

Monteggia Fracture Dislocation: A Study on the Functional Outcome of Surgical Management in Adults

G. Praneeth Kumar Reddy^{1*}, K. B. Vijaya Mohan Reddy², Y.V. Satyanarayana³

¹Assistant Professor, Department Of Orthopaedics, Kurnool Medical College, Kurnool, Andhra Pradesh

²Associate Professor, Department Of Orthopaedics, Kurnool Medical College, Kurnool, Andhra Pradesh

³Assistant Professor, Department Of Orthopaedics, Kurnool Medical College, Kurnool, Andhra Pradesh

Received: 25-10-2023 / Revised: 23-11-2023 / Accepted: 26-12-2023

Corresponding Author: Dr. K.B. Vijayamohan Reddy

Conflict of interest: Nil

Abstract:

Background: Monteggia fractures account for around 1% to 2% of all forearm fractures. In the treatment of Monteggia fractures, early identification, anatomical reduction, and stable internal fixation are the most critical factors. This study was conducted to study the clinical profile and functional outcome of Monteggia fracture dislocation.

Methods: In a prospective study from May 2020 to May 2023, eighteen adult patients with Monteggia fracture were admitted and treated by closed reduction of radial head and compression plate fixation of ulna. Clinical details, details of management and outcome were noted.

Results: In our study, majority of the patients were males. Majority of the patients were in the age group of 31-40 years with road traffic accidents being the commonest mode of injury. 67% of patients had type-1 fracture-dislocation. (78%) patients had union in less than 4 months. Using Anderson scoring system, we achieved 67% excellent results, 28% satisfactory result and 5% unsatisfactory in study case. The complication encountered were superficial infection in 2 patients.

Conclusions: The procedure of early closed reduction of the radial head and open reduction and internal fixation of the ulna with a compression plate is a simple and efficient way of treating Monteggia fracture dislocation in adults, with excellent functional outcomes.

Keywords: Monteggia fracture dislocation, outcome, Open reduction and internal fixation of ulna fracture, closed reduction of radial head.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

A Monteggia fracture is a fracture of the ulna accompanied by ligamentous failure of the proximal radius and dislocation of the radial head. [1-3] Monteggia fractures account for around 1 to 2 percent of all forearm fractures. [4]

Bado divided Monteggia lesions into four separate groups. [5] Type I is a fracture of the top part of the ulnar diaphysis with accompanying anterior dislocation of the radial head. Type II is a fracture of the ulnar diaphysis with posterior angulation and posterior dislocation of the radial head. Type-IV is a fracture of the proximal third of the radius and ulna at the same level with anterior dislocation of the radial head. Type-III is a fracture of the ulnar metaphysis distal to the coronoid process with lateral dislocation of the radial head. Type I lesions are the most prevalent, followed by types III and II. Type IV lesions are the least frequent.

Persistent radial head dislocation results in a worsening valgus deformity of the elbow, which

damages either the ulnar or radial nerve. The range of motion is constrained due to the radial head's restriction. Long-term fracture-dislocation of the Monteggia can develop in secondary degenerative arthritis [6]. The purpose of the present study was to evaluate the efficacy of surgical treatment by open reduction and internal fixation of Monteggia fracture dislocation, assess the union of fracture, treatment-related problems, and functional outcome of the results.

Material and Methods

The present study was conducted in the Department of Orthopaedics, Government General Hospital, Kurnool during the study period of. During this period, 18 cases of Monteggia fracture dislocation were studied. Ethical Committee approval was taken from the Institutional Ethical Committee Board and consent was taken from all the participants. The inclusion criteria were patients with a fracture of the proximal ulna together with a

dislocation of proximal radioulnar joint; patients who gave their consent to undergo the procedure, the exclusion criteria included elderly patients, patients with neurovascular deficiency and patients medically unfit for surgery.

The dislocation of the radial head was evaluated using standard anteroposterior and lateral radiographs of the elbow and forearm to confirm the diagnosis and determine the type of fracture. According to Bado's [5] categorization, fractures were classified by assessing the site, displacement, and angle of ulna and/or radius fracture dislocation.

Surgical Management: For each patient, standard preoperative testing was performed. Surgical consent was acquired. All surgical procedures were performed utilising general anaesthetic and tourniquet. First, the dislocation of the radial head was attempted to be reduced by traction on the forearm and counter traction on the arm, followed by bending of the elbow to 110-120 degrees.

The displaced radial head was treated with the closed reduction approach. 3.5mm open reduction and internal fixation of the ulna. The dynamic

compression plate and screws were inserted while the patient was under general anaesthesia (GA) and under tourniquet ischemia control.

Data Collection Procedure: The patients' demographic information, medical history, clinical characteristics, and laboratory and radiographic examination results were recorded. In addition, management and outcome details were recorded. The duration of patient follow-up was six months.

