



Syncope : An aerial view

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Syncope: A conundrum

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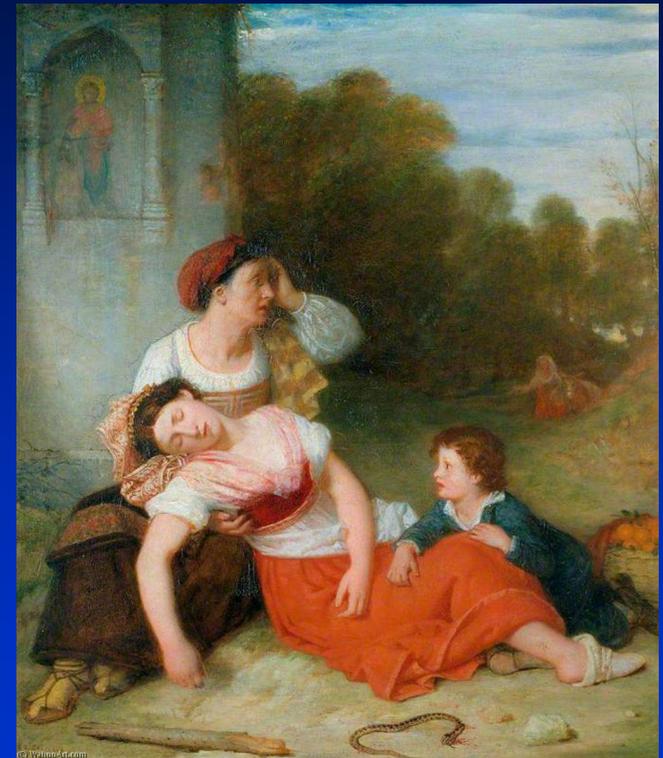
Pediatric Cardiologist, Fetal Cardiologist

Children's Mercy Hospital



Overview

- Definition
- Etiology
- Differential diagnosis
- Evaluation
- Management



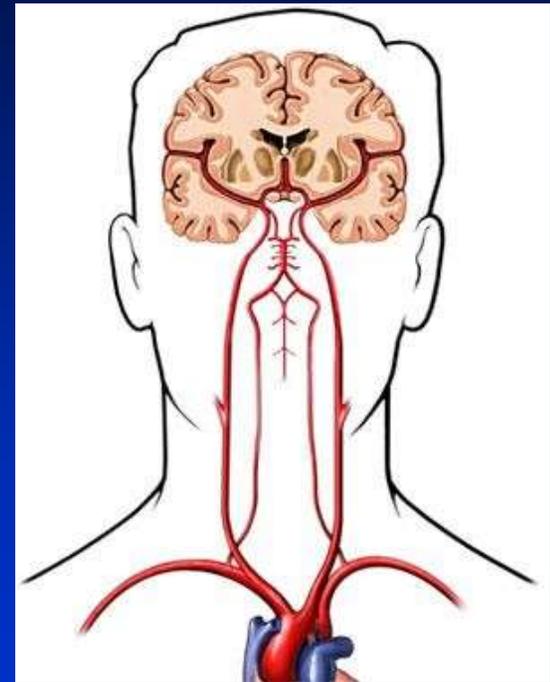
Syncope

- Sudden, brief loss of consciousness
- Loss of postural tone
- Spontaneous recovery
- Symptom, not a disease



Syncope

- **Incidence: up to 50% of children experience at least 1 episode by 18 year of age**
- **Age group: Bimodal distribution**
- **3% of all pediatric ER visits**
- **90%-Simple vasovagal or neurally mediated syncope**



Causes



Causes of syncope in children and adolescents

Primary cardiac electrical disturbances
Long QT syndrome*
Brugada syndrome*
Familial catecholaminergic polymorphic ventricular tachycardia*
Short QT syndrome*
Preexcitation syndromes (such as Wolff Parkinson White)*
Bradyarrhythmias (complete atrioventricular block, sinus node dysfunction)*
Structural cardiac abnormalities
Hypertrophic cardiomyopathy*
Coronary artery anomalies*
Arrhythmogenic right ventricular dysplasia/cardiomyopathy*
Valvar aortic stenosis*
Dilated cardiomyopathy*
Pulmonary hypertension*
Acute myocarditis*
Congenital heart disease*
Heat illness*
Anaphylaxis*
Vasovagal (neurocardiogenic) syndrome, including situational syncope (eg, cough, micturition, hair combing, blood draw, intramuscular injection, or emotional stress) †
Breath holding spell †
Orthostatic hypotension due to volume depletion (hemorrhage, dehydration, pregnancy, anorexia nervosa) †
Drug effects or toxic exposure (eg, clonidine, typical antipsychotic agents, carbon monoxide, ethanol intoxication) †
Hypoglycemia*
Conditions that mimic syncope
Seizure
Migraine syndromes
Hysterical faint
Hyperventilation
Intentional strangulation (eg, the "choking game")
Narcolepsy

