

Comparative Study of Dynamic Compression Plating Vs Interlocking Nail in Fracture Shaft of Humerus

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I. Introduction

Fractures of humerus shaft are very commonly seen now a days of modern World accounting about 3% of all the fractures.¹ Treatment methods are also advancing, initially treated with the help of hanging casts, arm cylinders, collar and cuff slings, then functional cast bracing, U casts, shoulder spica improved results but the long duration of treatment results in adverse effect on economy of the patients.² Nonunion, malunion, limitation of joint motion and progressive degenerative arthritis are commonly seen complications in conservative modes. The present study covers the comparison of results of open reduction and internal fixation by dynamic compression plate with close interlocking nailing in fracture shaft of humerus.

II. Materials And Methods

This was a prospective study conducted in maharajah's institute of Medical College, Vizianagaram during the period of June 2016 to December 2018, after taking ethical committee approval.

The study consist of 11 cases (group A) of fracture shaft humerus treated with closed intramedullary nailing and 11 cases (group B) treated with dynamic compression plating.

Inclusion and exclusion criteria

The inclusion criteria was patients more than 15 years of age of either sex. All cases of compound fractures, poly trauma patients who were initially managed with external fixator and patients below 15 years age were excluded from the study. The exclusion criteria not less than 16 years old, pathological fractures, severely medically ill patients, Neglected fractures, Refractures

All the fractures were managed and stabilized initially with pop back splint, then fractures were classified and managed accordingly with intramedullary nails or DCP.

III. Surgical Approach

For interlocking nail under General anesthesia patient was placed in semi inclined position, A 2 cm incision was given lateral to acromion in the direction of deltoid fibers. Entry made into the medullary canal just medial to the greater tuberosity. Guide wire passed into the proximal fragment under c. arm control, passed to distal fragment. Sequential reaming done over the guide wire. Then nail of appropriate size placed with jig and guide wire taken out. Distal locking done by free hand technique, fracture compression given by back hammering. Wound closed and arm sling applied.

For D.C.P patient was placed in supine position under G.A with shoulder fully adducted and forearm lying on the chest. After proper painting and draping incision was given proximally and distally to fracture site through Henry- Thompson approach. Skin and subcutaneous tissue incised. Deep fascia was incised in the line of skin incision. Biceps muscle identified and retracted medially exposing brachialis and brachioradialis muscle. Biceps and brachialis retracted medially. Radial nerve identified and explored wherever required. Muscle were stripped off by periosteal elevator, fracture reduced and plate of appropriate size fixed with screws. Wound washed with saline and betadine and stitched in layers under drain, crepe bandage applied arm sling given.

Postoperatively limb was elevated over pillow. Broad spectrum I/V antibiotics, anti-inflammatory and analgesic were given. Physiotherapy of shoulder and elbow advised from the next day in group A patients and after stitch removal on 12th day in group B patients. Radiographic examination done on next day to confirm the fixation of reduction. Suction drain removed was removed after 48 hours. Patients were followed up examined weekly interval till union. On every visit radiographs were taken in anteroposterior and lateral view. Radiological sign of union, displacement, angulation were recorded. Clinically patients were examined for any

tenderness, infection, pain. Movements of elbow and shoulder recorded. Results were evaluated according to NEERS classification¹¹.

IV. Results

GROUP A	11 patients	ILN
GROUP B	11 patients	DCP

The youngest patient in our study had age of 18 years and oldest has age of 59 years. Average age was 35.77 years. 80% of fractures occurred between age group of 21-50 years as this age has more outdoor activities. There is male preponderance in our study with male female ratio 7:3 due to more involvement in outdoor activities

Injury was more common on right arm because of conditioned protective reflex in using right upper limb more often in a bid to avoid trauma. As > 80% persons are right handed.8 (36%) cases occurred because of fall from height and 1 (4%) case, mode of injury was railway accident.

