



## COMPARISON OF CLINICAL AND FUNCTIONAL OUTCOME IN MONTEGGIA FRACTURE: MANAGED WITH RUSH NAIL COMPARED WITH MANAGED BY PLATTING

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### ABSTRACT

**Introduction-** Monteggia is a fracture of the proximal third of the ulna with dislocation of the radial head from both the proximal radioulnar and radio-capitellar joints. At present in most case scenario all the monteggia fractures in adults operated with ORIF plating but hereby we have study about monteggia fracture managed with CRIF with rush nail compared with ORIF and plating. **Aim-** This study aimed to see the clinical and functional outcome of monteggia fracture fixation with Rush nail compared to plating in adult. **Material and Method-** A prospective study was conducted over 6 months of a total of 30 patients with monteggia fracture operated with rush nail and 30 patient operated with plating. Patients were divided by randomized controlled trial. All these 60 patients were followed up for mean duration of 6 months. **Results-** The postoperative Mayo Elbow Performance Index at the time of follow-up ranged from 65 to 100, with twenty-two excellent, five good, three fair, and no poor results in operated case with rush nail and twenty-three excellent, four good, three fair, no poor result in operated case with plating. The radial head remained in a completely reduced position in twenty-five patient (86%) and was subluxated in five patients (14%) in operated case with rush nail and radial head completely reduced position in twenty-eight patient (94%) and was subluxated in two patient (6%) in operated case with plating at the time of the latest follow-up. Radiographically, there were twenty-six good, four fair, and no poor results operated with rush nail. A good radiographic result was obtained in all of the patients who had undergone open reduction and plating within three years after the injury. **Conclusion-** In overall comparison of clinical, functional and radiological outcome it was found that Rush nail gives superior results than plating.

**KEYWORDS :** Rush nail and plating, Mayo index, radial head subluxation, infection, non-union

### INTRODUCTION

Most of pediatric monteggia fracture has been managed by closed reduction, the controversy remains in adults to opt closed method or open method for reduction and fixation. At present, most of monteggia fracture has been operated with ORIF plating, but as we have taken follow up operated case of monteggia fracture, many patient had one of the complications from infection, pain, poor range of motion and early arthritis. That draw our attention to compare functional, clinical and radiological outcome in monteggia fracture operated with ORIF plating and operated with rush nail. As the monteggia fracture operated with closed reduction internal fixation have some complications like radial head subluxation, delayed union or non-union, arthritis most of surgeons turns towards ORIF plating. But ORIF plating had its own complication like infection, pain, swelling, poor range of motion, revision surgeries open debate for monteggia fracture that it can be operated with CRIF (rush nail), Which don't have complications like ORIF Plating.

### MATERIALS AND METHODS

A prospective study was conducted in our institution over six months of a total of 60 patients with monteggia fracture. Patients were divided into two groups by randomized controlled trial. Group 1 included 30 patients who were treated with closed reduction and rush nail. Group 2 included 30 patients who were treated with ORIF plating. All these 60 patients were followed up for mean duration of months.

### Inclusion Criteria

1. age group of patients more than 18 years
2. closed unstable monteggia fracture with one or more following findings
  - fracture with intra-articular extension
  - dorsal comminution
  - unstable radial head
  - displaced fractures

### Exclusion Criteria

- age group of patient less than 18 years.
- patient not giving consent.
- compound fracture.
- patients having other comorbid/pathological conditions in the same limb
- patient having any operative history in same limb
- systemic disorder

Operative technique for each group was as follows

### Group 1

Surgery was performed under brachial block with the patient in simple table supine position. Anatomical reduction was achieved by manual traction and forearm mobilization. Radial head was manipulated and placed under anatomically reduced position.

We use Rushnail for maintaining axial length and reduction for proximal ulna fracture inserted under image intensifier placed to maintain reduction and control displacement of fracture.

Care was taken on the rush nail placement to avoid injury to soft tissues and superficial neurovascular structures. Patients were encouraged to start active mobilization of fingers and wrist on the second postoperative day. Dressing done and above elbow slab was given to prevent further displacement of fracture.

Follow up was at one week, then every weeks for 4 weeks, and then at 3 months and 6 months for final evaluation and Above elbow slab was removed after 1 to 1.5 month and active mobilization exercises were started 4 to 6 weeks postoperatively depending on the patient's co-operation.



