A rare case of fracture both bones of forearm complicated by combined anterior and posterior interosseous nerve palsy

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Introduction

Many traumatic and non-traumatic causes of isolated posterior interosseous nerve and anterior interosseous palsies have been reported in the literature. The common traumatic causes of posterior interosseous nerve palsy include Monteggia fractures, forearm lacerations, forearm contusions and penetrating injuries. Traumatic anterior interosseous nerve palsy is uncommon. Combined anterior and posterior interosseous nerve palsies are extremely rare. We report a case of combined anterior and posterior interosseous nerve palsy complicating an open fracture of radius and ulna of forearm.

Case report

A 53-year-old male presented with history of injury to his left forearm when his boat toppled over while fishing. He presented to us 7 h after the injury. He was diagnosed to have open fracture of middle third of radius and ulna of left forearm. There were two lacerated wounds (i) 2 cm x 1 cm over the volar aspect (ii) 2 cm x 2 cm over the dorsoulnar aspect of upper third of the forearm.

He was unable to extend the fingers and the thumb. The wrist extensors were acting. The sensations over the dorsal aspect of the first web space (autonomous zone of radial nerve) were intact. The flexor digitorum profundus of the index finger and flexor pollicis longus were not acting. The ulnar nerve was intact clinically. There was no stretch pain in both flexor as well as extensor compartments. X-rays of left forearm showed displaced fracture middle third of radius and ulna (Fig. 1).

The wounds were thoroughly debrided under brachial block. As the wounds were contaminated and the limb was grossly swollen, primary fixation of the fractures was delayed. The musculotendinous injury was ruled out, the wounds were closed and an above elbow slab was given. After the wounds healed a nerve conduction study was done. It showed a delay in conduction of anterior interosseous nerve and an equivocal study of posterior interosseous nerve. During the open reduction and internal fixation of the radius and the ulna at the end of 3 weeks, the anterior interosseous nerve and flexor pollicis longus tendon were found to be adhered. Neurolysis was performed to free the nerve. Posterior interosseous
nerve was not explored as the electromyographic studies showed continuity of the nerve and due to the lack of facilities and expertise in micro-neuro-surgery. Thus, we would prefer a tendon transfer for posterior interosseous nerve lesion at a later date than repairing it primarily. Post operative period was uneventful and the fractures united within 6 months (Fig. 2). At the end of 9 months, there was

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**Figure 1** Displaced fracture middle third of radius and ulna.

**Figure 2** Union of the fracture at 6 months with DCP in situ.

**Figure 3** Characteristic pinch of the left hand due to lesion of the anterior interosseous nerve with palsy of flexor pollicis longus and flexor digitorum profundus of the index finger.
partial recovery of both anterior and posterior interosseous nerves (Figs. 3 and 4). There was terminal 30 degrees extension lag of the fingers at the metacarpophalangeal joints. The grip strength was good. Patient was able to carry out all his activities of daily living. Patient was advised reconstructive surgery in the form of transfer of flexor carpi ulnaris to extensor digitorum communis and palmaris longus to extensor pollicis longus with the intention of improving physiologic function. However, the patient

Figure 4 Paralysis of finger extensors and thumb extensors resulting in finger drop and thumb drop. Note that wrist extensors are acting.

Figure 5 Proposed mechanism of injury.
refused for any surgery as he was happy with functional result, which he had at the end of 9 months.

**Discussion**

Forearm fractures with associated posterior interosseous nerve palsies are uncommon.¹,⁵ Anterior interosseous nerve palsies by themselves are uncommon.³ Moehring reported anterior interosseous nerve paralysis as a complication of supracondylar fracture of humerus.² Incomplete lesions of anterior interosseous nerve other than neurotmesis are common and these recover irrespective of the modality of treatment.⁴ Combined anterior interosseous nerve and posterior interosseous nerve palsies complicating forearm fractures are extremely rare and has not been reported so far to the author’s knowledge.

In our case injury to musculotendinous structures were ruled out during the initial debridement. The compartment syndrome was ruled out clinically on day one and subsequently by the absence of stretch pain in both flexor and extensor compartments. The consistency of the muscle mass was normal and volkmann’s sign was negative during the follow up. Though primary fixation of the fracture of both bones was warranted, it was not possible in our case because of extensive contamination of the wounds and our protocol of treating compound small wounds is to tackle in two stages. First to debride and defer internal fixation for 2–3 weeks till the soft tissue equilibrium is achieved.

We presume that the insults to the nerves were incomplete in nature as there was partial recovery at the end of 9 months and the mechanism of injury could be the pull of the fishing hook over the two nerves through a penetrating wound on the dorsoulnar aspect of the forearm (Fig. 5). The functional deficit at the end of 9 months was negligible for his occupation. We believe that combined anterior and posterior interosseous nerve palsy complicating fracture both bones of forearm have not been previously reported in the literature.

**References**