

Long COVID POTS: Treatments

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Conflict of Interest Disclosure



- **Consulting/Honoraria**

- Regeneron – POTS Consulting
- Argenx BV – POTS Consulting
- Antag Pharma – POTS Consulting
- Lumia Health – POTS Consulting
- Theravance Biopharma – Enrollment
- Medtronic Inc - Enrollment

- **Associate Editor**

- Autonomic Neurosciences: Basic & Clinical (Elsevier)

- **Research Grants**

- Canadian Institutes of Health Research
- Heart and Stroke Foundation of Canada
- Dysautonomia International
- Standing up to POTS
- Canerector Foundation
- Long COVID Web

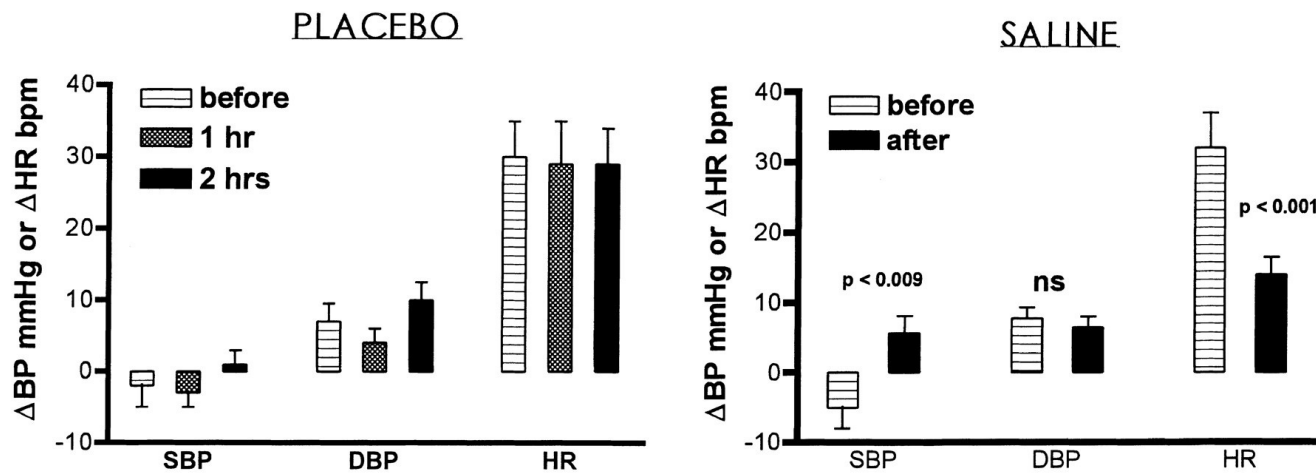
POTS: Non-Pharmacological Treatment Approaches

- **Dietary Salt**
 - **Compression Garments**
 - **Exercise**
-

POTS: Pharmacological Treatment Approaches

- IV Saline
 - DDAVP
 - Midodrine
 - Propranolol
 - Ivabradine
 - Pyridostigmine
 - NETi/SNRI
-

