

# A Case of Anterior Interosseous Nerve Syndrome After Peripherally Inserted Central Catheter (PICC) Line Insertion

M E Puhaindran, H P Wong

## ABSTRACT

**Palsies involving the anterior interosseous nerve comprise less than 1% of all upper extremity nerve palsies. Patients often present initially with acute pain in the proximal forearm, lasting several hours to days. The pain subsides, to be followed by paresis or total paralysis of the pronator quadratus, flexor pollicis longus and the radial half of the flexor profundus, either individually or together. Patients with a complete lesion will have a characteristic pinch deformity. We report a case of anterior interosseous syndrome in a 42-year-old male. The patient was admitted initially for chronic osteomyelitis of the left calcaneum. He had a peripherally inserted central catheter (PICC) line inserted into a brachial vein for the administration of intravenous antibiotics, and developed anterior interosseous nerve palsy as a complication of this procedure. The catheter was subsequently removed and a new line was placed on the other side, and his neurological deficit has been improving since. This case highlights the potential hazards of venupuncture or arterial puncture of the brachial vein or artery respectively, even under controlled conditions with the benefit of ultrasound guidance. It also serves as a reminder to look out for the complications of these common procedures, and to be able to react appropriately when they arise.**

**Keywords: anterior interosseous nerve palsy, anterior interosseous nerve syndrome, complication, PICC line**

*Singapore Med J 2003 Vol 44(12):653-654*

## INTRODUCTION

The anterior interosseous nerve is a purely motor branch of the median nerve. It arises on the radial aspect of the median nerve 5 cm to 8 cm distal to the medial epicondyle of the humerus, after which it passes through the pronator teres and follows the anterior aspect of the interosseous membrane with the anterior interosseous artery as far as the wrist.

It provides motor innervation to the flexor pollicis longus (FPL), flexor digitorum profundus (FDP) to the index and sometimes middle fingers, and to the pronator quadratus (PQ). Paralysis of these muscles from a complete nerve palsy will result in a pinch deformity, though weakness of pronation may be masked by the concurrent action of the pronator teres (PT). Duchenne de Boulogne first reported a case of isolated palsy of the flexor pollicis longus, while Parsonage and Turner described five cases of anterior interosseous nerve palsy due to neuralgic amyotrophy in 1948. There are many causes for anterior interosseous nerve palsy, also known as anterior interosseous nerve syndrome.

We present the case of a middle-aged man who developed anterior interosseous nerve syndrome after the insertion of a peripherally inserted central catheter (PICC) line.

## CASE REPORT

The patient is a 42-year-old Chinese male who had a history of traumatic paraplegia with a neurogenic bladder and bilateral foot drop. He developed chronic osteomyelitis of the left calcaneum as a complication of a long-standing neuropathic ulcer. He had previously been admitted on numerous occasions for exacerbation of the osteomyelitis and was treated with surgical debridement and intravenous antibiotics. He was admitted on this occasion with pain and swelling of the left heel and a sinus discharging pus. X-rays showed changes of the left calcaneum suggestive of osteomyelitis. He underwent surgical debridement of his wound and was started on a six-week course of intravenous antibiotics.

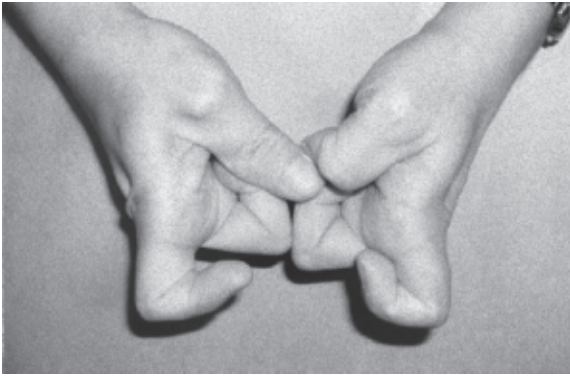
A PICC line insertion was arranged for in view of this need for a long course of intravenous antibiotics. The procedure was performed by a radiologist and the right cubital fossa was selected as the site for insertion. A right brachial vein was identified under ultrasound guidance and a 5-French PICC line was inserted over a peel-away sheath and stitched down. The procedure was uneventful and the patient was sent back to the ward.

