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CASE REPORT

- 7 Simple lateral elbow dislocation: A case report

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Simple lateral elbow dislocation: A case report

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Abstract

BACKGROUND

Simple lateral elbow dislocation (SLED) is a rare type of elbow dislocation; however, its treatment may be complicated by accompanying soft tissue or neurovascular damage. Herein, we report a rare case of SLED managed secondarily with open reduction and soft tissue repair following failure of closed reduction.

CASE SUMMARY

A 67-year-old woman suffered SLED after falling on her outstretched left hand with her elbow extended. She developed pain, swelling, and movement restriction in the elbow; there were no neurovascular symptoms, except for numbness in the 4th and 5th digits. Radiologic investigation confirmed the SLED, and a closed reduction under anesthesia was performed. The follow-up radiographs at 1-wk revealed failure of reduction; accordingly, open reduction with lateral collateral ligament and common extensor origin repair were carried out. The patient regained full elbow range of motion by six weeks.

CONCLUSION

Adequate concentric reduction for SLED, conservatively or surgically, reduces complications and provides a more functional joint.

Key Words: Common extensor origin; Elbow joint capsule; Lateral collateral ligament; Closed reduction; Open reduction; Fluoroscopy; Case report

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Core Tip: Despite their rarity, the results of simple lateral elbow dislocations are gratifying if they are handled well from start to finish. Treatment may be terminated with closed methods or surgery may be required. Regardless of the method of treatment, the results are good with a close follow-up.

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INTRODUCTION

Elbow dislocation, the second most common joint dislocation in adults[1], frequently occurs in the posterior or posterolateral direction, whereas simple lateral elbow dislocation (SLED) is a rare entity, with only a handful of reports in the literature[1-3]. Simple dislocation involves pure articular disengagement without accompanying fractures, while dislocation with a concomitant fracture is called complex dislocation[4,5].

SLEDs are usually accompanied by neurovascular involvement[6,7] or soft tissue damage[8], which may hinder closed reduction[9-11] due to interposition of muscles (such as the anconeus and brachialis) or fracture fragments (if any). In this study, we report a rare case of SLED managed by open reduction and repair of the lateral collateral ligament (LCL) and common extensor origin performed one week after a failed closed reduction.

CASE PRESENTATION

Chief complaints

A 67-year-old right-hand dominant woman was admitted to the emergency room with elbow pain and inability to move her elbow on January 4, 2021 with a history of falling on an outstretched left hand with her elbow extended.

History of present illness

She presented with a swollen left elbow and her right hand holding her left wrist with a pronated forearm. She fell down while walking and was admitted to hospital within 20 min.

History of past illness

There is no history since this was an emergent case.

Personal and family history

Hypertension was her only chronic illness. There was no family history.

Physical examination

The patient's body temperature was 36.2 °C, heart rate 96 bpm, respiratory rate 24 breaths/min, blood pressure 140/90 mmHg, height 162.0 cm and weight 96 kg. There was no open wound around the elbow, as seen on the first examination. There were no signs of any distal circulatory disorder or neurological deficits in the left upper extremity, except for numbness in the left 4th and 5th digits.

Laboratory examinations

Complete blood count parameters were in the normal range.

