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CASE REPORT

Idiopathic Carpal Tunnel Syndrome Presenting with Raynaud's Phenomenon: Neurophysiological Evaluation

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ABSTRACT

Carpal tunnel syndrome and Raynaud's phenomena are common diseases and coexist in some patients while in others Raynaud's phenomenon may be a clinical feature of carpal tunnel syndrome. I describe an interesting case with Raynaud's phenomenon as a predominant presenting clinical feature due to an underlying mild carpal tunnel syndrome with preferential involvement of the autonomic fibers. Nocturnal wrist splinting, a common treatment for carpal tunnel syndrome, resulted in marked improvement in the symptoms.

Key words- carpal tunnel syndrome, Raynaud's phenomenon, autonomic tests

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Case Report

A 51 year's old woman, staff nurse by profession, presented with repeated transient episodes of blanching of the left hand for about a week. These episodes lasted for 2-3 minutes and were followed by dull aching in whole of the affected hand. She denied history of cold sensitivity, emotional stress, joint pain, finger ulcerations or any other significant medical illness in the past. She was not taking any medications prior to these episodes. She did not complain of any weakness in the hands, neck pain or radicular pain. She did not sustain any trauma to the upper extremities or neck in past. There was no history of any actions with a repetitive use or an abnormal and prolonged abnormal positioning of the hands. She denied any previous history of diabetes mellitus, thyroid disorders, rheumatoid arthritis or osteoarthritis of upper extremities. She was not taking any medications prior to this presentation. She was a right-handed averagely built woman with an unremarkable general examination. Both

the brachial and radial pulses were equally palpable. Motor and sensory examination of both upper limbs did not reveal any abnormality. Tinel's sign was absent bilaterally while mildly positive Phalen's test was noted over the left hand. Rest of the neurological examination was unremarkable. No reproducible sensitivity to cold or vibrations was noted.

Routine blood tests, serum markers for connective tissue diseases, electrolytes and thyroid functions were within normal limits. X-rays of the chest and cervical spine were negative for a cervical rib or any other significant pathology. Vascular sonography of the root of neck for the subclavian artery was normal. Nerve conduction tests demonstrated normal motor and sensory latencies as well as conduction velocities, both in the median as well as ulnar nerves in both upper extremities. However, a mildly prolonged second lumbrical-interossei latency difference (0.7ms; normal <0.4 ms) was noticeable in the left upper limb.

Normal Sympathetic skin responses (SSR) could be obtained from both hands. Autonomic studies showed significant differences between the two hands. Vasomotor studies, using gasp induced vasoconstriction and measuring the flow changes

in the capillaries of finger pulps by laser Doppler, revealed a 30% change in the flow in the left hand as compared to a 60% change in the right. Water immersion testing revealed a skin wrinkling of grade 1 (skin surface not smooth any more) in the left in comparison to a grade 3 (3 or more lines on the digit tip due to wrinkling) in the other hand.

Later, she confirmed a history of developing some mild and vaguely defined numbness and clumsiness of the hands, especially while carrying weights. She was awakened from sleep on a couple of occasions by the pain in the left hand, which was relieved by some shaking.

A diagnosis of Raynaud's phenomenon in the left hand due to a mild grade carpal tunnel syndrome was made and splinting of the left hand was advised during the nights. A remarkable improvement was noted in her symptoms after about a week. On a follow-up visit about 2 months later, she was noted to be asymptomatic despite continuing her previous usual daily routine.

DISCUSSION

This case describes the Raynaud's phenomenon as the presenting complaint in a patient with carpal tunnel syndrome. George Phalen described 'since the median nerve carried with it most of the sympathetic supply of the hand, it seems logical to anticipate certain vasomotor changes arising from the irritation or compression of the nerve'. [1] Carpal tunnel syndrome (CTS) remains mainly a clinical diagnosis. [2] Numbness or pain especially in the first 3 digits, precipitated by a particular action or position of the hand, with nocturnal awakening and relief by changing the position or shaking of the wrist are the commonest clinical features. Although most patients with CTS will exhibit some of these primary clinical features, the clinician should be aware of the variability of CTS symptoms. Nerve conduction studies are fundamental in supporting a diagnosis of CTS, but depending on which parameters are used, 10-50% of patients may have normal motor and sensory conduction values. [3] Ultrasonography [4], MRI [5] and direct measurement of intracarpal pressure [6] have been evaluated as additional parameters for CTS diagnosis with variable accuracy parameters.

Both idiopathic CTS and Raynaud's phenomenon (RP) are common and may have some similar clinical symptoms. Additionally, these two may

even co-exist. Chung et al found 60% of their idiopathic CTS patients diagnosed clinically and electrophysiologically, having Raynaud's phenomenon. [7] Similar association has been noted in various other studies. [8], [9]

Autonomic dysfunctions are common in CTS and may be seen in up to 55% cases [10] and their presence may correlate with worsening symptoms and electrophysiological findings. Campero et al found that median nerve provides vasomotor innervation to the hand. [11] The pathogenesis of Raynaud's phenomenon in CTS remains unclear. The local or systemic sympathetic nervous system has been considered to play a significant role in the constriction of the digital arteries, thus invoking a Raynaud's phenomenon. [12] However, exact role played by the sympathetic nerve fibers in causing Raynaud's phenomenon is not known. It is said that the sympathetic axons may remain unaltered even in patients with long standing profound sensory impairment [13] and the testing of sympathetic fibers does not help in the diagnosis of CTS. [14] Moreover release of CTS does not affect the symptoms and signs of Raynaud's phenomena. [15] Loebe et al [16] studied 40 patients of CTS with Raynaud's phenomena. They found a poor correlation between CTS and Raynaud's phenomena and concluded that CTS can not be regarded as a disease underlying Raynaud's phenomenon.

Investigations for the assessment of autonomic nerve fibres are not routinely performed in the evaluation of carpal tunnel syndrome. Autonomic nerve fibres are basically important for sudomotor, vasomotor and pilomotor functions. My patient had normal sympathetic skin response (SSR), which indicates the integrity of the sudomotor fibers. The presenting complaints from the patient were only suggestive of Raynaud's phenomenon. Her electrophysiological studies showed only a mildly abnormal second-lumbrical interosseus latency difference, consistent with a possible minimal grade carpal tunnel syndrome. Measurement of the Second Lumbrical-Interosseus latency difference has been found to be a sensitive test (sensitivity of 95-98%) for the diagnosis of CTS, both in mild as well as severe cases. [17]

However, the vasomotor studies and the skin wrinkling testing were significantly abnormal. In addition, she showed considerable improvement in her symptoms after splinting of the wrist during

night, a common and useful practice for the treatment of CTS. I presume that the cause of Raynaud's phenomenon in this patient was an underlying mild carpal tunnel syndrome with preferential involvement of the autonomic fibers.

Consent- Consent was obtained from the patient for the publication of this case report.

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