

# Long COVID and the Heart

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# Acute cardiovascular manifestations

- ▶ Increased MI – Type 1 and 2
- ▶ Myocarditis
- ▶ Takotsubo (Stress) Cardiomyopathy
- ▶ CHF- Ac. cor pulmonale
- ▶ PE
- ▶ CVA

# Troponin

- ▶ Marker of myocardial injury
- ▶ Around 10% of admitted patients
- ▶ Proportionate to severity of illness
- ▶ Majority is Type 2
- ▶ 4X Mortality when troponin elevated, 10X if both BNP and Troponin elevated

# Other findings

- ▶ Atrial Fibrillation around 5% in hospitalized
- ▶ RV dilatation and dysfunction- 12% critical patients
- ▶ Findings of myocarditis in 10-15% on Cardiac MRI
- ▶ Autopsy studies around 15% lymphocytic infiltration in myocardium
- ▶ Increased Sudden Death

# Sudden Death

- ▶ Italian study 60% increase
- ▶ French study 50% increase
- ▶ 2019- January – December - total # CA/ROSC -73
- ▶ 2020 - January –December-total # CA/ROSC-148

# Sudden Death-causes?

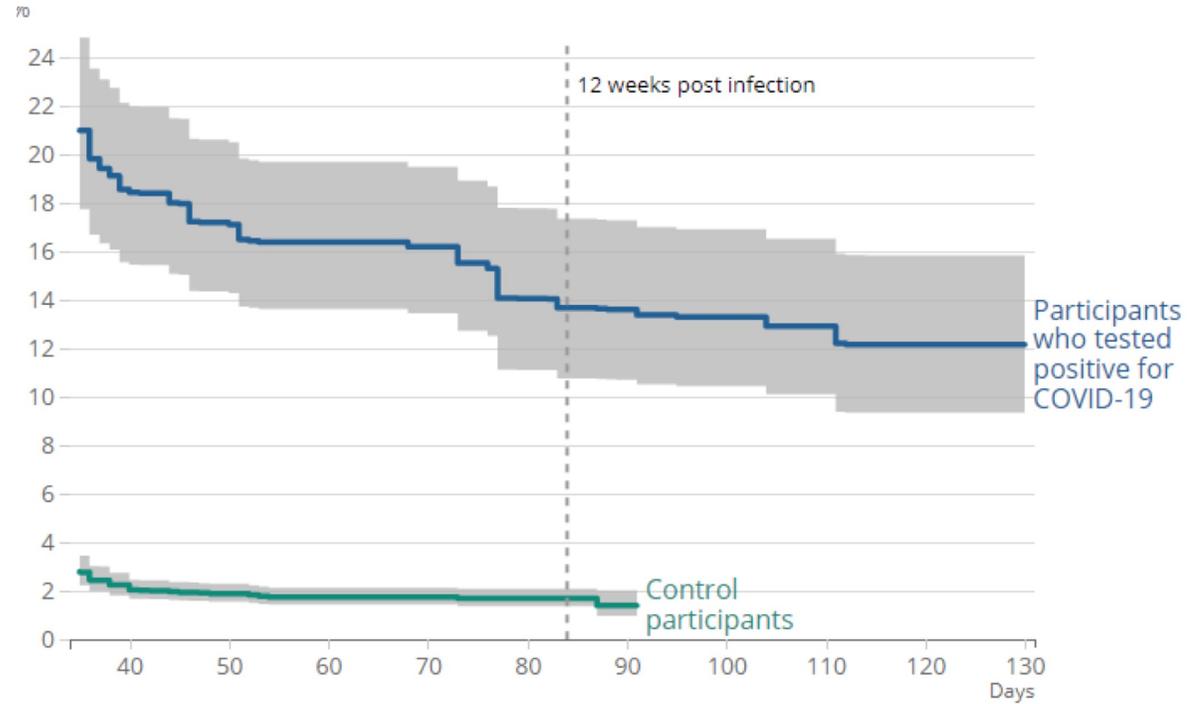
MI-delayed presentation

PE

? Cardiac arrhythmia



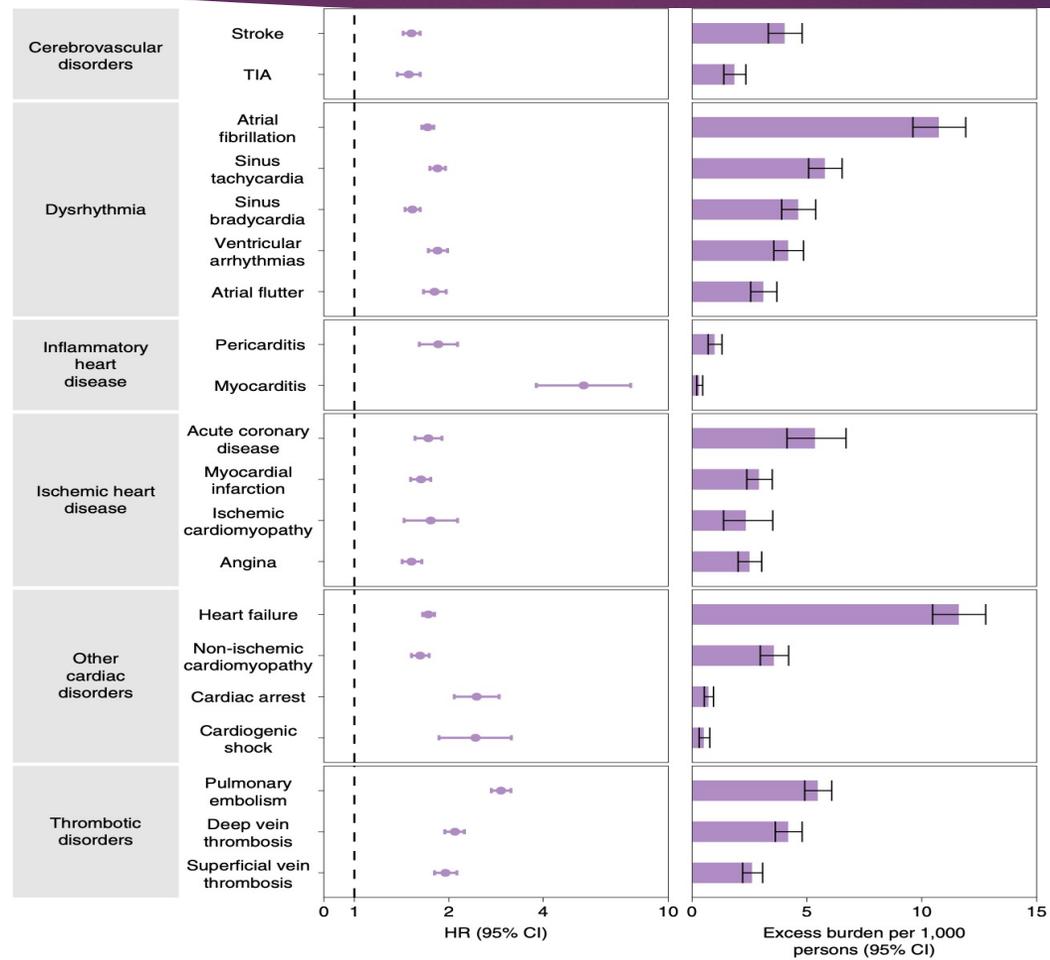
# LONG COVID-Prevalence



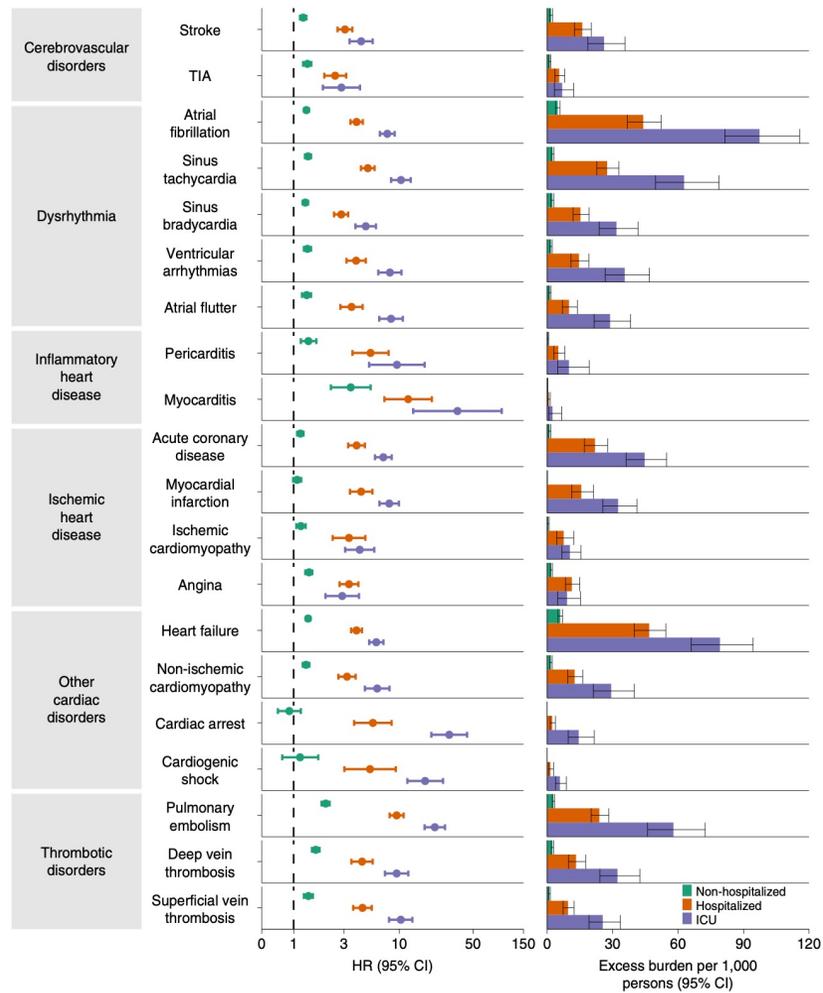
