



A Complicated Fracture Associated to Proximal Congenital Synostosis

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Abstract

We present a case of a severe comminuted fracture of the elbow. The complexity of the fracture was predisposed by a congenital synostosis of the proximal radio-ulnar joint.

The situation was completely unknown by the patient who referred no previous problems with his arm. The synostosis fragment was the actual key to successful fixation.

Keywords: Elbow; Malformation

Introduction

Congenital radio-ulna synostosis is due to a failure of differentiation; Radius and Ulna separate from distal to proximal. There is presumed that a separation failure occur at proximal end.

The incidence is similar in males and females. This malformation occurs in 60% of cases as a bilateral phenomenon [2]. In 65% of cases appears as an isolated malformation, but it can also be part of a syndrome, like Apert's or Carpenter's syndrome.

The various forms have been categorized into two groups by Wilkie:

- **True congenital:** When no cortical interface is found separating cancellous bone of the radius or ulna with a consequent fusion of the proximal radial head to the ulna.
- Associated to dislocation of the radial head either anterior or posterior. Here the radius is fairly normal and the fusion is not as extensive. This type is often unilateral, and associated with other deformities including polydactyly, syndactyly or

absence of the thumb [3]. It is thought to occur due to failure of separation of cartilaginous precursors at the 7th week of gestation [2].

- Some authors refer a third group in where the radius and ulna are united by a thick interosseous ligament as if both of them were fused. There is no supination or pronation in this type [4].

Often there is a familial predisposition, and it seems to be transmitted on the paternal side of the family.

Case Report

A 20-year-old U.K. born Asian man who had sustained an injury to his left forearm in self-defense during an assault presented to Newham General Hospital on the 14th November 2000. He had insulin dependent type I diabetes and eczema, but no other previous medical history, X-ray imaging showed a comminuted fracture of the proximal third of the ulna with a fairly normal radial head, which was anteriorly dislocated (Figure 1).



Figure 1: Radiography AP and Lateral forearm.

On examination supination and pronation could not be demonstrated due to the swelling and the pain associated with the fracture. The next day was taken to the operating theatre for open reduction and internal fixation. The fracture was reduced and fixed with a ten-hole semi tubular plate. The key to achieving stability and a rigid fixation was a long screw holding the synostosis fragment (Figure 2). Intra-operatively it was noted that the radial head was almost completely normally developed except for the articular surface which was only covered with a ring of hyaline cartilage leaving a small round center of rough tissue. After plaster immobilization for a few weeks, he made an uneventful recovery.



Figure 2: Lateral view fixation proximal radio-ulna synostosis.

On discussion with the patient post-operatively, he did not recall having any relative with a similar malformation. After consolidation of the fracture he presented to the out-patient clinic with the left forearm in the neutral position, having approximately 40 degrees of pronation and supination. Further movement was compensated at the shoulder and the wrist (Figures 3a and 3b).

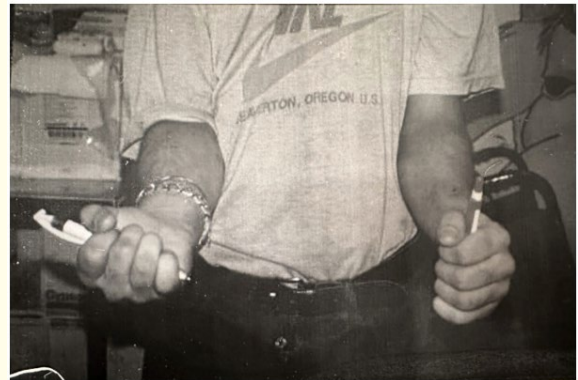


Figure 3a: Range of pronation.

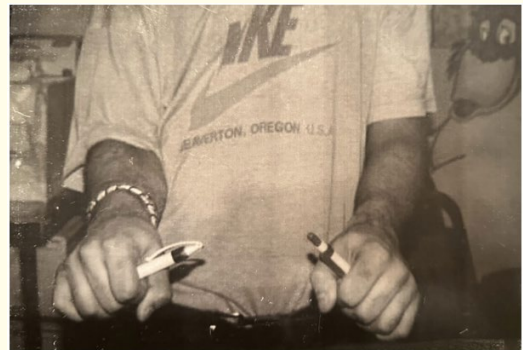


Figure 3b: Range of supination.

Discussion

In the literature there are only very few cases of proximal congenital radio-ulnar synostosis identified, 20 cases of 196 extremities in 12 patients [1]. This underlines how rare this pathology is.

Surgeons who may be involved in the treatment of fractures associated with this malformation must be aware that synostosis increases the degree of comminution of the fracture and add difficulty to get a stable reduction. This will come after the achievement of a secure fixation of the synostosis piece.

The radio-ulnar synostosis is difficult to treat, the interosseous membrane is narrow, and the supinator muscles may be abnormal or absent, only are advised to do osteotomies to improve rotation or supination, excise the fused part never improve the function. That is why the decision in this case was to go for the fixation to stabilize the forearm.

Conclusion

A good habit of close study of the fracture by the surgeon will help with the surgical planning mainly in cases when even the patient is not aware of the malformation he suffers because he has not significant functional deficit [2] and have no family history of deformity or any significant past medical history.

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