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Editorial.....

Fractures of Radial Head and Neck

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Fractures of the radial head and neck occur most often due to a fall on outstretched arm. These fractures make about 1.5 – 4.0% of all the fractures (1) and 15 – 25% of the fractures around the elbow (2).

ROLE OF RADIAL HEAD in the stability of elbow and forearm. The radial head stabilizes the elbow from ***valgus*** forces by radiocapitelar contact and ***longitudinal*** stability of forearm is due to transfer of forces from wrist along the radius to radiocapitelar joint.

1. Valgus stability

Laboratory studies by Morrey et el show (3) that the radial head is a secondary stabilizer resisting the valgus load. The primary stabilizer being the medial collateral ligament.

2. Longitudinal stability

Studies on transfer of forces across the joints report that when forearm was loaded at wrist the forces transmitted across the forearm were shared by proximal ulna (60%) and by radial head (40%). No change in the loading pattern was found when all the soft tissue connection between radius and ulna was incised (4).

When the radial head is excised and If the main soft tissues connecting radius and ulna (inter-osseous ligament and the triangular fibro cartilage complex) are disrupted, the radius will displace proximally relative to ulna.

In contrast if the radial head is intact or reconstructed proximal translation of the radius does not take place in spite of injuries to the soft tissues linking radius and ulna (4).

The principal deformity after proximal translation is at the wrist : the distal ulna sits dorsal and distal to the carpus, blocking supination and extension of the wrist. In acute proximal translation (Essex-Lopresti) there is damage to the inter-osseous ligament and all the attempts at preserving the head should be done. Cross pinning the radius and ulna is shown to be not very reliable in stabilising the soft tissues.

For established proximal translation of the radius; shortening of the ulna to correct the wrist deformity is not very helpful.

The methods of management of the fractires vary according to the fracture pattern. Fixation of the fracture is not commonly carried out by a general orthopaedic surgeon. Most common surgery performed for such fractures in this part of the world is “excision of the radial head.”

❖ Diagnosis ❖

Diagnosis is essentially on radiographs but clinical signs like swelling, tenderness in the area with pain and restriction of movements of forearm rotations often clinch the diagnosis.

Displaced fractures of the capitellum can sometimes be mistaken for fractures of the radial head. Radiograms in different planes and /or C.T.scan are helpful in doubtful cases.

Many patients present late as the injury is trivial and the pain tolerable.

Classification

The modified Mason classification is very useful in planning the management of these fractures.

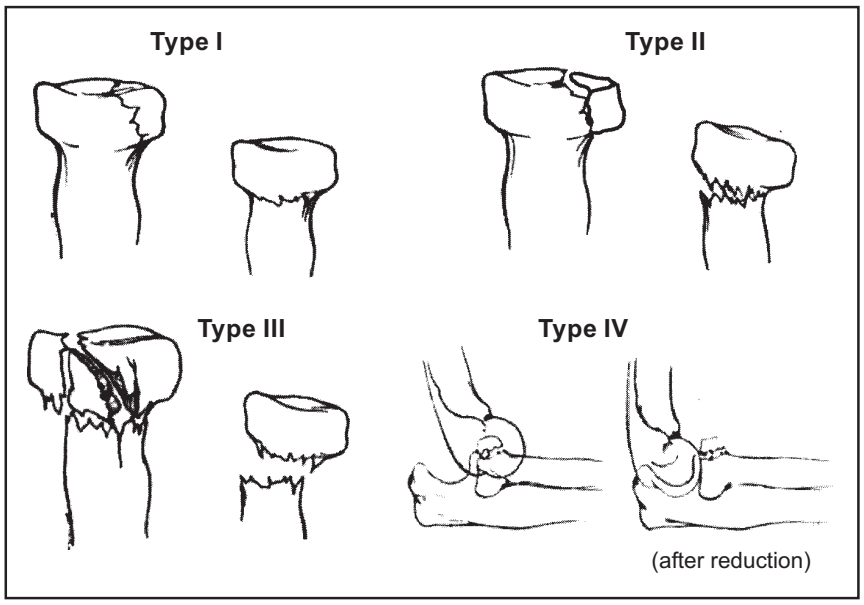

Figure 1 : The modified mason classification.