# Definition

- Long haulers
  - Long haul COVID
  - Long COVID syndrome
  - Post-COVID syndrome
- 
- Definition at this point: **any** symptoms lasting > 8 weeks after recovery of initial COVID infection

# Prevalence



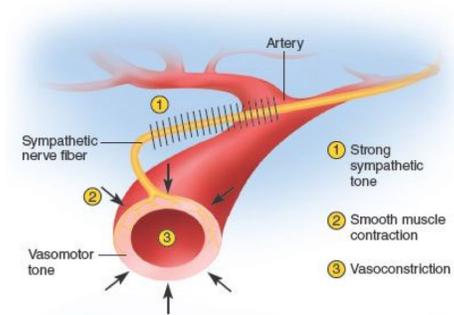
# Prevalence - cont



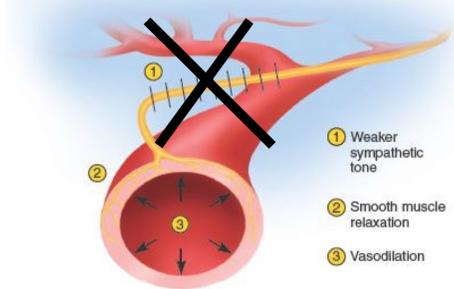
# POTS

- Increasing numbers of case reports/series of dysautonomia among long haulers
- Symptoms are very characteristic for POTS
- POTS is known to be post-viral in nature (~40-50%)
- However, many providers are not familiar with POTS