Imaging examinations

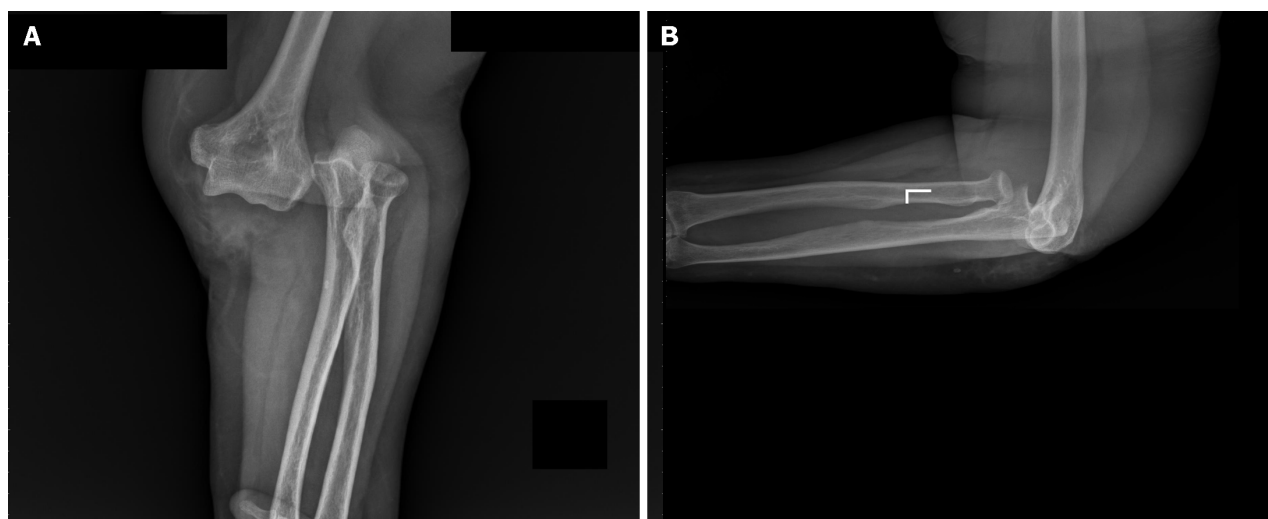
Anteroposterior and lateral radiographs of the elbow revealed lateral displacement of both the ulna and radius relative to the humerus without a fracture (Figure 1).

FINAL DIAGNOSIS

Left SLED.

TREATMENT

Under sedation anesthesia in the operating room, a gentle closed reduction under fluoroscopy was performed. An assistant applied longitudinal traction to the humerus through the axilla, and the surgeon, while holding the forearm in supination, maneuvered it in the medial direction, as the assistant moved the humerus in the lateral direction. An audible click confirmed the correction of the dislocation which was also evident under fluoroscopy. After reduction, both passive flexion and extension range of motion (ROM) of the elbow were regained. The valgus stress test was normal, but the varus stress test performed at 25° elbow flexion was abnormal opening to about 20°. Next, a gravity-assisted varus stress test[12] was applied, which indicated a LCL deficiency. A concentric reduction was confirmed under fluoroscopic



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Figure 1 Roentgenographs at the time of the injury. A: Anteroposterior; B: Lateral.

examination; afterward, we applied a long arm splint to immobilize the elbow in 90° flexion and neutral rotation, as LCL-deficient elbows are most unstable in supination[13,14]. When the patient woke up from anesthesia, she had no pain in her elbow, and the numbness in the fingers was also relieved. Radiographs taken after manipulation confirmed the concentric reduction (Figure 2).

OUTCOME AND FOLLOW-UP

At the one-week follow-up, although the patient remained pain-free, the follow-up radiographs revealed a loss of reduction (Figure 3).

Accordingly, a decision was made for open reduction and LCL repair using the Kocher approach. During surgery, the disrupted LCL and joint capsule were exposed just after dissecting the fascia underlying the subcutaneous tissue. The LCL complex was repaired with a suture anchor (DePuy Mitek; Johnson and Johnson, Raynham, MA, United States), and the torn common extensor origin was sutured using non-absorbable sutures (2-0 Ethibond Excel, Ethicon; Johnson and Johnson, Raynham, MA, United States). Elbow joint stability, both in flexion and extension, was evaluated using fluoroscopy. As full ROM of the elbow was achieved, and there was no subluxation or articular incongruity fluoroscopically, the surgery was terminated. No additional intervention was planned for the medial side, and the elbow was immobilized at 90° flexion and neutral rotation in a splint for 5 d.

A hinged elbow brace was subsequently applied to allow active joint movement (12th day after the injury) (Figure 4).

The ROM was controlled by increasing the flexion and extension angles daily after the fifth day of brace application. Full ROM of the elbow was achieved by the end of three weeks post-injury, and the brace was removed.

