

NEGLECTED MONTEGGIA FRACTURE: EXPERIENCE IN ELEVEN PATIENTS

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ABSTRACT

Objectives: To evaluate surgical options in the treatment of missed Monteggia fracture dislocation.

Study Design: Case series

Place and Duration of the Study: CMH Rawalpindi from May 2007 to August 2009.

Patients and Methods: We have presented our surgical experience in 11 patients who reported to CMH Rwp from May 2007 to August 2009. They were treated by close reduction or surgically depending upon the patient age and delay. Boyd's approach was used for open reduction of the radial head in some cases. Postoperatively they were evaluated by Kim's elbow performance score

Results: Patients were all boys. Those below 12 years of age were included in the study. Excellent to good results were observed in those who were treated by open reduction of ulnar fracture by callus trimming with indirect reduction of radial head via interosseous membrane traction.

Conclusion: Single forearm bone fracture should be treated as fracture dislocation until proved by adequate radiological survey and clinical examination.

Keywords: Monteggia, ulnar osteotomy, radial head.

INTRODUCTION

Normal function of forearm requires intact skeletal structures, interosseous membrane, proximal and distal radioulnar joints and neurovascular structures to put hand more effectively in space. Acute injuries if not treated early and in an integrated manner can result in chronic disorder of forearm interfering stability, strength and rotatory motion¹⁻³. One such lesion is Monteggia fracture dislocation. In this dual lesion with fracture /plastic deformation of upper half of ulna is associated with proximal radioulnar dislocation or subluxation⁴. When ulna becomes displaced the radius follows the lower fragment because of its strong attachment to interosseous membrane^{4,5}.

However missed Monteggia has difficult treatment but they can have good results. Point for emphasis is that single bone fracture in the forearm should always be treated as fracture-dislocation until proved other wise by adequate clinical/ radiological survey^{5,6}. A series of 11 patients operated in CMH Rawalpindi from May 2007 to Aug 2009 is presented.

PATIENTS AND METHODS

We studied 11 patients which were cases of missed Monteggia fracture dislocation

reporting to Combined Military Hospital Rawalpindi from May 2007 to May 2009. Although rare but we have received 11 cases in our tertiary care hospital CMH which has a large draining area especially from Kashmir.

They reported to us not because of pain but because of limited range of motion, deformity of elbow due to radial head prominence, as fracture ulna with POP back slab elsewhere, treated initially by bone settlers. All patients below 12 years were included in the study and those above 12 with neglected Monteggia were decided for follow-up and radial head excision later if becomes symptomatic.

They were treated by close methods or surgically depending on patient age and time since injury. Elbow was evaluated by four parameters pain, deformity, range of motion and function with 25 each for a perfect score of 100 points.

Deformity; no concern 25, minor concern 15, major concern 0

Pain; No pain 25, mild pain 15, pain limiting activity 0

Range of motion-[sum of flexion extension], supination pronation arcs; more than 250, 250-200, less than 200

Function; comb hair, feed self, open door knob, hold on to over head rail, put on shoes with hands ~five points for each task.

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Total elbow performance score was graded as excellent (90 or more), Good (89-75), fair (74-60), poor (less than 60).

In five cases who reported in 2-4 weeks time, open reduction through incision along subcutaneous border of ulna callus trimming, correction of ulnar mal-alignment and fixation with 06 hole semitubular plate was done and we were able to do indirect reduction of radial head through interosseous membrane attachment to distal fragment as shown in Fig.1. In one case we could not achieve radial head reduction so open reduction of radial head through Boyd's approach and transcapitellar Kwire fixation was done as shown in Fig.2.

Three cases who reported after 02 months to 01 year after injury were treated surgically. In our department we believed that correction of shortening and angular deformity of ulna is fundamental in attaining stable reduction of radial head. They were operated through Boyd approach with patient in supine position. First osteotomy of the ulna at fracture site, correction of mal-alignment, maintaining ulnar length, open reduction of radial head, annular ligament reconstruction with triceps fascial loop and transcapitellar K-wire fixation of radial head. Ulnar osteotomy was also fixed with K-wire in one case as shown in Fig.3 and with plate in two other cases. Postoperatively POP back slab was given for 4 - 6 weeks.

One case who only presented with isolated radial head dislocation type III open reduction through Boyd's approach and transcapitellar K-wire fixation was done.

Residual radiocapitellar mal-alignment is usually due to residual mal-alignment of ulna and does not necessarily indicate need for open reduction of radial head.

In another case who was operated twice with transolecranon and transcapitellar K-wire fixation followed by pintract infection which were removed after 03 weeks. He ended up in chronic Monteggia lesion with deformed dislocated radial head resulting in limited supination, pronation and flexion.

After close reduction they had their first visit after 03 day, then after 01 week and followed after 04 weeks.

After open reduction and K-wire fixation of radial head, bock slab and K-wire removal was done after 04 weeks. Patients were booked for plate removal after 09 months.

K-wire removal for ulnar osteotomy was done when there are radiological signs of union.

