



**CARDIAC DYSAUTONOMIA
SECONDARY TO
SARCOV-2 INFECTIONS
AND COVID 19 VACCINES**

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Cardiac Dysautonomias Secondary to SarCoV-2

Infections and COVID-19 Vaccines

With

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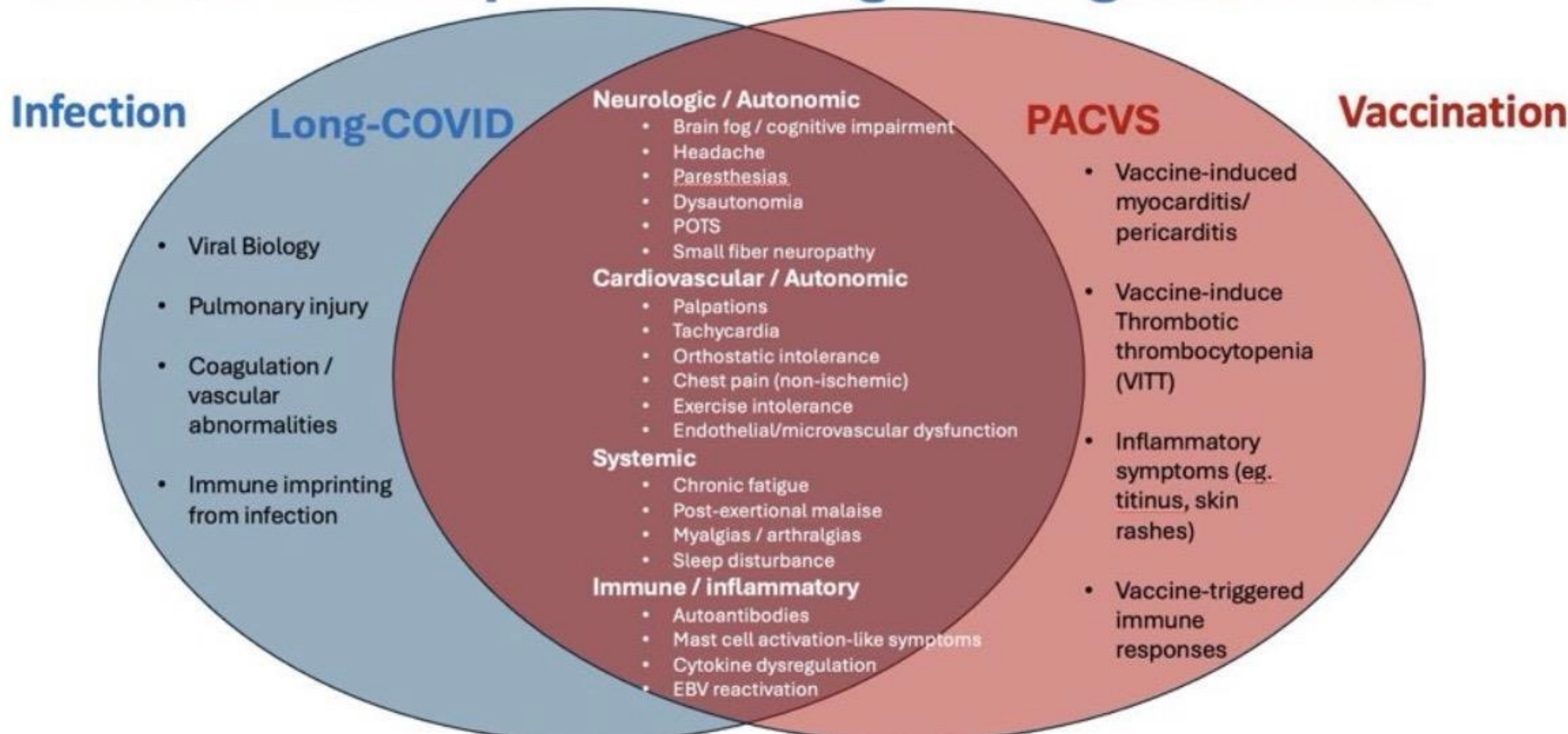
Objectives

Cardiac Autonomic Disorders: OBJECTIVES

Understand Syndromes That Cause Dysautonomia

- Know the diagnostic criteria for each subtype
- Review supportive treatment options for different symptom presentations
- Understand the mechanisms underlying pharmacologic therapy

