CASE REPORT

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An Unusual Late Complication of Pediatric Medial Condyle Fracture of the Humerus: Ulnar Nerve Entrapment

Orçin BOZKURT[a]

[a]Düziçi State Hospital, Clinic of Orthopedics and Traumatology, Osmaniye, Türkiye

ABSTRACT Medial condyle fractures of the humerus account for less than 1-2% of elbow injuries in the pediatric population. Nondisplaced or minimally displaced medial condyle fractures of the humerus are typically managed successfully nonoperatively with a long-arm cast. We report a rare case of ulnar nerve entrapment in an 11-year-old male with a medial condyle fracture of the left humerus that was treated nonoperatively with a long-arm cast. He developed a claw-hand deformity by the 6th-month follow-up. Ulnar nerve release and callus excision were performed. Four months postoperatively, the claw-hand deformity had completely resolved, and electromyography showed complete recovery from ulnar nerve palsy.

Keywords: Humerus; humeral fractures, distal; bony callus; ulnar nerve compression syndromes

Medial condyle fractures of the humerus (MCFH) are the least common elbow fractures in children.[1,2] The most frequent mechanism of injury is a fall onto the elbow.[2] Diagnosing MCFH is more challenging than lateral condyle fractures due to the later ossification of the trochlea compared to the capitellum.[2] Kilfoyle classified these fractures into 3 types: Type I, a nondisplaced fracture that does not involve the joint; Type II, a fracture extending into the trochlear fossa (Salter-Harris Type IV); and Type III, where the medial condyle is displaced.[2] Nonoperative treatment is recommended for Type I and Type II fractures with less than 2 mm displacement.[1-3]

We present the surgical and follow-up experience of an 11-year-old male patient with a minimally displaced medial condyle fracture of the humerus. The patient developed ulnar nerve palsy during follow-up after nonoperative management with a long arm cast.

CASE REPORT

An 11-year-old male patient presented with a deformity in the fingers of the left hand (Figure 1A). The patient's history included a Type II MCFH sustained 6 months prior due to a fall onto his elbow. He was treated nonoperatively with a long-arm cast for 4 weeks (Figure 1B). He underwent physical therapy for elbow stiffness 3 weeks after cast removal. On physical examination, he had a claw-hand deformity and hypoesthesia in the 4th and 5th digits of the left hand. The left elbow and forearm had full range of motion, with no varus-valgus deformity in the upper extremity. Electromyography (EMG) findings were compatible with ulnar nerve palsy; no ulnar nerve sensory or motor response could be obtained. Plain radiographs revealed a healed fracture of the MCFH and a medial metaphyseal spike arising from the left humerus (Figure 1C). Laboratory findings were normal.

Correspondence: Orçin BOZKURT
Düziçi State Hospital, Clinic of Orthopedics and Traumatology, Osmaniye, Türkiye
E-mail: orcinbozkurt@hotmail.com

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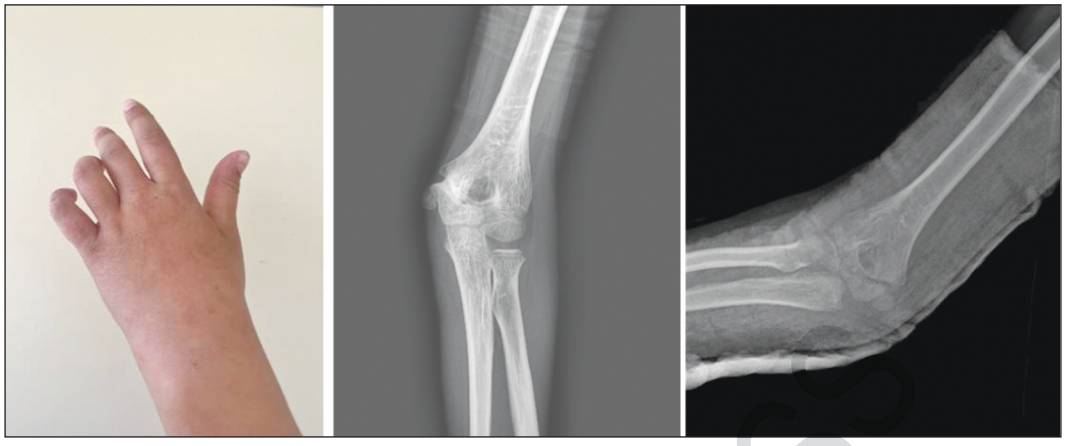

