Long COVID POTS: Treatments

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Conflict of Interest Disclosure

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- **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

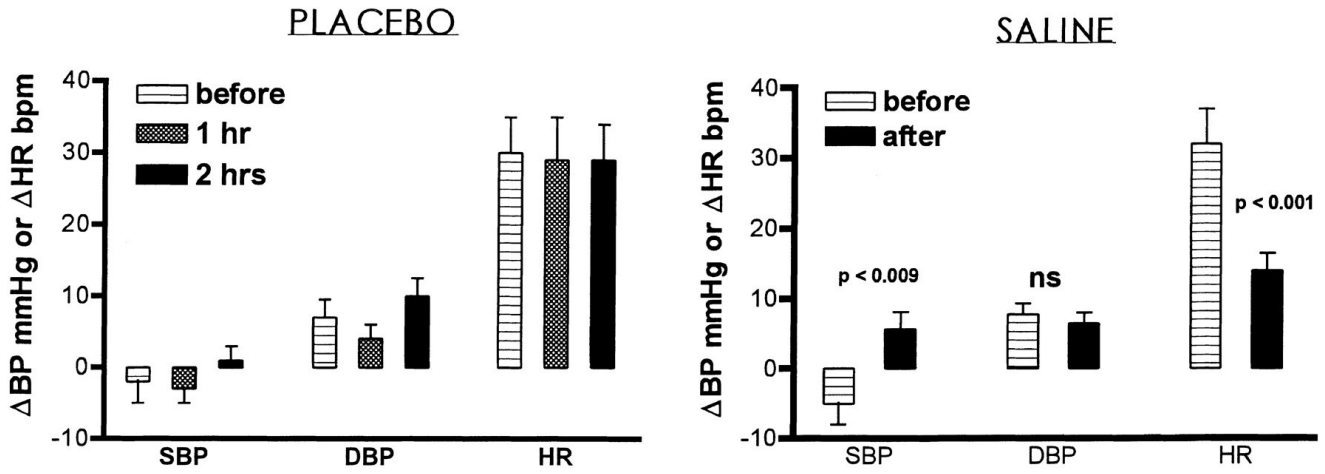
POTS: Non-Pharmacological Treatment Approaches

- 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!!



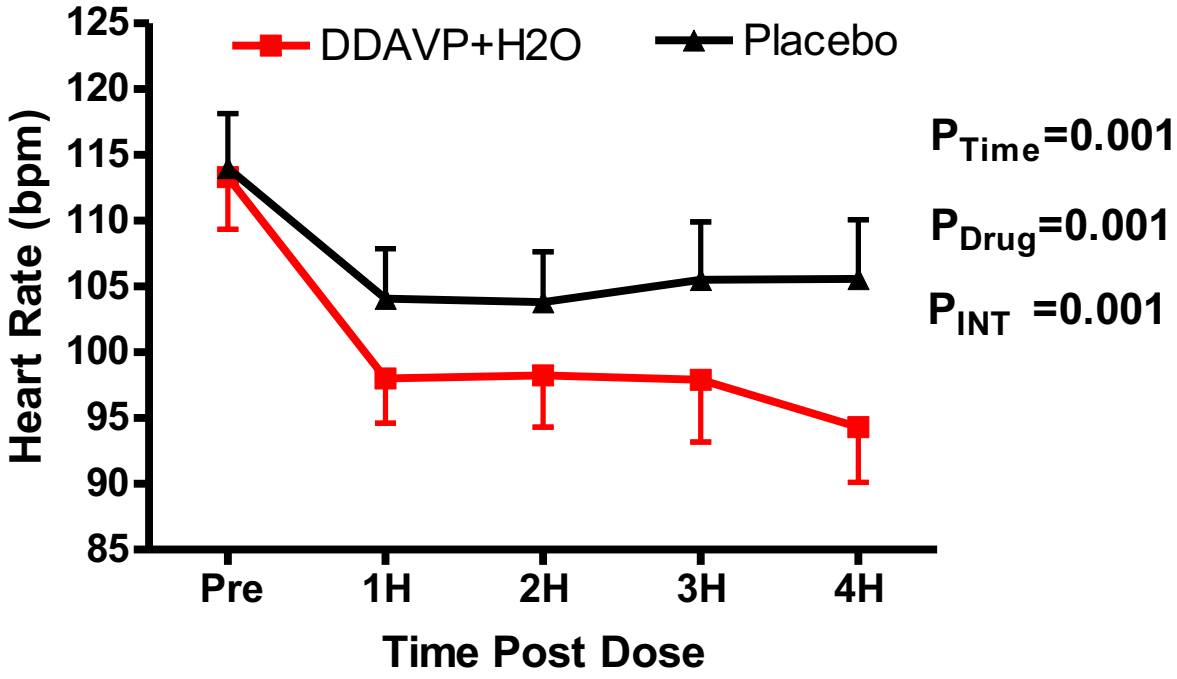
G Jacob et al. Circulation 1997;96:575-580

