A rare case of progressive and late onset posterior interosseous nerve palsy following distal biceps tendon repair

I.R. Gill*, S.J. Pearce, A. Iossifidis

Mayday University Hospital, Orthopaedics, 530 London Road, Croydon, London CR7 7YE, United Kingdom

Accepted 15 December 2005

Case report

A 57-year-old right handed management surveyor, with minimally sporting activities presented with a ruptured right biceps tendon, after removing furniture from the boot of his car. Surgical repair was performed in view of the patient’s activity level and demands.

Surgical repair was undertaken via a single anterior incision technique with fixation achieved by the use of suture anchors inserted into drill holes in the proximal radius. The patient was discharged the following day with full neurological function. He made an uneventful recovery, being able to return to work within one week. He continued to gain steady improvement with almost full function reported by six months.

At seven months post-operatively the patient began to complain of difficulty in controlling the mouse at work with his right hand. This progressed over several weeks leading to weakness in ulnar three digits associated with difficulty in performing activities of daily life. Neither sensory changes nor painful sensations were reported.

The progressive nature of his symptoms were noticed by his general practitioner who referred him back to his original surgeon.

At this stage physical examination revealed profound weakness in extension of ulna three digits, no sensory changes and radial deviation of the wrist. Radiographs also showed a 15 mm × 15 mm mass of heterotopic ossification adjacent to the radial tuberosity (Fig. 1).

The diagnosis of PIN palsy caused by compression was suspected; electrophysiological studies confirmed a severe palsy and surgical decompression was recommended.

Exploration occurred through a single anterior incision. At this time a dual pathology was identified. The nerve was being constricted under the Arcade of Froshe (fibrous edge of supinator muscle) resulting in a bulbous proximal portion prior to the arcade with flattening of the nerve distal to the constriction (Fig. 2). Secondarily there was a mass of heterotopic ossification adjacent to the radial tuberosity. This measured 15 mm × 15 mm and could be clearly seen to compress the swollen nerve as the forearm moved through its range of motion from full pronation to full supination.
The mass of heterotopic ossification was excised and the constricting arcade divided to release pressure from the nerve. The patient was discharged later that day.

Electrophysiological studies undertaken at two months post decompression showed improvement in PIN function. Currently at three months post surgery there is significant improvement in extension power of all affected fingers with no associated functional impairment.

Discussion

PIN palsy is a rare occurrence. It can be broadly classified into either traumatic or non-traumatic causes. Traumatic causes include iatrogenic injury as a complication of arterio-venous fistula creation and radial head resection. Non-traumatic causes include inflammatory (including rheumatoid arthritis), entrapment, neuralgic amyotrophy and space-occupying lesions such as ganglia, lipoma, fibroma and amyloid. Entrapment at the arcade may well cause an incomplete lesion of the PIN, which may progress to complete palsy if untreated.

The case we present of PIN palsy following distal biceps tendon repair is even more unusual with only one case described in the literature. It is also the first described case of PIN palsy caused by two distinct pathologies namely, entrapment at the Arcade of Froshe and dynamic compression through a mass of heterotopic ossification.

The radial nerve is derived from C5 to T1 roots, it passes down the humerus in the spiral groove before piercing the lateral intramuscular septum to enter the anterior compartment of upper arm. The main trunk divides into the anterior sensory branch (superficial radial nerve) and the posterior motor branch (posterior interosseous nerve) 2.5–3.5 cm distal to the antecubital flexion crease. Before dividing into two main branches it supplies several muscles (brachial, brachioradialis and extensor carpi radialis longus muscle). The anterior sensory radial nerve continues down the forearm underneath brachioradialis before supplying the first dorsal webspace. Whereas the PIN passes beneath the fibrous edge of the supinator muscle (this area is referred to as the Arcade of Froshe) where it enters the extensor compartment and divides into its terminal branches supplying the extensors to wrist, fingers and thumb (extensor carpi ulnaris, extensor digitorum communis, extensor digiti minimi, extensor pollicis longus and brevis, abductor pollicis longus and extensor indicis muscles).

As the PIN branch of the radial nerve is predominantly motor, patients present complaining of varying degree of difficulty of wrist and finger extension. Diffuse aching sensation in the forearm and wrist, due to innervation of the wrist capsule is also reported.

On examination the wrist can be found to be in radial deviation, with weakness of extension in all fingers and thumb. Radial deviation is present as the radial wrist extensor (extensor carpi radialis muscle) is spared due to the fact that it is innervated before the radial nerve divides at the elbow.

Initial investigations must be tailored to the individual clinical presentation including routine blood tests and radiography. Electrophysiological studies are useful in supporting the diagnosis of PIN palsy and Ultrasonography/MRI are useful in identifying aetiology.

The treatment of PIN palsy caused by entrapment/compression or trauma should be surgical exploration to prevent further irreversible deterioration of nerve function. One study has shown that paralysis disappeared in all but one patient who...
had decompression, at a mean of 5.6 months after surgery.²

Conclusion

The symptoms from early PIN palsy can be cured by surgical exploration and decompression in the appropriate patient. A high index of suspicion is needed in the patient who presents with hand and wrist weakness which does not appear to conform to the classical radial nerve palsy. Additionally a low threshold for investigations such as electrophysiological studies and MRI are needed in accurate and timely diagnosis to prevent irreversible neurological sequelae.

References