CASE REPORT

Novel elastic nailing in radial malunion

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Introduction

Elastic stable intramedullary nailing (ESIN) is a well established method for the treatment of unstable paediatric forearm fractures.6 We report a case in which we used elastic nailing of a radial fracture to correct an underlying pathological deformity. We suggest that this method may provide a suitable method of treatment of abnormal long bone bowing secondary to malunion.

Historically paediatric forearm fractures have been treated conservatively,2,5 as such fractures tend to heal quickly and possess a strong intrinsic remodelling capacity.8 It is well documented however that these measures do not necessarily produce an optimal functional result.3 In recent years more aggressive surgical techniques have been pioneered. The main methods for operative fixation are ESIN, K-wire fixation and internal fixation with plate and screws. ESIN has evolved as the gold standard.1,7

Case report

A 9-year-old girl presented to clinic with a history of repetitive forearm fractures. Over the course of 6 years the patient had sustained a total of five diaphyseal fractures of her right radius, each with varying degrees of angulation. There were associated fractures of the ulna in a number of cases. Two of these fractures were unstable and required MUA and casting. Satisfactory reduction was achieved in both cases. The remainder required cast immobilisation only. The parents of the child were concerned that there may be an underlying pathology giving rise to these multiple fractures.

There was no history of fracture to any other long bones. No underlying metabolic abnormality was found. It was noted that the initial fracture healed with a minimal degree of malunion and excessive bowing of the radius (Fig. 1). This was thought to create a stress riser within the radius, and hence the multiple breaks through the same area with minimal trauma. At initial consultation surgical intervention to correct the radial bowing was discussed, but, as between fractures the patient had a full range of movement and no pain, it was felt that traditional surgery with an open approach, bone graft and plate fixation would be excessive and may have led to an unsightly scar, possible loss of forearm movement and may necessitate further surgery to remove any implants.

Four months later the patient represented with a further diaphyseal radial fracture, sustained after minimal injury (Fig. 2) and it was decided to surgically stabilise the fracture and at the same time address the radial deformity. The fracture was
reduced closed and a pre-bent 2.5 mm × 15 cm elastic nail was inserted into the radius via a distal volar incision under image intensification control. A volar incision was chosen to place the tip of the nail deep to the pronator quadratus muscle to avoid subcutaneous irritation and to allow the nail to be left in situ for a longer period of time. The nail was pre-bent more than usual to correct the pathological radial bowing. The arm was protected in an above elbow cast for 2 weeks. Radiographic analysis on follow up in the outpatient clinic confirmed satisfactory callous formation across the fracture site with restoration of normal radial alignment (Fig. 3).

Correction of the radial deformity was evident on radiographic examination 2 years later (Fig. 4). The patient was asymptomatic and had returned to competitive sports. Clinically there was no deficit in forearm movements and the nail was removed.

Discussion

Whilst it is documented that corrective osteotomy is of benefit in the management of malunited radial fractures,4 it has not been previously reported that ESIN can be used to treat malunited fractures. The described method is, in our opinion, an excellent technique for the management of such malunions as it minimises surgical trauma, allows early functional recovery and provides a more physiological bony stabilisation.

References