

Case Report

Closed reduction and percutaneous intramedullary pinning of displaced radial neck fracture in a 12 years old child: reduction technique and outcome

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ABSTRACT

Fracture of the radial neck are uncommon injuries in the pediatric age group. In children, they may present as radial neck fractures, a component of forearm fracture-dislocations, or as isolated fracture-dislocations. Most of the displaced radial neck fractures with more than 30° angulations (Judet type III and IV fractures) should be surgically treated. An unusual variant of radial neck fracture with dislocation of the radial head to the radial side without associated nerve injury. The fracture-dislocation was fixed with closed reduction and Kirschner wire under image intensifier. The patient is being followed up for 6 months. Operative treatment with closed reduction and intramedullary pinning has better correction of angulation and rotation compared to closed reduction techniques with angulation of 30° or more with 10° of rotation. We achieved a supination of 80° and a pronation of 50°.

Keywords: Fracture of radial neck, Dislocation of the radial head, Metaizeau, Intramedullary pinning

INTRODUCTION

The treatment of radial neck fractures in children is dependent on the displacement, angulation, and skeletal maturity. Radial neck fractures are usually reduced by manual traction, percutaneous K wire leverage, closed intramedullary pinning or open reduction and internal fixation. Most of the displaced radial neck fractures with more than 30° angulation (Judet type III and IV fractures) should be surgically treated.¹⁻³ Judet type 1 and type 2 are treated with closed reduction and casting with good functional outcome.⁴ Various treatment methods for Judet type III and IV fractures, including percutaneous pin reduction, elastic intramedullary nailing, and open reduction with or without internal fixation.⁵⁻⁷ We describe here an unusual presentation of radial neck fracture with >30° angulation with dislocation of the radial head onto the lateral aspect of the elbow, treated by a combination of

closed manual reduction and intramedullary pinning as proposed by Metaizeau et al.⁸

CASE REPORT

A 12 years old female child presented to our outpatient department with an injury to the elbow following a fall on the outstretched hand. On examination there was diffuse swelling with a hard-bony lump on the lateral aspect of the elbow with no external wounds. The radiograph of the elbow showed a fracture of the radial neck with displacement of the radial head onto the Lateral side of 30-40°, However radial head was intact.

The patient was taken up for closed reduction with percutaneous pinning underneath the image intensifier. Fracture reduced by Patterson's manipulative technique, an assistant grasps the arm proximal to the elbow joint with

one hand and places the other hand medially over the distal humerus to provide a medial fulcrum for the varus stress applied across the elbow. The surgeon applies distal traction with the forearm supinated to relax the supinator's and biceps muscles. A varus force is then placed on the elbow to overcome the ulnar deviation of the distal fragment so that it can be aligned with the proximal fragment. The varus force also helps to open up the lateral side of the joint, which facilitates the manipulation of the head fragment.

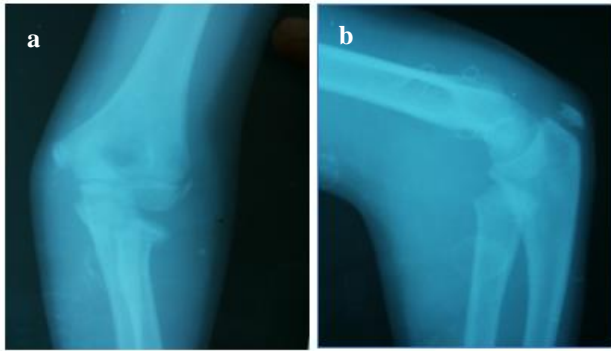


Figure 1 (a and b): AP and lateral view showing radial neck fracture Judet type 3.

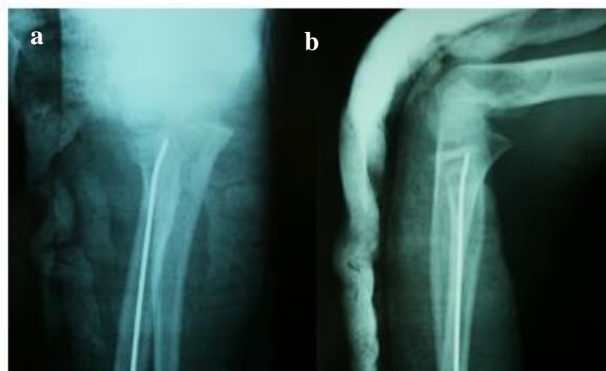


Figure 2 (a and b): AP and lateral view showing intramedullary pinning.



Figure 3 (a and b): 6 months follow up.

Metaizeau technique of closed intramedullary pinning is done. This technique consists of inserting a 1.5 mm

retrograde k wire through the distal radial metaphysis into the medullary canal. The wire is advanced until the point fixes in the epiphysis of the radial head and elevates and replaces it under the lateral condyle. The pin is turned around its long axis through 180 degrees, producing a medial shift of the radial head and reducing it. posterior above elbow slab applied with the elbow in 90 degrees flexion and immobilized for 3 weeks followed by active elbow mobilization.

DISCUSSION

Radial head and neck fractures are relatively rarer injuries in children, constituting 4.5-14% of elbow injuries in children. We acknowledge with the majority of authors who recommend treating fractures with an angulation of less than 30° (Judet type I and II fractures) conservatively and treating those with an angulation of more than 30° (Judet type III and IV) surgically.^{1,6,7,9} It is widely reported in the literature that open reduction and internal fixation in children leads to poor functional outcome.^{5,10,11} The fracture itself or the dissection needed for open reduction leads to disturbance in the blood supply with avascular necrosis of radial head and early physal closure.^{12,13} In this case the radial head is displaced laterally without significant angulation and rotation.

Biyani et al described driving the pin used to reduce the radial head across the fracture site to stabilize it.¹² The pin is removed and motion is allowed after 3 weeks. In 1980, Metaizeau et al proposed reducing severely tilted radial neck fractures with an intramedullary wire passed from the distal metaphysis.⁸ A wire is inserted into the medullary canal through an entrance hole in the distal metaphysis. Once the wire reaches the fracture site, the angulation at the tip enables it to engage the proximal fracture site at the neck. Once engaged, the wire is twisted to reduce the head and neck fragment. This technique has produced results superior to open reduction with fewer complications.

The criteria for acceptable reduction are no translation with 50 to 60 degrees of pronation and supination on clinical examination. Complications following open reduction like elbow stiffness, non-union of the radial neck, osteonecrosis of the radial head, myositis ossificans, proximal radioulnar synostosis are avoided.

CONCLUSION

we conclude that operative treatment with closed reduction and intramedullary pinning has better correction of angulation and rotation compared to closed reduction techniques with angulation of 30° or more with 10° of rotation. we achieved a supination of 80° and a pronation of 50°.

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