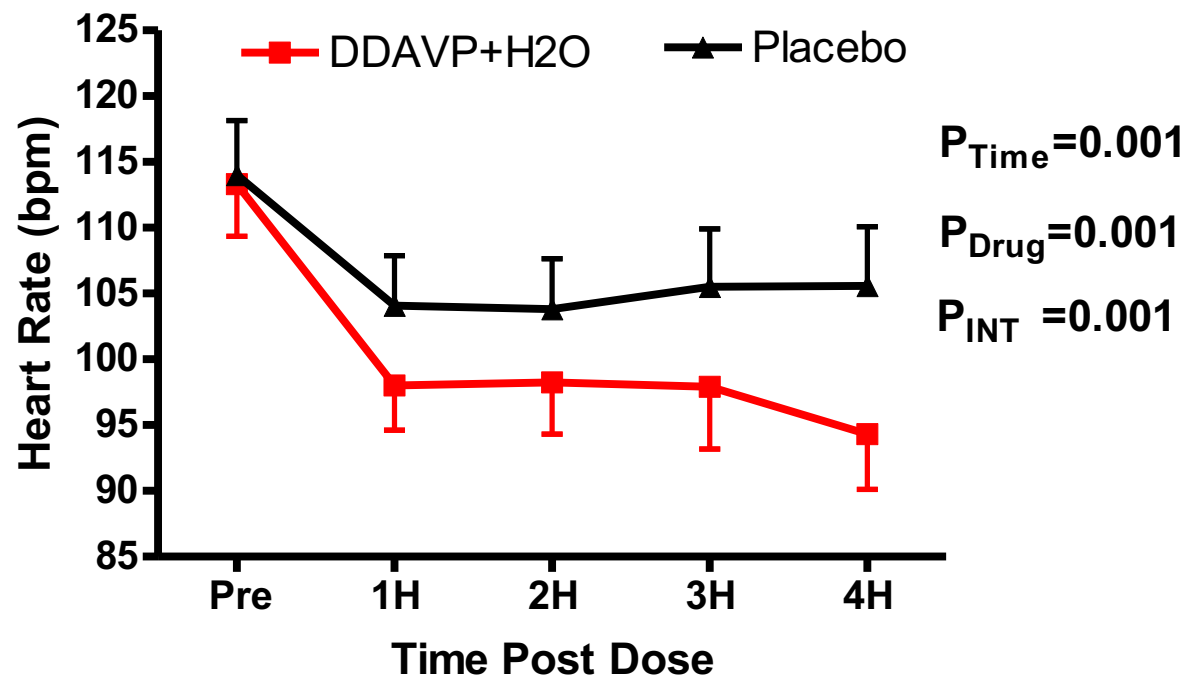
IV Saline (1L) Acutely Decreases Orthostatic Tachycardia...a LOT!!



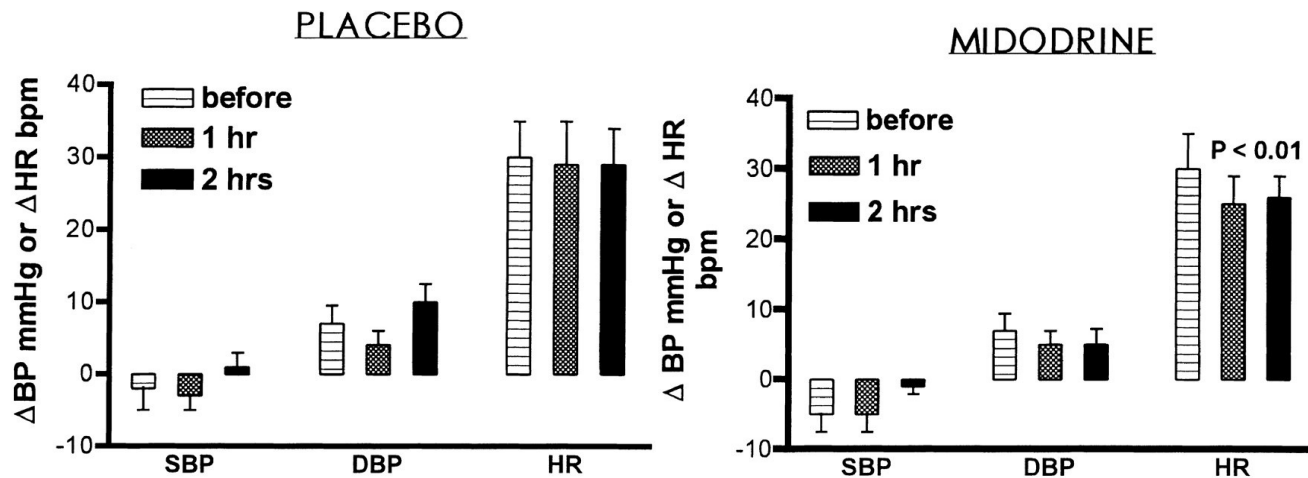
IV Saline Recommendations

COR	LOE	Recommendation
IIa	C	It is reasonable to treat patients with POTS who have short-term clinical decompensations with an acute intravenous infusion of up to 2 L of saline.
III	E	Regular intravenous infusions of saline in patients with POTS are not recommended in the absence of evidence, and chronic or repeated intravenous cannulation is potentially harmful.

