

Case Report

Presentation and Management of Displaced Lateral Condylar Mass Fractures With Ipsilateral Displaced Olecranon Fractures in Two Pediatric Cases[☆]

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ABSTRACT

Cases: Two pediatric patients, aged 4 and 6-years-old, presented to a level one children's hospital with displaced lateral condylar mass (LCM) and ipsilateral displaced olecranon fractures after falling directly on to the affected extremity. Both patients underwent surgical fixation of the fractures, one of whom was found to have a laterally dislocated radial head intra-operatively. While one of the patients underwent open reduction internal fixation (ORIF) of both the LCM and olecranon fractures, the other patient underwent ORIF of the LCM and closed reduction percutaneous pinning (CRPP) of the olecranon fracture.

Conclusions: Both patients were treated immediately upon presentation. They went on to full recovery with well-healed fractures and return of function to the affected extremity. Appropriate surgical management with ORIF versus CRPP may depend on displacement of the fractures and/or involvement of the radial head. Due to the rarity of this fracture combination, it can be difficult to identify in the acute setting. Most complications arise when the LCM-olecranon fractures go untreated. Therefore, it is imperative to have a high suspicion for multiple injuries at the elbow when a pediatric patient presents with elbow pain and swelling after a fall.

Introduction

Pediatric elbow fractures are associated with a high rate of complications when misdiagnosed or undiagnosed [1]. Lateral Condylar Mass (LCM) fractures are the third most frequently encountered pediatric elbow fracture, accounting for 12 to 20% of cases [1–3]. The injury typically arises from a high energy varus force, leading to avulsion of the extensor muscles and lateral collateral ligaments from the lateral condyle [1,3]. When hyperextension accompanies the varus stress, distraction of the radiohumeral joint can rupture the annular ligament and dislocate the radius [3].

Nevertheless, pediatric LCM fractures with ipsilateral olecranon fractures are rare. Between 1986 and 2005, prior case reports presented only sixteen cases without detailed discussion of diagnosis and treatment [1,4–7]. Most recently, Faroq et al. described a 4-year-old male with LCM and olecranon fractures managed by ORIF without complications after 6 months [8].

We discuss two pediatric patients with displaced LCM and ipsilateral olecranon fractures; both underwent surgical fixation. The first patient was found to have a concomitant lateral radial head dislocation, so an ORIF was done for the LCM and olecranon

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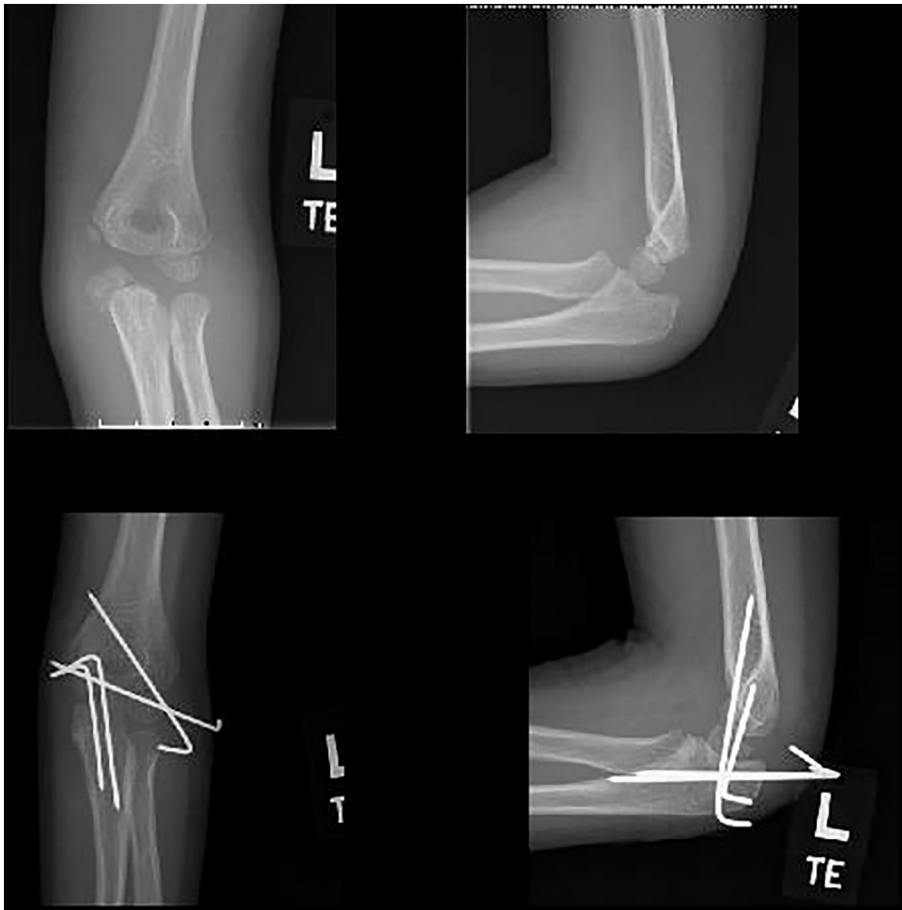