Clinical Overlap and Distinguishing Features



Post Vaccination vs PACVS

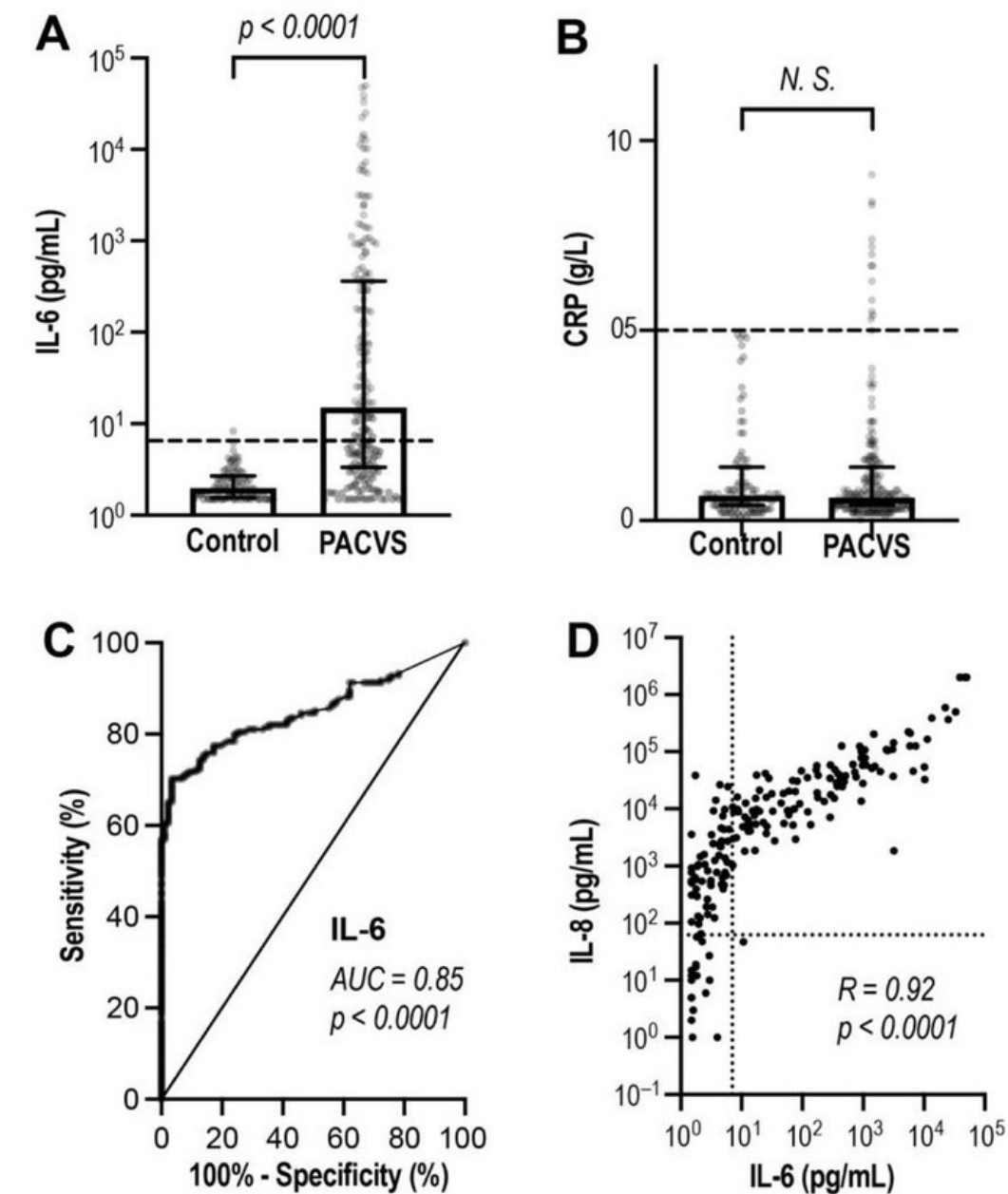


Figure 4. Inflammation markers in post-vaccination controls and PACVS-affected subjects. IL-6 (A) and CRP (B) were compared in post-vaccination controls (Controls, $N = 88$) and PACVS subjects (PACVS, $N = 191$) using U-test. (C) IL-6 values were subjected to ROC analysis (identity indicated by solid line). (D) Spearman correlation analysis of IL-6- and IL-8 values from PACVS subjects. Boxes: medians; error bars: interquartile ranges; brackets: results of U-test (N.S.: not significant). Dotted lines: 99% confidence limits of reference values corrected for age and gender in (C).