DDAVP+H₂O reduces standing HR



Midodrine Decreases Orthostatic Tachycardia...a little bit.



Beta-Blockers in POTS

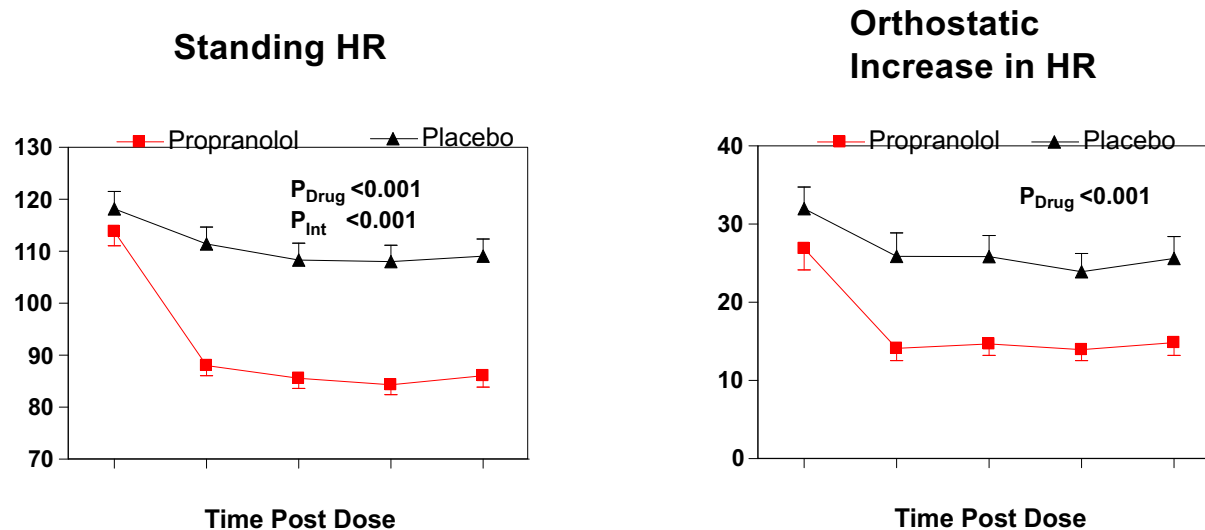
■ PRO

- Intuitively appealing
 - High HR -> Lower it

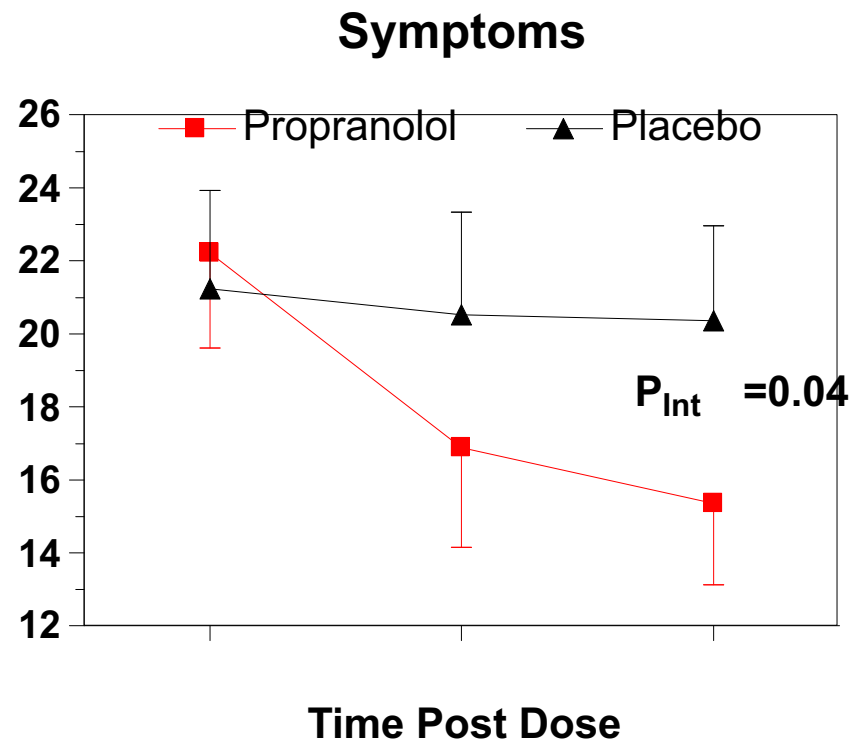
■ CON