Fig. 1. Anteroposterior and lateral radiographs of six-year-old female at presentation (top row) and at four-week follow-up after fixation (bottom row).

fractures. The second patient underwent ORIF for the LCM fracture and CRPP of the olecranon fracture.

Case reports

Case 1

A six-year-old female presented to the orthopedic clinic five days after falling from playground equipment directly on to her outstretched left arm. Initially evaluated by an outside hospital, she was placed in a long arm splint for “an elbow fracture.” In clinic, the affected extremity was neurovascularly intact with moderate ecchymosis and edema. Plain radiographs of the elbow showed a 2.33 mm displaced lateral condyle fracture that traversed the capitellum and a 3 mm displaced olecranon fracture (Fig. 1).

After obtaining consent, the patient underwent ORIF of the left LCM fracture with placement of two k-wires through a lateral-based incision. When attempting closed reduction of the ulna, the radial head was found to be subluxed laterally. A posterior incision was made for ORIF of the olecranon fracture, again using two k-wires. Reducing the fracture allowed reduction of the radiocapitellar joint. Post-operatively, the patient was placed in a bivalved long arm cast that was later overwrapped in clinic.

Pins and cast were removed after four weeks. At eight weeks, imaging revealed stable alignment of both fractures and appropriate callus formation. Elbow range of motion was full without deformity and she had returned to full activity without restrictions.

Case 2

A four-year-old male presented to the emergency department one day after falling from playground equipment directly on to his outstretched left arm. On physical exam, the left elbow was moderately edematous with ecchymosis. The extremity was neurovascularly intact. Plain radiographs of the elbow revealed a displaced 5 mm LCM fracture and a 4 mm displaced olecranon fracture (Fig. 2).

After obtaining consent, he underwent ORIF of the LCM fracture using an anterolateral approach and placement of two k-wires.

