The Ups & Downs of Syncope: When Should I Worry

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Objectives

- Review syncope definitions and background
- Define causes of syncope in children and adolescents
- Define the burden of syncope in pediatrics
- Discuss the evaluation and treatment of pediatric syncope

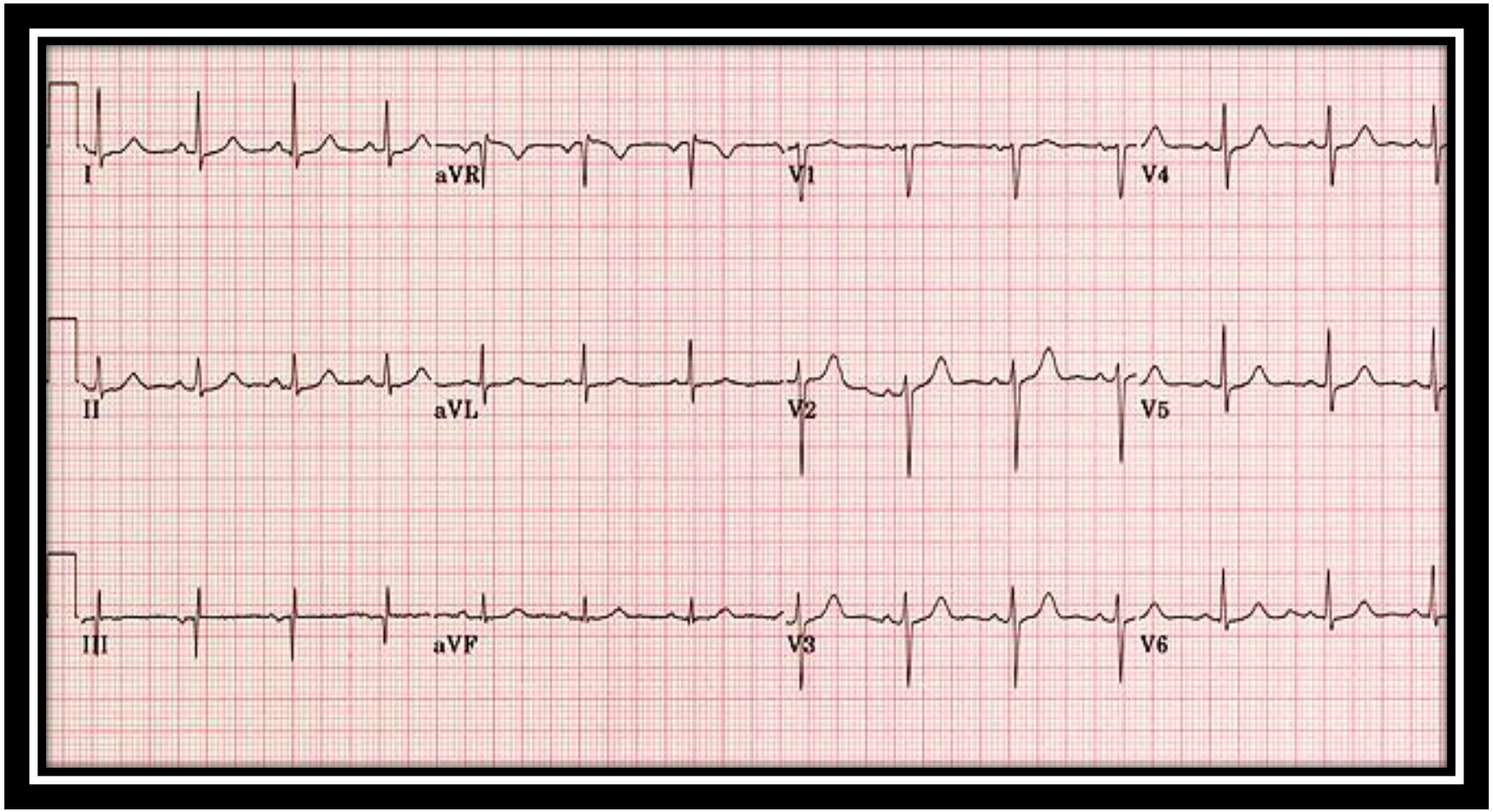
Akron Children's Syncope Clinic

- Created in 2014 to provide a standardized approach to patients referred for syncope
- Staffed by 2 nurse practitioners with cardiologist available for consultation
- Purpose of ACH Syncope Clinic:
  - To screen appropriately for patients who may be a risk for sudden death
  - To provide comprehensive treatment for patients with vasovagal / neurocardiogenic syncope
    - Improvement of symptoms
    - Improve perceived quality of life

