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VIEWPOINT

Managing POTS

A Cardiovascular Call to Action

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Patients with postural orthostatic tachycardia syndrome (POTS) come to cardiology with orthostatic and exercise intolerance, palpitations, presyncope, fatigue, and cognitive impairment. The resting electrocardiogram, echocardiogram, and ambulatory electrocardiogram are normal; the monitor rarely records body position, however, and thus the link to posture goes undocumented. The patient is told the heart is fine, and many leave without a diagnosis, a plan, or the sense that what they describe has been heard.

Cardiology has seen this pattern before. Women with angina and no obstructive epicardial disease were dismissed for decades until angina and no obstructive coronary artery disease was named and pursued mechanistically. POTS sits in the same posture: predominantly young women, multisystem symptoms that exceed resting tests, long delays to diagnosis, and a culture that reads normal imaging as evidence the illness is not real.[1-4]

What patients carry away is the experience of not being believed. That outcome persists because of 3 gaps cardiology has yet to close: in disease *recognition*, in understanding the underlying *mechanism*, and in offering optimal *management* (**Figure 1**).

RECOGNITION

POTS is position dependent, dynamic, and sensitive to volume status and temperature, and the resting evaluation is predetermined to miss these features. Cardiology already accepts this principle in stress testing, ambulatory monitoring, and invasive exercise hemodynamics,[5] and the same logic applies to testing in an upright position. When the history includes orthostatic intolerance, palpitations, presyncope, or exertional intolerance, an active stand test should be performed at the first cardiology visit rather than deferred to a tertiary clinic; this rarely happens, however, and diagnosis is delayed.[1,2]

The cost of skipping that step is documented: an average diagnostic delay of nearly 6 years and a population about 5 to 1 female.[2,3] A normal echocardiogram, resting heart rate, and ambulatory study do not rule out abnormal upright physiology.[6] The gap closes quickly: provoke the physiology and read the result like any inducible test.

MECHANISM

Several mechanisms are established and already guide therapy. Impaired venous return, relative hypovolemia, and excessive sympathetic activation drive orthostatic intolerance and reduced exercise capacity. They are the rationale for foundational nonpharmacologic care: structured exercise training, increased fluid and salt intake, and compression. Small fiber neuropathy and deconditioning contribute as well. These mechanisms do not explain

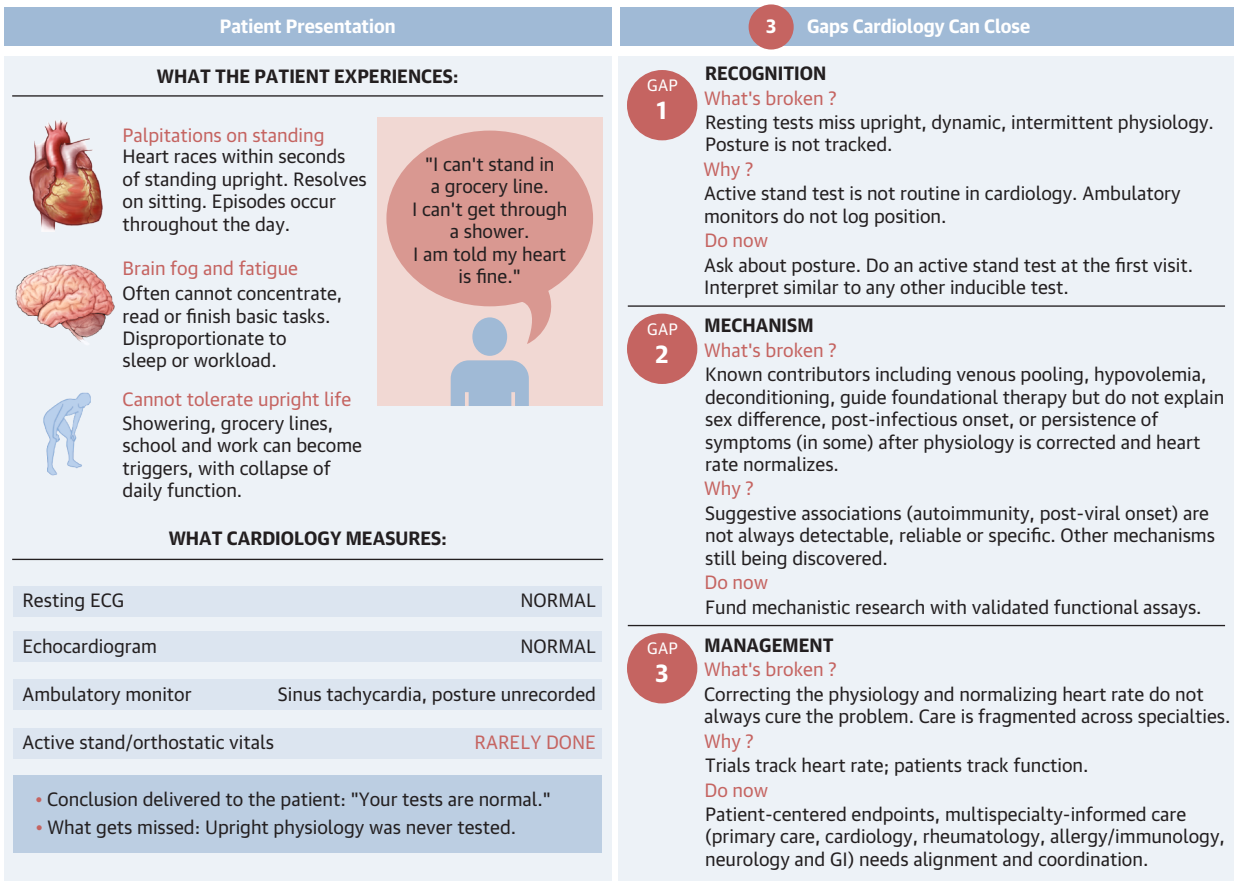
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FIGURE 1 What the Patient Experiences vs What Cardiology Measures, and the 3 Gaps Cardiology Can Close



