Case Report

Paediatric Medial Condyle Humeral Fracture with Early Fusion of Its Ossification Centre: A Rare Occasion

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Abstract

A distal humerus fracture is prevalent in paediatric patients; however, a humerus medial condyle fracture is rare and most often confused with a medial epicondyle fracture of the humerus. The ossification of the trochlear typically occurs at a later stage compared to the ossification of the capitellum, resulting in a higher likelihood of overlooking this particular injury. The centre of ossification of the medial condyle usually appeared radiologically at the age of five and fused around the age of fourteen. This was the case of a healthy eight-year-old girl who presented with left elbow pain and swelling after a fall. A radiograph of the left elbow revealed a non-displaced fracture of the medial condyle of the humerus with a fused ossification centre of the medial epicondyle. On the contrary, the radiograph of the right elbow revealed the presence of an ossification centre of the medial epicondyle. She was conservatively treated with an arm sling, and the fracture healed after one month. This case report depicted a rare fracture of the medial condyle of the humerus and an early fusion of the ossification centre in a child. Understanding the centre of ossification of the paediatric elbow is essential for a correct diagnosis and appropriate subsequent treatment. Fractures missed in the paediatric age group are detrimental because they can affect future development, growth, and function.

Keywords: Child; distal; elbow fractures; humeral fractures; ossification

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Introduction

A distal humerus fracture is prevalent in paediatric patients; however, humerus medial condyle fracture is rare and accounts for only one to two per cent of all paediatric elbow fractures (1). The condition is frequently mistaken for a fracture involving the medial epicondyle of the humerus. The ossification of the trochlear typically occurs at a later stage compared to the ossification of the capitellum, resulting in a higher likelihood of overlooking this particular injury (1). The ossification centre of the medical condyle usually appeared radiologically at the age of five and fused around the age of fourteen to seventeen (2). This case report depicted a rare humerus fracture of the medial condyle and an early fusion of the ossification centre in a child.

Case Report

This was a case of a healthy eight-year-old girl with no medical history who came to the Emergency Department (ED) with pain and swelling in the left elbow after falling while riding a mini scooter. No other injuries were sustained. On arrival in the ED, she was alert and hemodynamically stable. Examination of the left upper limb revealed minimal swelling in the left elbow region without open wounds. There was bony tenderness over the medial condyle region with a limited range of motion of the left elbow due to pain.

Otherwise, the neurovascular status was intact. A bilateral elbow radiograph was performed to look for fracture and comparison. A left elbow radiograph revealed a posterior fat pad and an undisplaced fracture of the medial condyle (Fig. 1&2).

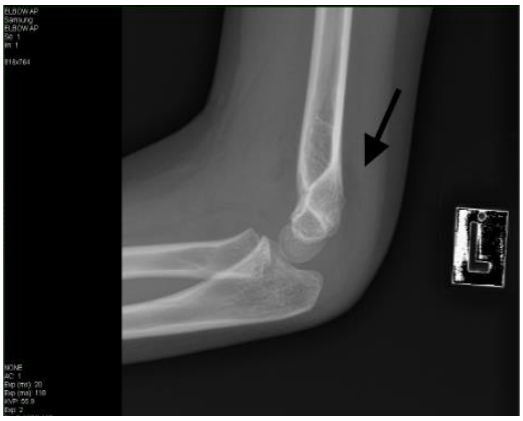

FIGURE 1: The radiograph of the left elbow anteroposterior view showed the presence of a posterior fat pad. No obvious fracture line was seen

Surprisingly, the centre of ossification of the left medial epicondyle had fused, while it was still presented in the right elbow (Fig. 3). She was conservatively treated by the orthopaedic team and discharged with an arm sling. Follow-up in the orthopaedic clinic one week after trauma revealed that swelling in the elbow had reduced with improvement in the elbow's range of motion. A repeated radiograph of the left elbow showed the presence of an undisplaced fracture of the medial condyle with callus formation (Fig. 4). She then had another follow-up in one month and was discharged well afterwards.