Case Study #1

- JM: 15 y/o otherwise healthy female
- Passed out in church after kneeling then standing
- Recalls feeling light headed, blurry to black vision, and nausea
- Has had 2 similar episodes after standing quickly
- Frequently skips breakfast and doesn't drink water
- Minimal exercise

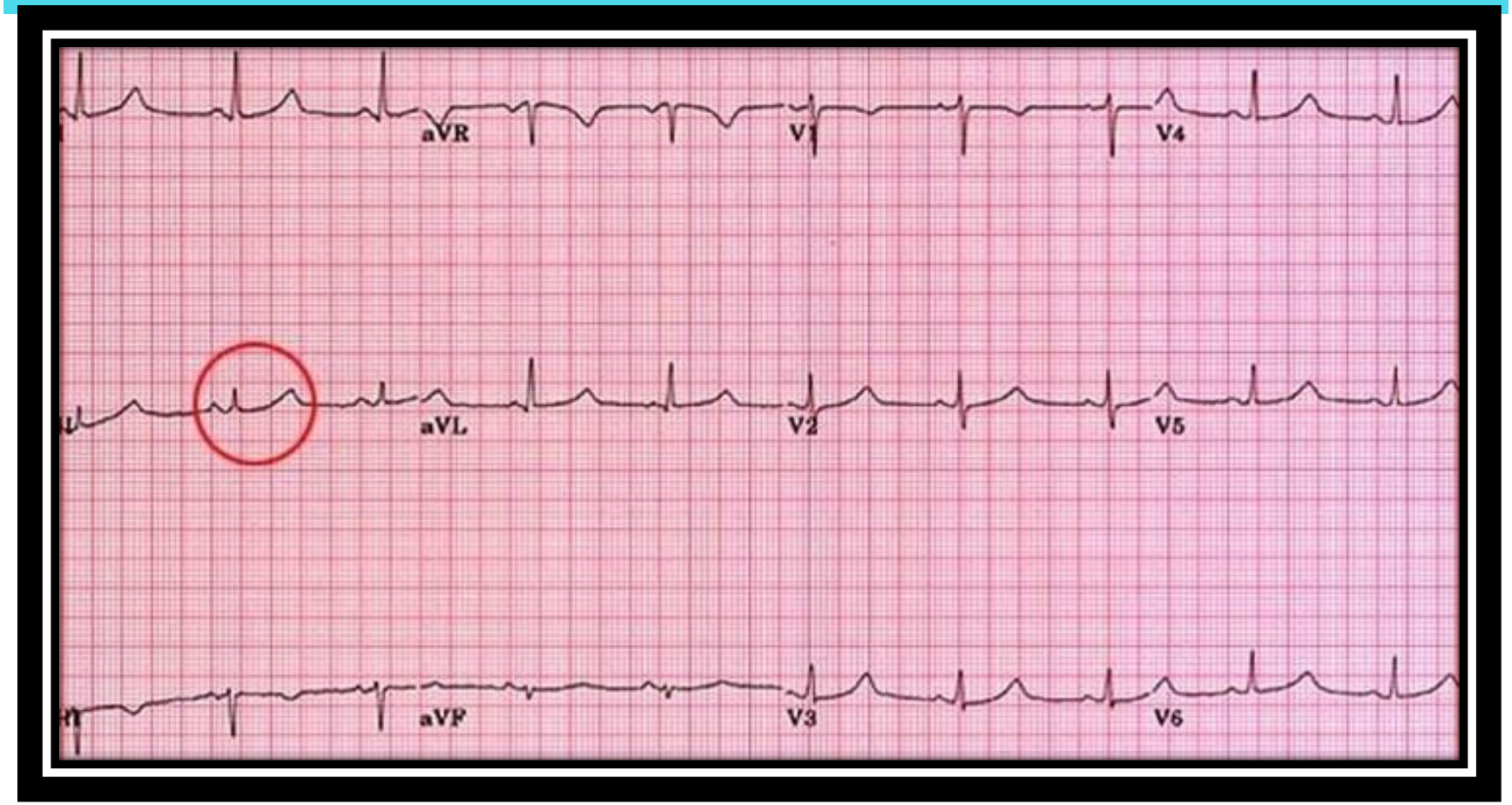
EKG #1



Case Study #2

- KK:13 y/o male, otherwise healthy
- 2 episodes of syncope, both mid-exercise
- Near drowning event at age 4
- Family history of sudden death in paternal uncle; drown while swimming in the ocean and 1st cousin died of SIDS at 3 months