RESULTS

Duration of delay ranged from three days to 1 year. Mean age at the time of reconstruction was 6.5 years.

There were 09 patients of type I and 02 type III in accordance with Bado's classification. They were all boys. They were treated by close methods or surgically depending on patient age and time since injury. Post operatively patients were assessed by Kim's elbow performance.

Mean time of follow up was 06 months. Two cases who reported at 3rd and 5th day post injury were treated by close reduction maintaining ulnar length, reducing radial head, kept in 100-110 flexion with full supination and above elbow cast for 5-6 weeks.

Kim's elbow performance score was used to evaluate postoperative results. Excellent functional results were obtained in patients with close reduction and in those where ORIF of ulna was done after callus trimming.

Good functional results were obtained in those with ulnar osteotomy, fascial loop reconstruction and transcapitellar K-wire fixation of radial head. PIN injury associated with Bado type -III showed recovery after radial head reduction. No injury of radial or ulnar nerve occurred (Table).

Complications

We had wound infection in one case. Subluxation was seen in one case and there was one case who landed in chronic monteggia lesion. We had no implant failure, non-union or radial head osteolysis.

DISCUSSION

Monteggia lesion first described by Giovanni Monteggia in 1814 and classified by Bado based on mechanism of injury is accepted as one of the classics of orthopaedic literature. We have used Bado's classification which explains the mechanism of injury although not

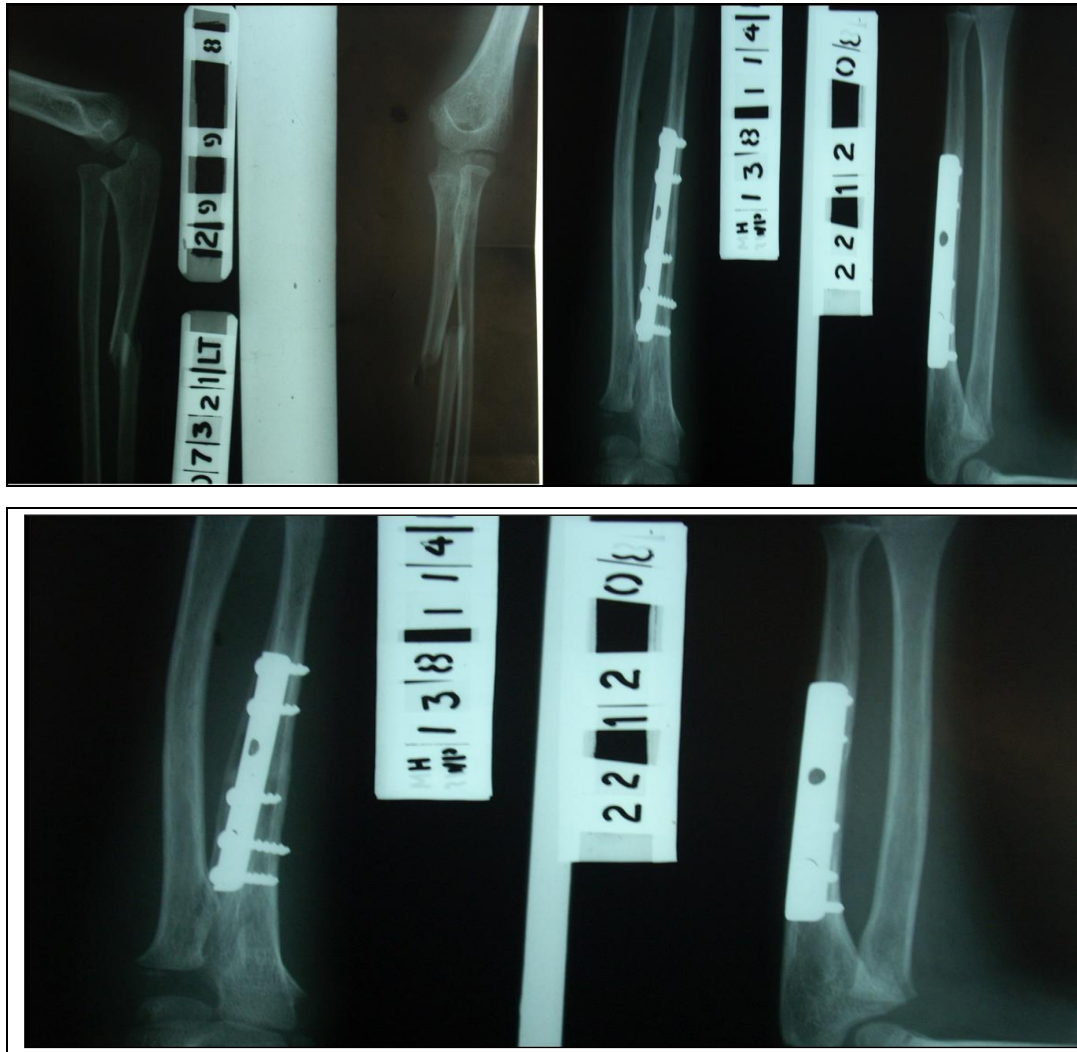


Figure 1: Type-I Monteggia with ORIF of ulna with 06 hole 1/3 tubular and reduction of radial head through interosseous membrane .



