

# Comparison the Outcome of Dynamic Compression Plating with Interlocking Nail Procedure in Patients with Fracture Shaft of Humerus

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## ABSTRACT

**Aim:** To examine the outcomes of dynamic compression plating and interlocking nail procedure in patients presented with fracture shaft of humerus.

**Study Design:** Prospective study

**Place and Duration of Study:** Department of Orthopedic Surgery, Bolan Medical Complex Hospital Quetta from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018.

**Methodology:** Forty four patients of both genders with ages 20 to 60 years presented with fracture shaft of humerus were included in this study. Patients were divided into two Groups Group I contain 22 patients and received dynamic compression plating and Group II contains 22 patients and received interlocking nail treatment. Pre and post-operative radiographical assessment was done. Post-operative complications were noted at 12 day. Functional outcomes were examined by the NEERs criteria.

**Results:** Thirty two (72.73%) patients (17 Group I, 15 Group II) were males and 12 (27.27%) patients (5 Group I, 7 Group II) were females. RTA was the most common mode of injury in 28 (63.64%) patients. Most of the fractures were on right side 30 (68.18%). Transverse fracture was the most common type found in 28 (63.64%) patients. Middle third was the most common level of fracture found in 25 (56.82%) patients. According to the NEER criteria, 81.82% patients shows excellent, 4 patients shows satisfactory with no poor results in Group I and in Group II 5 (22.73%) patients shows excellent, 12 (54.55%) patients shows satisfactory results and 5 (22.73%) shows unsatisfactory results.

**Conclusion:** It is concluded that dynamic compression plating shows better outcomes with less rate of complications as compared to interlocking nail procedure.

**Keywords:** Fracture shaft of humerus, Dynamic Compression Plating, Interlocking Nail

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## INTRODUCTION

A humeral shaft fracture is common to orthopaedic surgeons and represent between 3 to 5% of all fractures.<sup>1,2</sup> Most of them will recover with sufficient conservative attention, however small but reliable numbers of surgeons will require surgery to ensure optimum outcomes.<sup>3,4</sup> Provided the full range of shoulder and Elbow motion and the minimum impact from limited shortening degrees, a large spectrum of X-ray malunion with little functional deficit can be tolerated.<sup>5-7</sup>

The successful treatment of a human shaft split may never end with bony union: the treatment of the orthopaedic surgeon is ideally placed for intervention and for an enhancement of patient life beyond the generally accepted role of the surgeon in the current focus on the "holistic approach to the patient care process. The performance of a human shaft fracture involves anatomic awareness, surgical indications, procedures and implants, and patient function and expectations, as with most orthopaedic injuries.<sup>8</sup>

The present study was conducted aimed to examine the outcomes of dynamic compression plating and compare with interlocking nail procedure for the treatment of fracture shaft of humerus.

## MATERIALS AND METHODS

This prospective/observational study was conducted at Department of Orthopedic Surgery, Bolan Medical Complex Hospital Quetta from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018. A total of 44 patients of both genders with ages 20 to

60 years presented with fracture shaft of humerus were included in this study. Patient's detailed medical history including age, sex, residency, etiology of fracture, type of fracture, side of fractures and severity of fractures were examined after taking informed consent from all the patients. All cases of compound fractures, poly trauma patients who were initially managed with external fixator and patients below 20 years age were excluded from the study. Patients were divided into two equal groups; Group I (dynamic compression plating) and Group II (interlocking nail treatment). Pre- and post-operative radiographical assessment was done. Post-operative complications were noted at 12 day. Functional outcomes were examined by the NEERs criteria. All the data was analyzed by SPSS 20. P-value <0.05 was significantly considered.

## RESULTS

There 32 (72.73%) patients (17 Group I, 15 Group II) were males and 12 (27.27%) patients (5 Group I, 7 Group II) were females. 30 (68.18%) patients (16 in Group I, 14 in Group II) were ages between 20 to 40 years and 14 (31.82%) patients (6 Group I, 8 Group II) had ages 40 to 60 years. RTA was the most common mode of injury in 28 (63.64%) patients (15 in Group I, 13 in Group II), Fall from height found in 10 (22.73%) patients (5 in Group I and 5 in Group II), 6 (13.64%) patients (2 in Group I, 4 Group II) had other causes of fractures in which violent acts, sports activities and unidentified. Most of the patients 30 (68.18%) had right side fracture (16 in Group I, 14 in Group II), 14 (6 in Group I, 8 in Group II) patients had left side fracture. 25

(56.82%) patients 13 in Group I and 12 in Group II had middle third fracture level, 15 (34.09%) patients (7 in Group I, 8 in Group II) had distal third and 4 (9.09%) patients (2 in Group I, 2 in Group II) had proximal third fracture level. Types of fracture was recorded in Group I and Group II as transverse, spiral and oblique in 15 and 13 patients, 4 and 5 patients, 3 and 4 patients respectively. Average union time in Group I was 10.25±2.58 weeks and in Group II it was 12.75±4.36 weeks. Shoulder pain was found in 14 (63.64%) patients in Group II and 4 (18.18%) patients had shoulder pain in Group I. 1 (4.55%) patients had delayed union in Group I and 3 (13.64%) patients in Group II, shoulder stiffness found in 6 patients in Group I and 0 patient in Group II p-value <0.05. According to the NEER criteria, 81.82% patients shows excellent, 4 patients shows satisfactory with no poor results in Group I and in Group II 5 (22.73%) patients shows excellent, 12 (54.55%) patients shows satisfactory results and 5 (22.73%) shows unsatisfactory results p-value <0.05 (Tables 1-3).

