

## Case Report of an Essex-Lopresti Injury with Both Bone Forearm Fracture

### Abstract

**Background:** Essex-Lopresti injury (ELI) is one of the rare injuries of the elbow area, which includes fracture of radius head, disruption in the interosseous membrane of the forearm (IOM), and distal radio-ulnar joint dislocation. This happens as a result of transverse pressure on the elbow and forearm when falling down or when high energy is applied.

**Methods:** In this study, we introduced a 40-year-old patient who suffered both bone forearm fracture in addition to the above injuries. First, the patient underwent both bone forearm ORIF surgery, and then fixation of radius head and distal radio-ulnar joint reduction and fixation.

**Results:** After six months, the patient has 20 degrees of motion limitation only in the pronation state, and the joint's motion range in other joints is complete.

**Conclusion:** In general, the Essex-Lopresti injury (ELI) is one of the rare hand injuries that are difficult to diagnose with simple radiographs and requires great care.

**Keywords:** Radial head fractures, Interosseous membrane, Radius fracture, Ulna fractures, Radial fractures

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### Introduction

The bony structure of the forearm includes two parallel bones of radius and ulna. The upper and lower radio-ulnar joints are responsible for rotation of the distal end of the radius on the adjacent end of the ulna, and cause supination and pronation movements. In case of a forearm injury, usually the fracture of both bones or the fracture of one bone along with the dislocation of the other bone occurs <sup>(1)</sup>. Classically, there are three types of injury to the radius and ulna bones:

1- Monteggia Fracture-dislocation, which includes the fracture of the ulna along with dislocation of head of the radius.

2- Galeazzia Fracture-dislocation, which includes the fracture of the trunk of the radius along with the dislocation of the distal end of the ulna <sup>(2)</sup>.

3- Colles' fracture, which includes the metaphysis fracture of the distal of the radius with displacement of the distal fragment to the posterior side <sup>(1)</sup>.

Another type of forearm injury that is very rare is a fracture of the head of the radius with dislocation of the inferior radioulnar joint and a tear of the membrane between the radius and ulna (IOM), which is known as an Essex-Lopresti injury <sup>(3)</sup>. In this article, we intend to introduce a patient who, in addition to the rare Essex-Lopresti injury has also suffered both bone fracture forearm.

### Presentation of the case

A 40-year-old male patient with pain and swelling in the elbow, forearm and right hand, following crushing of hand and forearm between wall and a car, referred to the emergency department of Imam Ali (AS) hospital in Bojnurd. Radiographic examinations showed that distal radio-ulnar joint dislocation, forearm interosseous membrane (IOM) tear, both bone forearm fracture, crushing of the head of the radius in the anterior part and its posterior displacement (Figure 1 & 2).

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Figure 1: X-ray photo of the patient before surgery