Figure-2: Annular ligament reconstruction and K-wire osteosynthesis done



Figure-3: Six months post-op

predicting the treatment options. They are four types depending on direction of angulation of ulna predicting direction of dislocation of radial

head. Monteggia fracture although an uncommon injury but is commonly missed, Causes for misdiagnosis are rarity of the

Table: Postoperative Outcome of Different Treatments done for Missed Monteggia Fracture Dislocation

S. No	Age in Years	Delay	Type	Treatment	Outcome
1.	09	03 days	I	Close reduction	Excellent
2.	09	05 days	I	Close reduction	Excellent
3.	04	03 weeks	I	Open reduction, callus trimming, plating of radius and indirect radial head reduction	Excellent
4.	07	03 weeks	I	"	Excellent
5.	10	2 ½ weeks	I	"	Good
6.	10	3 weeks	I	"	Good
7.	06	05 weeks	I	Open reduction+ plate osteosynthesis and transcapitellar K-wire fixation of radial head	Good
8.	05	03 month	III	Isolated radial head dislocation, open reduction and transcapitellar K wire fixation	Good
9.	08	03 month	III	Ulnar osteotomy + K wire fixation + transcapitellar K wire fixation of radial head +facial loop reconstruction	Good
10.	11	07months		Fascial loop reconstruction	Poor
11.	07	1 ½ year	I	Ulnar osteotomy + plate fixation + Transcapitellar fixation	Good

lesion^{6,7}. Inadequate radiological / clinical examination^{7,8} and especially in our set up ignorance to the lesion. Single forearm bone fracture should be treated as fracture dislocation until proved otherwise^{9,10}. All the patients who were referred to us were treated as ulna fracture and parents were told that deformation of ulna will correct with passage of time.

Injuries of the forearm and elbow in children must be carefully evaluated by the trauma / orthopaedic surgeon in the initial treatment period^{10,11}.

Monteggia fracture dislocation can be diagnosed easily if radiographic evaluation of elbow is done by radiocapitellar line and ulnar bow sign^{6,9}.

There is no doubt of obtaining excellent results with close reduction. But reduction is lost in 20% of patients after close reduction^{7,8} so close follow up is required.

There is controversy regarding treatment of chronic Monteggia lesion with proponents for operative and non-operative treatment^{5,10}. Regarding operative treatment there is no panacea but rather a variety of techniques i.e., ulnar osteotomy Kwire or plate osteosynthesis,

radial osteotomy, transcapitellar K-wire fixation with or without annular ligament reconstruction^{7,8,10,13,14}.

Natural history of the disease is not benign if left untreated can lead to progressive valgus deformity, instability and decreased range of motion especially rotatory movements⁸.

Surgery was advised to achieve anatomic reduction of radial head, prevent progressive valgus instability and improve cosmetic appearance and range of motion.

We agree that excellent results can be achieved in children 12 years of age because they have the potential for remodeling and have flexible soft tissue so joint stiffness does not appear to be a problem postoperatively^{7,8,10,15}. Surgical treatment was tendered to the patient considering patient age, disability and chronicity.

Boyd's approach is the most appropriate for radial head dislocation and ulnar osteotomy in proximal metaphysis⁴.

We have also used Kwire for fixation of ulnar osteotomy. Best and Methe did not recommend plate fixation of ulnar osteotomy rather than K-wire fixation for remodeling to occur and we had no problem with K-wire

fixation and no complication of crossover synostosis, non union occurred. We did not have a single incidence of wire breakage, or migration.

Stelling and Kote recommend that chronic Monteggia lesion should be observed till skeletal maturity where radial head excision can be done if becomes symptomatic^{16,17}.

Treatment of missed Monteggia lesion is difficult but newer surgical techniques are promising and long term sequelae of chronic Monteggia injuries do warrant intervention in skeletally immature patients^{7,13,18}.

Ulnar osteotomy is essential to correct ulnar deformity and attain anatomical and stable reduction of radial head^{6,8,13}.

Counseling of parents is necessary as surgical procedures are salvage procedures we might be able to achieve excellent radiological alignment but functional outcome with surgical intervention might be more troublesome.

Open reduction of radial head and reconstruction of annular ligament are accompanied by an increasing risk of functional deficits and radioulnar synostosis. Reconstruction of annular ligament is not necessary^{9,14}.

CONCLUSION

Early recognition of Monteggia lesion by adequate x-ray (two planes) including elbow and wrist joint, adequate clinical examination, high index of suspicion and early examination by an orthopaedic surgeon can prevent the morbidity associated with chronic Monteggia lesions.

All missed monteggia fractures should be operated within the period of 4-5wks.

Health care facilities should be expanded for proper management of these lesions so that these are not missed by untrained personnel and quacks.

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