Post SarsCoV2 Infection

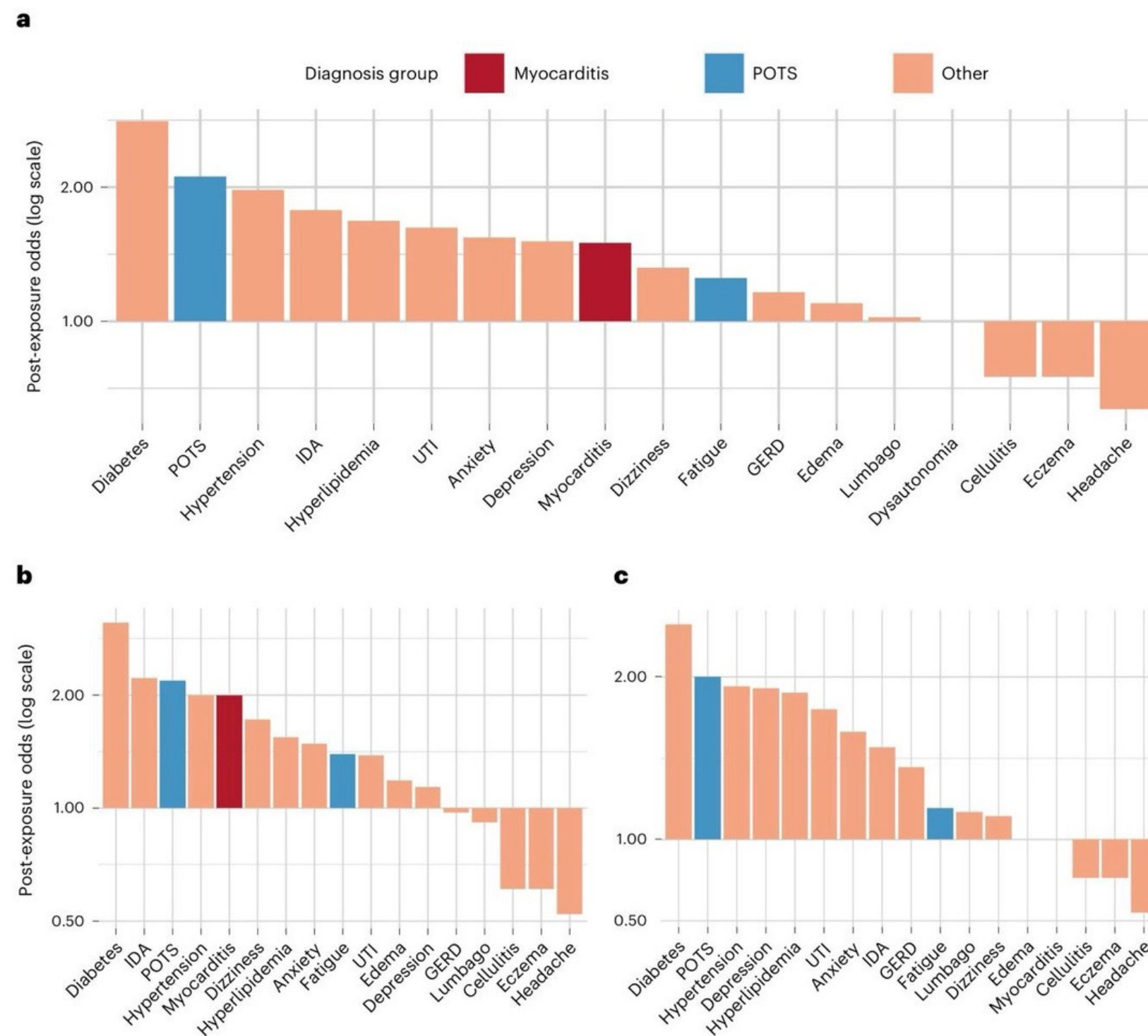
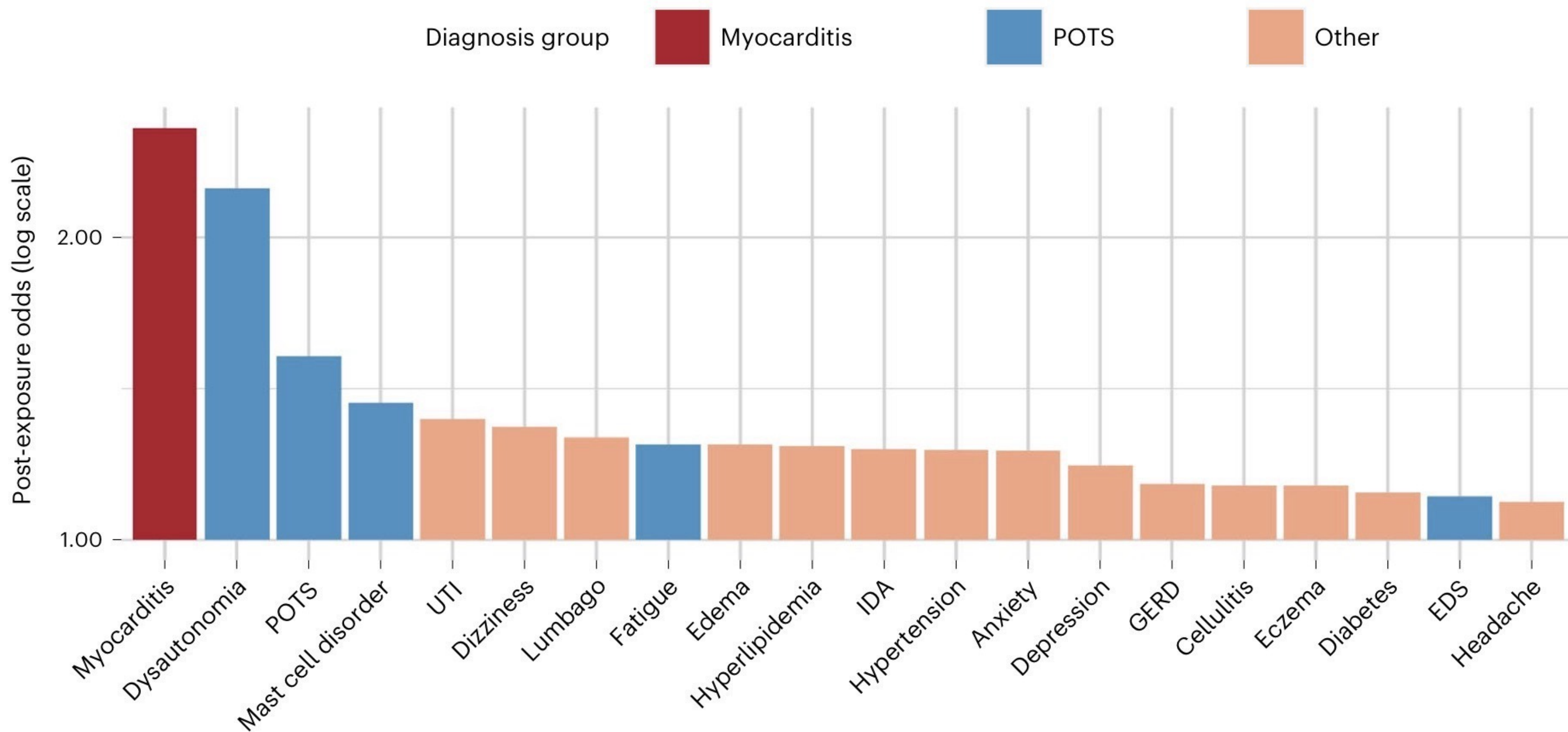