FIGURE 1: A) Claw-hand deformity at presentation. **B)** Anteroposterior X-ray of the elbow shows minimally displaced medial condyle fracture of the humerus. **C)** Anteroposterior X-ray of the elbow shows union of medial condyle fracture of the humerus and a medial spike on the metaphysic

We planned ulnar nerve exploration at the left elbow. Under general anesthesia, an incision was made over the medial epicondyle of the left elbow. The ulnar nerve was explored using the microscope. It was observed that a callus had formed on the medial condyle fracture line, and the ulnar nerve was compressed into an S-shape between the callus and the medial epicondyle of the humerus (Figure 2A). The ulnar nerve was dissected and released from the callus. The callus was excised with an osteotome. The ulnar nerve was observed to be stable in the cubital tunnel and anterior transposition of the ulnar nerve was not required (Figure 2B). By the 4th month postoperatively, the claw-hand deformity had completely resolved, and motor-sensory examinations of the ulnar nerve were normal (Figure 2C). At the 1-year follow-up, there were no abnormal findings such as varus-valgus deformities, avascular necrosis, or fishtail deformity on the plain radiographs. EMG showed that the sensory and motor responses of the ulnar nerve were normal. There was no loss of elbow range of motion.

Informed consent was obtained from the patient's parent for the publication of this case report.

FIGURE 2: A) The ulnar nerve is seen compressed between the medial epicondyle of the humerus and the callus formation. B) The callus was excised, the ulnar nerve is in the cubital groove. C) No claw-hand deformity in the fourth month after surgery.

DISCUSSION

MCFH account for less than 1-2% of elbow injuries in the pediatric population.[4] They are Salter-Harris Type IV physeal fractures that involve the joint. Diagnosis can be challenging because trochlear ossification occurs around the age of 9.[5] A delayed or incorrect diagnosis of these fractures can lead to serious complications such as varus-valgus deformities, nonunion, and stiffness of the elbow.[1-6] Yang et al. reported a case of nonunion in a 5-year-old patient with a MCFH due to misdiagnosis.[6] Leet et al. observed a 33% complication rate in 21 patients with MCFH.[3] Moreover, they reported nonunion and hypoplastic development of the trochlea in one out of 11 patients who had nondisplaced MCFH.[3] Sağlam et al. reported ulnar nerve palsy in three preoperative patients with Type II and Type III MCFH.[7] McCarthy et al. described median nerve entrapment in a pediatric Type III MCFH.[8] They recommend open reduction for all displaced MCFH to prevent the devastating consequences of upper extremity nerve injuries.[8]

A series of MCFH cases in the literature have shown that minimally displaced fractures (Type I and II) heal well with cast immobilization, leading to excellent functional results.[2-4] Our patient had a minimally displaced (Type II) MCFH and was treated nonoperatively with a long-arm cast for 4 weeks. Union was achieved by the end of the 4th week. Elbow range of motion was fully restored with physical therapy. However, ulnar nerve palsy in the left upper extremity developed by the 6-month follow-up.

When examining the literature, there are no studies on ulnar nerve entrapment caused by the callus of MCFH. Therefore, our study is highly novel and represents the first report of its kind in the literature. As a result, it is important to recognize that callus formation following an MCFH may lead to ulnar nerve entrapment. Even in cases of minimally displaced MCFH treated nonoperatively with a long-arm cast, close neurological follow-up is essential. Early diagnosis and surgical decompression should be performed to prevent permanent damage and ensure optimal functional outcomes.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

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