



Resolution of PIN syndrome following Physiotherapy: A case report

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Abstract

This case report highlights the use of physiotherapy as monotherapy for non-traumatic posterior interosseus nerve palsy, which is a rare compression neuropathy that usually gets referred to a surgeon and for which the patient may undergo surgical decompression. However, in a resource limited setting, patients are often not able to afford advanced radiographic modalities like high resolution ultrasound and MRI scans. Hence the standard pathway to surgery is uncertain and they often get referred to physiotherapy while awaiting surgery. In this case, the patient was referred for Physiotherapy and the palsy improved. This suggests there was no defined surgical lesion, as has been found in many patients who have undergone ultrasound. This case highlights the need for robust research on the role of physiotherapy for PIN palsy in resource limited settings and a possible treatment algorithm that reserves investigations and surgery for patients whose PIN palsy does not improve with physiotherapy and for whom surgery is not clearly indicated from the outset.

Introduction

Atraumatic posterior interosseus nerve (PIN) palsy is a rare condition and has no defined treatment algorithm.¹ The annual incidence of posterior interosseus nerve syndrome is 0.03%, while that of compression of the superficial radial nerve is 0.003%.² The first case of compressive radial nerve palsy found in the literature was described by Guillain and Courtellemont in 1905, adducing a role to the supinator muscle.³ The radial nerve originates in the axilla from the posterior chord of the brachial plexus, carrying the continuation of nerve roots C5 to T1. The nerve travels down the arm in the posterior aspect, exiting into the anterior aspect of the arm in the distal third through the lateral intermuscular septum and passing into the forearm deep to brachioradialis and anterior to the lateral epicondyle of the humerus. Subsequently, it divides into the motor posterior interosseus nerve and the sensory anterior interosseus nerve. Thus, the PIN has no sensory function and compression of this nerve has no sensory feature, which supports the position taken by McGraw and others, including the authors of this report.¹

The posterior interosseus nerve passes under the arcade of Frohse and through the supinator muscle to supply motor fibres to the muscles in the posterior aspect of the forearm (finger and thumb extensors and extensor carpi ulnaris), except the extensor carpi radialis longus, in most people. Various locations at which the posterior interosseus nerve can be compressed include the arcade of Frohse and the distal edge of the supinator muscle. Curiously, its been noted that autopsy studies on babies revealed an absence of

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the arcade of Frohse.⁴ The usual treatment for PIN palsy is surgical decompression when patients present early, with physiotherapy as an adjunct. This case is being presented to highlight the option of physiotherapy as definitive treatment when the patient presents early if there is evidence of recovery. Patients that do not show recovery from

physiotherapy will require surgical considerations. The difficulty of patients in this resource limited environment due to financial constraints, lends more weight to the role of non-operative care.

Case history

A 32-year-old man was referred for Physiotherapy on account of a spontaneous right sided radial nerve palsy of two weeks duration, in 2018. He complained of progressive weakness of right wrist extension which started two weeks earlier. There was no pain, numbness, or paraesthesia. There was no related trauma nor prior history. He was not a known diabetic. There was no neck pain or difficulty with right elbow extension. He was in good general state of health and had a normal blood pressure. The power of right wrist and MCPJ's extension was zero. He had normal extension of the interphalangeal joints in the right hand. There was no sensory loss in the right hand.

A diagnosis of right posterior interosseous nerve mononeuropathy was made. However, the aetiology was not clear and was assumed to be inflammatory. He was given standard Physiotherapy, which consisted of soft tissue manipulation, transcutaneous electrical nerve stimulation, therapeutic ultrasound, and passive and graduated active stretching. There was gradual recovery of power in right wrist extension and MCPJ extension, with a muscle power of grade 4. He was later lost to follow up. The duration on Physiotherapy could not be ascertained as his hospital records were yet to be retrieved at the time of this write-up. However, he was encountered in an informal setting awhile later and his improvement was noted to have been sustained.

Discussion

Paterson et al diagnosed PIN compression based on atraumatic dorsal forearm pain, no wrist extensor paralysis, and positive provocative tests – “sensory collapse test over the radial tunnel”, “pain with forearm pronation and compression over the radial tunnel” and Tinel sign.⁵ His team obtained uniform success in their case series, by decompression of the radial nerve.⁵ Other authors have distinguished between PIN palsy and radial tunnel syndrome by the absence of sensory symptoms in the former and the absence of motor weakness in the latter.¹ This

case report aligns more with the outlay by McGraw, which is a better fit for the anatomy of the radial nerve.¹ Radial tunnel syndrome overlaps with PIN syndrome because the radial tunnel extends from the head of the radius to the distal edge of the Supinator muscle, thus overlapping with the area related to the PIN. The major distinguishing feature is the presence of sensory symptoms, suggesting either a joint anterior and posterior interosseous nerve lesion or a lesion of the main trunk of the radial nerve.²

Atraumatic PIN palsy can be caused by compression (anatomical or tumoral) or nerve lesions. The arcade of Frohse is the commonest site of compression of the PIN; other anatomical sites of compression include - within the supinator muscle and at its distal edge. It may also be compressed by a tumour within the supinator muscle, such as an intramuscular haemangioma, a lipoma, or a neurogenic tumour.⁶⁻⁸ Peripheral mononeuropathies are common and surgical decompression rather than Physiotherapy is usually the mainstay of treatment. Some other examples of peripheral mononeuropathies are Carpal tunnel syndrome of the median nerve and Bell's palsy of the facial nerve. PIN syndrome is a rare cause of peripheral compression mononeuropathy.⁶

The use of ultrasound in further diagnosing the aetiology of PIN and/or radial nerve palsy has been undertaken, though the findings are as usual user dependent and there is a high specificity and low sensitivity.^{7,9,10} In addition, Djurvedic et al noted an enlargement of the PIN in all patients with PIN palsy but no defined surgical lesion, suggesting that physiotherapy rather than surgical decompression would be indicated.⁹ On the other hand, Kim et al noted masses in four of the ten patients they insonated and also noted enlargement of the PIN in all the patients. In this environment, high resolution ultrasound may be out of reach for most patients, hence the need to select patients who will require further investigation and utilise the option of physiotherapy as a default, unless it is contraindicated as in immediate post trauma or local sepsis, among others. The use of MRI as an investigative modality for PIN palsy in this environment would be out of reach of even those in the middle-income bracket.

In this report, the patient made major recovery

following physiotherapy as the mainstay of treatment. This case suggests the need for research on the role of physiotherapy as the mainstay of treatment for PIN palsy without a defined surgically remediable lesion. The option of developing a treatment algorithm that reserves investigations and surgery for patients whose PIN palsy does not improve with physiotherapy and for whom surgery is not clearly indicated from the outset should also be considered.

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