SITE OF INJURY	NO. OF CASES	%
MIDDLE THIRD	12	54.54
PROXIMAL THIRD	08	36.36
DISTAL THIRD	02	9.09

TYPE OF FRACTURES	NO. OF CASES	%
TYPE A (SIMPLE)	17	77.27
TYPE B (WEDGE)	04	18.18
TYPE C (COMPLEX)	01	4.54

ABDUCTION POSSIBLE AT SHOULDER JOINT

ABDUCTION at shoulder(deg)	GROUP A CASES NO.	%	GROUP B CASES NO.	%	TOTAL	%
>160	02	18.18	09	81.81	11	50
130-160	06	54.54	02	18.18	08	36.36
<130	03	27.27	0	-	03	13.63
TOTAL	11	100	11	100	22	100

Present study had 90.90% closed fractures and 9.09% (2) compound fractures and all had grade I injury as per Gustilo Anderson classification.6 (27.27%) patients had associated injuries like fracture both bone forearm, radial nerve involvement, fracture metatarsals, head injury, pelvic injury, abdomen injury. In this study majority of the patients were operated within three days (80%) in group A and (73.33%) in group B.

	UNION TIME IN WKS
GROUP A (ILN)	10.6
GROUP B (DCP)	12.2

EARLY COMPLICATIONS GROUP B	PERCENTAGE
SUPERFICIAL INFECTION	9.09 (1)
RADIALNERVE NEUROPRAXIA	18.18 (2)

ROTATIONS AT SHOULDER JOINT

Rotations (deg)	GROUP A CASES NO.	%	GROUP B CASES NO.	%	TOTAL	%
>80	02	18.18	07	63.63	9	40.90
60-80	05	45.45	04	36.36	9	40.90
<60	04	36.36	0	-	4	18.18
TOTAL	11	100	11	100	22	100

LATE COMPLICATIONS	GROUP A	GROUP B
SHOULDER PAIN	72.72%	18.18%
DELAYED UNION	9.09%	18.18%
SHOULDER STIFFNESS	63.63%	0%

There was decrease in abduction and rotation possible at shoulder joint at final follow up in group A patients .

Fig 1 Showing ILN (Interlocking nail)

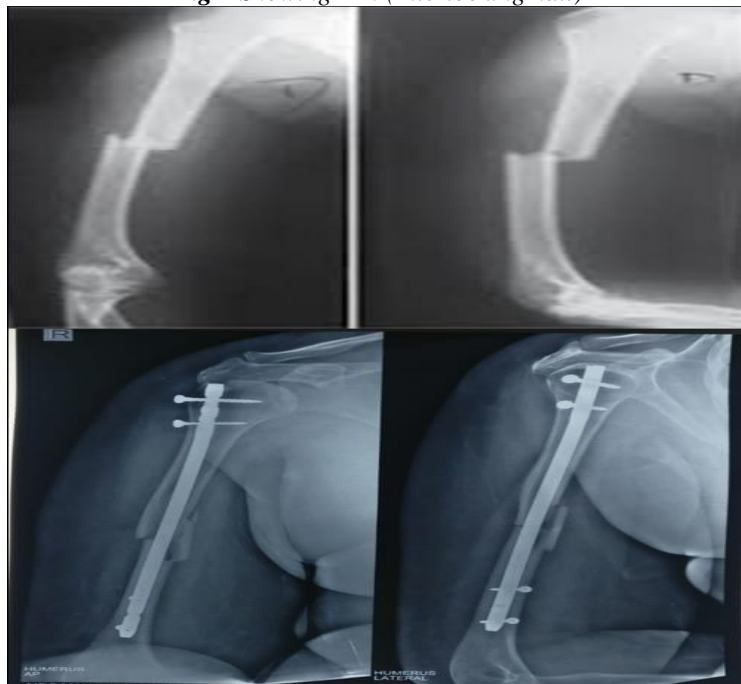


Fig 2 Showing DCP (Dynamic Compression Plating)



V. Discussion

11 of each cases group A and group B were treated with interlocking nail and compression plating respectively with age of youngest patient 18 years and oldest 59years with mean age 35.7. Similar trend was seen in a series of Lalet al³ in which mean was 39.5 years and chachaet al⁴ average being 36.3 years. In this study male/ female ratio being 7:3 similar to study series of Reddy et al⁵ where also m/f ratio was 7:3. The study shows the more involvement of right side with road side accidents (59%) as mode of injury, fall from height (36%) and cases due to railway injuries(4.54%).