- Stewart et al. studied IV esmolol and found that it **DID NOT** improve orthostatic tolerance
 - Many patients report “intolerance to beta-blockers”
-

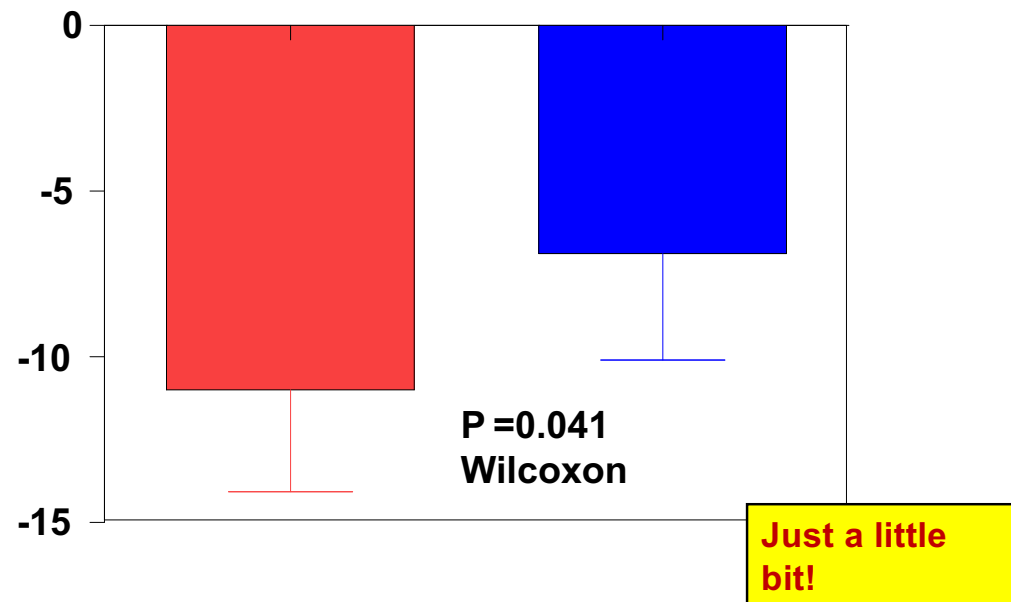
Propranolol 20mg lowers Orthostatic Tachycardia



Propranolol Improves Symptoms...