EKG #2



QTc 480 msec

Case Study #3

- CB: 10 y/o male, otherwise healthy
- 2 episodes of syncope during exercise
- Reported chest pain prior to syncope
- EKG shows LVH

Case #3


Cardiac
#223 / 18.0cmMI 0.7
P2-5AC / Gen TI 0.4 10:29:14 am
[2D] G47 / 76dB
FA1 / EE8 / P98

Syncope

- A relatively abrupt, self-limiting loss of consciousness
- Causes reduced blood flow to the brain
- Triggered by a sudden drop in either the heart rate, the blood pressure, or both

Background

- Syncope is relatively common in children and adolescents
- 30% of all people will experience a near syncope or syncope in the first two decades of life
- Accounts for 1% of all pediatric ED visits in United States
- Accounted for 0.05% of all visits to ACH ED in 2018
- 645 visits to ACH Syncope Clinic in 2018

Etiology of Loss of Consciousness

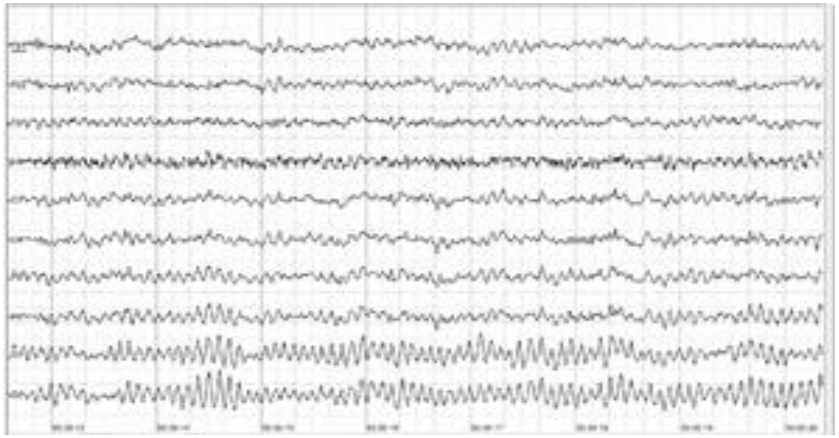
- Circulatory abnormalities
- Neurologic abnormalities
- Psychological/Psychiatric abnormalities
- Cardiac abnormalities

Circulatory Abnormalities

- Vasovagal/neurocardiogenic syncope
- Situational/reflex syncope
  - Hair combing
  - Blood and gore
  - Pain
  - Micturition/defecation
  - Stress/anxiety

Neurologic Abnormalities

- Complex or simple seizures
- Migraine variant
- Vascular events
- Disrupted CSF circulation



Psychological/Psychiatric Abnormalities

- Conversion disorder/ PNES/ pseudoseizures
- Hyperventilation
- Panic Attack
- Munchausen's Syndrome

