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A Rare Case: Transphyseal Distal Humerus Fracture in a Newborn

Vzácný případ: transepifyzární zlomenina distálního humeru u novorozence

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SUMMARY

Transphyseal fractures of the distal humerus are usually seen in children younger than 3 years of age and are considered as Salter-Harris Type I epiphysiolysis. Neonatal transphyseal distal humerus injuries are extremely rare. It usually occurs due to trauma during difficult labour but can also be seen after child abuse. Since the distal humerus is composed of cartilaginous tissue in newborns, it is difficult to make a diagnosis with direct radiography. Patients are often diagnosed with elbow dislocation. However, elbow dislocation is almost never seen under the age of 3 years. Transphyseal fractures can be seen as a result of manoeuvres performed to deliver the baby during difficult normal delivery. Transphyseal humeral injuries can also be seen after caesarean section, child abuse and falling on the hyperextended arm. Clinical symptoms include pain, swelling, ecchymosis and crepitation at the elbow. Pseudoparalysis is present due to pain. In children with a history of difficult birth or trauma, evaluation with direct radiography should be performed initially. Radiocapitellar line is distorted on radiographs and the elbow joint appears subluxated. The treatment algorithm for transfusional humeral fractures in neonates is varied. It should be remembered that patients in this age group have a tremendous healing capacity. In conservative treatment, 2–4 weeks of follow-up with a long-arm splint after reduction is sufficient. In addition, closed reduction-internal fixation or open reduction-internal fixation can be applied according to the amount of displacement of the fracture. Cubitus varus, osteonecrosis, growth disturbance, decreased range of motion, compartment syndrome, neurovascular injury and infection are the main complications seen after transfusional humeral fractures.

INTRODUCTION

Neonatal transfusional distal humerus injuries are extremely rare. It usually occurs due to trauma during difficult labour, but it can also be seen after child abuse. The exact incidence is unknown due to the rarity of the fracture and the paucity of data in the literature. Paediatric transfusional distal humerus fractures are fre-

Fig. 1. AP and lateral radiographs of the elbow at the time of initial presentation.

Fig. 2. AP and lateral radiographs of the elbow on the 10th day.

quently confused with elbow dislocations and the differential diagnosis is usually difficult (3, 5).

CASE

A 1-day-old baby girl was referred to our centre for consultation from a private health institution because of limitation of movement and swelling in the left arm. The patient was in good general condition and consciousness was clear. It was learnt that she was born one day before with normal vaginal delivery but had a difficult delivery. Physical examination revealed pain and tenderness in the left elbow by palpation. Range of motion was limited due to pain. In the anamnesis, it was learnt that there was no history of trauma after birth. No suspicious findings suggestive of abuse were found. Peripheral neurovascular examination was normal. The patient was active and mobile and no findings suggestive of septic arthritis or osteomyelitis were found. Other orthopaedic physical examination findings were normal. Left upper extremity radiographs were taken to evaluate possible osseous pathologies.

Transphyseal fracture of the distal humerus was found in the elbow radiographs (Fig. 1). Closed reduction and long arm splinting were applied and the patient was followed up closely (Fig. 2). Callus tissue was observed in the distal humerus and conservative treatment was continued. At the end of 1 year, radiological and clinical improvement was excellent (Fig. 3, 4).

DISCUSSION

Transphyseal fractures of the distal humerus are usually seen in children younger than 3 years of age and are considered as Salter-Harris Type I epiphysiolysis. The distal fragment is most commonly displaced posteromedially. In newborns, the coronoid fossa, olecranon fossa and supracondylar region are partly in the metaphysis and partly in the epiphysis. In the first 6 months, the supracondylar region migrates to the metaphyseal region with growth. Because of this feature of the distal humerus in the newborn, rotational or sliding epiphyseal separations may be observed (1, 2, 4, 5).

Fig. 3. AP and lateral radiographs of the elbow of the patient in the first year.

Fig. 4. Bilateral elbow flexion image of the patient at 1 year.

In newborns, it is difficult to make a diagnosis with direct radiography because the distal humerus is composed of cartilage tissue. Patients are frequently diagnosed with elbow dislocation. However, elbow dislocation is almost never seen under the age of 3 years. Transphyseal fractures can be seen as a result of manoeuvres performed to deliver the baby during difficult normal delivery. Transphyseal humerus injuries may also be observed after caesarean section, child abuse and falling on the hyperextended arm (1, 2, 4, 5).

Clinical symptoms include pain, swelling, ecchymosis and crepitation at the elbow. Pseudoparalysis is present due to pain. In children with a history of difficult birth or trauma, evaluation with direct radiography should be performed initially. Babygrams may cause the diagnosis to be missed. Therefore, full AP and full lateral radiographs of the relevant region should be taken. On radiographs, the radiocapitellar line is distorted and the elbow joint appears subluxated. It should be kept in mind that this injury may be missed even by radiologists and radiographs should be evaluated by an experienced orthopaedist. USG and MRI can also be used in the diagnosis. The use of MRI is extremely limited because it requires sedation. Separation of the distal humeral epiphysis from the metaphysis is the most important finding on USG. However, it is very difficult to find experienced radiologists in emergency departments. In addition, elbow arthrogarphy is another method to be used in the diagnosis (1).

The treatment algorithm for transfusional humeral fractures in neonates is varied. It should be kept in mind that patients in this age group have a tremendous healing capacity. In conservative treatment, 2–4 weeks of

follow-up with a long-arm splint after reduction is sufficient. In addition, closed reduction-internal fixation or open reduction-internal fixation can be applied according to the amount of displacement of the fracture. Cubitus varus, osteonecrosis, growth disturbance, decreased range of motion, compartment syndrome, neurovascular injury and infection are the main complications seen after transfusional humeral fractures. In the literature review by Ratti et al. it was reported that 12% of a total of 33 cases with a mean follow-up period of 22 months from 1926 to 2014 were treated surgically and 88% conservatively. Range of motion was found to be normal in 80% of the patients. The carrying angle was found to be normal in 88% of the patients. It was reported that pin bottom infection developed one week later in 1 patient who underwent open reduction and internal fixation 17 days after birth (5).

We performed closed reduction and long-arm splinting in the emergency department on the 1st day after birth and followed up closely radiologically. At the end of 4 weeks, we removed the splint. At the end of 1 year follow-up, range of motion, carrying angle and direct radiograph were found to be normal.

Transphysial fractures of the distal humerus are extremely rare in newborns and are frequently confused with elbow dislocation. In children under 3 years of age, dislocation of the elbow is extremely rare because the distal humeral physic line is weaker than the bone-ligament structure. The results are usually very good in patients in whom treatment is started early. There is no consensus on surgical or conservative treatment after adequate reduction. Cubitus varus is the most common complication after treatment.

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