra Pradesh between October 2020 and October 2022 were included in present study. The method used for fixation of fracture shaft of humerus was humerus interlock nailing (Russel Taylor type) and Dynamic Compression plating (3.5mm and 4.5mm) and results of both were compared. A prospective study of 30 cases with fracture shaft of humerus included fractures from upper 1/3 i.e. 3cm distal to greater tuberosity and upto 5cm above elbow joint were included in present study .

Inclusion criteria

1. Humeral shaft fractures which required operative intervention and were treated with interlocking or plating procedure.
2. Patients of 18 years or more.

Exclusion criteria

1. Patients aged less than 18 years.
2. Patients having an associated radial nerve palsy.
3. Patients who are medically unfit for surgery.
4. Pathological fractures
5. Segmental fractures

Intra operative pictures



Fig.1: Instrument Set for Interlock Nailing



Fig.2: Instrument Set for Dynamic Compression



Fig.3-Entry Point for the nail



Fig. 4: Inserting the nail



Fig.5: Lateral position for posterior approach



Fig. 6: Posterior approach being done with patient in lateral position

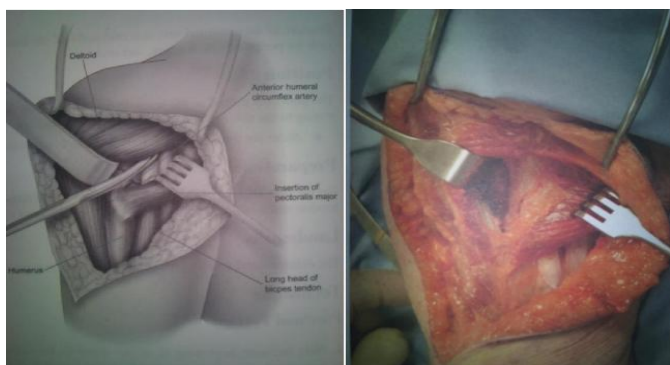


Fig.7: Anterior Exposure for the proximal humeral shaft



Fig. 8: Splitting the superficial heads of triceps longitudinally



Fig. 9: Isolating the radial nerve

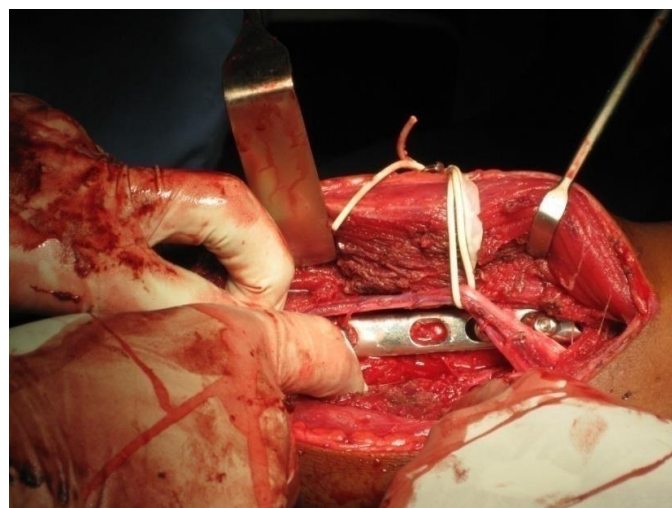


Fig.10: The neurovascular bundle identified and isolated and plate slid underneath.

Results:

Excellent Result: Out of 15 cases of interlock nailing we got excellent results in 4 cases i.e. 27% and 9 cases of dynamic compression plating i.e. 60%. All of these cases with excellent results had good union, no joint stiffness and no pain.

Good Result: Out of the 15 cases undergoing interlock nailing 4 cases (27%) had good results as compared to the 5 cases (33%) in plating group. The interlock nailing patients having good results had mild shoulder joint stiffness (<20%) whereas the patients in the group of plating primarily had elbow joint stiffness.

Fair Results: Results were fair in 5 cases (33%) of interlock nailing whereas none of the patients undergoing plating had fair results.

Fail: Two cases (13%) undergoing interlock nailing had failure as compared to 1 (7%) in the plating group. These cases had non unions the case undergoing failure in the plating group had infective nonunion with persistent pain and moderate (20-40%) restriction of ROM. One case of interlock nailing undergoing failure had nonunion with severe restriction of shoulder

ROM(>40%) whereas the other case had nonunion with persistent pain and moderate stiffness.

The study by Chapman J R shows failure rate of 13% in cases of interlock nailing as compared to 7% in the group of plating.

The study by Kesemenli et al showed failure in 4 cases (12%) in the interlocknailing group as compared to 1 case (4%) in the group of plating. Study McCormak also shows a failure rate of 9.5% in interlock nailing as compared to 4% in plating.

Our results are in line with previous standard studies which too indicate a higher failure rate in interlock nailing.

Discussion

30 cases with fracture shaft of humerus were operated in ASRAM Medical College, Eluru, West Godavari district, Andhra Pradesh between October 2020 and October 2022. Out of these 30 available patients 15 were in group of plating and 15 were in inter locknailing group

The mean age of patients was 37.3 years with 25 males and 5 females. 20 were due to road traffic accidents, 7 fall from height, 2 pathological and 1 assault There was preoperative radial nerve palsy in 2 cases and post operative in 1 case but all of them recovered conservatively. There were 19 patients with type – A fracture (AO Classification), 10 patients with type – B fracture and 1 patient with type C There was only one patient of infective non union in DCP group. There were 2 patients of intraoperative comminution in interlock nailing group whereas no such cases were found in group of plating. Full range of shoulder motion was seen in 9 cases in plating as compared to 4 cases of interlock nailing. There were 9 excellent results in the group of plating and 4 in interlocking group. 5 good results in the

group of plating and 4 in interlocking group. 5 fair results in interlocking group and none in group of plating. 2 under interlocking group and 1 under plating group got fail. The complications were more in the interlocking group with most of them pertaining to poor shoulder function with pain. Though both modalities of treatment offer good union, the rate of secondary complication were more in the interlocking nailing group, which makes dynamic compression plating a more favourable option. We therefore conclude that open reduction and internal fixation with a DCP remains a better treatment option for fractures of the shaft humerus. Fixation by IMN may be indicated for specific situations, but is technically more demanding and has a higher rate of complications.

Conclusion

1. Internal fixation of the fractures shaft of humerus with dynamic compression plating gives a higher rate of union than interlocknailing.
2. There is no significant difference in average time taken for union between the dynamic compression plating and interlocknailing.
3. Restriction of range of motion of adjacent joints is more common with interlock nailing however shoulder stiffness is associated with interlock nailing and elbow stiffness with dynamicplating.
4. Pain is significantly higher in patients with interlock nailing than with dynamic compressionplating.
5. Interlock nailing has a higher complication than dynamic compression plating. Thus dynamic compression plating remains the management of choice for the fractures shaft of humerus.

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