Differential Diagnosis of OI with Excessive Upright tachycardia

- a Physiological Response to Central Hypovolemia?
Normal Circulatory Response to Orthostasis

HEART RATE (beats/min)
RELATIVE STROKE VOLUME (ratio)
RELATIVE CARDIAC OUTPUT (ratio)
BLOOD PRESSURE (mmHg)
RELATIVE TOTAL PERIPHERAL RESISTANCE (ratio)

TIME (min)
Normal Segmental Changes in Impedance and volume with Tilt

Thorax  Splanchnic  Pelvic  Leg
Orthostatic Intolerance
The presence of one or more symptoms, e.g., lightheadedness, dizziness, nausea, breathlessness, and vision change, linked specifically to assuming or maintaining upright posture, and symptoms abate once supine
Etiology is not a criterion.

Chronic Orthostatic Intolerance
Orthostatic Intolerance for at least 3 months with functional impairment

POTS
Chronic Orthostatic Intolerance with excessive postural tachycardia (at least 40 bpm change within 10 minutes on standardized passive tilt testing) without significant sustained hypotension in the absence of an alternative explanation. If a specific cause is found (e.g. Addison’s Disease) it is no longer called POTS. But the POTS Response is still present.
Major Variants of Orthostatic Intolerance Comprise a Differential Dx of POTS

• Chronic Bedrest
• Initial Orthostatic Hypotension
• Orthostatic Hypotension
• Chronic Orthostatic Intolerance Postural Tachycardia Syndrome (POTS) Chronic OI
• Postural Vasovagal Syncope/I.S.T.
• Any Condition that Promotes Central Hypovolemia
Gravitational Deconditioning

- Reduced blood volume
- Cardiovascular remodeling
- Different Regional blood volume redistribution
- Reduction in the response to norepinephrine/MSNA (and other pressors)
Initial Orthostatic Hypotension
Orthostatic Hypotension (OH) is Easy to Understand

- Blood pressure falls sufficiently to impair brain blood flow

- **Non-neurogenic OH**
  - Hypovolemic or Forced Vasodilation

- **Neurogenic OH**
  - Autonomic vasoconstrictor failure due to inadequate release of norepinephrine from sympathetic vasomotor neurons.
Chronic Orthostatic Intolerance: Postural Tachycardia Syndrome (POTS)

Day-to-Day Symptoms of OI

**Excessive Tachycardia**
(without Hypotension)
Adults $\Delta > 30$ or HR $> 120$ bpm within 10 min
Adolescent – $\Delta > 43$
(IOH a confound)?

+ Concurrent Symptoms of OI during testing

Improved by Recumbence

Postural Vasovagal Syncope in the Young Defined by Clinical History

Transient loss of consciousness and postural tone due to global cerebral hypoperfusion and characterized by rapid onset, short duration, and spontaneous recovery.

Almost always the result of systemic hypotension

Very Common (~40%)
And remember, graduation is not an ending but a beginning.