

Frequency of Radial Nerve Injury in Management of Mid Shaft of Humerus Fracture with Dynamic Compression Plate on Anterolateral with Anteromedial Surface Through Henry Approach

Afzal Javid, Zulfiqar Ahmad, Fida Hussain

ABSTRACT

Objective: The objective of this study was to compare the frequency of radial nerve injury in management of mid shaft of humerus fracture with dynamic compression plate on anterolateral with anteromedial surface through henry approach. **Study Design:** Randomized controlled trial. **Settings:** Orthopedic unit, DHQ Hospital, Faisalabad. **Duration:** During 01-08-17 to 31-01-2018. **Methodology:** Patients were enrolled in the study through out-patient department in case of non-union humerus after conservative management and through Emergency department after history of trauma and fracture shaft of humerus. Patients were divided into Group A and Group B using computer generated random number table. Patients in Group A having plate applied on anterolateral surface by surgeon1. Patients in Group B having plate applied on anteromedial surface by surgeon. 2 Information was collected by myself and comprised age, sex, address, contact number and injury to radial nerve as determined by clinical examination on 1st post-op day. All the information was entered in a standardized Performa by Principal Investigator. **Results:** On comparison of radial nerve injury in management of mid shaft of humerus fracture with dynamic compression plate on anterolateral with anteromedial surface through henry approach was 20%(n=7) in Group-A cases and 2.86%(n=1) in Group-B cases had radial nerve injury, p value was 0.02. **Conclusion:** We concluded that the frequency of radial nerve injury is significantly lower in anteromedial plating when compared with anterolateral plating for fracture shaft of humerus using henry approach.

Keywords: Mid shaft of humerus fracture, Management, Dynamic compression plate on anterolateral, Anteromedial surface through henry approach, Radial nerve injury

Corresponding Author

Dr. Afzal Javid

Senior Registrar, Orthopedics
DHQ Hospital, Faisalabad-Pakistan
Contact: +92 333-6866703
Email: dr_afzaal703@yahoo.com

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INTRODUCTION

Humeral shaft fractures are commonly recorded in young population and account for 1.2% of all fractures.¹

Main etiological causes are motor vehicle accident fall, from standing or height, but can be also pathological due to osteoporosis, Paget disease or cancer osteolysis process.²

Humeral shaft extends from major pectoralis insertion to supracondylar ridge. Attachments from major pectoralis deltoideus, rotator cuff muscles influence the degree of displacement of fractures.¹

The type of forces which cause fracture can be compressive, bending, torsional or combination torsional and bending. Depending upon the direction these fractures can be classified as transverse, spiral, oblique, segmental, and comminuted.²⁻³

The humerus is perhaps the easiest of the major long bones to treat by conservative methods.⁴

The conventional treatments are nonsurgical including POP splintage and bracing. Other surgical treatments include plate osteosynthesis using various techniques, locked intramedullary nailing and external fixation.⁴⁻¹⁴

Conservative management may be done in uncomplicated cases¹. Plate osteosynthesis is considered as the gold standard of surgical treatment of the fracture.^{1,2} Fixation of plate is found with higher rate of union however requires extensive dissection and soft tissue stripping. The usual approaches while managing these fractures include posterior and anterolateral.¹

Several studies have documented high success rate with plate osteosynthesis using anterolateral application of plate by open or MIPO technique and with locked intramedullary nailing but incidence of associated radial nerve injury remains a point of concern.^{4-8, 10, 11, 13-14}

In a study by Gouse et al in 2016 showed that the incidence of radial nerve injury was 16% by anterolateral plating of humerus. All of which recovered within 06-month duration.² This was physiological nerve injury which recovered spontaneously (neuropraxia).

In a study by Senthil et al in 2015, it was observed that anteromedial plating resulted in no radial nerve injury either intraoperatively or after the surgery.¹

We anticipate less burden of radial nerve palsy/injury with anteromedial than anterolateral application of plate. Therefore, we want to carry out this study to compare the outcome of these two treatment methods. It will help us to formulate better recommendations for treatment of this condition.