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.

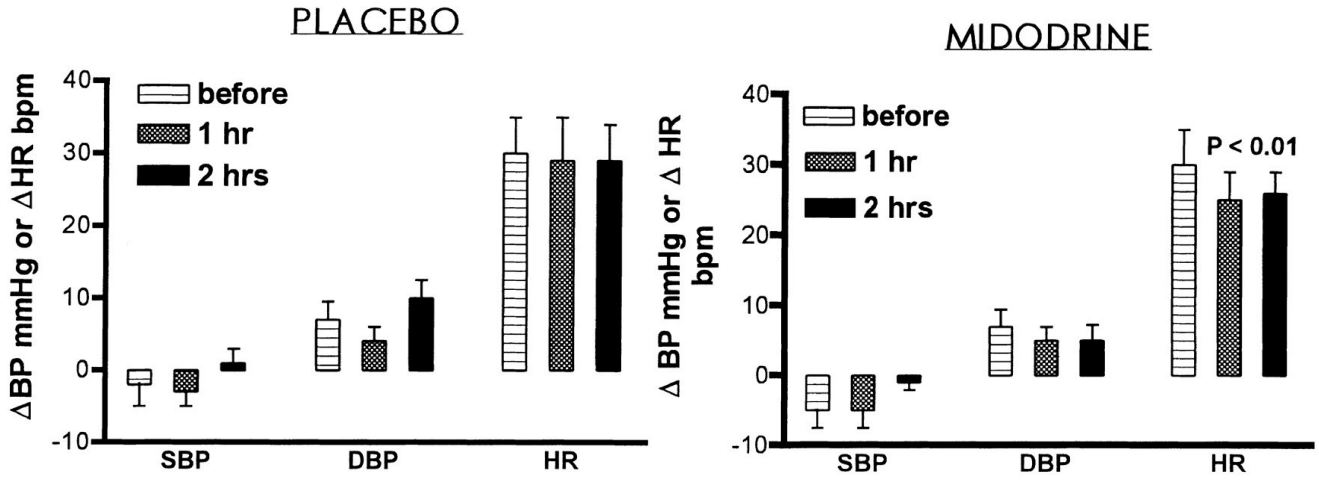
R Sheldon et al. Heart Rhythm 2015; 12(6):e41-63

DDAVP+H_2O reduces standing HR



ST Coffin et al., Heart Rhythm. 2012;9:1484-90

Midodrine Decreases Orthostatic Tachycardia…a little bit.

