

Bilateral Flexion-Type Supracondylar Humerus Fracture

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ABSTRACT

Supracondylar humerus fractures are common in the pediatric population, but flexion fractures are very rare in this population. The need for open reduction in these fractures is high and can be challenging for orthopaedic surgeons. In this article, we report a 9-year-old patient with bilateral flexion-type humeral fracture treated with closed reduction, which, to our knowledge, is the first report in the literature. We concluded that the first step in the treatment of flexion-type supracondylar fractures should be closed reduction with the help of an experienced assistant surgeon and that successful results can be obtained even in bilateral flexion-type fractures with appropriate treatment and follow-up.

Supracondylar humerus fractures are frequently encountered fractures in orthopaedic surgery practice. They constitute approximately 70% of all elbow circumference fractures in pediatric patients. While 95 to 98% of these fractures are extension type, flexion fractures are seen only 2 to 5%.¹ Flexion-type fractures usually occur after direct contact with the flexed forearm and are more prone to neurovascular complications. In the treatment of these injuries, plaster cast, closed reduction or open reduction, and percutaneous pinning are applied.^{2,3}

Although extension-type fractures and case series are frequently found in the literature, flexion-type fractures are few in number. To our knowledge, the case presented is the first case in the literature with a bilateral flexion-type fracture. The aim of this report was to present a patient with a bilateral flexion-type supracondylar fracture treated with closed reduction and pinning.

Case Report

A 9-year-old boy presented to our emergency department with a history of falling from a height. The mechanism of injury was falling from a tree onto a hard ground. On inspection, there was notable swelling and tenderness in both elbows. Radial, ulnar, median, and anterior interosseous nerves were normal in her neurological examination. He had radial and ulnar pulses, and his hand was warm.

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Radiographic evaluation revealed a flexion-type supracondylar fracture in both elbows (Figure 1). Both elbows were temporarily stabilized in a long arm splint with a 30° flexion position, and the patient was transferred to the operating room.

Neurovascular examination of the patient was repeated in the operating room before general anesthesia, and it was normal. In the surgery, with the help of an experienced resident surgeon, closed reduction was first attempted for both elbows. Longitudinal traction was applied with the elbow in extension, and the distal fragment was reduced with a force directed posteriorly. Coronal plane deformity was then corrected, and the reduction was evaluated. It was decided that the reduction was appropriate on the right and adequate on the left, except for minimal translation. Stability was achieved with two Kirschner wires placed laterally on the right and two Kirschner wires placed laterally and one Kirschner wire placed medially on the left. Stability was evaluated by fluoroscopy in the lateral plane and was appropriate. A long arm splint was placed at 60° flexion of the elbow joint, and the patient was taken to his room in the clinic. Postoperative neurovascular examination was also normal (Figure 2). Follow-up and examination were performed postoperatively at the third week, sixth week, sixth month, and 12th month. K-wires were removed at

the third week in the outpatient clinic without any anesthesia. The long arm splint was kept for three more weeks, and gentle movement was started at the sixth week control. It was observed that the patient did not have malunion, nonunion, or limitation of movement in the first year of follow-up (Figures 3 and 4). The patient's guardians provided informed consent for this case to be published.

Discussion

Although pediatric supracondylar humeral fractures are well-known fractures, to our knowledge, bilateral flexion-type supracondylar fractures have not yet been reported in the literature.

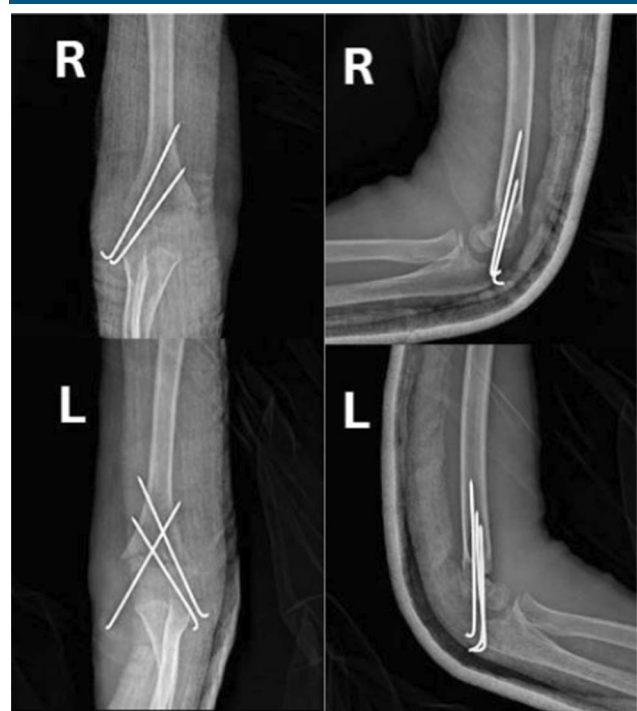
Flexion-type supracondylar fractures account for 1 to 11% of all supracondylar fractures. The incidence of neurapraxia, especially of the ulnar nerve, is higher in these fractures.⁴ The ulnar nerve can be injured by pinching between the distal and proximal fragments or by stretching the nerve over the posterior spike of the proximal fragment.⁵ Axonotmesis or neurotmesis is seen in only a minority of injuries and usually resolves within approximately 10 weeks with close follow-up and reassessment.⁶ For this reason, it is important that

Figure 1



Preoperative radiographic images showing bilateral flexion-type supracondylar fracture.

Figure 2



Postoperative radiographic images of percutaneous pinned supracondylar fractures.

Figure 3

Photographs showing functional results at one year.

the preoperative neurovascular examination is carefully performed preoperatively and postoperatively and recorded. Urgent surgery is important to avoid compartment syndrome and loss of joint range of motion.⁷

There are different treatment options such as cast immobilization, skeletal traction, closed reduction and percutaneous pinning, and open reduction and internal fixation.⁸ These treatment modalities can be chosen according to patient's age, type of fracture, and patient condition as well as surgeon's experience and preference.

Figure 4

Postoperative first year radiological images of both elbows.

Many studies in the literature have reported the superiority of closed reduction and percutaneous pinning in the treatment of supracondylar elbow fractures in children.^{9,10} This is also recommended in flexion-type supracondylar fractures. Flexion-type supracondylar fractures are seen in the older patient group compared with the extension-type.^{11,12} This is one of the reasons why flexion-type displaced fractures require open reduction more frequently than extension-type fractures. Another reason is that it is difficult to achieve an anatomical reduction in displaced flexion-type fractures.¹¹ In our case, closed reduction was performed without difficulty with the help of an experienced assistant. However, we think it is important to resort to open reduction after three attempts.¹¹

Flexion-type supracondylar fractures have a higher incidence of growth disorders and other complications compared with other elbow circumference fractures in children.² According to Kuoppala et al,² flexion-type fractures tend to be more displaced. This displacement may be why these fractures are associated with more complications. However, in most studies, nine of 10 children achieved excellent or good results an average of 6 years after injury.¹¹ Because we intervened early in our patient and provided closed reduction at the third hour of the trauma, as a result of 12-month follow-up, the patient's range of motion in both elbows was normal.

Conclusion

In our case report, we wanted to enhance the literature by showing that closed reduction is the first step in the treatment of flexion-type supracondylar fractures and that successful results are obtained in flexion-type fractures, even bilateral, with appropriate treatment

and follow-up. Orthopaedic surgeons should be aware of the need for open reduction in these fractures and should inform the family about this before the operation, but first of all, they should try closed reduction with the appropriate technique and preferably with an experienced assistant surgeon.

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