CASE REPORT

A new technique for closed reduction and percutaneous fixation of fracture dislocation of radial head in the skeletally immature forearm

M.J. Barakat,*, H.S. Gosal

a Bristol Royal Infirmary, Bristol BS2 8HW, United Kingdom
b Cheltenham General Hospital, Cheltenham GL53 7AG, United Kingdom

Accepted 23 February 2006

Introduction

Radial neck fractures constitute 5–10% of all elbow fractures in children.4 They usually occur in children between the ages of 8 and 11.4 The mechanism of injury is usually that of a fall on an outstretched hand with the elbow extended and the forearm supinated. The resulting valgus force compresses the capitellum against the radial head.2 Radial neck fractures may occur in association with a posterior dislocation of the elbow.2 The majority of these fractures involve the proximal radial physis, usually producing a Salter–Harris type II injury.2

The diagnosis is usually made from a detailed history of the mechanism of injury and on examination, identifying tenderness on palpation of the radial head, exacerbated by supination and pronation. Crepitus, swelling and bruising may or may not be present, depending on the severity of the fracture.

There is marked controversy as to how much initial displacement is acceptable when deciding

operative and non-operative management. As such, no consensus exists on the ideal classification system with some authors classifying them based on the amount of initial angulation and others adding to that the degree of translation.9

Several options are available for operative treatment. These include:

- Closed reduction techniques such as elbow flexion to 90° with maximal supination followed by digital pressure applied to the lateral aspect of the proximal fragment while the forearm is rotated gradually into full pronation.1
- Percutaneous reduction techniques which are recommended after failed closed reduction in an attempt to avoid high incidence of complications after open reduction.3
- Open reduction techniques which are recommended for severe initial displacement but also for failure of closed or percutaneous attempts.7,8

Given the controversies in the literature concerning the measurement of initial displacement, determination of severity, choice of treatment and classification of outcome, it is no wonder that the assessment and comparison of outcome result is
A review of literature shows that most authors agree that worse results follow more aggressive treatment, but clearly it is the more severe injury that warrants the more aggressive approach. Whether poor results are a consequence of the treatment or the severity of the fracture is not entirely clear.

**Case report**

A 9-year-old right hand dominant girl presented to the Accident and Emergency department with a painful left elbow following a fall onto an outstretched left hand with the elbow in full extension. On examination it was noted that there was marked tenderness on palpation of the radial head, made worse by supination and pronation of the hand. Anteroposterior (AP) and true lateral radiographic views of the left elbow demonstrated a radial neck fracture with 100% displacement (Fig. 1).

The patient was transferred to the operating theatre following emergency treatment in the Accident and Emergency department. Under general anaesthesia, the fracture was reduced by passing an intramedullary k-wire from the radial styloid proximally into the radial head and then "joysticking" the fragment into position. A further crossed k-wire

![Figure 1](image1.png)  
**Figure 1** AP and lateral radiograph demonstrating 100% displaced radial neck fracture.  

![Figure 2](image2.png)  
**Figure 2** Intra-operative radiographs confirming satisfactory reduction and fixation.  

![Figure 3](image3.png)  
**Figure 3** AP and lateral radiographs 1-year post-operation.
was used to secure the fragment. An intra-operative radiograph confirmed satisfactory position (Fig. 2).

She was followed up closely in clinic and the wires were successfully removed at the 4-week interval post-operatively. At the 1-year interval post-operatively, the patient had regained full range of movement and function of the left elbow with anatomical radiographs (Fig. 3).

Discussion

Many operative techniques have been described with the emphasis of closed or percutaneous techniques so as to avoid complications such as avascular necrosis of the radial head. Such techniques include that of Metaizeau5 where he describes the use of the intra-medullary wire in fractures with less than 100% displacement to manoeuvre the fracture fragment to a reduced position and hold it in place. We have demonstrated a case where such technique has been successfully used in the reduction and fixation of a 100% displaced radial neck fracture in a skeletally immature forearm.

References