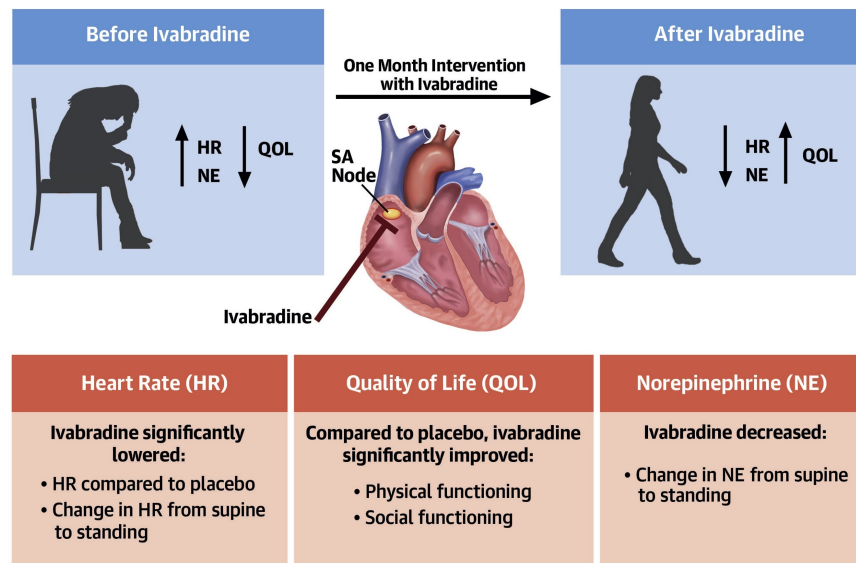


...but Less is More



Ivabradine in POTS – Crossover RCT

CENTRAL ILLUSTRATION: Ivabradine Improves Heart Rate, Quality of Life, and Norepinephrine Levels in Hyperadrenergic Postural Orthostatic Tachycardia Syndrome



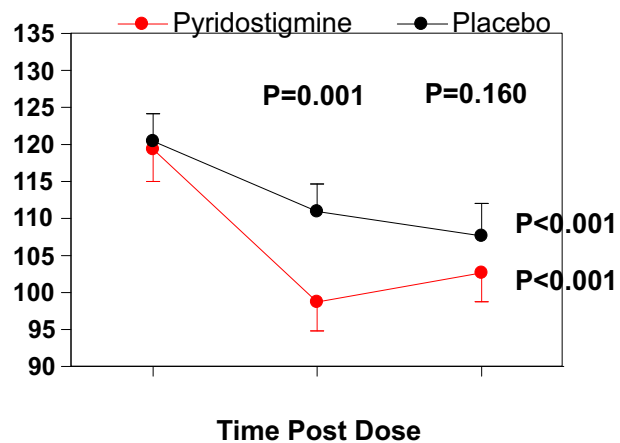
Taub, P.R. et al. J Am Coll Cardiol. 2021;77(7):861-71.

Acetylcholinesterase Inhibition

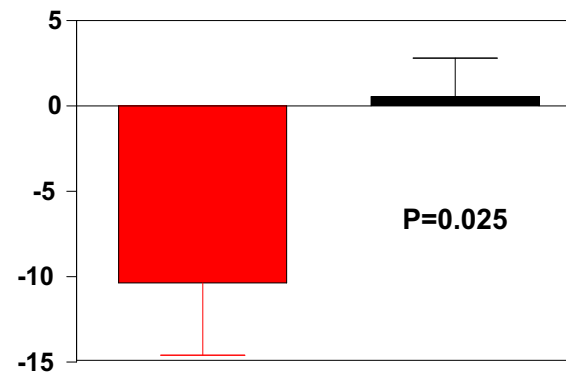
- **Pyridostigmine**
 - **Peripheral AChEI**
 - **Increases availability of synaptic ACh**
 - **Ganglionic Nicotinic Receptor**
 - **↑ SNS & ↑ PNS**
 - **Postganglionic Muscarinic Receptor**
 - **↑ PNS**
 - **Might decrease tachycardia in POTS**
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Acetylcholinesterase Inhibition