Data analysis: Data entry was entered in Microsoft Excel 2010 and analysed using Statistical Package for Social Sciences (SPSS) v 20.0. Data were summarized as mean and SD or frequency and percentage

Result:

1. Age Incidence: The age of these patients ranged from 21-60 years with fracture dislocation being most common in 2nd and 3rd decade In this series 7 (35%) patients were between 21-30years, 8(40%) patients between 31-40 years, 3 (15%) between 41-50 years, 1(5%) patient between 51-60 years and patients above 60 years were 1 (5%) (Table 1)

Table 1: Age wise distribution of study participants

Age	Frequency	Percentage
21-30	8	44
31-40	7	39
41-50	2	11
51-60	1	6

2. Sex Incidence: Out of 18 patients 10 (56%) were male and 8 (44%) were female showing male preponderance (Fig 1)

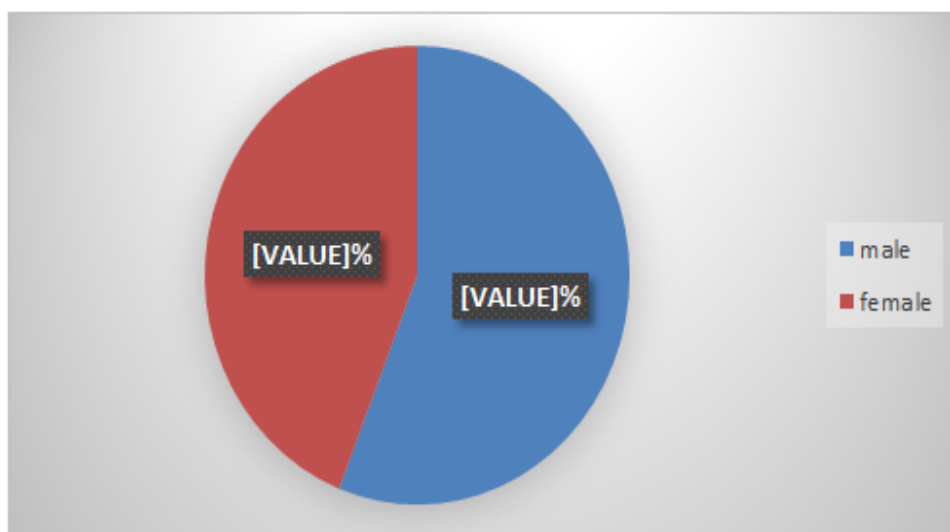


Fig 1: Sex wise distribution of study participants

3. Side Effected: In this study, 11 (61%) cases and 7 (39%) cases presented with monteggia fracture dislocations on the right and left side of the patient respectively (Table 2)

Table 2: Distribution of study participants with side of Injury

Side	Frequency	Percentage (%)
right	11	61
left	7	39

4. Mode of Injury: In our study, there were 8 (44%) patients with road traffic accidents, 7 (39%) patients with fall and 3(17%) patients with violence. (Table 3)

Table 3: distribution of study participants with mode of injury

Mode of Injury	Frequency	Percentage (%)
RTA	8	44
Fall	7	39
Violence	3	17

5. Type of Fracture: In the present study, 12 (67%) of the cases were of type I Bado's classification, 3(16.5%) of cases type II, 3 (16.5%) type III and none in type IV. (Table 4)

Table 4: distribution of study participants with type of fracture

Bados classification	Frequency	Percentage (%)
Type I	12	67
Type II	3	16.5
Type III	3	16.5
Type IV	-	-

6. Duration of Fracture Union: 14 (78%) patients had sound union in less than 4 months, 4 (22%) had union between 4-6 months. (Table 5)

Table 5: Distribution of study participants with duration of fracture union

Duration of fracture union	Frequency	Percentage (%)
< 4 months	14	78
4-6 months	4	22

7. Functional Outcome: The outcome of operation was excellent in 67% of cases, satisfactory in 28% of cases, unsatisfactory in 5% of cases. There were no failure cases. (Table 6)

Table 6: Distribution of Study Participants with Functional Outcome

Results	No. of cases	Percentage (%)
excellent	12	67
satisfactory	5	28
Unsatisfactory	1	5
Failure	-	-

8. Complications: Two patients developed superficial infection which resolved on further treatment.

Discussion

The majority of participants in this study were male (61.2%), as opposed to female (39%) participants. The majority of study participants were males (65%) as opposed to females (35%), supporting the present study's conclusions. [7] Males comprised for eighty percent of the participants in other studies, compared to twenty percent of women. [8] 45.16 percent of the participants in the study were between the ages of 21 and 30, while 29 percent were between 31 and 40 years old. Approximately 2% of the participants in the study were over the age of 50. In additional research, the majority of individuals were between the ages of 21 and 30, followed by those between 31 and 40. [9,10] In the majority of cases, fractures were caused by road traffic accidents, which accounted for 45 percent of the cases, followed by falls on outstretched hands, which accounted for 39 percent of the cases, and violence, particularly beatings with sticks, which accounted for 16 percent of the cases. In a study

conducted by Konrad et al., the leading cause of fractures (51%) was motor vehicle accidents, which is greater than the current study, followed by falls (19%), which is less than the current study. [7]