* Potentially life-threatening causes.

† Common causes.

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Types of Syncope

- **Situational**
- **Young**
- **Neurocardiogenic**
- **Cardiac**
- **Orthostatic**
- **Psychological**
- **Endocrine**



Etiology

Disorders of blood flow and vascular tone

- Vasovagal
- Orthostatic hypotension
- Situational
- Carotid sinus syncope

Etiology

Cerebrovascular causes

- Vertebrobasilar insufficiency

Cardiovascular disorders

- Arrhythmias
- Structural/obstructive disorders

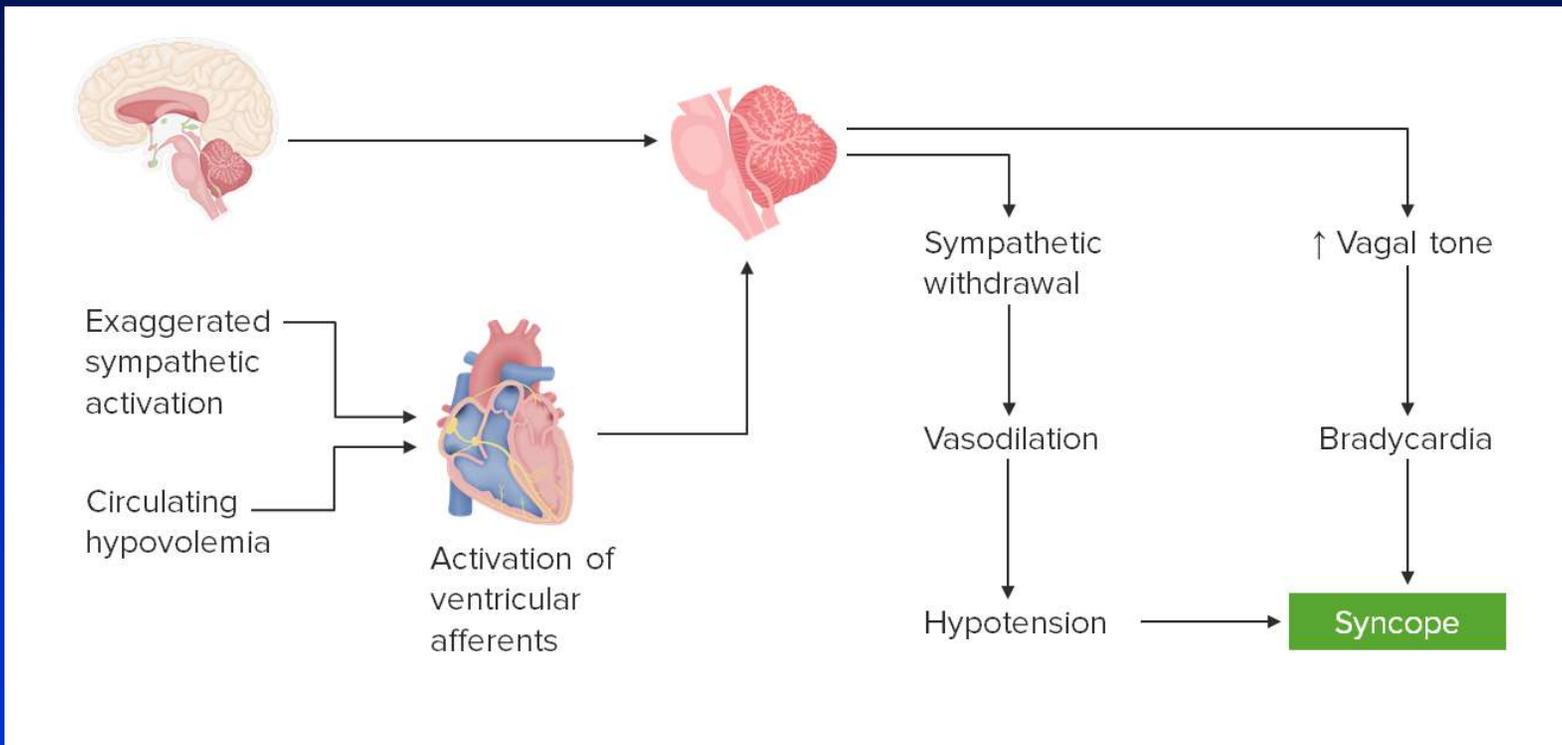
Others that mimic syncope

- Seizures
- Metabolic
- Psychogenic

Vasovagal Syncope

- Most common cause
- Bimodal distribution
- Precipitating factors
- Prodrome features

Pathophysiology

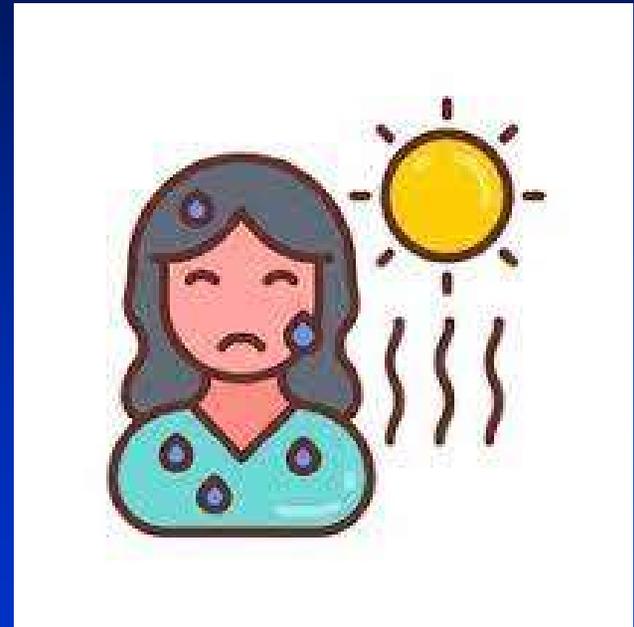


Diagnosing the cause

- History is the key
- Physical exam
- Evaluation

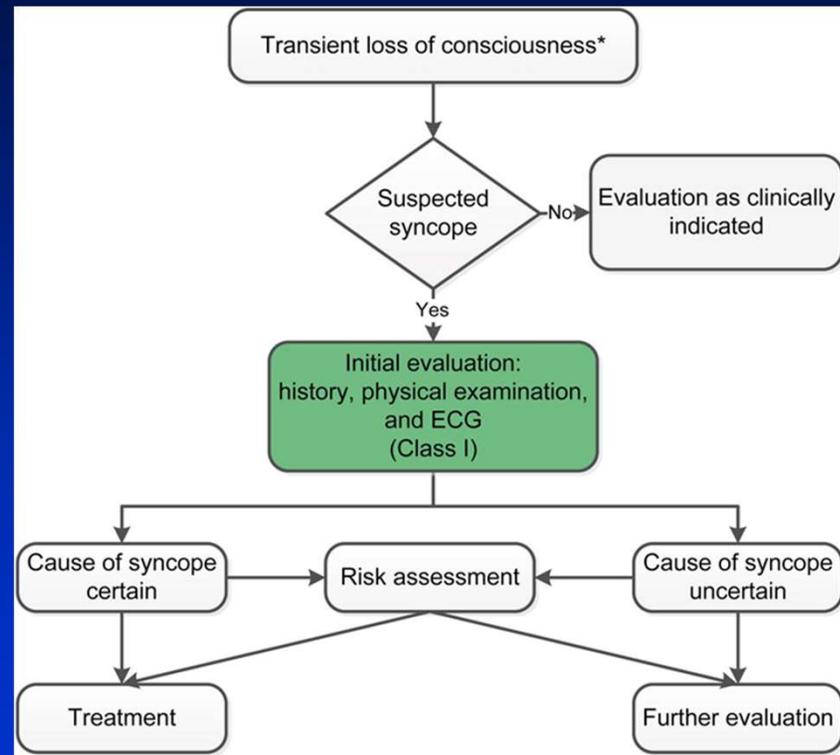
Historical aspects

- Number of episodes
- Prodrome
- Preceding events
- Witnessed event
- Recovery/post event period
- Fam hx/ PMHx/Medications