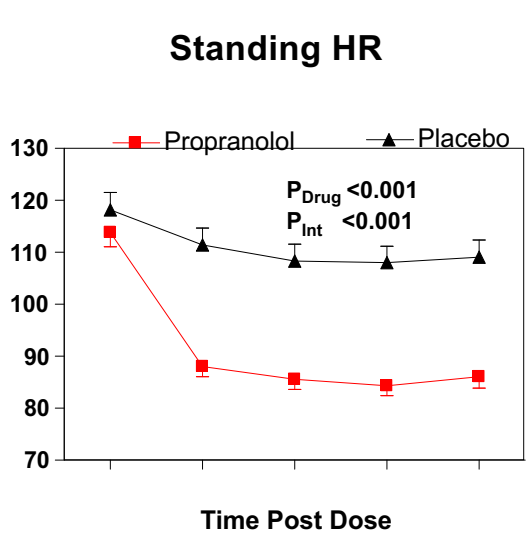


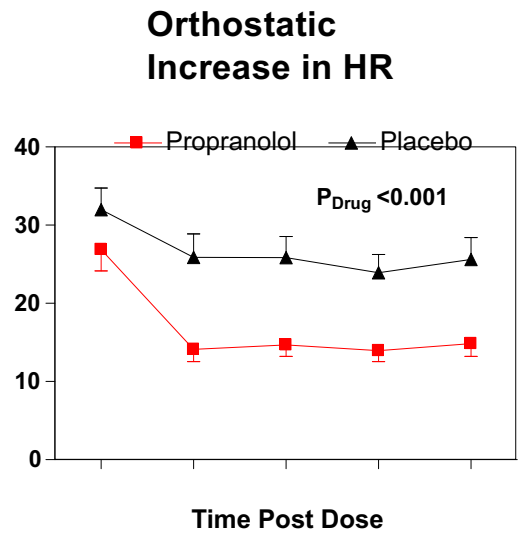
Jacob, G. et al. Circulation 1997;96:575-580

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"**

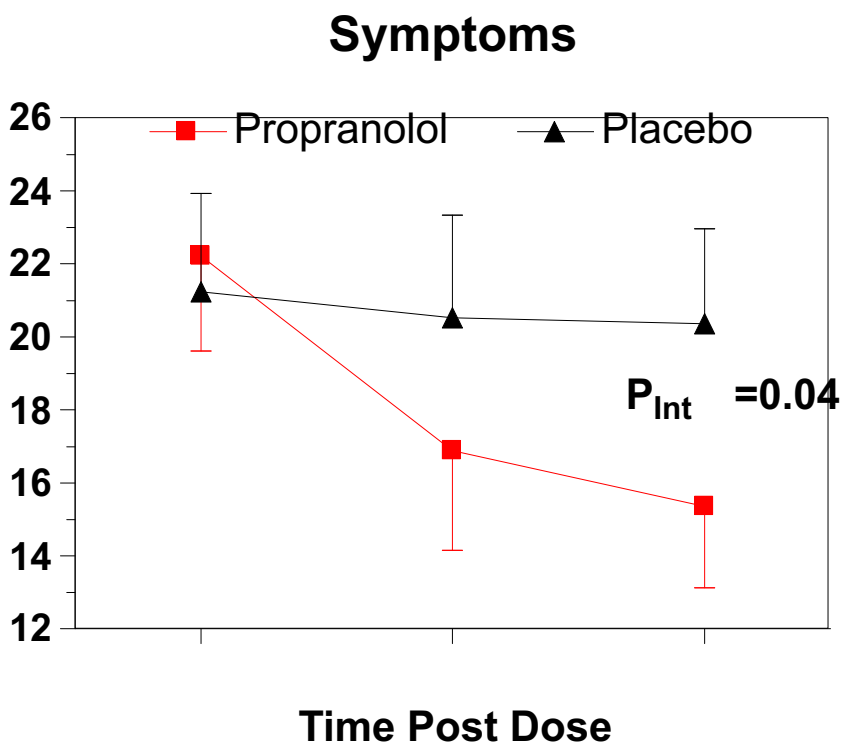
Propranolol 20mg lowers Orthostatic Tachycardia





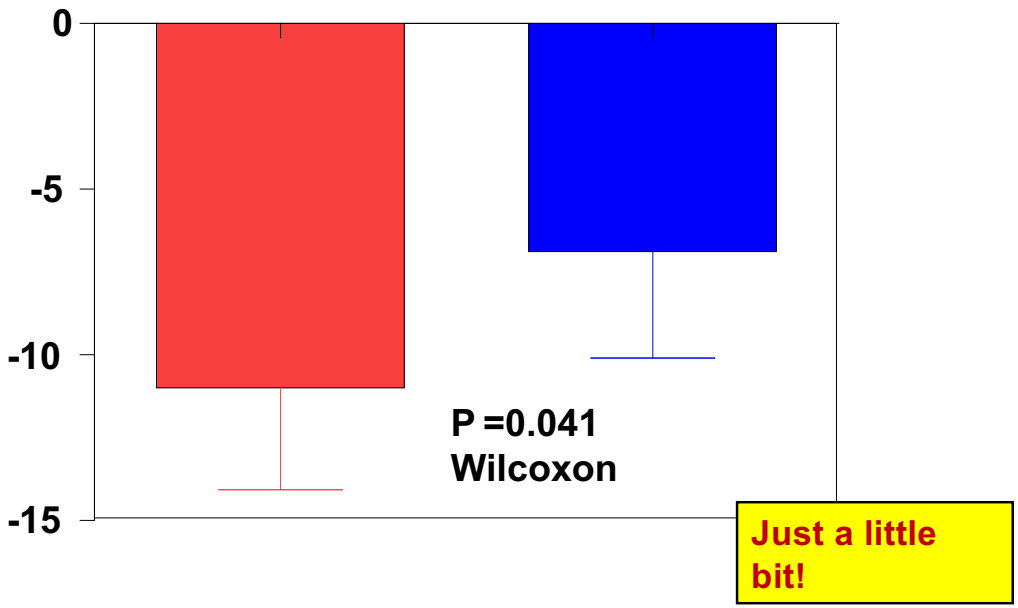
SR Raj et al. Circulation 2009;120:725-734