Table 1 : Modified Mason Classification*

Type I : Nondisplaced or minimally displaced fracture of the head or neck.

- Forearm rotation (pronation/supination) is limited only by acute pain and swelling (no mechanical block).
- Intra-articular displacement of the fracture is usually < 2 mm or a marginal lip fracture.

Type II : Displaced (usually >2 mm) fracture of the head or neck (angulated).

- Motion may be mechanically blocked or incongruous.
- Without severe comminution (technically possible to repair by open reduction with internal fixation).
- Fracture involves more than a marginal lip of the radial head.

Type III : Severely comminuted fracture of the radial head and neck.

- Judged not reconstructable on basis of radiographic or intraoperative appearance.
- Usually requires excision for movement.

*All of these fractures may have associated injuries (*e.g.,* interosseous ligament injury, posterior elbow dislocation with or without coronoid fracture).

❖ Management ❖

Management can be either conservative or operative.

Conservative

Mason type 1 & 2 fractures can be managed by conservative treatment.

The options are :

(a) Immediate mobilization of the elbow and forearm with or without local infiltration of anaesthetic in fracture site.

(b) Early mobilization after a period of slab and sling for 5 days.

(c) Closed reduction under general anaesthesia, above elbow cast in supination for 3-6 weeks and then mobilization.

Operative

Those type 2 fractures which can not be reduced by closed methods and some type 3 fractures are managed by

❖ Open Reduction and Internal Fixation ❖

Procedure

A tourniquet is very useful. The midline dorsal skin incision is used when access to the ulna or the medial side of the elbow is required. The lateral skin incision is used while approaching the radial head alone. Head is exposed through the interval between the anconeus and extensor carpi ulnaris (kochers). Separation of common extensors and lateral collateral ligament from lateral humeral condyle gives larger exposure when required, these should be reattached at the end of the surgery.

Once the fracture fragments are exposed the head should be reconstructed with the help of small ' k ' wires. These wires are used as temporary holds and then plates and screws are used for permanent fixation.

Where the hardware should be fixed ?

There is a SAFE ZONE for hardware placement measuring about 100 degrees centered on the equator in the neutral position. There is no impingment of the metal on the proximal radio-ulnar joint when this zone is used.

Implants

Minifragment screws alone, Herbert screws, 2.0 mm T plates or L plates are used for fixation of fracture. The screws are buried when used in articular area.

The associated injuries should then be treated, like plating of ulna fracture, radio-ulnar pinning for Essex-Lopresti lesion, lateral epicondyle fixation by screw etc.

The elbow is immobilized in supination for 2 weeks and mobilization started with active use of hand for light work.

It should be remembered that the available data suggest that open reduction and internal fixation of the radial head is effective for partial articular fractures with a single fragment and for complete articular fractures with 3 or less fragments. Comminuted fractures and those associated with complex elbow fractures or dislocation may be better treated by excision of radial head with or without prosthetic replacement.(3)