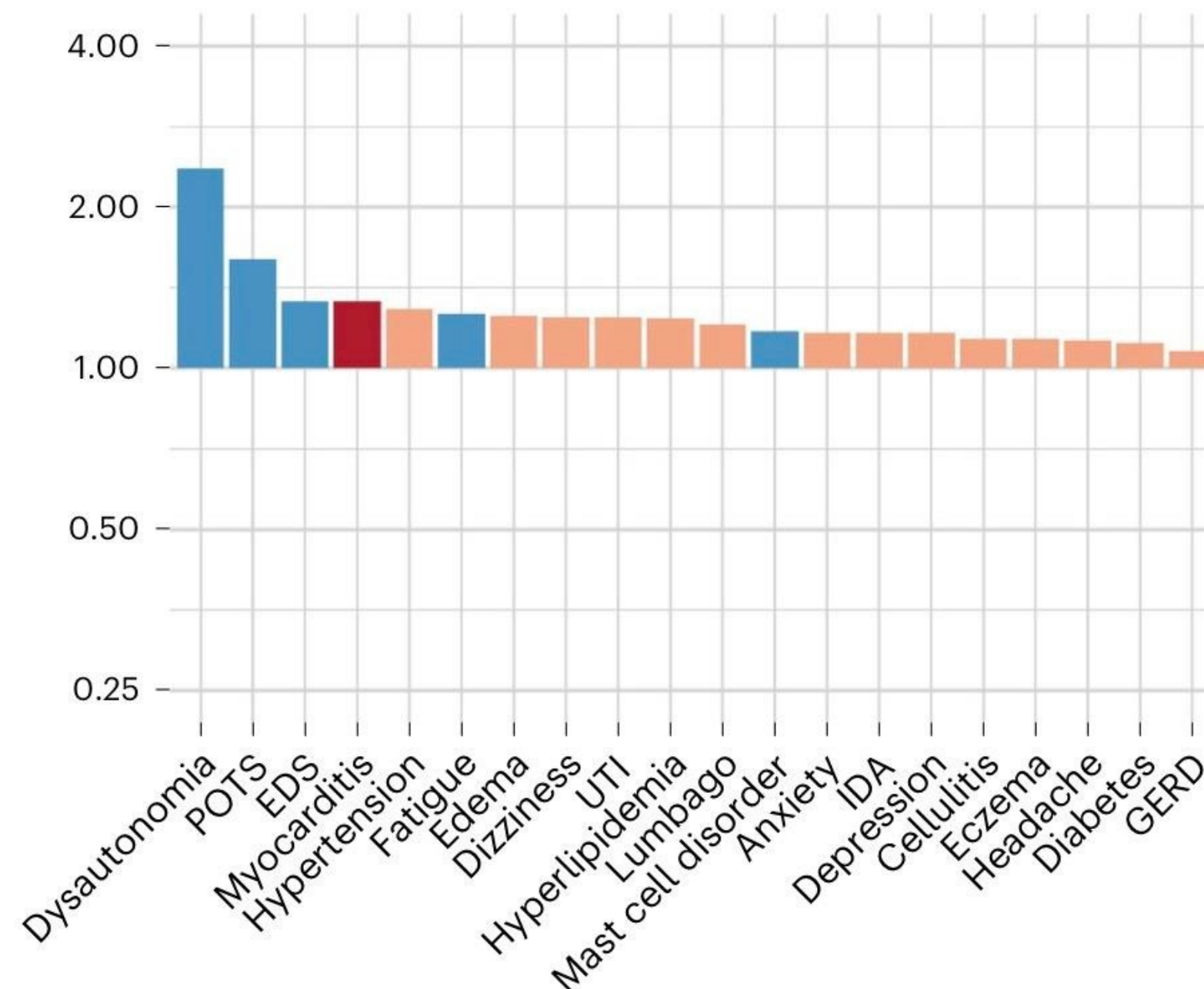
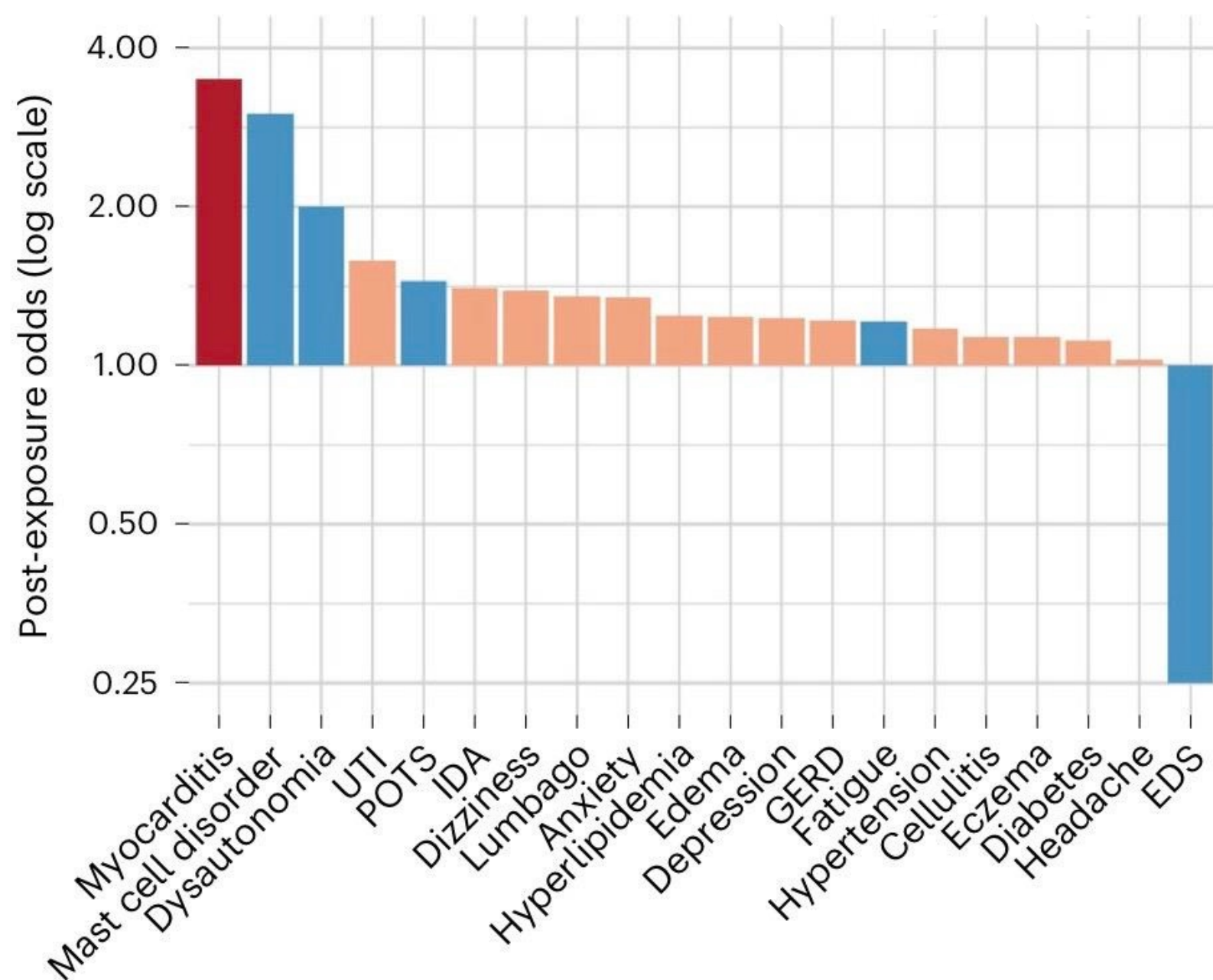
Fig. 2 | Post-infection odds by diagnosis. **a**, All patients, post-infection. **b**, Male patients only, post-infection. **c**, Female patients only, post-infection. GERD, gastroesophageal reflux disease; IDA, iron deficiency anemia.