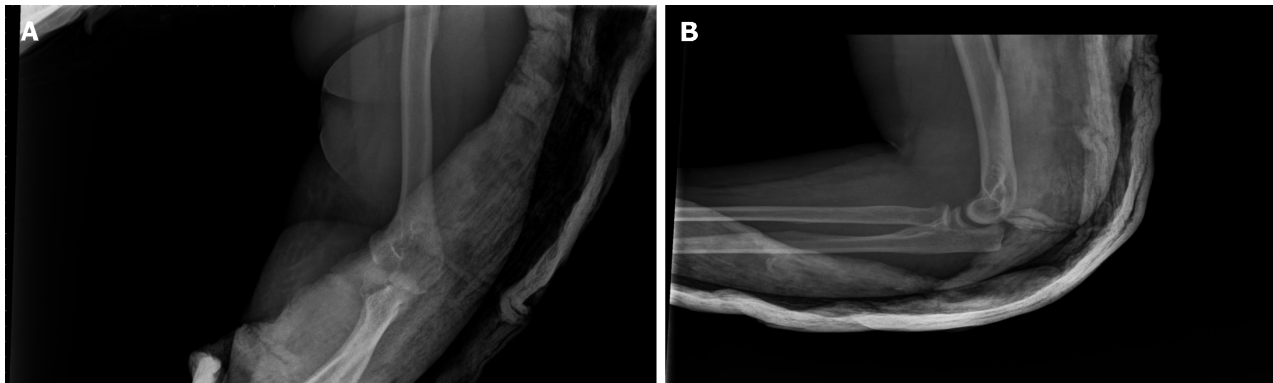
The patient was followed up for two years, during which she remained symptom free. Figure 5 shows the radiographs at the two-year follow-up; the joint retained concentric reduction with minimal heterotopic ossification along the radiohumeral joint without compromising the ROM for supination and pronation. The patient reported no problems carrying heavy objects or getting up from a chair by pushing bilaterally.

DISCUSSION

Elbow dislocations are more commonly seen in men than in women. They are also more common in the adult age group than in the younger age group. Overall prognosis is better in the younger age group (< 35 years old)[4]. Despite elbow dislocation being a common musculoskeletal injury, SLEDs are rare and seldom managed by closed reduction[1]. Predominantly, only case reports are available for this injury. Even in a systematic review of 342 cases of complete elbow dislocations, only three lateral dislocations were reported[1].

Schnetzke *et al*[15] revealed that in cases of simple elbow dislocations, a diverse range of ligamentous and muscular soft tissue injuries are observed. A subset of patients exhibit prominent injury patterns with a notable emphasis on the medial aspect. These significant findings provide robust evidence for the existence of a valgus mechanism, characterized by the initiation and propagation of a medial force from the medial to anterior regions. Our patient also injured a valgus mechanism.

Ulnar nerve involvement is a common complication with lateral elbow dislocation[10], as reported in our patient; thus, a detailed neurologic examination was necessary at the time of admission. Hopefully, as in our patient, neurological involvement resolves rapidly and spontaneously once nerve compression is relieved by joint reduction. Radiological



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Figure 2 Roentgenographs after closed reduction. A: Anteroposterior; B: Lateral.



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Figure 3 Roentgenographs after one week. Loss of reduction is seen. A: Anteroposterior; B: Lateral.

