

POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS)

IT'S NOT THAT SIMPLE

POTS

- Irritable heart syndrome.
- Soldier's heart.
- Effort syndrome.
- Vasoregulatory asthenia.
- Neurocirculatory asthenia.
- Anxiety neurosis.
- Idiopathic tachycardia syndrome.

Fairly Simple Definition

- Presence of chronic symptoms of orthostatic intolerance.
- Accompanied by:
 - Increased heart rate (HR) >40 bpm.
 - Or >120 bpm.
 - Within 1st 10 minutes of orthostasis.
 - Absence of orthostatic hypotension (BP fall >20/10).

What occurs when we stand

- -Instantaneous shift of 500 ml of blood from the thorax to the lower abdomen, buttocks, and legs.
- -There is a secondary shift of plasma volume out of the vasculature and into the interstitial tissue.
- -Result is decreased venous return to the heart resulting in a transient decline in cardiac filling and BP.
- -Baroreceptors trigger compensatory decrease in parasympathetic tone and an increase in sympathetic activation.

Net Hemodynamic Effect

- -10 to 20 bpm increase in HR.
- -Negligible change in systolic BP.
- -5 mmHg increase in diastolic BP.
- -And now we are standing symptom free.

Orthostatic Dysregulation

- -Unifying feature: development of orthostatic symptoms without consistent orthostatic hypotension.
- -Orthostatic symptoms: light headed, palpitations, presyncope, exacerbation with heat and/or exercise, sense of weakness, tremulousness, shortness of breath, chest pain, exacerbation by eating, exacerbation by menses, hyperhidrosis, anhidrosis.
- -Nonorthostatic symptoms: nausea, bloating, diarrhea, constipation, abdominal pain, bladder symptoms, vomiting, fatigue, sleep disturbance, headache, pain, brain fog.

Who has POTS?

- -80% female.
- -500,000 to 3,000,000 Americans.
- -Age range 15 to 50. Mean age is 30.
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Other Predisposing Factors

- -Recent viral illness.
- -Pregnancy.
- -Trauma/Surgery.
- -Hypermobility.
- -Other serious illnesses or conditions: diabetes, cancer, autoimmune disease.

Evaluation

- History.
- Tilt table test.
- ECG.
- Cardiac echo and Holter monitor.
- Exercise testing.
- Plasma catecholamines, supine , and standing.
- 24-hour urinary sodium.
- Autonomic reflex screen.
- Thermoregulatory sweat test.
- Ganglionic antibody.

Now you have to explain it

- PATHOPHYSIOLOGIC MECHANISMS:
 - Peripheral denervation.
 - Hypovolemia.
 - Venous pooling.
 - Beta-receptor supersensitivity.
 - Presumed impairment of brainstem regulation.
 - Deconditioning.

POTS SUBTYPES

- -NEUROPATHIC POTS
- -HYPERADRENERGIC POTS
- -POTS WITH PROFOUND VOLUME DYSREGULATION
- -POTS AND PHYSICAL DECONDITIONING

NEUROPATHIC POTS

- -Indirect evidence of peripheral sympathetic denervation in legs.
- -Characterized by loss of sweating in the feet on thermoregulatory sweat tests.
- -Impaired increase of norepinephrine release in response to orthostatic stress.
- -Result in impaired peripheral vasoconstriction leading to venous pooling in legs.
- -Frequently associated with previous viral illness.
- -Presence of a ganglionic acetylcholine receptor antibody in 14% of patients.

HYPERADRENERGIC POTS

- -Evidence of increased central sympathetic drive: elevated plasma NE levels, hypertensive response during tilt table, hyperhidrosis.
- -Episodes can more often be tied to emotional stimuli and physical activity.
- -Reduced clearance of synaptic NE.
- -Mast cell activation disorders.

VOLUME DYSREGULATION

- -Many patients have low plasma and low red cell volume.
- -Low levels of standing plasma renin activity and aldosterone compared with controls.

PHYSICAL DECONDITIONING

- -Tachycardia.
- -Reduced stroke volume.
- -Reduced LV mass.
- -Reduced peak oxygen uptake when upright and during and after exercise compared to controls.
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General Approach to POTS Patient

- -Resolution may not be complete and will take time, probably at least 2 years.
- -Need to learn adequate fluid and salt intake.
- -Physical counter maneuvers.
- -Compression clothing.
- -Avoidance of stressors.
- -Biofeedback.
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Pharmacotherapy

- -No FDA approved drugs. But we write prescriptions anyway.
- -Withdraw drugs patient may already be taking that can aggravate symptoms.
- -Fludrocortisone (aldosterone derivative).
- -DDAVP.
- -Midodrine, alpha-1 agonist. Best for neuropathic type.
- -Beta-blockers. Low dose.
- -Clonidine, an alpha-2 agonist that acts centrally to decrease sympathetic nervous system outflow.
- -Modafinil, stimulant may help with alertness and concentration.
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