Diagnostic evaluation

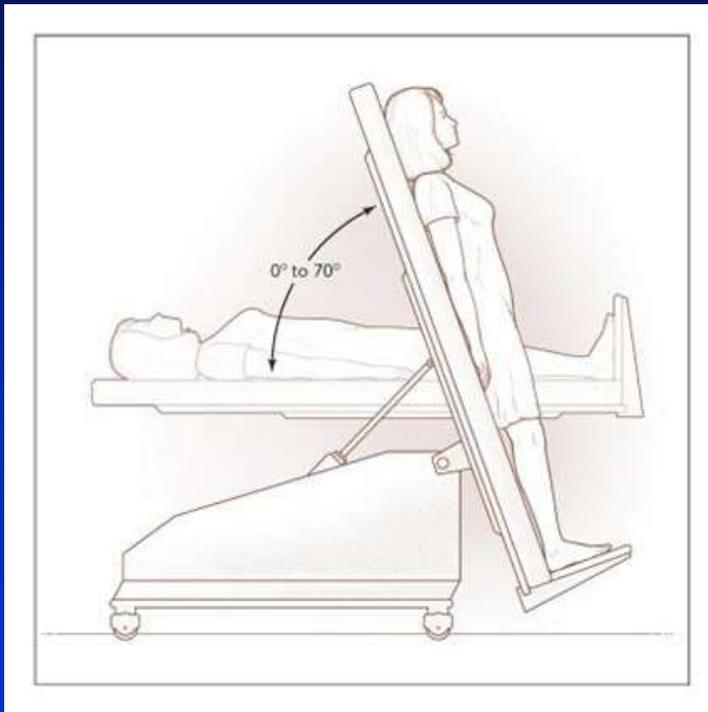
- Benign
- Cardiac
- other



Evaluation

- PE
- ECG
- Baseline labs
- ? Tilt table
- Further testing

Tilt table testing



- Neurocardiogenic or vasovagal syncope
- Positive test
- Specificity is 90%
- Sensitivity is uncertain

Treatment

- Non-pharmacological
- Avoid triggers
- Hydration
- Salt supplementation
- Specific exercises
- ? Compression stockings

Orthostatic Hypotension

- Clinical presentation
- Drop in SBP \geq 20mm Hg or reflex tachycardia $>>$ 20bpm
- 55% in elderly
- Triggers

POTS!!!

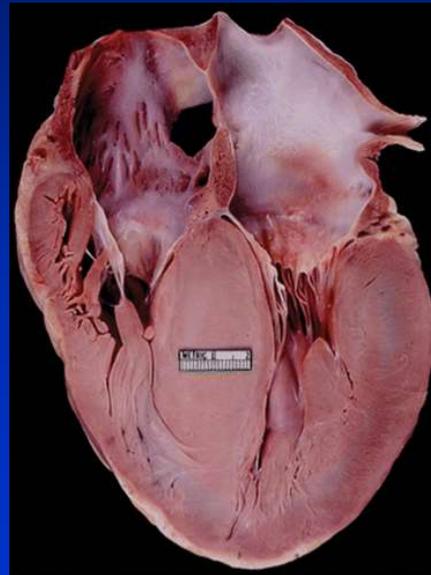
- **Postural Orthostatic Tachycardia syndrome**
- **Form of dysautonomia**
- **Not orthostatic hypotension**
- **Very common**
- **Symptoms are similar but**
- **No clear etiology found**

Treatment

- Volume repletion
- Adjustment of medications
- Fludrocortisone or Midodrine
- Beta blockers
- Autonomic dysfunction
 - Salt/fluid regime
 - Waist high stockings
 - Abdominal binders

Cardiac Syncope

- Structural heart disease
- Arrhythmias
 - Brady
 - Tachy
- Conduction disorders