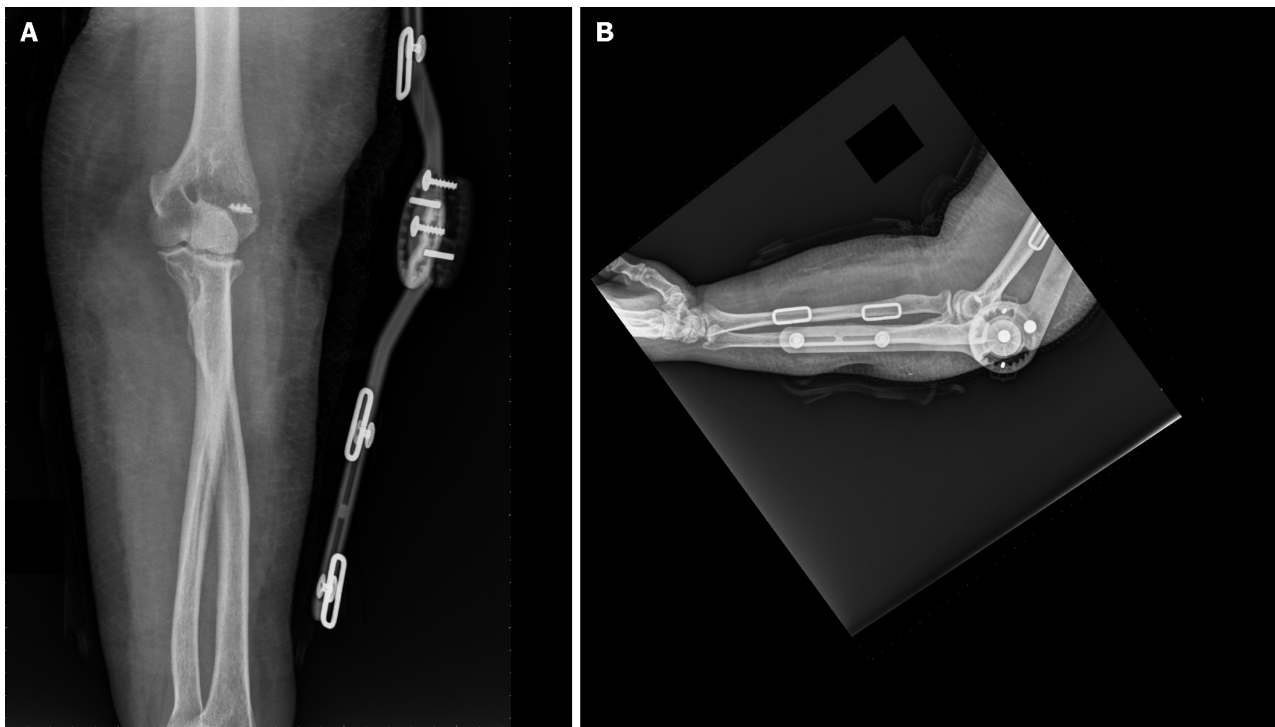
investigation is necessary, starting with conventional roentgenography, whereas computed tomography is mandatory if there is an accompanying fracture[5]. In our patient, there was no evidence of a fracture, so we did not perform computed tomography.

There are two treatment options for SLEDs-conservative or surgical. The existing case reports for simple lateral dislocations state that conservative treatment comprising closed reduction and functional treatment with a pressure bandage[1] or splinting[2,7,9-11], followed by early movement, is satisfactory. Moreover, certain closed reduction maneuvers have been specifically designed for lateral elbow dislocations[9-11]. Since our patient also had a simple dislocation, we proceeded with a closed reduction first.

However, a number of studies have described the use of open reduction for lateral elbow dislocations[3-6,8]. Muscle or fracture fragment interposition is often cited as the reason for failure of the closed reduction; however, in our patient, there was no muscle or soft tissue interposing the joint space. We were able to approach the bone just under subcutaneous tissue in the open reduction due to a large defect in the LCL and the joint capsule. Therefore, repair of the lateral complex in elbow dislocation is essential[4]. Micic *et al*[16] and Hobgood *et al*[17] checked elbow joint stability in extension under fluoroscopy after repairing the LCL complex and the common extensor origin, and reported that if the elbow is stable in extension, there is no need to repair medial structures. Similarly, in our patient, the elbow joint was stable in extension after repairing the LCL and common extensor origin, so we decided not to touch the medial side.