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Male vs Female



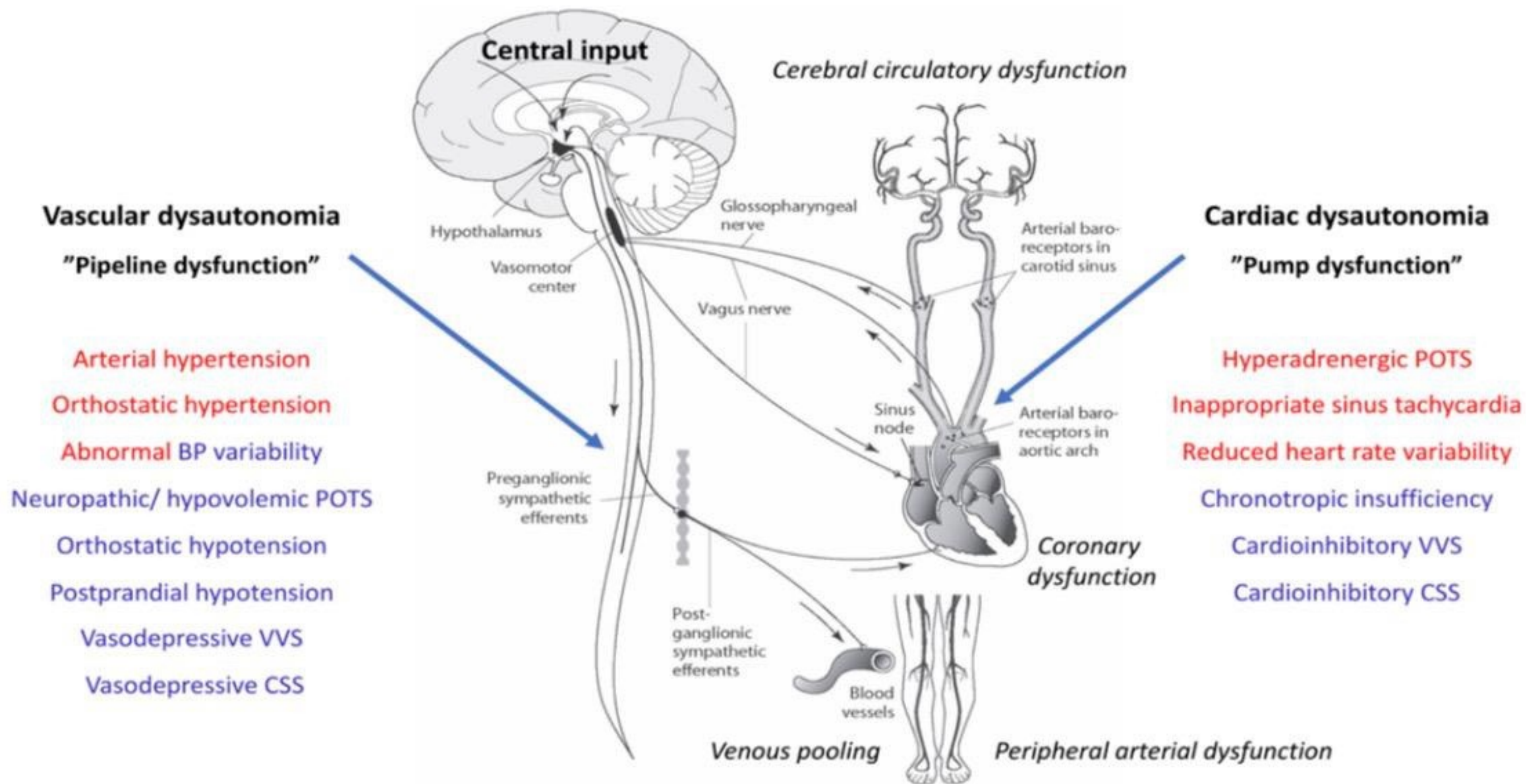
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Definitions