# Autonomic regulation

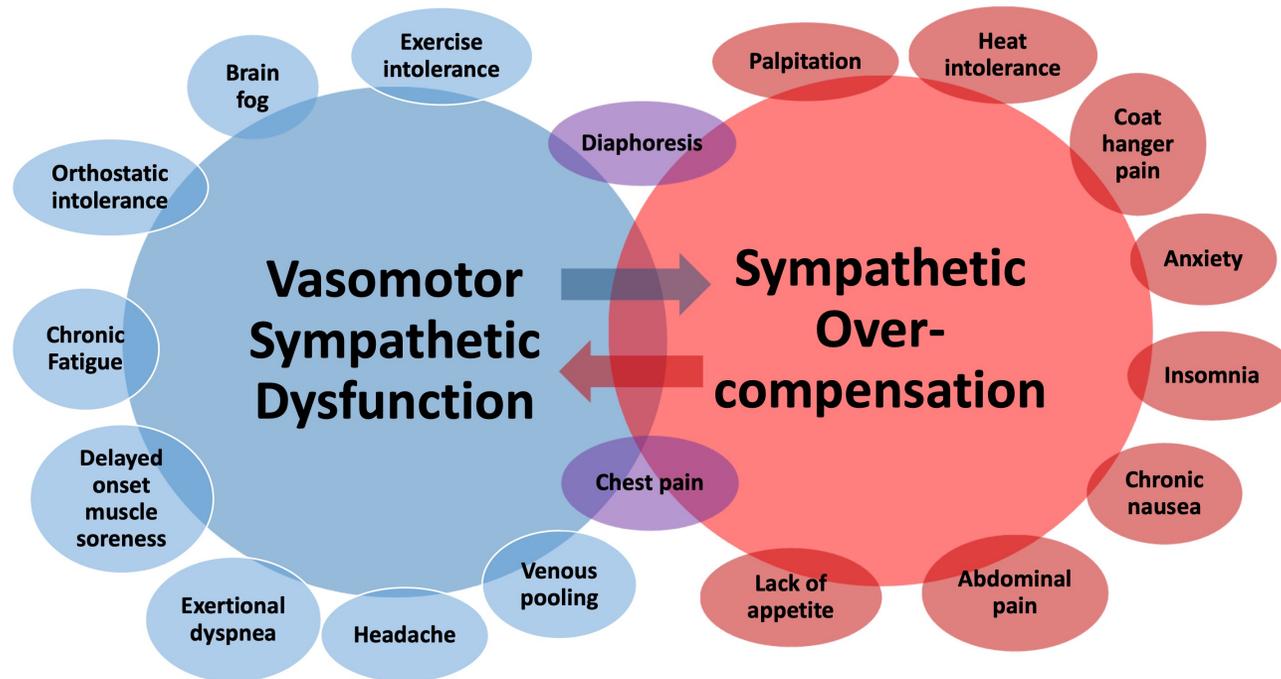


(a) Vasoconstriction

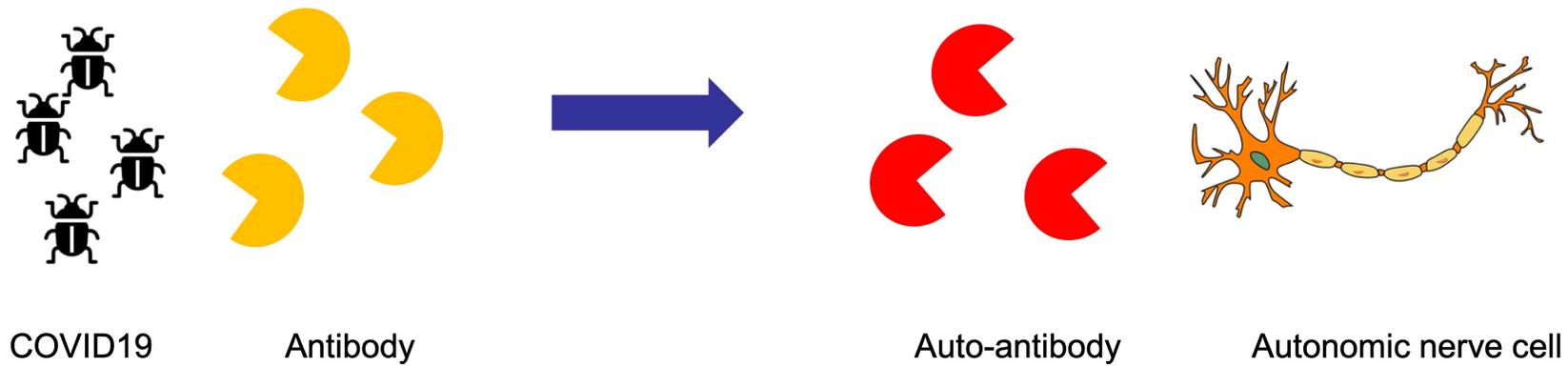


(b) Vasodilation

# Symptoms



# Possible mechanism



**POTS**  
**(Inflammation to sympathetic vasomotor fibers)**

# Symptoms

**Table 1. Common postural tachycardia syndrome symptoms**

<b>Patients experiencing symptoms, %</b>	<b>Orthostatic intolerance symptoms<sup>a</sup></b>	<b>Symptoms not necessarily associated with posture</b>
>90	<ul style="list-style-type: none"><li>• Light-headedness, presyncope</li><li>• Palpitations (heart racing)</li></ul>	<ul style="list-style-type: none"><li>• Cognitive impairment (brain fog)</li><li>• Frequent nausea</li><li>• Headache</li><li>• Fatigue</li></ul>
>80	<ul style="list-style-type: none"><li>• Breathlessness</li></ul>	<ul style="list-style-type: none"><li>• Abdominal pain</li><li>• Muscle pain/weakness</li><li>• Cold feet/hands</li></ul>
>70	<ul style="list-style-type: none"><li>• Atypical chest pain</li><li>• Tremulousness</li><li>• Blurred vision</li></ul>	<ul style="list-style-type: none"><li>• Bloating/constipation</li><li>• Hand tingling</li></ul>
Other common symptoms	<ul style="list-style-type: none"><li>• Syncope (36%)</li><li>• Sweating</li></ul>	<ul style="list-style-type: none"><li>• Diarrhoea (69%)</li><li>• Poor sleep</li><li>• Exercise intolerance</li></ul>

<sup>a</sup>Symptoms that develop when upright and are relieved by reclining.