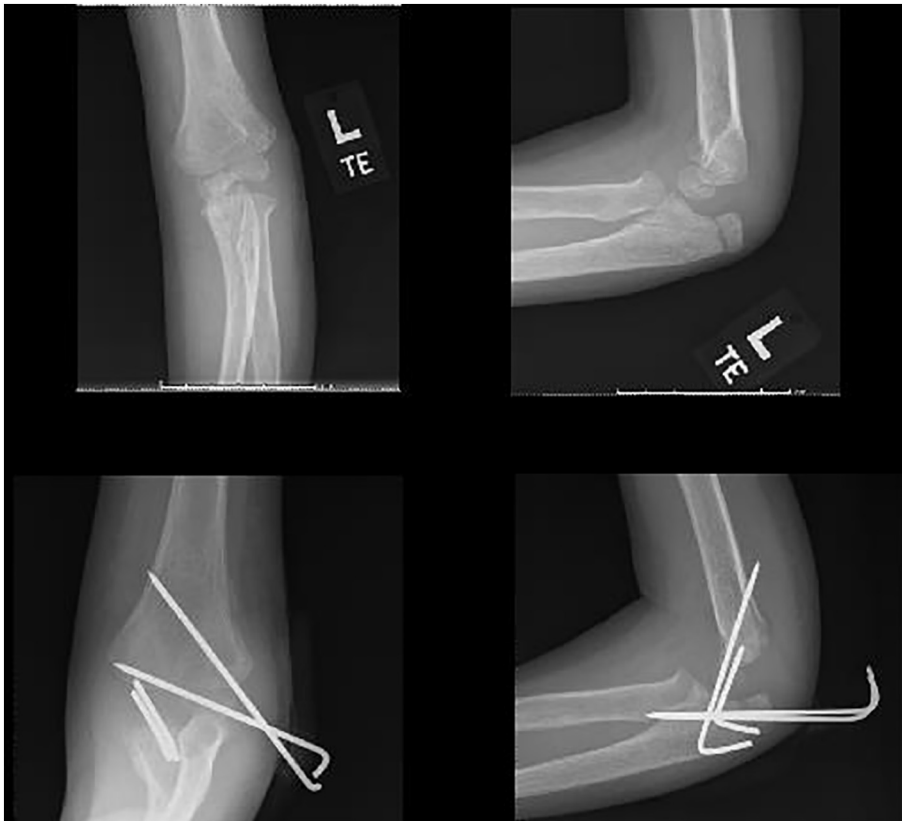


Fig. 2. Anteroposterior and lateral radiographs of four-year-old male at presentation (top row) and at four-week follow-up after fixation (bottom row).

The olecranon fracture was fixed with CRPP using two k-wires. The patient was initially placed in a posterior slab splint and transitioned to a long-arm cast four days later.

Pins and cast were removed at four weeks. By 12 weeks, the patient lacked 5° of extension and 10° of supination without deformity. He began physical therapy for improved range of motion. Otherwise, the patient had returned to full activity without restrictions.

Discussion

LCM fractures occur in up to one out of five pediatric patients who present with an elbow fracture. Few involve a concomitant ipsilateral olecranon fracture. Displacement of LCM fractures > 2 mm requires surgical fixation due to high risk of nonunion [1,2]. Recent studies argue that pediatric condyle fractures without significant displacement or articular surface incongruity should be managed by CRPP rather than ORIF, since it decreases operative time and reduces risk of nonunion or osteonecrosis [2]. Additionally, complications of lateral condylar overgrowth, stiffness, cubitus varus or cubitus valgus and fishtail deformity have been described following ORIF [9].

Weiss et al. proposed a new classification system of lateral condyle fractures to assist with determining adequate surgical treatment. Type 1 fractures with < 2 mm displacement can be managed with close observation and casting. Type 2 fractures are displaced or hinged > 2 mm with an intact articular cartilage surface and can be managed with CRPP. Those with articular surface displacement are classified as Type 3 and should undergo ORIF [9]. The patients' LCM fractures exhibited disruption of the articular cartilage and thus required ORIF in both cases within this report. Additionally, the second patient's fracture was displaced > 4 mm.

Previously presented cases on LCM with ipsilateral olecranon fractures in pediatric patients only briefly discuss surgical technique in relation to size of displacement. While many studies comment on fixing the LCM if displaced > 2 mm, little is mentioned about the threshold for fixing the olecranon fracture. Prior evidence suggests surgical intervention of the olecranon fracture to be limited to patients with displacement of > 5 mm, a threshold that neither case in this study met [10]. In the first case, fixation of the olecranon by direct visualization was required for reduction of the laterally dislocated radius. The second case underwent CRPP of the 4 mm displaced olecranon fracture to decrease risk of further displacement.

Due to the rarity of this fracture combination, we present two patients with displaced LCM and ipsilateral olecranon fractures. The first case underwent ORIF of both fractures in the setting of a laterally displaced radial head dislocation. The second case underwent

ORIF of the LCM fracture and CRPP of the olecranon fracture even with greater displacement than the first case. Since complications mainly occur with delay in diagnosis and treatment, it was imperative that the fractures were identified upon presentation and appropriately managed with surgery. Of note, the second patient did experience prolonged stiffness and required physical therapy, but no other complications occurred after either treatment with successful healing and return to normal activity.

Declaration of competing interest

Mark Erickson is a Green Sun Medical unpaid consultant & Pediatric Orthopaedic Society of North America board or committee member. Sarah E. Sibbel is a Pediatric Orthopaedic Society of North America board or committee member.

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Ethical approval

This study was approved by our institutional review board.

Statement of informed consent

No identifiable information of the patient was included in this case report; therefore, informed consent was not required.

Statement of human and animal rights

Procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 and 2008.

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