FIGURE 2: The radiograph of the left elbow lateral view showed an undisplaced fracture of the medial condyle with the absence of the ossification centre of the medial epicondyle

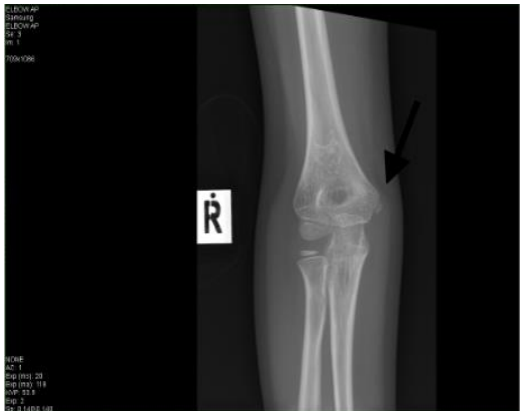

FIGURE 3: The radiograph of the right elbow lateral view showed the presence of an ossification centre at the medial epicondyle

Discussion

Paediatric fractures are prevalent occurrences, exhibiting a higher lifetime risk in boys compared to girls (3). Although paediatric elbow fractures are less prevalent than forearm or wrist fractures, they require meticulous attention to ensure accurate diagnosis and a favourable prognosis (4). Medial condylar humerus fractures in children are rare, accounting for only 1-2% of all paediatric elbow fractures (5). These injuries usually occur between 8 and 12 years of age (6). The diagnosis is frequently overlooked in paediatric patients due to delayed ossification of the trochlear relative to the capitellum (1).

This fracture is associated with two distinct methods of injury. The first mechanism involves a direct hit to the proximal ulna when flexing the elbow. The second mechanism occurs when an individual falls onto an outstretched hand with the elbow extended, forearm

FIGURE 4: The radiograph of the left elbow showed the presence of an undisplaced fracture of the medial condyle with callus formation

mechanism leads to the splitting of the medial condyle and avulsion (7). These fractures typically result from substantial force trauma and are, therefore, often associated with several forms of elbow injuries, including elbow dislocation and radial head dislocation.

Kilofyle classified the medial condyle fractures of the humerus into three types according to the degree of displacement (8). Type I fractures are characterised by the extension of the fracture line from the medial condylar metaphysis to the physis; Type II is the extension of the fracture line into the medial condylar physis, and Type III refers to the combined occurrence of rotation and displacement of the condylar fragment. As in this case, it is a type I Kiloflye fracture. Because these fractures are often missed, they can cause elbow instability, growth disturbance, delayed ulnar nerve palsy, and articular incongruity (9). The prevalence of medial condyle fractures of the humerus is mainly classified as type IV intraarticular Salter-Harris, rendering these injuries susceptible to non-union (6). Therefore, performing a meticulous radiographic assessment and fully understanding the ossification centres surrounding the paediatric elbow is imperative, as shown in Table 1.

TABLE 1: Radiographic evaluation of paediatric elbow – ages at appearance and fusion of ossification centers (± 1 year for influence of gender) (2)

Ossification centre	Age of ossification (years)	Age of fusion (years)
Capitellum	1	12
Radius	3	15
Medial epicondyle	5	17
Trochlea	7	12
Olecranon	9	15
Lateral epicondyle	11	12

Trochlear blood supply is an essential determinant of the clinical outcome of paediatric medial condyle fracture of the elbow (8). The distal humerus is supplied by terminal nutrient vessels without collateral circulation. Therefore, any vascular insult significantly impacts the healing and development of the humerus. Vascular supply to the trochlear can be disrupted, suppressing growth and resulting in cubitus varus deformity. However, growth can be stimulated at the injury site, causing a cubitus valgus abnormality. Additionally, if the blood flows to the area stops, it will lead to osteonecrosis (10).

Papavasiliou et al. (1987) reported excellent results in conservative treatment of undisplaced fractures of the medial condyle humerus (11). In this case, an isolated non-displaced fracture of type I Kilofyle classification is rare, as reported in many publications. A study mentioned that this fracture probably never occurs in children (5). It is also unusual for the ossification centre over the medial epicondyle to fuse radiologically before the age of 14 to 17 years, in this case (2). The patient was treated conservatively, and the fracture healed clinically and radiologically without operative intervention or complications.

Conclusion

Although paediatric elbow injuries are not uncommon, medial condyle humeral fractures are still rare. Understanding the centre of ossification of the paediatric elbow is essential for a correct diagnosis and subsequent appropriate treatment. Fractures missed in the paediatric age group are detrimental because they can affect future development, growth, and function.

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