P.M Rommens⁷ found 7% rate of open fracture. No patient of group A had superficial infection in comparison with 1 patient in group B; 2 patients in group B has postoperative neurapraxia of radial nerve with no patient in group A, this patient recovered from neuropraxia within 12 weeks of conservative management and no exploration was needed.

8 patients in group A had shown pain in shoulder in comparison to 2 in group B. 07 patients of group A has shoulder stiffness in comparison to no patient in group B, one patient in group A had shown delayed union in comparison to 2 in group B. In this study 63.63% of patients develops shoulder stiffness treated with interlocking nail, same trends seen in study of Suh JT et al⁸ where 50% of patients shows shoulder stiffness. No patient in either group shows nonunion, malunion, deep infection and any instability.

In our study 100% cases achieve union. Ikpeme⁹ noted 100% union of shaft fractures with I.L.N. Willis MP et al¹⁰ reported union rate of 100% in humerus fractures with plating.

VI. Final Results

	GROUP A no. of patients	%	GROUP B no. of patients	%
EXCELLENT	02	18.18	09	81.81
SATISFACTORY	07	63.63	02	18.18
UNSATISFACTORY	02	18.18	-	-

VII. Conclusion

So we concluded that compression plating is gold standard for fracture shaft humerus. While there is no significant difference in the radiological union in the patients treated with interlocking nail and compression plate. But there is significant decrease in movements of shoulder joint; shoulder stiffness and persistent shoulder pain in patients treated with interlocking nail.

References

- [1]. Corroll EA, Schweppe M, Langfitt M, Miller AN, Halvorson JJ. Management of humeral shaft fractures. J Am AcadOrthop Surg. 2013;20:423-33.
- [2]. Canavese F, Marengo L, Cravino M, Giacometti V, Pereira B, Dimeglio A, Origo C, Andreacchio A. Outcome of Conservative Versus Surgical Treatment of Humeral Shaft Fracture in Children and Adolescents: Comparison Between Nonoperative Treatment (Desault's Bandage), External Fixation and Elastic Stable Intramedullary Nailing. J PediatrOrthop. 2016 Jul 29.
- [3]. Lal Y, Sharma S, Krishna LG, Ahmed A: Humeral shaft fractures treated by undreamed interlocking nail. Indian journal of Ortho. 1999;33:23-30.
- [4]. Chacha PB: Compression plating without bone grafting for delayed and nonunion of humeral shaft fractures injury. 1974;5:283-85.
- [5]. Reddy BJ, Athmaram M, Swaroop VS. A clinical study of fixation of fracture of shaft of humerus with interlocking nail. JEMDS. 2015;4:2172-9
- [6]. Changulani M, Jain UK, Keswani T. Comparison of the use of the humerus intramedullary nail and dynamic compression plate for the management of diaphyseal fractures of the humerus. A randomised controlled study. International orthopaedics. 2007;31:391-5.
- [7]. Rommens PM, Verbruggen J, Retrograde locked nailing of humerus shaft fractures. A review of 39 patients JBJS. 1995;77B,84-9.
- [8]. Suh JT, Jung SW, Ku JK, Yoo CI. Operative treatment of the humeral shaft fracture: Comparative study of dynamic compression plate and interlocking intramedullary nail. Journal of the Korean Society of Fractures. 2002;15:391-7.
- [9]. Ikpeme JO, I.M. nailing interlocking of humerus fracture. Experience with Russel Taylor nail. Injury. 1994;25:447- 55.
- [10]. Willis MP, Brooks JP, Badman BL, Gaines RJ, Mighell MA, Sanders RW. Treatment of atrophic diaphyseal humeral nonunions with compressive locked plating and augmented with an intramedullary strut allograft. Journal of orthopaedic trauma. 2013;27:77-81.
- [11]. Neer CS. Displaced proximal humeral fractures. J Bone Joint Surg Am. 1970;52:1090-103.

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