- Dysautonomia
- Cardiac dysautonomia

POTS: Postural Orthostatic Tachycardia Syndrome

IST: Inappropriate Sinus Tachycardia



POTS Subtypes

Primary POTS

- Hyperadrenergic
- Volume dysregulation
- Autoimmune

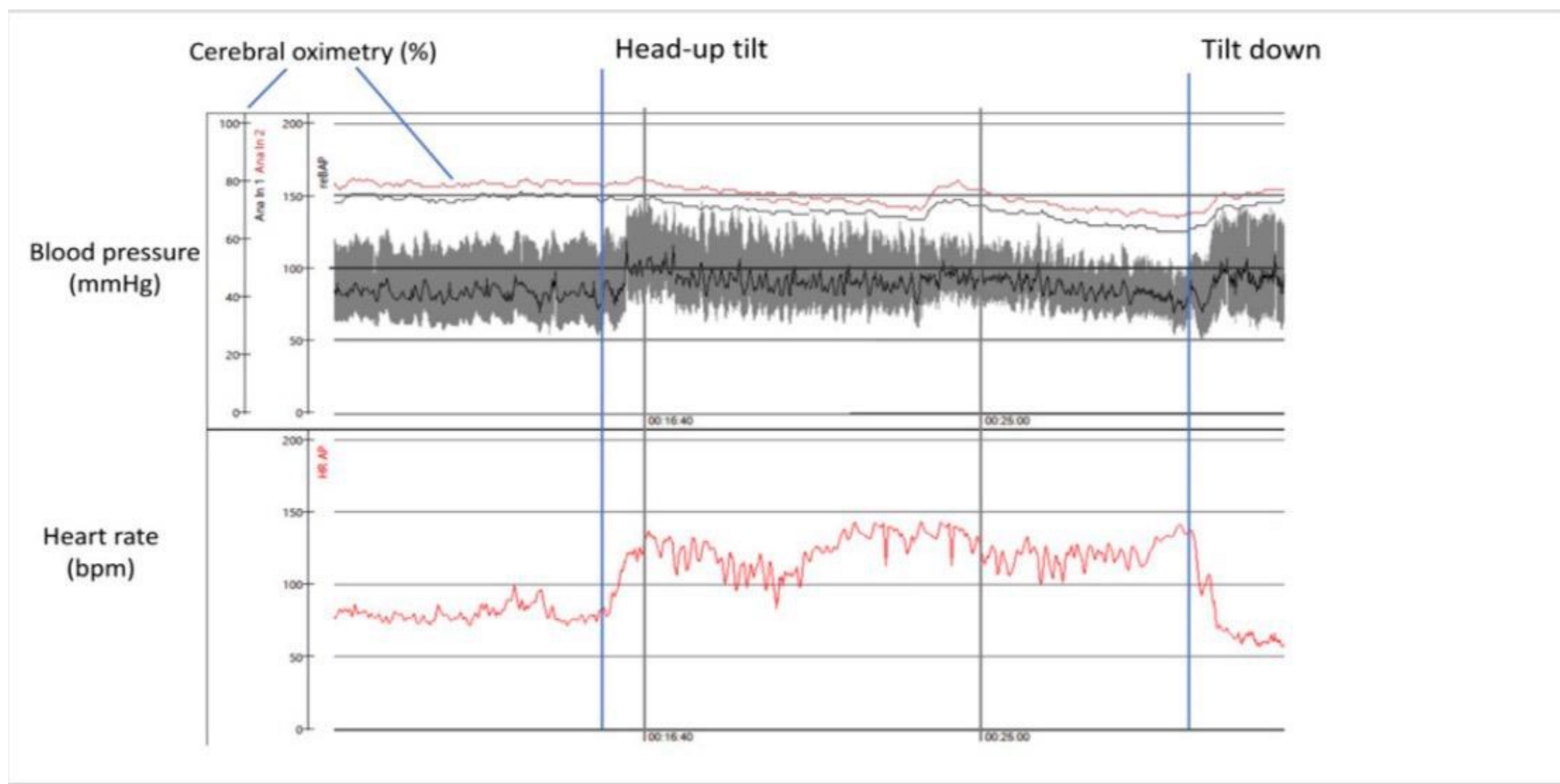
Secondary POTS

- Neuropathic
- Mast Cell Activation Syndrome
- Diabetes
- Alcoholism
- Paraneoplastic syndromes
- Heavy metal poisoning
- Chemotherapy
- Viral illness

