Original Research Paper

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Orthopaedics

SURGICAL OUTCOME OF PERCUTANEOUS PIN FIXATION OF PROXIMAL THIRD FRACTURE OF ULNA IN MONTEGGIA FRACTURE DISLOCATION IN CHILDREN

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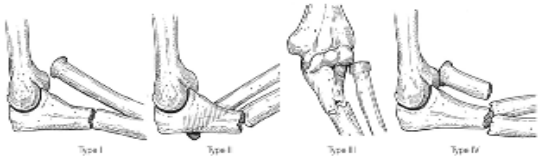
ABSTRACT **Introduction:** Monteggia fracture dislocation is a rare and severe injury of both paediatric and adult forearm and elbow.It was described for the first time by GIOVANNI BATTISTA MONTEGGIA in 1840,who reported two cases of fracture of the proximal third of ulna with conjoint ventral dislocation of the proximal radius. In 1967 JOSE LUIS BADO published a classification scheme of monteggia lesion based on the direction of the dislocation of radial head,this anatomical classification was suitable for both adults and children .Monteggia fracture dislocations constitute about 1% – 2% of all forearm fractures . Monteggia fractures remain challenging paediatric injuries because of difficulties in diagnosis , propensity for instability and complexity of late reconstruction. More than 50% of these fracture dislocation are misdiagnosed in children and leads to dysfunction of elbow joint. The fixation and stabilization of ulna fracture will automatically reduce the radial head dislocation. The aim of this study is to evaluate a group of paediatric patients with Monteggia lesion and its equivalents treated by percutaneous fixation of proximal third ulna fracture with k wire after reduction of fracture ulna and dislocated radio capitular joint under c-arm guidance. Materials and methods We treated 18 children of age ranging between 6 to 12 years with Monteggia fracture dislocation of the forearm with percutaneous fixation of the proximal third fracture of ulna with k wires after reduction of fracture and dislocated radio-capitular joint under C-arm control.The elbow is immobilized in flexion with plaster of paris slab and bandage for a period of four weeks and mobilization of elbow is started after four weeks. By the end of 8 weeks K-wire removed. All fractures are fixed with in twenty four hours. **Results :** The results are good, there is no incidents of any stiffness. Range of movements of elbow and forearm are well preserved.The function of elbow and forearm are satisfactory.Conclusion:A good outcome after Monteggia injury in a child requires early diagnosis and prompt stable anatomical reduction of the ulna fracture and this can be achieved through stabilization of ulna by percutaneous intramedullary k wires.

KEYWORDS : Monteggia , K- wires , radio-capitular joint

INTRODUCTION:

Monteggia fracture dislocation is a rare and severe injury of both paediatric and adult forearm and elbow.It was described for the first time by GIOVANNI BATTISTA MONTEGGIA in 1840,who reported two cases of fracture of the proximal third of ulna with conjoint ventral dislocation of the proximal radius. Monteggia fractures remain challenging paediatric injuries because of difficulties in diagnosis , propensity for instability and complexity of late reconstruction. More than 50% of these fracture dislocation are misdiagnosed in children and leads to dysfunction of elbow joint. In 1967 JOSE LUIS BADO published a classification scheme of monteggia lesion based on the direction of the dislocation of radial head,this anatomical classification was suitable for both adults and children. Bado classified monteggia lesions into four distinct categories: Type-I (Extension injury) is a fracture of ulnar diaphysis at upper third level with anterior angulation at the fracture site and an associated anterior dislocation of the radial head (60% of the cases). Type-II (Flexion injury) is a fracture of ulnar diaphysis with posterior angulation at the fracture site and a posterior or postero-lateral dislocation of radial head (15% of the cases). Type-III is a fracture of ulnar metaphysis with lateral or antero-lateral dislocation of radial head (20% of the cases). Type-IV is a fracture of the proximal third of radius and ulna at the same level with anterior dislocation of radial head.



BADO'S CLASSIFICATION

The reduction and stability of dislocated radio humeral joint depends on the perfect reduction and stabilization of fracture proximal third ulna. Stable anatomic reduction of the ulnar fracture results in anatomic reduction of the radial head. The reduction and stabilization of proximal third fracture ulna can be achieved by percutaneous fixation with K wire which also stabilizes the reduction of head of the radius. This study was conducted to know the outcome of of percutaneous pin fixation of proximal third fracture of ulna in monteggia fracture dislocation in children.

MATERIALS AND METHODS

This is a prospective non-randomised study, conducted between August 2020 and June 2022,in children who came to the emergency department/outpatient department and got admitted under the department of orthopaedics , Rangaraya Medical College, Kakinada and KIMS Amalapuram. Eighteen patients were included in the study with the mean age of 7.24±1.32 years ranging from 6 to 12 years with male predominance of 15(66%) cases . Male to female ratio was 2:1. Majority of cases resulted from fall, accounting to 12 (66.66%) cases and 6 (33.33%) had road traffic accidents. 11 cases had fracture on right side and 7 cases had fracture on left side.

CRITERIA:

Inclusion criteria: Age between 6 – 12yrs, closed fractures of ulna and fresh fractures .