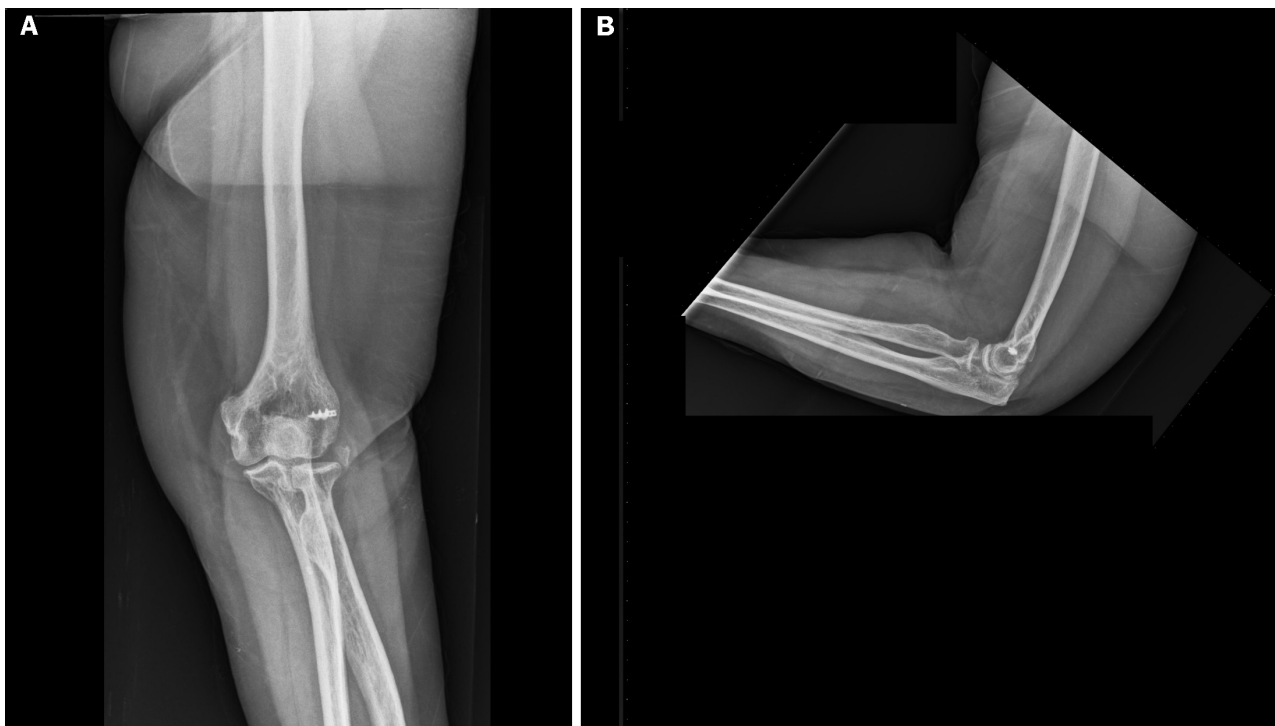
According to the publication by de Klerk *et al*[18], surgical intervention may offer a more advantageous result in comparison to non-operative treatment. However, it is not possible to definitively conclude this based solely on the findings of the aforementioned study. It is recommended that future investigations prioritize the comparison between these approaches and additionally determine specific subsets of patients with uncomplicated elbow dislocation who would derive benefits from surgical intervention.

The complications of simple elbow dislocations include loss of motion due to contracture, pain, and heterotopic ossification[4], residual instability is also a major concern[4]. In our case, none of the aforementioned complications were observed with closed reduction; however, when the radiographs revealed a loss of joint congruency at the end of the one-week observation period, open reduction was inevitable.



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Figure 4 Roentgenographs after surgery. The elbow is in a brace. A: Anteroposterior; B: Lateral.



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Figure 5 Roentgenographs at the end of two years. A: Anteroposterior; B: Lateral.

If the elbow remains unstable after reduction, primary ligament repair begets sufficient stability to allow early movement, which prevents contractures formation[4]. We also opted for ligament repair along with open reduction, which allowed early ROM exercises, and the patient was protected from developing contractures.

CONCLUSION

Regardless of the severity of the trauma, a closed reduction maneuver while monitoring neurovascular status can efficiently manage SLED. However, in the case of failure of closed reduction, open reduction with additional soft tissue repair may be required to ensure the maintenance of joint congruity. Adequate concentric reduction with conservative or surgical methods allows early resumption of ROM, reduces complications, and provides a more functional joint.

FOOTNOTES

Author contributions: Albayrak M contributed this work, designed the research study, performed the research, contributed new reagents and analytic tools, analyzed the data and wrote the manuscript. The author has read and approved the final manuscript.

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