Department of  
Orthopaedic  
Surgery  
Tan Tock Seng  
Hospital  
11 Jalan Tan  
Tock Seng  
Singapore 308433

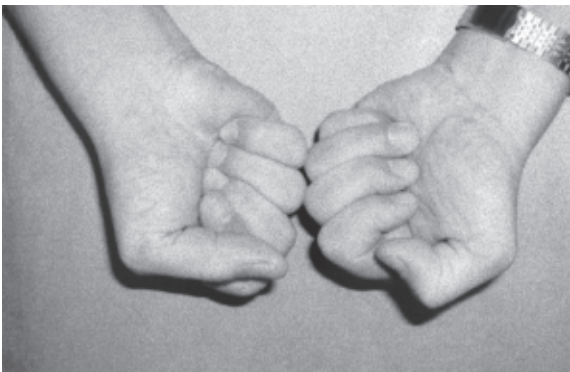
M E Puhaindran,  
MBBS  
Medical Officer

H P Wong, MBBS,  
MMed (Surgery),  
FAMS (Ortho)  
Senior Consultant

Correspondence to:  
Wong Ho Poh  
Tel: (65) 6357 7715  
Fax: (65) 6357 7713  
Email: Ho\_Poh\_  
Wong@ttsh.com.sg



**Fig. 1** Picture demonstrating paralysis of the flexor digitorum profundus to the right index finger.



**Fig. 2** Picture demonstrating paralysis of the flexor pollicis longus.

The patient started to complain of pain the next day. It was low grade and described as burning in nature, and was localised to the forearm. On examination, there were no areas of paraesthesia or motor deficits. He was diagnosed with neuropraxia of the median nerve as a result of the PICC line insertion, and it was decided to observe him as there was no obvious swelling or haematoma at the insertion site, and the line was functioning well. Two days later, the pain resolved but the patient then complained of difficulty gripping objects with his right hand. Examination again showed no areas of paraesthesia, but he was unable to flex the distal phalanges of his index finger and thumb. There was also slight weakness on pronation of the forearm. A clinical diagnosis of anterior interosseous nerve palsy was made, and an electromyogram (EMG) was performed. This confirmed an incomplete and most likely demyelinating lesion of the anterior interosseous nerve with sparing of the main trunk of the median nerve. An ultrasound was performed and this showed no haematoma or fluid collection. Given the presenting history, the nerve palsy was attributed to the line insertion and it was decided to remove the line. The patient was treated conservatively with rest initially followed by gentle mobilisation by the hand therapist. A second PICC line was inserted at the left cubital fossa and the course of intravenous antibiotics was

completed uneventfully. The patient has demonstrated some functional improvement with partial recovery of the flexor digitorum profundus to the index finger, one month after the first line was removed.

## DISCUSSION AND CONCLUSION

There are many causes for anterior interosseous nerve palsy that have been reported in the literature. They range from blunt trauma, local pressure after sleeping on the affected arm or a poorly applied cast, after excessive exercise and weight lifting, viral neuritis, and even as a complication of a forearm fracture. Two cases were also reported as a complication of forearm oedema which occurred after intravenous infusion<sup>(1-4)</sup>. Anterior interosseous nerve palsy is often misdiagnosed for several reasons. Firstly, it is not encountered commonly, comprising less than 1% of all upper limb nerve palsies. Secondly, partial lesions of the nerve with paralysis of only one of the innervated muscles (FPL or FDP) occur occasionally, and can mimic single tendon lesions<sup>(2)</sup>. Especially in such cases, an electromyogram (EMG) will help to confirm the diagnosis, as well as to ascertain the site and severity of the lesion. It will also help to differentiate between an anterior interosseous nerve palsy and a partial median nerve or even partial brachial plexus palsy<sup>(1,2,4)</sup>.

Pain is a common feature of anterior interosseous nerve palsy, affecting up to 85% of patients. The pain tends to be in the proximal forearm and increases with exercise and decreases with rest. The patient will often massage or rub his arm in an attempt to alleviate this annoying symptom<sup>(2)</sup>.

Treatment is related to the specific disease etiology. Conservative treatment includes rest and avoidance of strenuous forearm activity, especially if it was the precipitating cause. Other means include immobilisation, steroid injections and anti-inflammatory medications. Should the history suggest a transected nerve, or the EMG show evidence of axonal interruption, then surgical exploration of the nerve is indicated<sup>(1-4)</sup>. Some cases have shown spontaneous recovery a year after onset without surgical intervention, and it is the opinion of some authors that the use of tendon transfers to restore function should be delayed till then<sup>(2,3)</sup>.

## REFERENCES

1. Arishita GL and Tsai TM. Anterior interosseous nerve syndrome. *Hand Surgery*, Vol 3, No 1 (June 1998):57-62.
2. Seror P. Anterior interosseous nerve lesions, clinical and electrophysiological features. *Journal of Bone and Joint Surgery (BV)* 1995; 78B:238-41.
3. Schantz K. and Riegels-Nielsen P. The anterior interosseous nerve syndrome. *Journal of Bone and Joint Surgery (BV)* 1992; 17B:510-2.
4. Eversmann W. W. Proximal Median Nerve Compression. *Hand Clinics* Volume 8 Number 2, May 1992.