1



**2**

**Group 2**

Patients with Monteggia fractures were treated with open reduction and internal fixation (ORIF) with plating. Surgery was performed under brachial block, patient in lateral position. All patients received prophylactic dose of intravenous antibiotic preoperatively. The fracture was exposed through posterior approach then open reduction internal fixation was done by using single dynamic compression plate which fixed by cortical screws. During fixation by plating avoid fracture gap and translation, because that can lead to non-union and malunion. Only 2mm gap can be compressed by dynamic compression plate, more than that lead to non-union complication. Utmost care should be taken for ulnar malrotation, while fixing fracture. If even after ORIF plating, there is residual radial head subluxation or dislocation, then extra incision can be made on radial head. Elbow extension flexion should be done to check for radial head stability. Passive elbow exercise should be started on 2<sup>nd</sup> post operative day and after 2 weeks active mobilization should be done.



Standard anteroposterior and lateral radiographs were obtained and evaluated for fracture healing, non-union, malunion, loosening of implant, loss of reduction and radial subluxation. Clinical examination included by pain, functional range of motion, stability, functions of elbow according to the Mayo score. The criteria for radiographic healing were when all fragments showed substantial cortical continuity.

**RESULTS**

Mean operation time was 40 minutes in group 1 (range 30-50 Minutes) and 120 minutes in group 2 (100 -140 minutes) In group 1, the average blood loss during surgery was 20 ml (range 10-30 ml), whereas in group 2 it was 300 ml (range 200- 600ml). Both groups received broad spectrum antibiotics.

The average age of the patient was 30+/-6 in both the groups. Group 1 had 18 males (74%) and 12 females (26%) whereas Group 2 had 22 males (86%) and 08 females (14%). Over- all 40 patients (66%) had history of road side accident while 20 patients had history of fall, following which were diagnosed by fracture Monteggia. All fractures were classified as per the Bado classification.

Postoperatively no major complication was encountered intra-operatively. One female patient had tachycardia due to excessive blood loss, which was managed with blood transfusion. Post op complications were noted in 06 patients in group 1 and 12 patients in group 2. In group 1, in 02 patient surgical site infection noted, 04 patients had malunion (2 patients with type 2 fracture). Patients with infection were treated with daily dressing and antibiotics. The range of movements was acceptable in patients in whom malunion had occurred, so no further intervention was done. In group 2, 2 patients (with type-2 fracture) had nonunion, 08 patients had infection. For patients with nonunion, bone grafting with plating was done in group 1. Patients with infection were treated with antibiotics after obtaining culture sensitivity report. Mean time for radiology union in group 1 was 12 weeks while it was 8 weeks in group 2 patients. Mean Mayo score at final follow up was 91 in group 1 patients while it was 82 in group 2 patients. As per the Mayo scoring system; 24 patients (80%) in group 1 had excellent results, 06 patients (20%) had satisfactory Results. For Group 2, as per Mayo scoring system 20 patients (66%) had excellent results, 08 patients (25%) had satisfactory results, 2 patients (09%) had unsatisfactory result with poor outcome.



**Group 1- Functional Outcome**



**Group 2- Functional Outcome**

**DISCUSSION**

Monteggia fractures require surgical treatment for better outcomes as they are one of the most difficult fractures to treat. These are common both with high energy trauma as well as simple fall in elderly patients with osteoporosis making these fractures difficult to manage conservatively because of their anatomical location. Although fracture union has been a problem in displaced Monteggia fractures, Surgical procedures like Rush nail has the advantage of less soft tissue damage, less blood loss but do not ensure anatomical reduction and has limitations such as delayed mobilization and longer period of recovery whereas pre-contoured plate has revolutionized the treatment of Monteggia fracture with better results in respect with higher rate of union, especially in osteoporotic bone, more stable anatomical reduction which is of great importance in any surgery, with ease of reconstruction of comminuted irreducible fractures. It has disadvantage of excessive soft tissue dissection and blood loss, risk of

injury to neurovascular structure and increased higher risk of infection. However long-term results of Monteggia fractures managed by plate are lower as compared with Rush nail. Higher Mayo score with equal ROM was observed in patients of Group 1 as compared to Group 2 operated type I, type II. In the present study it was concluded that though plate provides stable fixation and anatomical reduction but there is more chance of infection, PIN Palsy and extensive soft tissue damage. In case of closed reduction by Rush nail shows better functional outcome despite of delayed mobilization and there is less risk of neurovascular damage, blood loss and infection and less intra-operative time.

## 5. CONCLUSION

Although Radiological results are slightly better with Plating than Rush nail but functional outcomes are equal with Rush nail and plating but more complications occur in case of plating than Rush nail.

As other medical co-morbidities accompany elderly patient and are fitness for anesthesia fitness is sometimes in question, Rush nail is preferred. In conclusion it was found that Rush nail for Monteggia fractures type 1, 2 gives superior results than plating in case of Monteggia fracture.

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