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Missed monteggia dislocation with plastic deformation of ulna

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Abstract

Background: isolated radial head dislocation with plastic deformation of ulna is a frequently missed injury in pediatric age group. Most common error is incomplete X-Ray survey in initial medical attention. Proximal ulnar osteotomy with radial head reduction is associated with predictable outcome.

Material and method: In a prospective study of 3 patients with mean age 6.3 years, who presented with isolated radial head dislocation with plastic deformation of ulna. All three patients treated with proximal ulnar osteotomy with open radial head reduction without annular ligament reconstruction. We used kim criteria to assess the elbow function.

Result: Average follow up duration was 12 months. All osteotomy healed well. All patients had excellent results with kims criteria.

Keywords: missed monteggia, isolated radial head dislocation, proximal ulna osteotomy

Introduction

Frequent challenge in the treatment in monteggia fracture and its equivalent is delayed diagnosis. The common error is in adequately taken trauma X-Ray at the time of initial presentation. If radial head dislocation is associated with plastic deformation of ulna, is more associated with missed diagnosis¹. Isolated radial head dislocation diagnosis should always be questionable because in almost all cases association with plastic deformation of ulna^[2, 3]. Missed monteggia lesion is defined as one presented after 4 weeks of initial treatment^[1, 4].

Restriction of rotation (supination and pronation), terminal restriction of flexion and further development of valgus deformity is one few indication of surgical intervention if child present early age^[5, 6].

Surgical prognosis in terms of function is mainly depends upon duration of missed monteggia.

Several surgical options are available to treat missed monteggia once the consensus of surgery is defined. Proximal ulnar osteotomy, open radial head reduction, with or without annular ligament reconstruction. External fixator, ulnar osteotomy with gradual lengthening and angulation of ulna and spontaneous reduction of radial head is reported by few studies. Reconstruction of annular ligament is a question of debate. In few studies reconstruction is one of the steps of treatments while in other it leads to elbow stiffness, heterotopic ossifications and radio ulnar synostosis^[7, 8].

The purpose of this study is to emphasize that plastic deformation of ulna is associated with radial head dislocation in paediatric age group. Complete X ray exposure including elbow and wrist is a basic and should never overlooked in case of upper limb trauma^[9]. Early treatment of missed monteggia on early presentation is associated with predictable outcome.

Material and method

Three patients of missed monteggia with plastic deformation of ulna treated in our institute from may 2015 to October 2016. The mean age was 6.3 years (5 to 7.5 years) with all three were male child. Two of our patients had injury to their left elbow and one patient had in his right elbow. All three patients were bado type 1 equivalent with anterior radial head dislocation with anterior angulation of ulna at mid shaft of ulna.

Average duration of delayed (missed monteggia) presentation was 8 to 13 week from initial injury. All our patients took their initial treatment in the form of above elbow slab.

On their final X-Ray it was found by their treating doctor that radial head is not in place. All patients presented with elbow X-ray with keeping an image of sole elbow trauma, none of our patients undergone full forearm X-ray including wrist and elbow.

Elbow range of motion assed for each patient and compared with normal elbow. Pre assessment of our patients had near normal range of motion with restriction of terminal flexion and rotation. One patient had complains of fullness (swelling in anterior aspect of elbow).

All three patients treated with proximal ulnar oblique osteotomy to increase the surface area of osteotomy and stability and fixed with semi tublar plate in comparison to transverse osteotomy. Slight oblique osteotomy reduces the

need of bone grafting. Approach for ulna was subcutaneous. Redial head reduction was performed with separate incision (kocher's approach), capsular release was performed in all three cases and fixed with transarticular (radiocapitular) k-wire. Annular ligament reconstruction was not performed in any of cases [7, 8]. Removal of k wire was done at 4 week and range of motion exercise sated at 8 to 9 weeks depending upon radiological sign of osteotomy. Immobilization of patients was performed in 90 degree of flexion and full supination. As the flexion and complete supination keep the radius and ulna at maximum distance and tension in the interosseous ligament [2, 10]. Subsequent follow up assessed on the basis of kim criteria (Table-1) – deformity, pain, range of motion and function [13].

Table 1: Kim's criteria Criteria

Deformity	No concern	Minor concern	Major concern
Score	25	15	0
Pain	No pain	Mild – Intermittent Activity limiting	
Score	25	15	0
ROM*	> 250°	200-250°	< 200°
Score	25	15	0
Function	No problem	With difficulty	Unable
ADL^	25	15	0

ROM*- Sum of flexion-extension and pronation-supination arc, ADL^ - Activities of daily Living: Five functions assessed: Comb hair, Feed self, Open door knob, Hold overhead, Put shoes



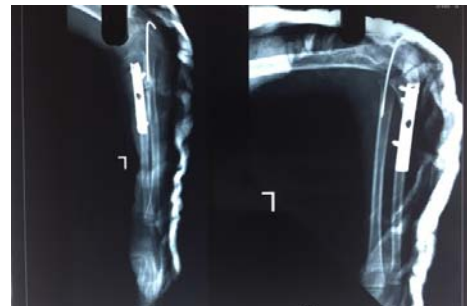
X-Ray taken during initial trauma



X-Ray taken at the end of initial treatment



X-Ray taken in our hospital (1-red ulna bow 2-yellow radiocapitular line)



X-Ray immediate post-operative



X-Ray immediate after removal of radiocapitular wire



C-ARM picture of oblique osteotomy

Result

The mean follow up duration was 12 month (5 months to 19 months). Regular follow up was done on the 4 to 6 weeks duration. All osteotomy healed well. All three of our patients had excellent result on the basis of kim criteria. None of our patients required a bone grafting.

Discussion

Isolated traumatic radial head dislocation is very rare condition and one should always look for the plastic deformation of ulna [2, 10, 11]. With the clinical suspicion and two radiological evaluations margin of error reduces. It is mandatory to take good AP and lateral radiograph including wrist and elbow. On AP and Lateral draw a line through the axis of radius to capitulum to see the integrity of radio humeral joint [11]. Second method is to look for ulnar bow sign and it should be checked in every child with elbow trauma [9]. The differential should always keep in mind, congenital radial head dislocation is a bilateral condition and present with dome shaped radial head [11, 12], pulled elbow is a condition usually affect the more younger population and reduced with gentle manipulation. If the diagnosis of radial head dislocation with plastic deformation of ulna made on initial presentation in order to achieve the proper reduction ulna fracture is required at maximum bow and forearm should be immobilize in complete supination and flexion [14]. If child presented with missed monteggia in early age though there will be very minimal complain, surgical procedure in form of ulnar osteotomy and radial head reduction is procedure with predictable outcome. It should be performed to prevent the further complication like valgus deformity, deformity of the radial head and popping elbow sensation.

Conclusion

It is mandatory to take complete X ray AP and lateral with two joints. As seen in our cases they had their elbow X ray which was almost near normal. Traumatic isolated radial head anterior dislocation should always questionable. If there is no radiological changes of radius, in lack of functional complains

early ulnar osteotomy with radial head reduction is associated with predictable outcome and less functional deficit in future.

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