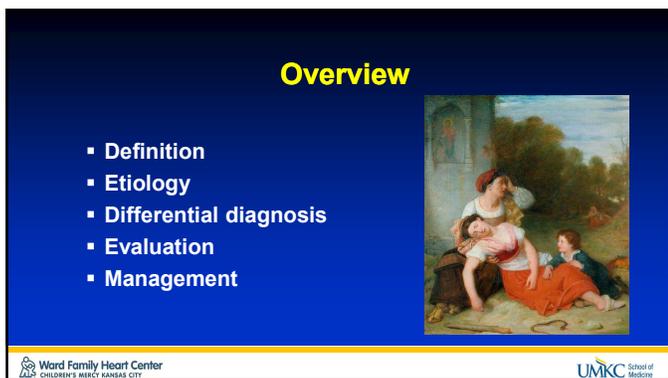


1



2



3

Types of Syncope

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



Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

7

Etiology

Disorders of blood flow and vascular tone

- Vasovagal
- Orthostatic hypotension
- Situational
- Carotid sinus syncope

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

8

Etiology

Cerebrovascular causes

- Vertebrobasilar insufficiency

Cardiovascular disorders

- Arrhythmias
- Structural/obstructive disorders

Others that mimic syncope

- Seizures
- Metabolic
- Psychogenic

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

9

Vasovagal Syncope

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

10

Pathophysiology

The diagram illustrates the pathophysiology of vasovagal syncope. It starts with 'Exaggerated sympathetic activation' and 'Circulating hypovolemia' leading to 'Activation of ventricular afferents'. This triggers a response where 'Sympathetic withdrawal' occurs, leading to 'Vasodilation' and 'Hypotension'. Simultaneously, there is an increase in 'Vagal tone', leading to 'Bradycardia'. Both 'Hypotension' and 'Bradycardia' contribute to the final state of 'Syncope'.

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

11

Diagnosing the cause

- History is the key
- Physical exam
- Evaluation

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

12

Historical aspects

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



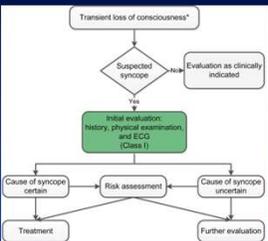
Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

13

Diagnostic evaluation

- Benign
- Cardiac
- other



Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

14

Evaluation

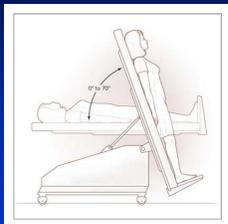
- PE
- ECG
- Baseline labs
- ? Tilt table
- Further testing

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

15

Tilt table testing



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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

16

Treatment

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

17

Orthostatic Hypotension

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

18

POTS!!!

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

19

Treatment

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

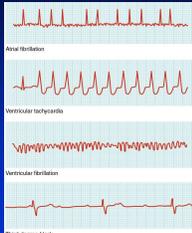
Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

20

Cardiac Syncope

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

21

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

22

Physical exam

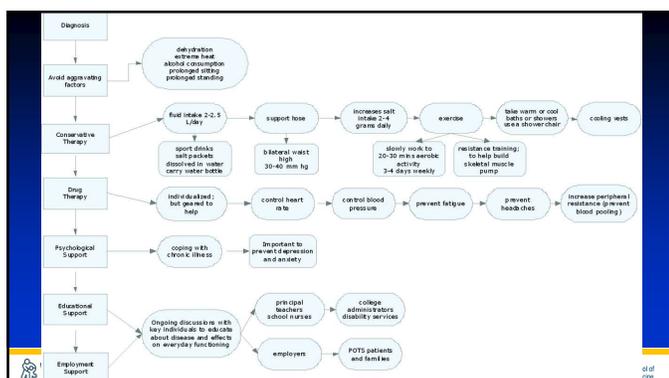
- ECG-normal
- POTS vitals

** 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"

UMKC School of Medicine

23



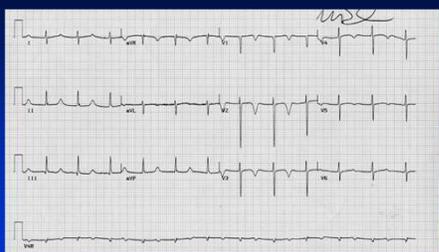
24

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

25

ECG



26

Cardiac 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)*
Bradycardias (complete atrioventricular block, sinus node dysfunction)*

27

Take Home Message

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

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

28

Thank you

- ghaligheri@cmh.edu

Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

29



Ward Family Heart Center
CHILDREN'S MERCY KANSAS CITY

UMKC School of Medicine

30

- Yancy et al. ACC/AHA/HRS Guideline for the Evaluation and Management of Patients with Syncope: Executive Summary: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. 2017
- Lewis DA et al. Syncope in the pediatric patient. The cardiologists perspective. *Pediatr Clin North Am* 1999.
- Friedman et al. Chest pain and syncope in children; a practical approach to the diagnosis of cardiac disease. *J. Pediatrics* 2013.
- Brignole m et al. New concept in the assessment of syncope. *J A Col of Card.* 2012
- Malasana et al. The prevalence and cost of the faint and fall problem in the state of Utah. *Pacing Clin. EP.* 2011
- Brignole et al. 2018 ESC Guidelines for the diagnosis and management of syncope. *European Heart Journal.*
- <https://crediblemeds.org/pdf/temp/pdf/CombinedList.pdf>
- Sheldon R, Raj SR, Rose MS, et al. POST 2 Investigators. Fludrocortisone for the prevention of vasovagal syncope: A randomized, placebo-controlled trial. *J Am Coll Cardiol.* 2016;68:1-9. DOI: 10.1016/j.jacc.2016.04.030.
- Izzovech A, Gonzalez Mella C, Manzotti M, et al. Midodrine for orthostatic hypotension and recurrent reflex syncope: A systematic review. *Neurology.* 2014;83:1170-7. DOI: 10.1212/WNL.0000000000000815
- Sheldon RS, Morillo CA, Klingenhoben T, et al. Age-dependent effect of beta-blockers in preventing vasovagal syncope. *Circ Arrhythm Electrophysiol.* 2012;5:920-6. DOI: 10.1161/CIRCEP.112.974386.
- Takata TS, Wasmund SL, Smith ML, et al. Serotonin reuptake inhibitor (Paxil) does not prevent the vasovagal reaction associated with carotid sinus massage and/or lower body negative pressure in healthy volunteers. *Circulation.* 2002;106:1500
- Brignole M, Moya A, de Lange F.J., et al. 2018 ESC guidelines for the diagnosis and management of syncope. *Eur Heart J* 2018; 39: pp. 1883-1948.
- Ethridge SP, Escudero CA, Blaufox AD, et al. Life-threatening event risk in children with Wolff-Parkinson-White syndrome: a multicenter international study. *JACC: Clin Electrophysiol* 2018;4:433-44.
- Executive summary: HRS/EHRA/APHRS expert consensus statement on the diagnosis and management of patients with inherited primary arrhythmia syndromes | EP Europace | Oxford Academic (oup.com)
