A fracture of the neck of the radius when the head is not ossified can be difficult to assess and treat. In a four-year-old child we suspected from the radiographs that there was an O’Brien type-III injury after trauma. Partial manual reduction of the non-ossified radial head was completed using the Métaizeau technique of intramedullary Kirschner (K-) wiring aided by intraoperative arthrography. The child had a full range of movement at the elbow and wrist when reviewed 11 weeks after the injury, three weeks after removal of the K-wire. We suggest that intraoperative arthrography is a useful complement to the Métaizeau technique for successful reduction of fractures of the radial neck in the presence of a non-ossified radial head.

Fractures of the neck of the radius are common in children and occur in 5% to 8.5% of elbow injuries in those aged between four and 14 years. The prognosis depends upon the degree of displacement, the age of the patient, associated elbow injury and the method of treatment. Major complications include limitation of movement of the forearm, cubitus valgus, heterotopic bone formation and avascular necrosis of the radial head.

Various methods of treatment have been described including immobilisation in a collar and cuff, manipulation under anaesthesia and leverage, open reduction with Kirschner (K-) wire fixation, and closed intramedullary pinning. Open reduction carries a high risk of avascular necrosis of the head of the radius with incomplete reduction of the head of the radius with a residual tilt of 40° (Fig. 2). Anatomical reduction of the fracture was obtained by rotating the tip of the intramedullary wire using anteroposterior (AP) and lateral views from the arthrogram (Fig. 3). An above-elbow back slab was applied for six weeks to treat the injury to the medial collateral ligament. The fracture of the neck was stable. The K-wire was removed at eight weeks. After five months a full range of movement of the elbow and forearm was present. No evidence of avascular necrosis of the head was seen on the radiographs (Fig. 4). The centre of ossification had appeared and was slightly larger than on the contralateral side.

Discussion

Various methods of treatment have been described for the management of fractures of the neck of the radius in children. Intramedullary pinning has gained in popularity as a simple and safe technique with a satisfactory outcome which avoids the need for open reduction. The management of such fractures in children aged less than five years is well documented. In this age group visualisation of the anatomy of the fracture is difficult because of the absence of the centre of ossification of the head. Fractures with mild displacement may be misdiagnosed or neglected.

The injection of radiopaque dye into the elbow provides clear definition of the lesion allowing both assessment and control of operative reduction.

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ARTHROGRAPHY FOR REDUCTION OF A FRACTURE OF THE RADIAL NECK IN A CHILD WITH A NON-OSTIFIED RADIAL EPİPHYSIS

Fig. 1a Fig. 1b
Preoperative a) anteroposterior (AP) and b) lateral radiographs of the elbow showing a fracture of the radial neck. The epiphysis of the head of the radius is not ossified.

Fig. 2
Peroperative AP arthograph of the elbow after injection of contrast outlining the radial head and showing the lesion of the medial collateral ligament.

Fig. 3a Fig. 3b
Fig. 3c
Radiographs after injection of contrast: (a and b) AP views during and after reduction c) lateral view after reduction.

Fig. 4a Fig. 4b Fig. 4c
Radiographs showing a) AP and b) lateral views of the right elbow and c) the AP view of the left elbow at follow-up of five months. There is ossification of the radial head on both sides with slight enlargement on the right.

References