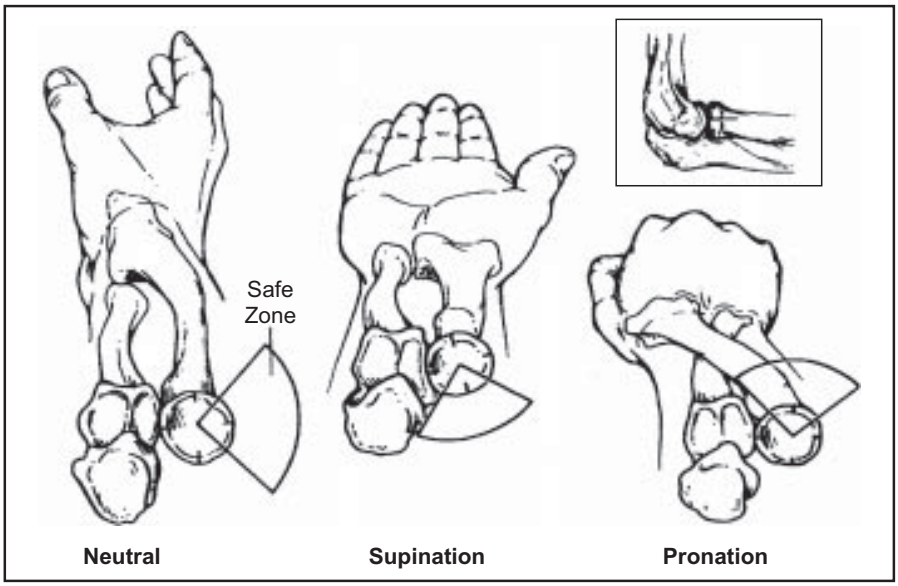

Fig. 2 : The safe zone for hardware placement can be found by bisecting the midline of the radial neck in neutral forearm rotation (inset).

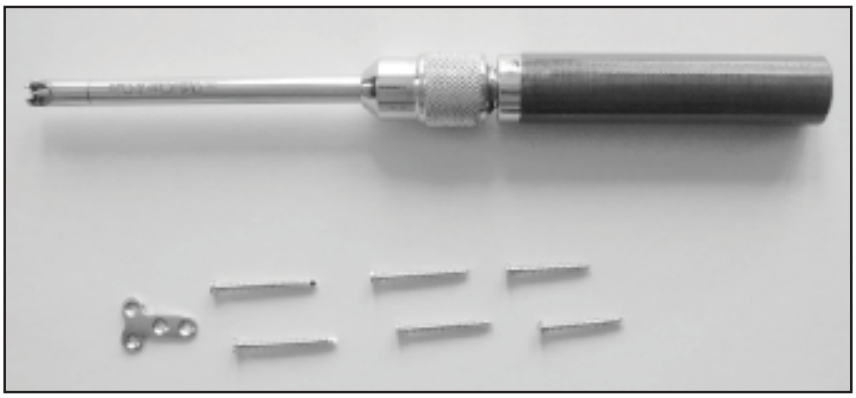

Figure 3 : Implants

Excision of radial head

Those fractures which can not be managed by ORIF are treated with excision of radial head. (type 3).the quality of the results after this procedure is controversial, with some authors considering it satisfactory with excellent elbow motion. (4, 5, 6, 7) and others reporting high incidence of unfavourable outcome.

Prosthetic replacement of radial head

Many surgeons in an attempt to reduce the valgus instability after radial head excision have performed radial head replacement by either monoblock or bipolar prosthesis. But it was found out that mean valgus laxity did not differ significantly between the elbows without the radial head and those with a bipolar implant.(8)

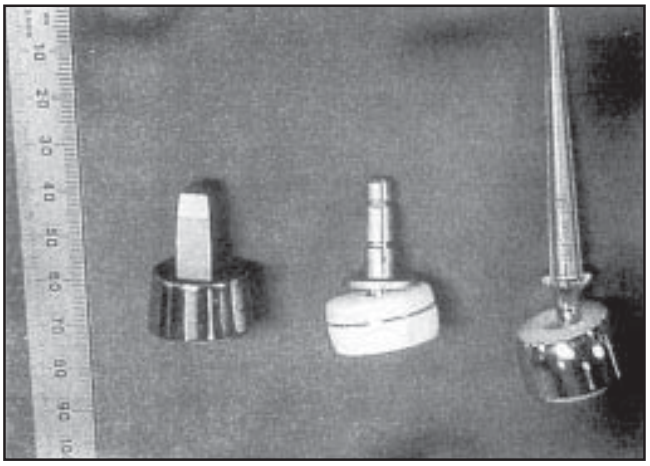

Figure 4 : 2 of prosthesis

Studies suggest that open reduction and restoration of radial head anatomy would be preferable to replacement in elbows with a deficient medial collateral ligament. (8)

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