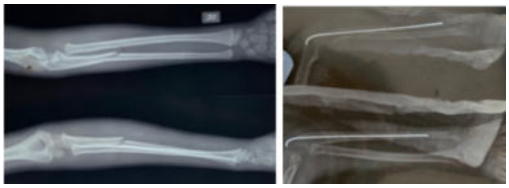
Exclusion criteria: open fractures, medically unfit children

AGE	FEMALE children	MALE children	TOTAL
6 – 9 YEARS	1	12	13
9-12 YEARS	2	3	5
TOTAL	3	15	18

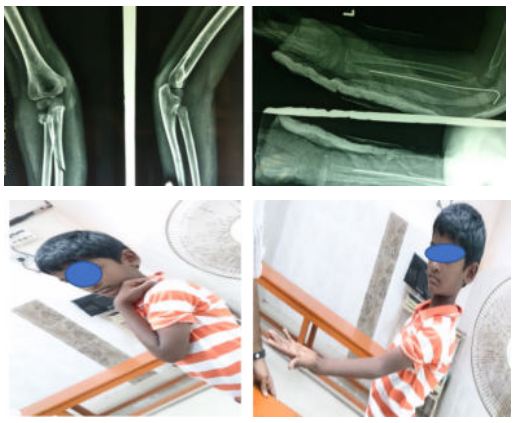
SURGICAL TECHNIQUE

- Supine position and under general anaesthesia
- Forearm was positioned on the radiolucent table. Tourniquet was applied and aseptic technique was followed
- Arm and elbow were held at 90 degree , through a stab incision ,bone awl was used to pierce the cortex of tip of the olecranon in the line of ulna and it was progressed to the medullary canal.
- Ulna fracture is manipulated and reduced by traction – counter traction.
- Appropriate size of K wires are inserted into olecranon and across the fracture site into the distal fragment of ulna.
- Now check the reduction of fracture and position of radio-humeral joint.
- If not reduced, reduction can be acheived by simple traction in extension with direct pressure over the dislocated head of the radius.
- Following reduction all injuries were immobilized in long-arm padded plaster molds wrapped on with an elastic bandage. The arm was routinely positioned in mid-rotation with the elbow at 80 to 90° of flexion. Since Evans established the forced pronation mechanism of these injuries, many authors have recommended immobilization in full supination.

CASE 1



CASE 2

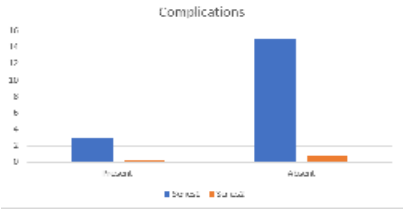


RESULTS

There was no functional or cosmetic impairment in any case. There were no neurologic or vascular complications. These facts suggest that if the diagnosis is made promptly and the reduction is accomplished promptly, a good result is likely to be obtained. Except pin entry point infection, all cases shown excellent results with good union of fractures and excellent range of movement of elbow and forearm. All cases showed union radiologicaly and clinically at an average of 4 to 6 weeks duration. Pin entry tract infection was the only complication observed.

COMPLICATIONS

Complications	No of cases	Percentage
Present	3	17%
Absent	15	83%



DISCUSSION

In this study, male and female patients were in 2:1 ratio with male predominance of 66%. The percentage of male predominance is slightly higher than that of female. The percentage of male predominance is slightly higher than the earlier observed results of Ring et al. Based on Bado's classification, study conducted by Henry et al. showed 79% cases of Type I, 12% Type II, 6% Type III, and 3% cases of Type IV whereas our study showed 60% Type 1, 20% Type II , 11% Type III and 9% Type IV. Other studies reported 70% cases of Type I, 18% Type II, 12% of Type IV and no case belonging to Type III. Evans and Speed and Boyd suggested that the injury is due to direct trauma while Naylor attributed it to be due to indirect trauma. They supported their statement by the fact that in majority of the cases comminuted fracture of ulna and the local signs of injury in the shape of bruises and contusions occur. The radial head plays a key role in maintaining stability of the elbow joint. Unreduced dislocation of the radial head for more than 4 weeks is considered to be chronic. The factors like interval between injury and treatment, patient's age and the amount of joint incongruity plays an important role . Hirayama et al. and Stoll et al. reported that reconstruction could be successfully achieved in children up to the age of 10 years and at least four years after the injury. Monteggia fractures are rare, representing approximately 1% of all fractures and/or dislocations of the wrist and mid or proximal forearm . The ulnar fracture is readily diagnosed but, the radial head dislocation is often missed.

CONCLUSION

Though monteggia fractures are uncommon fracture dislocation, early diagnosis and early closed reduction of radial head and percutaneous intramedullary K-wire fixation of ulna is a better option of treatment . Early mobilization gives excellent functional outcome. Pin tract infection was the only complication encountered during this study.

SUMMARY

- Monteggia fracture-dislocations can be easily missed on x-ray (50% mis diagnosis)
- In all proximal ulna fractures, always look for a radial head dislocation or sub luxation
- All Monteggia fracture-dislocations require an urgent orthopedic assessment.
- Reduction and fixation is always required.
- Delayed or missed diagnosis will lead to deformity

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