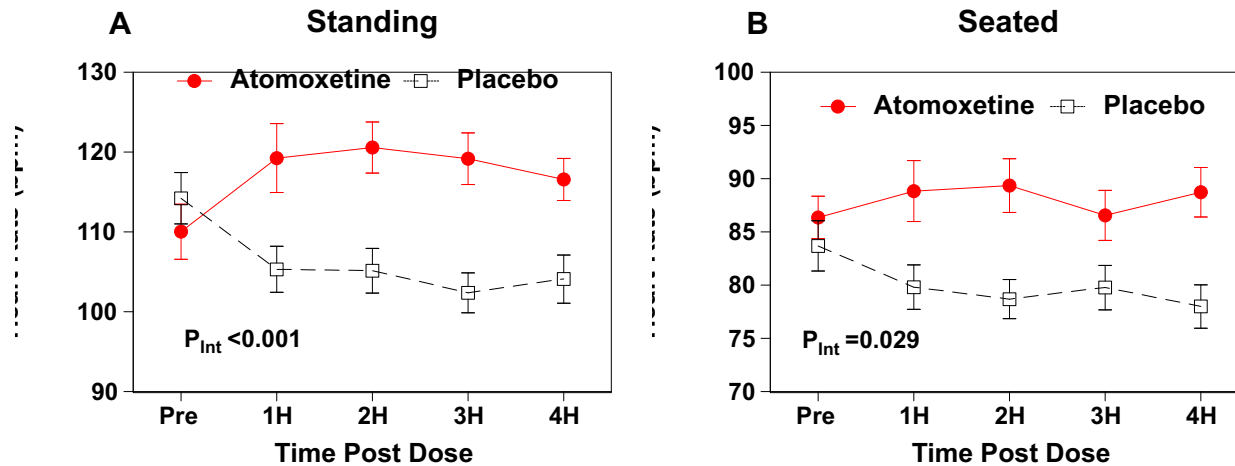
Standing Heart Rate



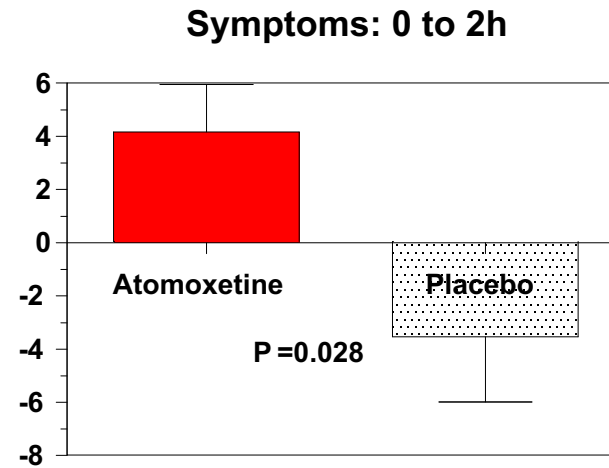
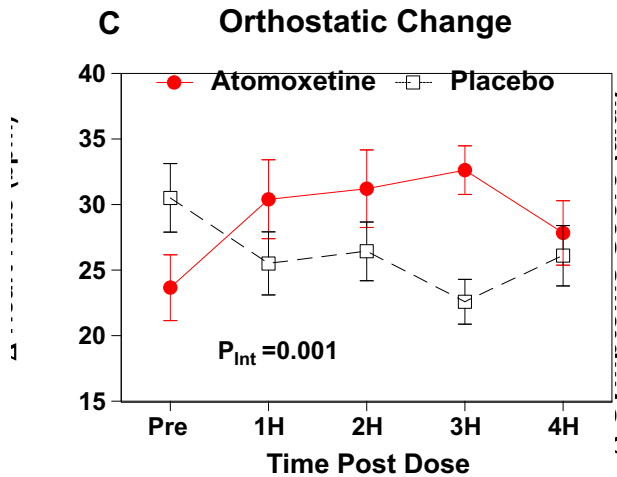
Symptoms