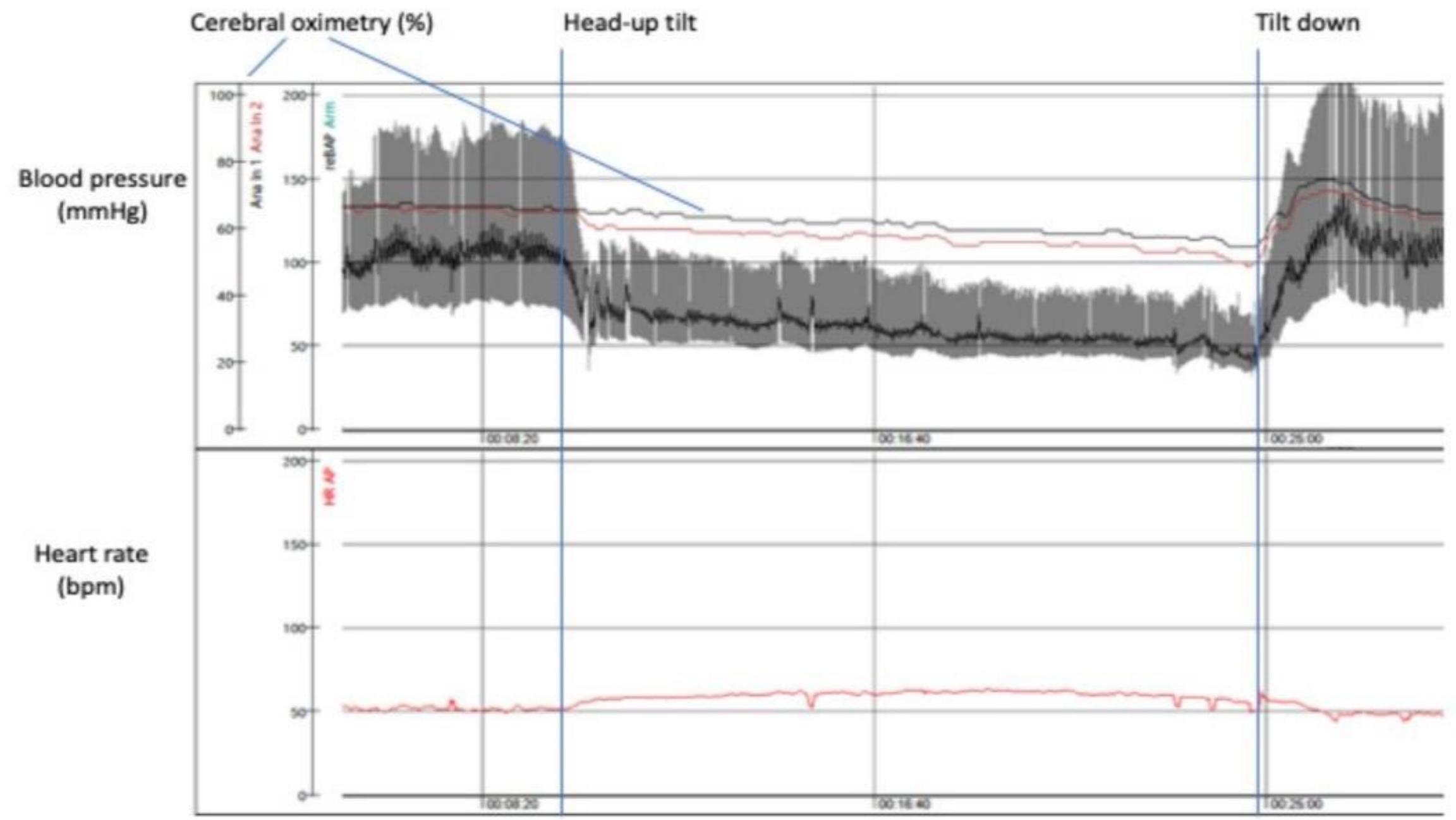
Associated Disorders

- Ehlers-Danlos syndrome
- Chronic Fatigue Syndrome
- Inappropriate Sinus Tachycardia
- Traumatic Brain Injury

POTS: Heads Up Tilt (HUT)



Orthostatic Hypotension (HUT)



Inappropriate Sinus Tachycardia as seen on a Holter



Diagnostic Options

TEST/DX	POTS	IST	OH	VVS
HUT	X		X	X
24Hr ECG	X	X		X
24Hr ABPM	X		X	X
ILR				X

Causal factors in PACVS and Cardiac Dysautonomia

- Likely multifactorial
- Autoimmunity
- MCAS
- Chronic IL-6 inflammation

Non-Pharmacological Therapies

- Increase fluids by 2-3L/Day
- 2-12gms of added Na⁺/day SBP <100mmHg 6-12gm/day,
SBP>135mmHg 2-3gm/day
- Compression garments
- Recumbent exercise

Pharmacological Treatments

- H1 and H2 Blockers
- Fludrocortisone
- Midodrine
- B-Blocker or Ca⁺⁺ channel blocker
- Ivabradine

References

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Thank you

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