Table 1: Demographic information of patients in both groups (n=44)

Variable	Group 1		Group II	
	No.	%	No.	%
<b>Gender</b>				
Male	17	77.27	15	68.18
Female	5	22.73	7	31.82
<b>Age (years)</b>				
20-40	16	72.73	14	63.64
41-60	6	27.27	8	36.36
<b>Trauma</b>				
RTA	15	68.18	13	59.09
Fall	5	22.73	5	22.73
Others	2	9.09	4	18.18
<b>Fracture side</b>				
Right	16	72.73	14	63.64
Left	6	27.27	8	36.36
<b>Level of fracture</b>				
Middle third	13	59.09	12	54.55
Distal third	7	31.82	8	36.36
Proximal third	2	9.09	2	9.09
<b>Fracture type</b>				
Transverse	15	68.18	13	59.09
Spiral	4	18.18	5	22.73
Oblique	3	13.64	4	18.18

P>0.05

Table 2: Average time taken for union and complications found in all the cases

Variable	Group 1 (n=22)	Group II (n=22)	P value
Union of bone (weeks)	10.25±2.58	12.75±4.36	>0.05
5-10	13 (59.09)	9 (40.91)	
11-16	8 (36.36)	10 (45.45)	
>16	1 (4.55)	3 (13.64)	
<b>Complication</b>			
Shoulder pain	14 (63.64%)	4 (18.18%)	<0.05
Superficial infection	-	-	
Non-union	-	-	
Delayed union	1 (4.55%)	3 (13.64%)	
Elbow stiffness	6 (27.27%)	-	

Table 3: According to the NEERs classification comparison between both groups

NEER Classification	Group I	Group II	P value
Excellent	18 (81.82%)	5 (22.73%)	0.02
Satisfactory	4 (18.18%)	12 (54.55%)	0.03
Poor	-	5 (22.73%)	0.001

## DISCUSSION

Overall male patient's rate was high 72.73% as compared to females 27.27%. Thirty (68.18%) patients (16 in Group I, 14 in Group II) were ages between 20 to 40 years and 14 (31.82%) patients (6 Group I, 8 Group II) had ages 40 to 60 years. These results shows similarity to some other studies in which male patients population was high 60 to 75% as compared to females 25 to 40% with mean ages of patients 35.5 years and 39.8 years.<sup>9,10</sup>

In present study road traffic accidents was the most common mode of injury in 28 (63.64%) patients followed by falling from height. Many of previous studies reported road traffic accidents was the most frequent cause of fracture shaft humerus followed by fall from height.<sup>11,12</sup> We found that most of the fractures were on right side. In our study transverse fractures was the most common type of fracture and rated 63.64% followed by spiral and oblique. A study conducted by Yousaf et al<sup>12</sup> reported transverse fracture was the most common type of fracture.

In the present study that an average union time in Group I was 10.25±2.58 weeks and in Group II it was 12.75±4.36 weeks. The overall union rate was 90.91%. These results were comparable to some previous study in which union of bone rate was 85 to 95% with mean time 10.5 to 14.6 weeks.<sup>13-15</sup> This study showed that shoulder pain was found in 14 (63.64%) patients in Group II and 4 (18.18%) patients had shoulder pain in Group I. 1 (4.55%) patients had delayed union in Group I and 3 (13.64%) patients in Group II, shoulder stiffness found in 6 patients in Group I and 0 patient in Group II p-value <0.05. These results shows patients treated with DCP had fewer rates of complications. Some other studies shows similarity that dynamic compression plating for fracture shaft humerus had lesser complications as compared to other modalities.<sup>16,17</sup>

According to the NEER criteria, 81.82% patients shows excellent, 4 patients shows satisfactory with no poor results in Group I and in Group II 5 (22.73%) patients shows excellent, 12 (54.55%) patients shows satisfactory results and 5 (22.73%) shows unsatisfactory results. Thus we found DCP procedure had better outcomes in terms of abduction at shoulder and rotation of shoulder as compared to interlocking nail procedure. These results shows similarity to some other studies in which DCP Group had high rate of excellent results with no poor results 80 to 92% as compared to other techniques.<sup>18,190</sup>

## CONCLUSION

For fracture shaft humerus, the compression plate is a gold standard among patients treated with interlocking nail and compression plate, however there is no substantial difference in radiological union but significant diminution in the movement of the shoulder joint; shoulder stiffness and

chronic shoulder pain in patients receiving interlocking nail procedure.

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