Open Galeazzi fracture with ipsilateral elbow dislocation

A 26-year-old male sustained right elbow and forearm injuries following a fall while playing football. He stated that he had fallen on his outstretched right arm. An initial clinical examination revealed a deformity of the elbow and forearm. There was a 5 cm wound on the ulna volar side of the wrist and the ulnar head was exposed. The neurovascular examination was normal. Radiographs of the forearm showed an oblique fracture of radial shaft at the junction of

A Galeazzi fracture has been described as a fracture of radial shaft combined with dislocation of the distal radioulnar joint (DRUJ).[1] This injury accounts for 6.8% of forearm fractures in adults.[2] Elbow dislocation is also a common injury type and accounts 11-28% of all elbow injuries.[3] We report a patient who suffered a combination of the Galeazzi fracture and dislocation of the elbow joint in the same extremity, because it is very rare.[4] Only seven cases have been reported in the literature which was written in English.[5-11]
distal and middle thirds, volar dislocation of the ulnar head and posterolateral dislocation of the elbow (Figure 1a, b). Immediate manipulation and reduction of the elbow dislocation was performed in the emergency department, the wound was covered with a sterile dressing and a long arm splint was applied (Figure 1c). Antibiotic treatment with a first generation cephalosporin was started in the emergency room and tetanus prophylaxis was also administered. The patient was taken to the operating room six hours after he arrived at the emergency department. Under general anesthesia, the patient’s wound was irrigated with saline, debrided then closed primarily. During the same surgery, the radial shaft fracture was fixed using dorsal Thompson approach. Using a sterile tourniquet, a dorsal longitudinal skin incision was made over the fracture level. The radial border of the extensor digitorum communis was exposed, then an interval was developed between this muscle and extensor carpi radialis brevis muscle and they were both retracted to the ulnar and radial sides. The abductor pollicis longus muscle was also retracted distally and toward the ulna and posterior surface of the radius until the fracture line was reached. After anatomical reduction, internal fixation of the radial shaft fracture was done using a 3.5 mm seven-hole locking compression plate. After internal fixation, the stability of the elbow joint and DRUJ was examined. Elbow joint stability was checked by looking at the range of motion of the elbow joint. It was fully flexed then extended slowly until dislocation occurred. Because it was not dislocated between 30-130 degrees of flexion, it was accepted as stable. The DRUJ was unstable under fluoroscopic examination and fixed with one 1.8 mm Kirchner wire (K-wire) in a pronated position (Figure 2a). The extremity was immobilized in a long arm splint with the elbow at 90˚ flexion (Figure 2b, c). After two weeks, the long arm splint was removed and gradual active flexion and extension exercises of the elbow joint were started with a limited motion brace. After six weeks, the K-wire was removed from the DRUJ then pronation and supination exercises commenced. One year after surgery, he had no pain or clinical evidence of instability. Final radiographs demonstrated normal elbow and wrist joints with a healed fracture of the radial shaft (Figure 3). Range of motion was 10°-135° at the elbow and 70° pronation and 70° supination at the forearm (Figure 4a-e). The patient was informed that data would be used for

![Figure 1.](image1.png) Figure 1. (a) X-ray of the right forearm showing both elbow dislocation and Galeazzi fracture. (b) Anteroposterior radiography of the wrist showing distal radioulnar joint dislocation and radius shaft fracture. (c) X-ray of the right forearm showing the closed reduction by immediate manipulation of both elbow and distal radioulnar joint.

![Figure 2.](image2.png) Figure 2. (a) Postoperative anteroposterior radiography of the right forearm showing distal radioulnar joint fixation with K-wire and plate osteosynthesis of the radial diaphyseal fracture. (b) Postoperative elbow lateral radiography. (c) Postoperative wrist lateral radiography.
Galeazzi fracture is a common injury accounting for 6.8% of forearm fractures in adults. However, a combination of Galeazzi fracture with elbow dislocation in the same extremity is very rare. A review of the English literature found only seven cases. It has been suggested that this injury occurs when causative energy is high or the position of the extremity at the time of impact is unique.

