

The Tale of Small Fiber Neuropathy, POTS and Knuckle hyperpigmentation – Is COVID-19 the Culprit?

Malak Alharbi, MBBS, Helen Burstin, MD, MPH, MACP

Department of Medicine, The George Washington University, Washington, DC

Learning objectives

- Recognize clinical features of Small Fiber Neuropathy (SFN) and its association with Postural Tachycardia Syndrome (POTS).
- Assess for SFN with a focused and cost-effective approach.

Case presentation

A 47-year-old woman with a medical history of migraine. She was diagnosed with POTS in her twenties, but it has been quiescent since that time. She presented to the clinic with multiple complaints that began gradually in June 2020, including episodes of facial swelling, palpitation, dizziness, skin discoloration underneath the eyes, brain foginess, cold sensation, heaviness in the feet, burning in the right arm and diffuse deep bone pain.

A few weeks after her initial presentation, she developed hypoglycemic episodes, diarrhea and loss of seventeen pounds over five months.

She has a family history of ovarian cancer.

Physical exam

Vital signs were remarkable for heart rate of 150 upon standing, 130 when sitting, 70 when lying down and hypotension. Neurological examination was normal. Skin examination showed Gottron sign (figure 1).

Investigations

She tested negative for SARS-CoV-2. Epidermal nerve fiber biopsy showed a reduced epidermal nerve fiber density consistent with small fiber neuropathy.



Figure1: Gottron sign (patient's hand)

Some of the repeated tests at different centers (figure2)

C-reactive protein , Sedimentation rate

Endocrine: TSH, serum cortisol, aldosterone\creatinine ratio, 24-hour urine collections of (5-HIAA, Vanillylmandelic acid, Catecholamine), Insulin and C-peptide level , LH, FSH.

Rheumatological: ANA, ANCA panel, Immunoglobulin levels, Complements level, C1 esterase inhibitor, CK , aldolase level, CCP antibodies, Anti-dsDNA antibodies, parietal cell antibodies, celiac antibodies, antibodies for paraneoplastic syndrome.

Neurological: Acetylcholine receptor antibodies, Lactate and Pyruvate level

Infectious: Lyme antibodies, parvovirus b19 igG, IgM, SARS-CoV-2 PCR and antibodies

Allergy: tryptase, prostaglandin level

Nutrition: vitamin b12, folate, Copper, vitamin b3, vitamin D , heavy metals profile

CT scan of chest, abdomen and pelvis, brain MRI ,MRI of the hand, EMG, nerve conduction study.

Management

She received antihistamine, hydration, salt tablets, midodrine, fludrocortisone ,and pulse steroid therapy, which significantly improved her symptoms while awaiting intravenous immunoglobulin.

Discussion

POTS is an elevation in the heart rate upon standing with manifestations of orthostatic intolerance such as dizziness and palpitation.

Multiple syndromes are associated with PoTS, including mast cell activation syndrome and SFN. SFN presents with both dysautonomia and neuropathic pain. SFN is found in 50% of patients with POTS.¹

Early diagnosis and recognition of SFN and the association with POTS could have led to a more focused and cost-effective evaluation.

Thus, increasing awareness among internal medicine physicians about SFN and POTS is crucial, especially since a subset of patients with COVID-19 may present with autonomic nervous system problems, including POTS after diagnosis.²

While our patient tested negative for SARS-CoV-2 ,it does not exclude prior infection. Since post-Covid syndrome remains a diagnosis of exclusion, she will need continued follow-up for potential paraneoplastic syndromes and autoimmune disorders that could be associated with her constellation of neurologic and dermatologic manifestations.

References

1) Gibbons, C.H., Bonyhay, I., Benson, A., Wang, N. and Freeman, R., 2013. Structural and functional small fiber abnormalities in the neuropathic postural tachycardia syndrome. PLoS One, 8(12), p.e84716.

2) Miglis, M.G., Prieto, T., Shaik, R., Muppidi, S., Sinn, D.I. and Jaradeh, S., 2020. A case report of postural tachycardia syndrome after COVID-19. Clinical Autonomic Research, 30(5), pp.449-451.