According to the Bados classification, 67.8% of the patients fell into the Type I category. There was a 16.1% incidence rate for both Type II and Type III, however nobody was categorised as having Type IV. According to the Bados classification, the majority of patients in a prior study (59%) were classified as Type II, but the majority of patients in the present study were Type IV. 3% of the study's participants were categorised in a previous study that was not supported by the current study's findings. [7] Similar to the present study, the majority of participants in prior investigations were classified as Type II. [11] In the majority of instances (61.3%), the operation resulted in excellent outcomes. The present study's findings were corroborated by another study in which 84 percent of participants had an outstanding functional outcome, which was comparable to the present study's results. [12] Similarly positive results were obtained in 81 percent of research

participants in other studies with similar results. [13]

In our study, 15% of patients had a superficial infection and 5% did not heal. In studies conducted by Reckling FW, [14] 6.25 percent of patients developed proximal radioulnar synostosis, 6.25 percent did not heal, and 31.25 percent had malunion. David Ring [15] recorded 6.25 percent cases of proximal radio ulnar synostosis, 8.3 percent nerve palsies, 2.1% non-union cases, and 4.75 percent delayed union cases. 7.5% delayed union, according to Chapman MW [16] In the present study, excellent outcomes were observed in 67% of instances, while unsatisfactory outcomes were observed in 5% of cases.

Conclusion

The present study concludes that the technique of early closed reduction of the radial head and open reduction and internal fixation of the ulna using a dynamic compression plate is a simple and effective method of treating fracture dislocation in adults with an excellent functional outcome.

References

1. Ring D, Jupiter JB, Waters PM. Monteggia fractures in children and adults. *J Am Acad Orthop Surg.* 1998; 6:215-24.
2. Boyd HB, Boals JC. The Monteggia lesion: a review of 159 cases. *Clin Orthop.* 1969; 66:94-100.
3. Broberg MA, Morrey BF. Results of delayed excision of the radial head after fracture. *J Bone Joint Surg [Am].* 1986; 68:669-74.
4. Reckling FW. Unstable fracture-dislocations of the forearm (Monteggia and Galeazzi lesions). *J Bone Joint Surg Am.* 1982; 64(6):857-63.
5. Bado JL. The Monteggia lesion. *Clin Orthop.* 1967; 50:71-86
6. Najd Mazhar F, Jafari D, Shariatzadeh H, Dehghani Nazhvani H, Taghavi R. Surgical Outcome of Neglected Monteggia Fracture-Dislocation in Pediatric Patients: A Case Series. *Journal of Research in Orthopedic Science* 2019; 6(1):e83225.
7. Konrad GG, Kundel K, Kreuz PC, Oberst M, Sudkamp NP. Monteggia fractures in adults. Longterm results and prognostic factors. *J Bone Joint Surg.* 2007; 89(3):354-60.
8. Chagou A, Rhanim A, Berrada MS. The Monteggia fracture: series of 20 cases. *Pan African Med J.* 2014; 19:1-5.
9. Jupiter JB, Leibovic SJ, Ribbans W, Wilk RM. The posterior Monteggia lesion. *J Orthop Trauma.* 1991; 5:395-02.
10. Guitton TG, Ring D, Kloen P. Long term evaluation of surgical treated anterior Monteggia fractures in skeletally mature patients. *J Hand Surgery.* 2009; 34:1618-24.
11. Konrad GG, Kundel K, Kreuz PC, Oberst M, Sudkamp NP. Monteggia fractures in adults. Longterm results and prognostic factors. *J Bone Joint Surg.* 2007; 89(3):354-60.
12. Suarez R, Barquet A, Fresco R. Epidemiology and treatment of monteggia lesion in adults: series of 44 cases. *Acta Ortop Bras.* 2016; 24(1):48-51.
13. Jaind M, Endler AWG, Kovar FM. Clinical Outcome of Monteggia Fractures – A Median Observation Time of 12 Years. *Ann Surg Int.* 2016; 2(6):1-6.
14. Reckling FW. Unstable fracture dislocations of the forearm (Monteggia and Galeazzi Lesions). *J Bone Joint Surg.* 1982; 64-A: 857-63.
15. Ring D, Jupiter JB, Simpson NS. Monteggia fractures in adults. *J Bone Joint Surg. Am.* 1998; 80A:1733-44.
16. Chapman, Michael W, Bruce A, Mallin, David TS. Fractures of the shaft of radius and ulna. In: Michael W, Chapman. *Operative orthopaedics.* 2nd Ed. Philadelphia: Lippincott; 1993; 1:489-502.