(A) Presentation of contrasts of the patient's disabling upright symptoms vs a conventional cardiac work-up that reads as normal because upright physiology is never provoked. The active stand test is performed after 5 to 10 minutes of supine rest. The patient then stands quietly and unsupported, not leaning against a wall, while heart rate, blood pressure, and symptoms are recorded every minute, or at 1, 3, 5, 7, and 10 minutes, for as long as tolerated. Patients should avoid a meal in the prior 2 hours, caffeine, cola, alcohol, and compression garments; should hold cardioactive medications for 48 hours beforehand when feasible; and should not be preloaded with large volumes of water. Testing is best performed in the morning, deferred during acute illness such as infection, and support should be available in case of syncope. A sustained heart rate rise of 30 beats/min or more (40 beats/min or more in patients aged 12 to 19 years), without orthostatic hypotension, supports the diagnosis. (B) The Recognition, Mechanism, and Management gaps are presented, each with what is broken, why, and what to do now. Under Management, what is broken also includes underuse of evidence-based interventions and dismissal of symptoms when heart rate normalizes but other symptoms persist.
ECG = electrocardiogram; GI = gastrointestinal.

the sex distribution, the onset after infection, or symptom persistence once tachycardia is corrected.

> *"POTS is often first suspected in cardiology, which is well positioned to make the diagnosis and characterize the cardiovascular phenotype"*

A postinfectious autoimmune contribution is plausible and increasingly studied. Roughly 40% of cases begin after a viral illness, and antibodies against G-protein-coupled adrenergic and muscarinic receptors have been reported in POTS cohorts.[7,8] The evidence is suggestive but not conclusive, and commercial autoantibody assays are not validated for clinical use and should not be ordered to diagnose or manage POTS. The field needs funded mechanistic research using validated functional assays, not another send-out panel.

Heart rate is also not the disease. A structured exercise program can restore an orthostatic heart rate, rightly so, but patients who pass an active stand test and still cannot finish a shower are telling us that

an upstream process remains untreated. Mistaking a normalized heart rate for a cured patient is the error that keeps these patients from being believed.

MANAGEMENT

The third gap is what we offer patients while the mechanistic science catches up, and here cardiology already has usable tools. Foundational nonpharmacologic care suits nearly all patients: volume expansion with sodium chloride (up to 10 g/d) and fluid (up to 5 L/d), waist-high or abdominal compression at 20 to 40 mm Hg, and a staged, supervised, initially recumbent reconditioning program. Each intervention attenuates orthostatic tachycardia and improves symptoms.[1,9]

When symptoms persist, pharmacologic therapy is off-label and guided by the dominant physiology. Rate-directed therapy with ivabradine reduced heart rate and improved selected quality of life domains in a small randomized crossover trial in patients with hyperadrenergic POTS.[10] Midodrine and fludrocortisone target venous pooling and low plasma volume, and pyridostigmine helps when supine hypertension limits pressor agents.[1,9] RECOVER-AUTONOMIC has begun testing such interventions rigorously in Long COVID POTS.[9] Its lesson generalizes: lowering the heart rate is necessary but not sufficient, and orthostatic symptom burden, standing time, and postexertional function belong at the center of trial design.

Language is part of management. Terms such as *functional*, *psychosomatic*, and *medically unexplained* are not neutral when they arrive before the work-up is complete. They close inquiry and stigmatize the patient. A more honest opening is available; that is, the symptoms are real and consistent with abnormal autonomic regulation, we do not yet have every answer, and we will work the problem together. For many patients, this will be the first time medicine has treated them as credible.

A CARDIOVASCULAR CALL TO ACTION

POTS is often first suspected in cardiology, which is well positioned to make the diagnosis and characterize the cardiovascular phenotype. Sustained care belongs in primary care, which best manages a chronic multisystem condition over time. Cardiology performs an active stand test at the first visit, checks blood pressure and resting heart rate, confirms the diagnosis, and starts foundational care. Primary care owns longitudinal management: foundational therapy, specialty-guided titration, and coordination of the whole patient. Specialty autonomic and multidisciplinary programs are for patients who did not respond to initial therapy, need autonomic testing, or are trial candidates. Hypermobility, mast cell symptoms, gastrointestinal dysmotility, and small fiber findings are prompts to engage rheumatology, allergy, gastroenterology, and neurology, not problems for one specialty to absorb.

The research agenda should match the disability: mechanistic studies of postviral onset with validated functional assays, work on the female predominance, characterization of the hypermobility and mast cell subgroups, patient-centered endpoints beyond heart rate, and pragmatic trials embedded in cardiology and primary care rather than confined to referral centers. Funding should be scaled to a condition that removes young people from school and work for years.

POTS is not a matter of belief. It is a call to study, to build, and to care, with honesty about what we do and do not yet know. We owe our patients a different next chapter.

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