Propranolol Improves Symptoms…



SR Raj et al. Circulation 2009;120:725-734

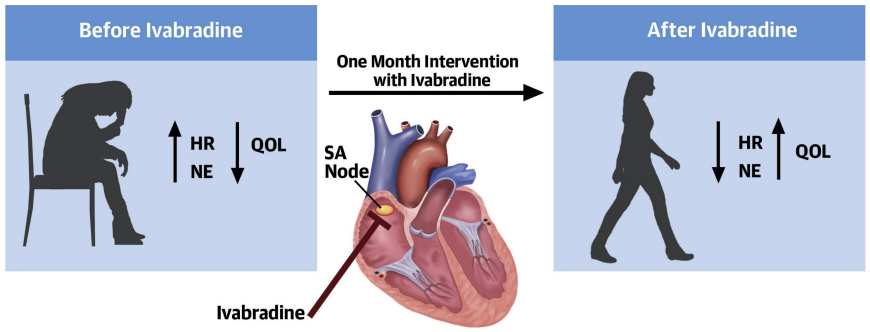
…but Less is More



SR Raj et al. Circulation 2009;120:725-734

Ivabradine in POTS – Crossover RCT

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



Heart Rate (HR)	Quality of Life (QOL)	Norepinephrine (NE)
Ivabradine significantly lowered: • HR compared to placebo • Change in HR from supine to standing	**Compared to placebo, ivabradine significantly improved:** • Physical functioning • Social functioning	**Ivabradine decreased:** • Change in NE from supine to standing

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

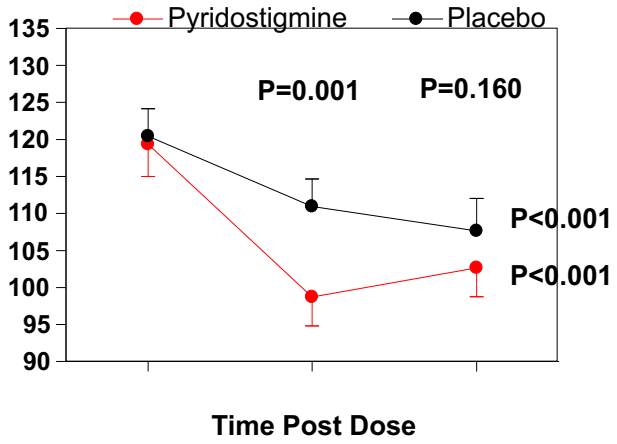
P Taub et al., JACC 2021;77(7):861-871

Acetylcholinesterase Inhibition

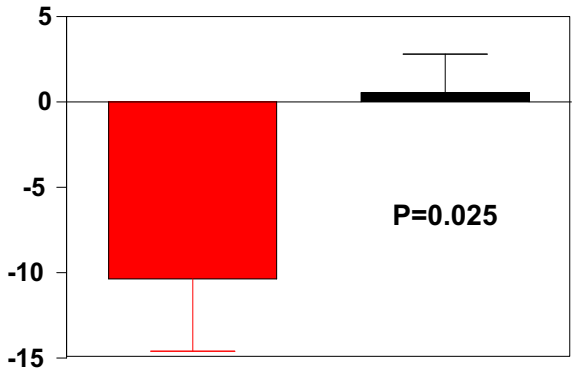
- **Pyridostigmine**
  - **Peripheral AChEI**
  - **Increases availability of synaptic ACh**
  - **Ganglionic Nicotinic Receptor**
    - **↑ SNS & ↑ PNS**
  - **Postganglionic Muscarinic Receptor**
    - **↑ PNS**
- **Might decrease tachycardia in POTS**