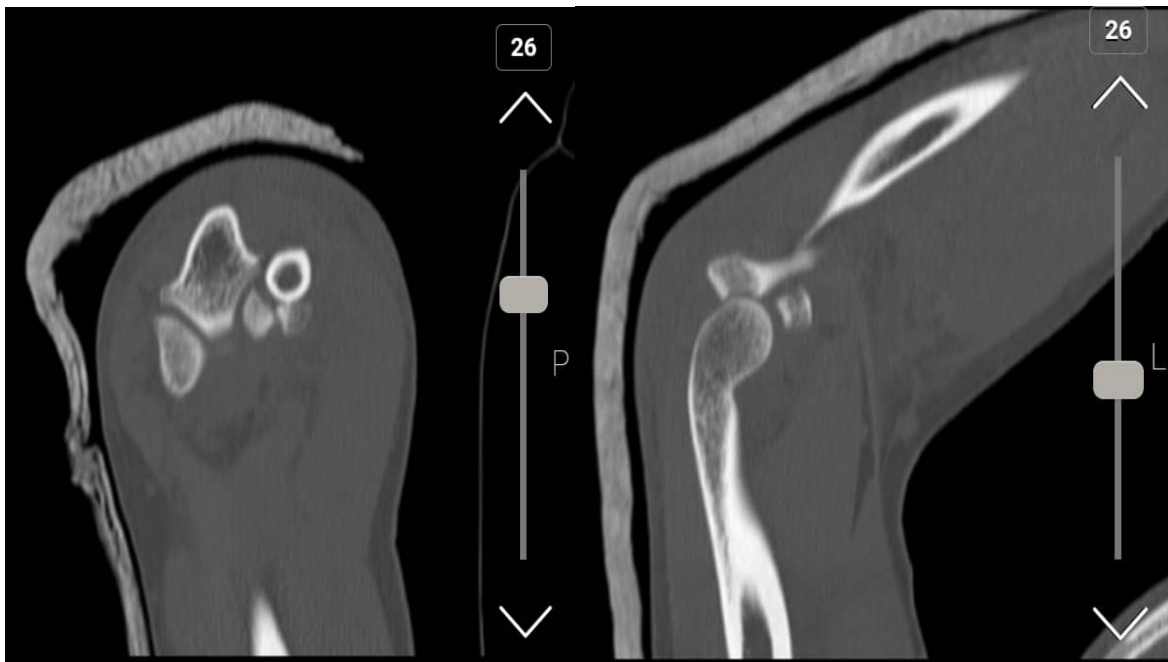


Figure 2: CT scan image before surgery

After being hospitalized and performing routine procedures, the patient underwent both bone ORIF surgery (Figure 3). In order to repair the fracture of the head of the radius, it was decided to use prosthesis, but was not available. 4 days later, the patient underwent the insertion of 2 Herbert screws, and the distal radio-ulnar joint, after closed reduction, was percutaneously fixed in the supine position using K-wires (Figure 4). Also, a long

arm splint was applied in a supination position at 90-degrees angle. The post-operative examination showed normal neurovascular state with no discharge. Also, the patient was told that due to pinning, he is unable to perform rotation movement and that the splint should remain for 6 weeks. 6 months post surgery improvement in elbow motion; full supination and only 20 degrees dropped in pronation was present (Figure 5).



Figure 3: Radiographic image of the patient after surgery



Figure 4: Final radiograph of the patient after surgery



Figure 5: Examination of elbow range of motion after 6 months

## Discussion

Forearm area as a unit consisting of radius and ulna bones, interosseous membrane and other organs has a complex function so that the damage to any of the members of this unit causes its malfunction<sup>(4)</sup>. Essex-Lopresti injury (ELI) includes a fracture of the head of the radius, disruption in forearm interosseous membrane (IOM), and dislocation of the distal radioulnar joint (DRUJ)<sup>(5)</sup>, which is caused by transverse pressure on the elbow and forearm as a result of falling or high energy input. Simple radiographs are generally unable to detect this complication<sup>(6)</sup> and only 20% of these injuries are fully identified in the

initial visit<sup>(7)</sup>. Usually, when ELI is not diagnosed in the initial visit, the patient returns after some time with chronic elbow and wrist pain<sup>(8)</sup>. The diagnosis of ELI in acute conditions can be challenging and requires great accuracy<sup>(9)</sup>. Many of the Essex-Lopresti injuries reported in the articles are associated with unilateral<sup>(3)</sup> or bilateral elbow dislocations<sup>(10)</sup>. However, only one case of Essex-Lopresti injury with radius shaft fracture has been reported<sup>(11)</sup>. ELI treatment is always a surgical challenge and a controversial issue<sup>(12)</sup>. And despite several treatment methods for this injury, there is still no fully accepted

technique for treating this problem. However, with the current awareness of the important role of the head of the radius bone in maintaining the stability of the elbow and forearm area, most of the techniques emphasize on performing open reduction and internal fixation surgery or replacing the head of the radial bone<sup>(9)</sup>. Stabilization of the lower radioulnar joint for 6 weeks using cast<sup>(13)</sup> and placement of K wire as well as maintaining the supination position is necessary to treat this injury<sup>(14)</sup>. In fact, in order to prevent restriction in the rotation of the distal radioulnar joint, the forearm interosseous membrane (IOM) should heal in supine position, because in this position the strain is higher on the distal part of the membrane than in pronation<sup>(15)</sup>.

## Conclusion

Essex-Lopresti injury consists of a group of injuries related to the forearm area, which its proper treatment requires quick and timely diagnosis. Association with both-bone forearm fracture is rare. We suggest that when this injury occurs, a complete clinical examination and radiography of the member should be performed to check all possible fractures and dislocations of the head of the radius and radioulnar joints so that the patient can be treated in time and chronic pain can be prevented.

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