Case

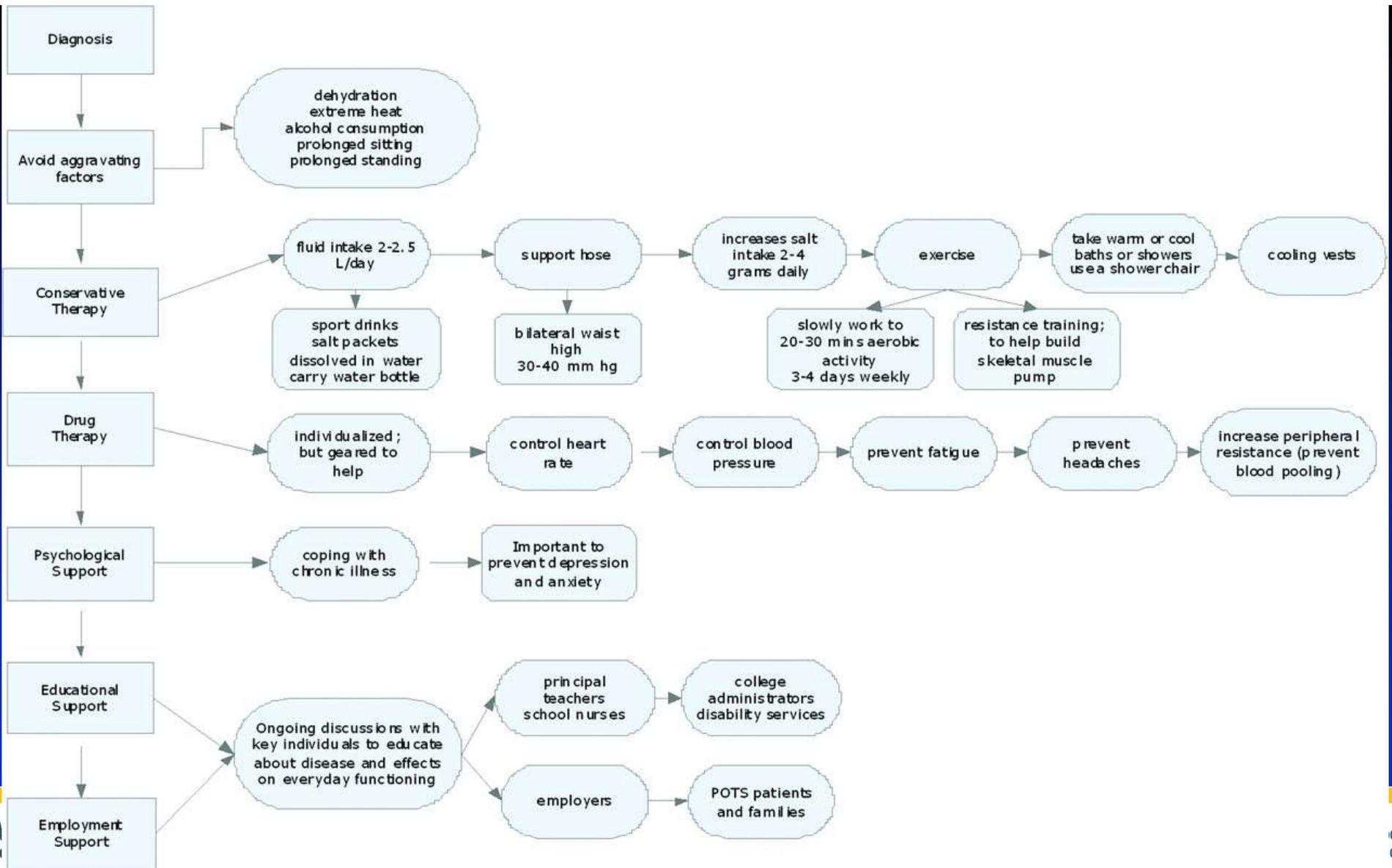
- **17y/o male presents with syncope 10x day, now in a wheelchair in your office**
- **Started 6 months ago after “mono” like illness**
- **Homebound from school**