METHODOLOGY

Study Design: Randomized Controlled Trial

Settings: Orthopedic unit, DHQ Hospital, Faisalabad

Duration: 01-08-2017 to 31-01-2018

Methods: We included all patients of isolated fracture shaft of humerus and non-union after conservative management with age range more than 18 years up to 70 years of either gender. All cases with poly trauma, History of previous surgery on same humerus and Pre-operative radial nerve injury were excluded from the study. Patients were enrolled in the study through out-patient department in case of non-union humerus after conservative management and through Emergency department after history of trauma and fracture shaft of humerus. Patients were divided into Group A and Group B using computer generated random number table. Patients in Group A having plate applied on anterolateral surface by surgeon 1. Patients in Group B having plate applied on anteromedial surface by surgeon 2. Information was collected by myself and comprised age, sex, address, contact number and injury to radial nerve as determined by clinical examination on 1st post-op day. All the information was entered in a standardized Performa by Principal Investigator. All the collected info transferred to SPSS version 20 and analyzed accordingly.

RESULTS

Mean age of Group-A cases was 35.14±9.78 years and 33.11±8.06 in Group-B cases. (Table 1), Male cases were slightly higher than females by calculating 74.29%(n=26) in Group-A and 65.71%(n=23) in Group-B, females were 25.71%(n=9) in Group-A cases and 34.29%(n=12) in Group-B cases. (Table 2) Whereas on comparison of radial nerve injury in management of mid shaft of humerus fracture with dynamic compression plate on anterolateral with anteromedial surface through henry approach 20%(n=7) of Group-A and 2.86%(n=1) of Group-B cases had radial nerve injury, p value was 0.02. (Table 3)

Table 1: Age distribution (n=70)

Age (in years)	Group-A (n=35)		Group-B (n=35)	
	No. of patients	%	No. of patients	%
18-40	27	77.14	30	85.71
41-70	8	22.86	5	14.29
Total	35	100	35	100
Mean±SD	35.14±9.78		33.11±8.06	

Table 2: Gender distribution (n=70)

Gender	Group-A (n=35)		Group-B (n=35)	
	No. of patients	%	No. of patients	%
Male	26	74.29	23	65.71
Female	9	25.71	12	34.29
Total	35	100	35	100

Table 3: Comparison of radial nerve injury in management of mid shaft of humerus fracture with dynamic compression plate on anterolateral with anteromedial surface through henry approach (n=70)

Radial nerve injury	Group-A (n=35)		Group-B (n=35)	
	No. of patients	%	No. of patients	%
Yes	7	20	1	2.86
No	28	80	34	97.14
Total	35	100	35	100

P value=0.02

DISCUSSION

A study by Gouse et al in 2016 was in agreement with our results showing that the incidence of radial nerve injury was 16% by anterolateral plating of humerus. All of which recovered within 06 month duration.² This was physiological nerve injury which recovered spontaneously (neuropraxia).

Shao et al¹⁵ reveals overall radial nerve palsy in 11.8%. Another study by Wang et al¹⁶ recorded 4–5% of the cases with radial nerve palsy, but in these studies they did not exclude the cases with a pre-operative deficit. The mean time to clinical recovery was 16 (5–30) weeks.

Shao et al¹⁵ found the frequency of radial nerve palsy more commonly in spiral and transverse fracture patterns and those involving the lower and middle third humeral shaft.

Considering the results of our study in agreement with other studies, the hypothesis of our study “frequency of radial nerve injury is less in anteromedial plating than anterolateral plating for fracture shaft of humerus using henry approach” is justified. However, these findings are helpful for us to formulate better recommendations for treatment of this condition.

CONCLUSION


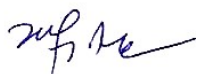
We concluded that the frequency of radial nerve injury is significantly lower in anteromedial plating when compared with anterolateral plating for fracture shaft of humerus using henry approach.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

AUTHORS	Contribution to The Paper	Signatures
Dr. Afzal Javid Senior Registrar, Orthopedics DHQ Hospital, Faisalabad	Principal Investigator	
Dr. Zulfiqar Ahmad Assistant Professor, Orthopedics Aziz Fatima Hospital, Faisalabad	Proof Reading, Data Analysis	
Dr. Fida Hussain Medical Officer, Government General Hospital, Samnabad, Faisalabad	Assisted, Data Collection	