The most common mechanism of Galeazzi fracture is a fall on the outstretched arm combined with extreme pronation. However, Galeazzi fracture can be divided into two types: apex volar and apex dorsal. In apex volar type, distal radial fragment is displaced dorsally (apex of the angulation is volar) and ulna is dislocated to the volar. In apex dorsal type, distal radial fragment is displaced volarly (apex of the angulation is dorsal) and ulna is dislocated to the dorsal. Axial loading of the forearm in supination results in an apex volar type and axial loading in pronation results in an apex dorsal type fracture. The frequency of apex volar type when compared with apex dorsal type is much lower in Galeazzi fractures occurring in adults. The mechanism for posterolateral elbow dislocation is valgus and posterolateral rotational force acts on an outstretched arm, whereas the mechanism for posteromedial dislocation is varus and posteromedial rotational force acts on an outstretched arm.

Our patient could not remember the exact mechanism of the injury. He only told us that he had fallen on his outstretched hand while playing football and his arm remained under his body. He presented with an apex volar type Galeazzi fracture. We believe that the mechanism of injury is very similar to the case described by Asadollahi et al. Axial loading to the supinated outstretched arm with the body weight of the patient acting as a driving force resulted in a Galeazzi fracture. After the radius fracture, the continuation of the axial force was transmitted through the intact ulna and caused elbow dislocation.

High energy trauma is the cause for most cases described in the literature. The only case described by Asadollahi et al. was caused by a low energy trauma. Our case was also a result of a relatively high energy sports trauma which caused an open Galeazzi fracture and ipsilateral elbow dislocation. Several of the cases which were described in the literature had
additional injuries such as ipsilateral humerus shaft fracture, scaphoid fracture or radial head fracture but none of them was an open injury.[5,9,10] The review of the literature demonstrates that in all seven cases, the Galeazzi fractures were treated successfully with open reduction and internal fixation. In five cases, the elbow dislocations were treated with closed reduction, the other two were treated with an open reduction (Table I). Shiboi et al.[8] described a case where there was a lacerated 1 cm wound at the ulnovolar wrist region, but they did not classify their injury as open.

Treatment of Galeazzi fracture or elbow dislocation does not change because they occurred concurrently.[11] In adults, open reduction rigid internal fixation and anatomical reduction of the distal radioulnar joint is standard care for Galeazzi fractures. Stability and reducibility of the DRUJ is commonly evaluated during surgery. If DRUJ is not reduced or not stabilized after reduction further surgical intervention may be necessary.[1] Acute simple elbow dislocations can be treated with closed reduction. Complex elbow dislocations which are unstable or fracture dislocations may need surgery. Ipsilateral Galeazzi fracture and elbow dislocation is a rare injury and likely is a result of a high energy trauma. Attaining the expected outcomes after treatment does not change in the presence of concurrent occurrence.

Declaration of conflicting interests
The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

**REFERENCES**


**TABLE I**

<table>
<thead>
<tr>
<th>Author</th>
<th>Age/Gender</th>
<th>Cause</th>
<th>Associated injury</th>
<th>Treatment of Galeazzi fracture</th>
<th>Treatment of Elbow dislocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mezzadra et al.[6]</td>
<td>16/M</td>
<td>Motorcycle accident</td>
<td>Ipsilateral ulna fracture</td>
<td>Radial plate</td>
<td>Closed reduction</td>
</tr>
<tr>
<td>Sarup and Bryant[10]</td>
<td>35/F</td>
<td>Fall from stairs</td>
<td>Ipsilateral humeral fracture</td>
<td>Radial plate</td>
<td>Closed reduction</td>
</tr>
<tr>
<td>Shiboi et al.[8]</td>
<td>34/M</td>
<td>Fall from height</td>
<td>–</td>
<td>Radial plate</td>
<td>Closed reduction</td>
</tr>
<tr>
<td>Ng and Rose[17]</td>
<td>27/M</td>
<td>Car accident</td>
<td>Radial head and coronoid fracture</td>
<td>Radial plate and DRUJ pinning</td>
<td>Open reduction</td>
</tr>
<tr>
<td>Nanno et al.[9]</td>
<td>32/M</td>
<td>Motorcycle accident</td>
<td>Scaphoid fracture</td>
<td>Radial plate and tension band of ulna styloid fracture</td>
<td>Closed reduction</td>
</tr>
<tr>
<td>Rajeev et al.[7]</td>
<td>26/M</td>
<td>Motorcycle accident</td>
<td>–</td>
<td>Radial plate</td>
<td>Open reduction</td>
</tr>
<tr>
<td>Asadollahi et al.[5]</td>
<td>58/F</td>
<td>Fall while running</td>
<td>Radial head fracture</td>
<td>Radial plate and DRUJ pinning</td>
<td>Open reduction</td>
</tr>
</tbody>
</table>

DRUJ: Distal radioulnar joint.