Acetylcholinesterase Inhibition

Standing Heart Rate

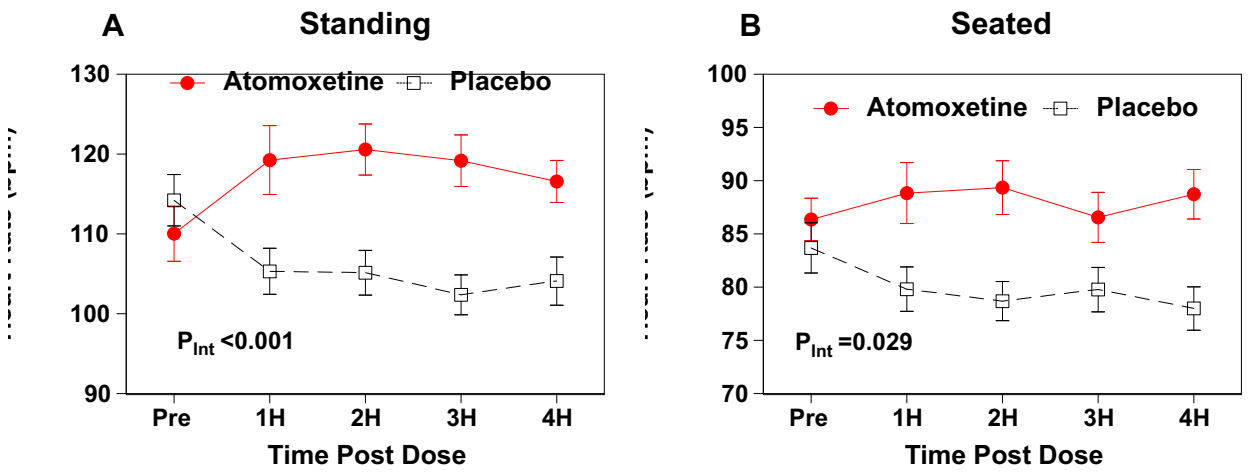


Symptoms



SR Raj et al., Circulation 2005;111:2734-2740

Norepinephrine Transporter Inhibition (e.g. SNRI drugs)