Physical exam

- ECG-normal
- POTS vitals

** positive

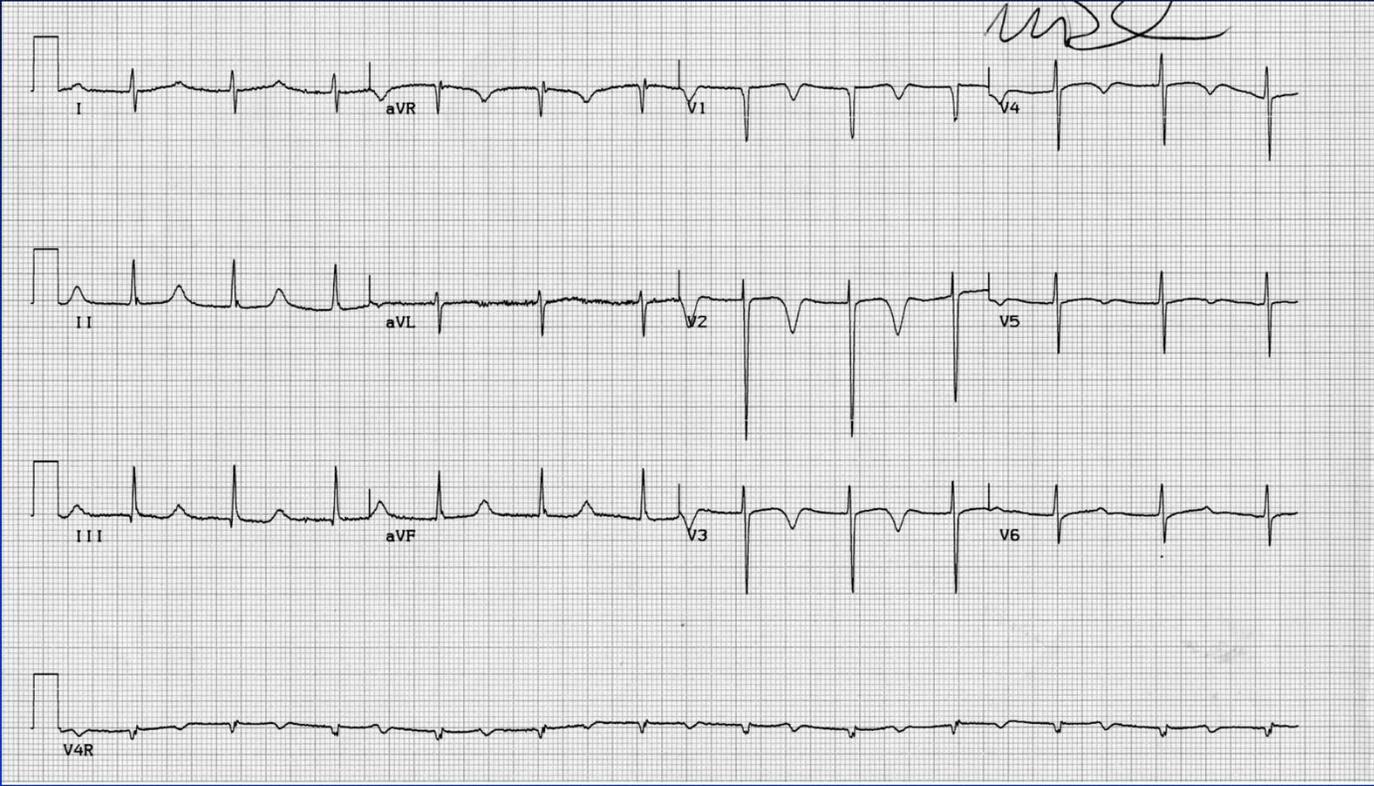
Lying 10 Minutes Systolic BP-POTS : 110
Lying 10 Minutes Diastolic BP-POTS : 52
Lying 10 Minutes HR-POTS : 73 bpm
Standing 1 Minute Systolic BP-POTS : 107
Standing 1 Minute Diastolic BP-POTS : 54
Standing 1 Minute HR-POTS : 97 bpm
Standing 2 Minutes Systolic BP-POTS : 104
Standing 2 Minutes Diastolic BP-POTS : 59
Standing 2 Minutes HR-POTS : 115 bpm
Standing 5 Minutes Systolic BP-POTS : 105
Standing 5 Minutes Diastolic BP-POTS : 48
Standing 5 Minutes HR-POTS : 131 bpm
** Had to stop because of symptoms , distraction during vitals prevented syncope “events”



Case 2

- 14 y/o male passes out while swimming in a meet at school
- He says he felt “weird before”
- PMHx/Medications- none
- Family history – unknown, adopted

ECG



Cardiac causes

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Take Home Message

- Remember the “3 groups”
- Good history and Physical
- ECG
- Other tests

Thank you

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