Late extensor pollicis longus rupture following plate fixation in Galeazzi fracture dislocation

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ABSTRACT
Late rupture of extensor pollicis longus (EPL) tendon after Galeazzi fracture dislocation fixation is an unknown entity though it is a well-established complication following distal radius fractures. We report the case of a 55-year old male who presented with late EPL tendon rupture 4 months following internal fixation of Galeazzi fracture dislocation with a Locking Compression Plate (LCP). He was managed with extensor indicis proprius (EIP) transfer to restore thumb extension. At 4 years followup, functional result of the transfer was good. We identify possible pitfalls with this particular patient and discuss how to avoid them in future.

Key words: Extensor pollicis longus rupture, Galeazzi fracture dislocation, locking compression plate
MeSH terms: Radius fractures, bone plates, bone screws, tendon injury

INTRODUCTION
Extensor pollicis longus (EPL) is the primary extensor of the interphalangeal (IP) joint and an important extensor of the metacarpophalangeal (MCP) joint of the thumb. Following the rupture of EPL tendon, there is an inability to elevate the thumb to the plane of the palm.1 Late rupture of the EPL usually follows fractures of distal radius managed with both conservative and operative methods.1,9 Since the tendon is closely related to dorsal radius when it passes through 3rd dorsal compartment, attritional rupture is common. But such presentation after a Galeazzi fracture dislocation managed by open reduction and internal fixation is not yet reported.

CASE REPORT
A 55-year-old male patient was referred to us with a history of sudden snapping at right wrist followed by inability to extend the IP joint of right thumb for 1 week. He had previously sustained a closed Galeazzi fracture dislocation in the same limb 4 months back [Figure 1], which was fixed with a locking plate (LCP, Synthes, Paoli, PA, USA). A below elbow plaster slab was used for 6 weeks. Immediate followup was uneventful and he was back to work by 6 weeks postoperatively. But the patient noticed a tender area over the dorsum of wrist for 3 months prior to presentation.

On clinical examination, the right thumb was in an adducted position and active extension of the distal phalanx was not possible. A clinical diagnosis of EPL rupture was made. Fresh radiographs [Figure 2] showed a uniting fracture of radius fixed with a 7 hole LCP. On the radiographs, the distal locking screw was relatively longer and appeared to protrude into the 3rd extensor compartment, which was the cause of late EPL rupture.

An EIP to EPL transfer was performed under supraclavicular block anesthesia [Figure 3]. A three incision method was used. A transverse incision was made proximal to the 2nd MCP joint level where the EIP tendon was identified and cut after confirming presence of the slip of extensor digitiunum communis (EDC) to the index finger. The second incision was made at the level of wrist joint and EIP tendon was delivered out. The third incision was made at the level of 1st MCP joint and the distal part of EPL tendon was delivered out. A subcutaneous tunnel was made from the second to the third incision through which EIP tendon was passed. An end to end repair of the tendons (EIP and distal part of EPL) was done at the third incision level using 4-0 Nylon by modified Kessler’s
After immobilization for 2 weeks, gradual physiotherapy was started and the patient achieved good function. The fracture eventually consolidated by 6 months. At 4 years of followup, the functional result with SEEM (specific EPL-EI transfer Evaluation Method)\(^2\) is excellent with a score of 85.

**Discussion**

Late rupture of EPL is a well-known complication following fractures of distal radius; the first case being reported as early as 1876 by Duplay.\(^3\) The causes cited include dorsal comminution, attritional rupture due to mal reduction, a direct microvascular compromise of the poorly vascularized tendon or degenerative necrosis due to reduction of blood supply caused by callus narrowing the third compartment (which any way has limited space due to the attachment of the extensor retinaculum to the Lister’s tubercle). Benson \textit{et al}.\(^4\) emphasized on two potential causes of late EPL rupture after volar plate fixation of distal radius fractures, namely iatrogenic damage by protruding screws or inadvertent penetration by drill bit and bone fragments, or dorsal gaping. Late EPL ruptures have also been reported after intramedullary nailing of fracture of radius--both in children and adults, caused by the prominent distal end at the insertion point.\(^5-8\) Rupture of the EPL tendon at the tip of a prominent fixation screw has been described in two cases after fixation of fractures of the radial shaft and one case of scaphoid fracture.\(^9\) But this complication is unknown after fixation of a Galeazzi fracture dislocation.

The Galeazzi fracture injury pattern was first described 1822, by Sir Astley Cooper,\(^10\) long before Galeazzi reported his results in 1934.\(^11\) Campbell termed it as the “fracture of necessity” in 1941 emphasizing the need of surgical treatment for achieving optimal functional outcome. Galeazzi fracture dislocations are preferably fixed with compression plating by a volar approach of Henry.\(^10\) As the fracture involves distal third of radius, the distal screws come in close relation to the extensor tendons which run close to the dorsal surface of distal radius. So protruding screw can potentially damage the extensor tendons.

To avoid this complication while using volar plates for distal radius fracture fixation many measures are suggested\(^4\) which are applicable in cases of Galeazzi fractures too. We suggest meticulous use of proper length screws and close scrutiny of screw length by good intraoperative radiographs before closure. The third extensor compartment is a “zone of no tolerance” and when in doubt the surgeon should not hesitate for open assessment performed through a small incision ulnar to the Lister’s tubercle.

Use of LCP is now popular especially in the elderly age group for fracture fixation. As the length of the inserted
screw is critical, unicortical placement of the locking screws may be recommended where they are potentially dangerous due to close proximity of tendons.

To conclude, EPL tendon rupture is a rare but disabling complication after fixation of a Galeazzi fracture dislocation but it can be prevented easily by meticulous choice of screw length and avoiding entry into the third extensor compartment.

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