# Management

**Table 2. Supported self-management for postural tachycardia syndrome<sup>1,3</sup>**

<b>Method</b>	<b>Rationale</b>	<b>Comment</b>
Avoid symptom triggers	To reduce vasodilation and venous pooling	Triggers include hot environments, prolonged standing, heavy meals, and alcohol
High fluid intake	Increase blood volume	3 l/day in adults
Additional salt (unless contraindicated)	Increase blood volume and pressure	10 g/day in adults, less in children
Lower body compression	Reduce venous pooling	Waist high, class 2. If not tolerated, sports compression clothing may help
Exercise	To strengthen skeletal muscle pump and prevent deconditioning	Start with low-level recumbent exercise
Counterpressure manoeuvres	Activating skeletal muscle pump to increase venous return/prevent syncope	Cross legs and squeeze thigh muscles, clench buttocks, and tightly fold arms
Sleep in a head-up tilt position (>10°)	To expand blood volume	Bricks under head end of bed
Pacing of activities	To regulate activity to achieve adaptive goals	To reduce severity of flares and fatigue
Psychotherapy	To help patient adjust to chronic illness and frightening symptoms	Cognitive behavioural therapy and mindfulness

# Conclusions

- ▶ Increased burden of chronic CV conditions such as Atrial Fibrillation , MI,CHF and CVA particularly in elderly and patients with chronic medical conditions.
- ▶ POTS and related conditions quite common particularly in young otherwise healthy people