EA Green et al., JAHA 2013;2:e000395

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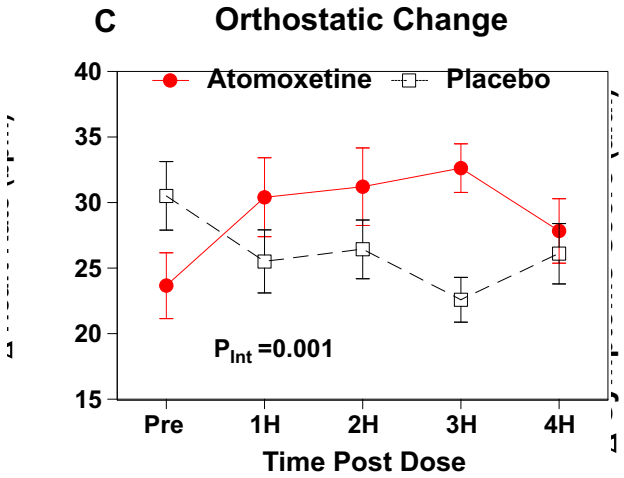
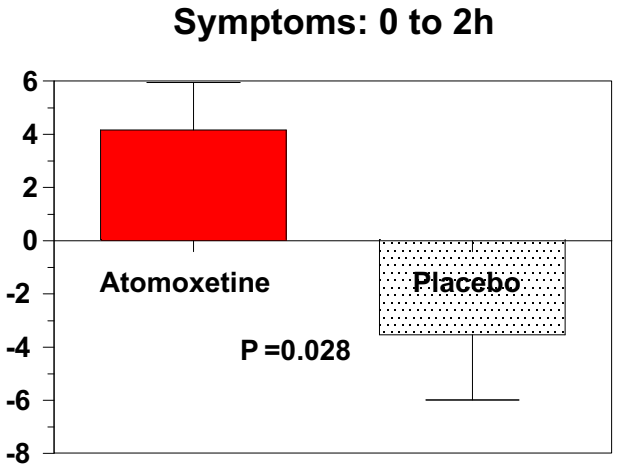
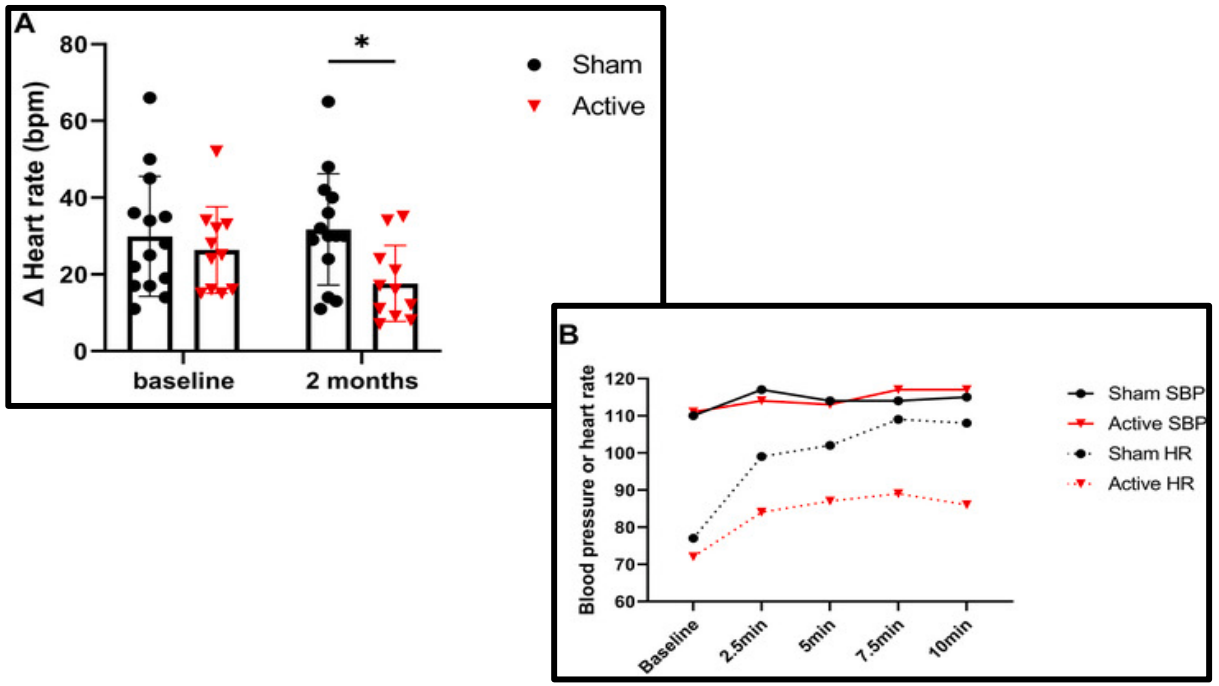




EA Green et al., JAHA 2013;2:e000395

NEW: Vagal Nerve Stimulation



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

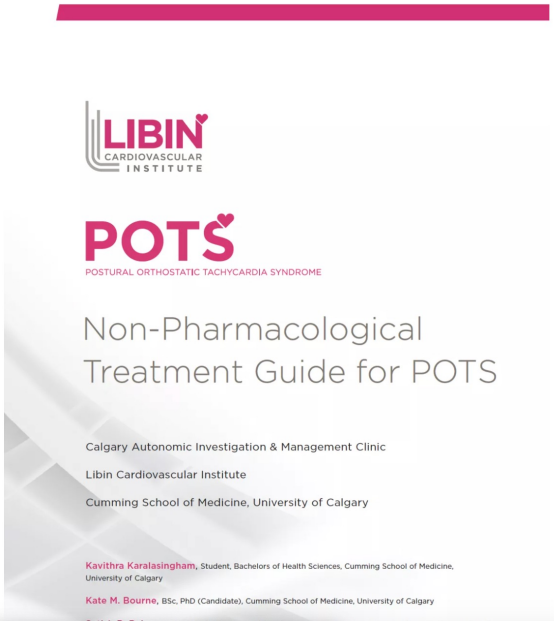
POTS Treatment– Take Home Messages

- 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.



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Questions?

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