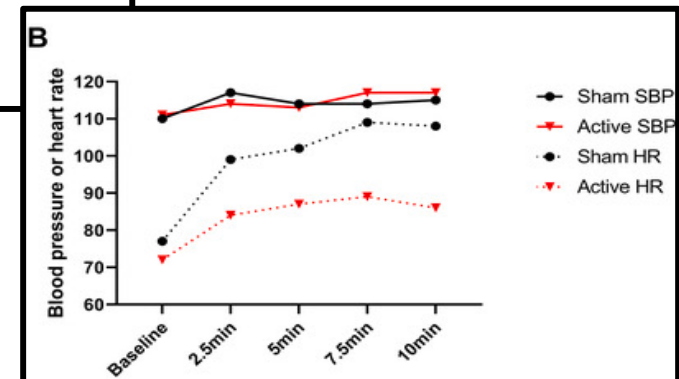
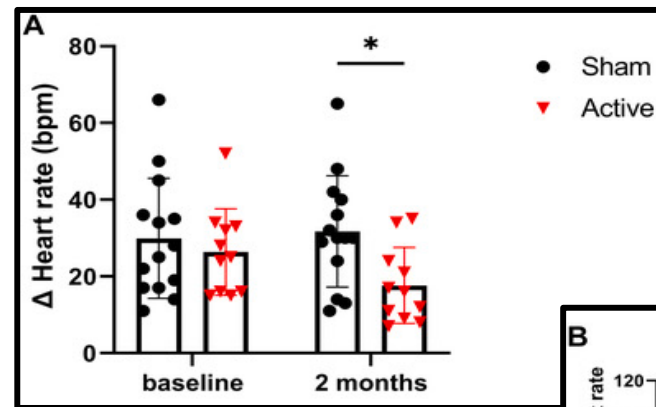
Norepinephrine Transporter Inhibition (e.g. SNRI drugs)



Norepinephrine Transporter Inhibition (e.g. SNRI drugs)



NEW: Vagal Nerve Stimulation



Stavros Stavrakis et al. *J Am Coll Cardiol EP* 2023;

POTS Treatment– Take Home Messages

- **Exercise**
 - **Volume expansion**
 - **Heart rate control**
 - **Manage the “living with a chronic illness”**
-

Calgary Non-Pharmacological Treatment Guide

<https://cumming.ucalgary.ca/labs/calgary-autonomic-investigation/pots-long-covid>

Click to access the POTS information brochures below.



POTS

POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME

Non-Pharmacological Treatment Guide for POTS

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POTS

POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME

Short Treatment Guide

What is POTS?

POTS is a type of autonomic dysfunction. When a healthy individual stands up, gravity pulls blood down from the chest into the abdomen and legs. To adapt to this blood shifting, their blood vessels squeeze more tightly, and their heart rate increases a bit. These changes in the body maintain blood supply to the heart and brain. In POTS patients, these changes are abnormal, causing an increase in heart rate of 30 beats/min or more (40 beats/min or more for those age 12-19 years), without a decrease in blood pressure.

What can I do to help with my POTS symptoms?



Increase WATER Intake

Drinking more fluid (3L/day) will help increase your blood volume. This will help your body more easily adapt to standing and may reduce your POTS symptoms. These should be water or water equivalents.



Increase SALT Intake

Some POTS patients have less blood in their bodies, compared to people without POTS. They also have higher levels of a chemical messenger called norepinephrine. Norepinephrine increases heart rate. Increasing your salt intake may help improve POTS symptoms by increasing the amount of blood in your body. Additionally, a high salt diet reduces the amount of norepinephrine in the



Wear COMPRESSION Garments

When you stand up, gravity shifts blood from the heart level to below the heart level. With less blood coming back to the heart, sometimes the heart rate must be increased to maintain the blood flow. Compression garments help push blood that has pooled in the lower body back to the heart. If you are going to try this, you MUST squish the abdomen. Garments that include compression of your abdo-

Scan here



Questions?



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