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POSTTRAUMATIC DISTAL RADIOULNAR SYNOSTOSIS AND DISTAL RADIAL EPIPHYSEAL ARREST

POSTTRAVMATİK DİSTAL RADİOULNAR SİNOSTOZ VE DİSTAL RADİAL EPİFİZ ARESTİ

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Özet

Posttravmatik radioulnar sinostoz önkol çift kemik kırığı sonrası görülebilen bir komplikasyondur. Sinostozun distal yerleşimli olması en nadir şeklidir. Biz burada, çok nadir görülen travmatik distal radial epifiz arestine eşlik eden distal radioulnar sinostoz olgusunu sunduk. Sinostozun eksizyonu, kas interpozisyonu, Sauve-Kapandji ameliyatı ve distal ulnar epifizyodez ile başarılı bir sonuç elde ettik.

Anahtar kelimeler: *Radioulnar sinostoz, distal, radial epifiz aresti*

INTRODUCTION

Double-bone fractures of the forearm are frequent in childhood, but radioulnar synostosis is a rare instance. Occurence of synostosis in distal forearm is even much more rare (1). Treatment includes resection of the synostosis, interposition of local tissue or synthetic materials, and osteotomies (1-6). Related literature discloses a decline in unsuccesful results with newly established treatment modalities such as low dose irradiation therapy (1,2,3,7,8).

Epiphyseal injuries of children are also common, but, growth arrests are rare and felt to result from repeated manipulations or Salter-Harris type-5 injuries. Crush injury of germinal cells of the growth plate is considered the main etiology (9).

Survey of the current literature did not reveal an injury of the distal radial epiphyses occuring concomittanly with distal radioulnar synostosis.

CASE

A 10 year old girl after a fall on her right hand presented with pain and deformity in her distal forearm. Radiographies revealed a right radial and ulnar distal diaphyseal fracture together with a right distal radial epiphyseal Salter-Harris type-2 fracture (Fig-1). Closed reduction was performed and a long arm cast was applied. On the following day, due to swelling and pain the cast was changed to a sugar-tongue splint. On the third day, there was loss of reduction of the forearm bones so closed reduction and long arm casting was repeated. The position was considered acceptable. After two days the position was lost again, so she was admitted to our clinic. Open reduction without fixation was performed and long arm casting was applied. After the operation she had regular radiographic evaluation and after 6 weeks the cast was removed. Physical examination revealed significantly limited forearm rotation; wrist flexion and extension were normal. X-ray films demonstrated synostosis occuring between distal radius and ulnar (Fig-2). She was lost to follow-up until two years after the injury when she returned to our clinic with the complaint of pain and limited forearm rotation. Her forearm was in 40 degrees of pronation and the total arc of motion was 15 degrees.

During surgery, the synostosis was resected with the accompanying part of the ulna. Periosteum was excised from all around the synostosis site, and a thin layer of bone wax was used to cover the raw parts. The muscular part of the extensor indicis proprius was transferred partly between radius and ulna. A part of synostosis was left intact distally and augmented by a K-wire in order to produce a modification of Sauve-Kapandji procedure. Distal ulnar epiphysiodesis with a cancellous screw was also performed. On the third postoperative day, active and passive motion were encouraged. At 6 months, active flexion and extension of the elbow was in full range, palmar flexion and dorsiflexion of the wrist were 70 degrees each and there was a 140 degrees arc of supination

Figure-1: After the trauma.

Figure-2: After synostosis and radial growth arrest.

Figure-4: After 6 months of the operation.

and pronation (Fig-3a,b). X-rays demonstrated some calcification proximal to the resection area which did not limit rotation (Fig-4).

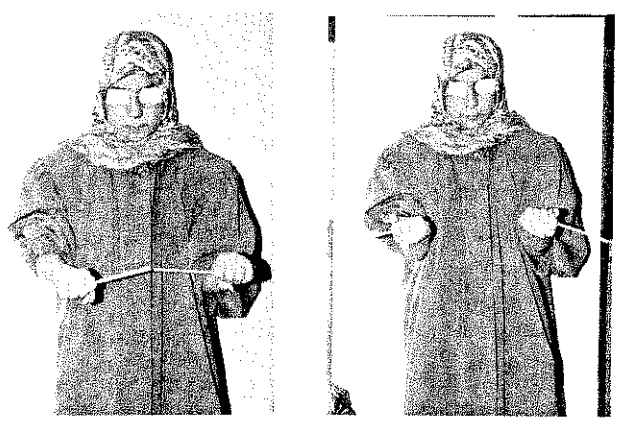
DISCUSSION

Several factors are felt to be responsible for post-traumatic synostosis. Double bone forearm fractures of the same level, comminuted and displaced fractures, proximally applied on lay grafts, late osteosynthesis, double-bone osteosynthesis done by a single incision, large haematoma due to disruption of the interosseous membrane and head injuries have all been cited as causative factors. In addition some would include hereditary predisposition (1-7).

According to several authors, including Vince and Miller, who have studied the largest series, the occurence of synostosis after trauma, and resynostosis after resection are rare in the distal forearm (1-3).

The case we present here is unusual because the synostosis occured distally and concurrent with the growth arrest of distal radial epiphyses. Although reposition of the epiphyseal fracture was established, repeated manipulations of the forearm fracture could be the reason of both the growth arrest and the synostosis. The injury of the interosseous membrane, excessive haematoma and injury to the germinal cells of the physeal plate at the time of the original trauma are the most likely causes, however.

Figure-3a,b: The rotational arc of motion.



Treatment should address existing and future functional problems. Recommended time for resection of the synostosis is between 1 and 3 years, by when, maturation of the synostosis is completed and disuse atrophy and fibrosis of the muscles have not yet developed (1). Early resection leads to recurrences and late excision yields unsuccesful results due to muscular insufficiency (1). In our case, there were 27 months between the time of the trauma and the time the synostosis was resected. We obtained 140 degrees of rotation intraoperatively and prevented haematoma formation using a thin layer of bone wax and good hemostasis. The extensor indicis proprius muscle was used as an interposing tissue between the two bones. It has been suggested that best results are obtained with synthetic materials, however.

Related literature points out that, the rate of both the reformation of the synostosis and the loss of function declines significantly after the third month(1,2,3,7). We obtained a hundred and forty degress of active rotation 6 months postoperatively, showing no decrease after the 6th week.

Epiphyseal arrest can occur after repeated manipulations of physeal injuries and Salter-Harris type 5 injuries. In our case reduction of the Salter-Harris type-2 injury was achieved initially, so, the arrest could be due to the original injury or the manipulations of the forearm fracture (9).

We present an uncommon case of a distal radioulnar synostosis occuring with a distal radial epiphyseal arrest. Resection of the synostosis, muscular interposition, Sauve-Kapandji procedure and ulnar epiphysiodesis, led to a succesful result.

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