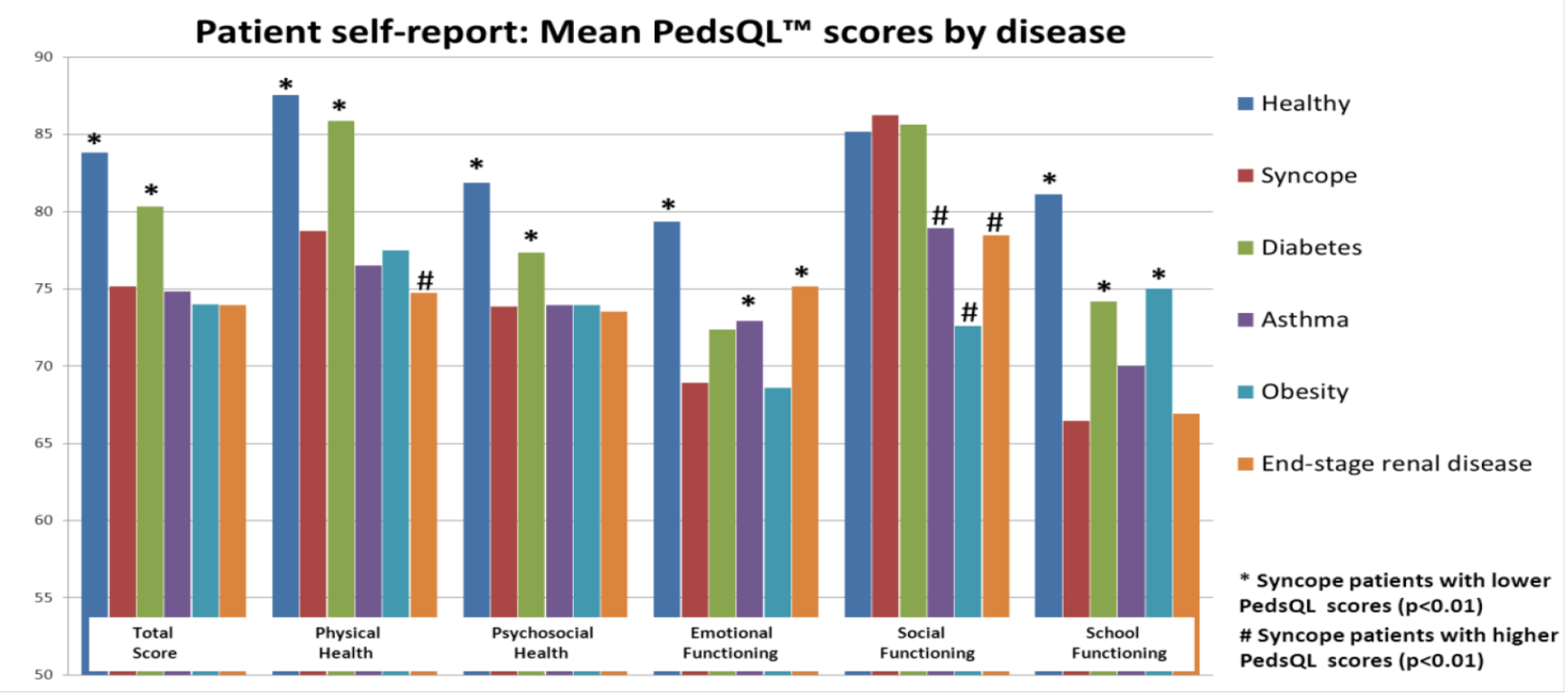
Cardiac Abnormalities

- Congenital **electrical** problems
  - Congenital long QT syndrome
  - Brugada syndrome
  - WPW/pre-excitation
  - Congenital complete heart block
- **Structural** heart disease
  - Hypertrophic cardiomyopathy
  - Anomalous coronary artery
  - Pulmonary hypertension
- **Acquired** heart disease
  - Myocarditis
  - Complete heart block (e.g. Lyme disease)
- * Most common cardiac causes of sudden/unexpected death in the young

Burden of Syncope

- Patient/Family burden
  - Concern for serious medical problem
  - Missed school and change in activity level
- System burden of disease
  - Multiple medical visits
    - Primary care, ED, neurology, cardiology
  - Cost of unnecessary medical testing

Pediatric Quality of Life



Anderson et.al. Evaluation and Management of Pediatric Syncope, Pediatric Neurology

Evaluation of Pediatric Syncope

Goal:

- Make a diagnosis of the etiology of syncope
- Rule out serious causes of syncope
- Not perform unnecessary tests

2017 ACC/AHA/HRS guidelines for the evaluation and management of patients with syncope

A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society

- AHA, ACC, HRS and ESC have created guidelines for the evaluation of syncope that include recommendations for evaluation of pediatric patients.
- Essential components of evaluation in children include a comprehensive **medical and family history, physical examination** and an **electrocardiogram.**
- Diagnostic yield is low for most tests used in the evaluation of pediatric syncope.
- Unnecessary diagnostic testing leads to increased medical costs and potential harm to patients.

Diagnostic Evaluation

- Thorough history
  - Past medical history
  - History of syncopal event
- Family history
  - Sudden death
  - Pacemaker/ICD implantation
  - Cardiomyopathy
  - Channelopathy

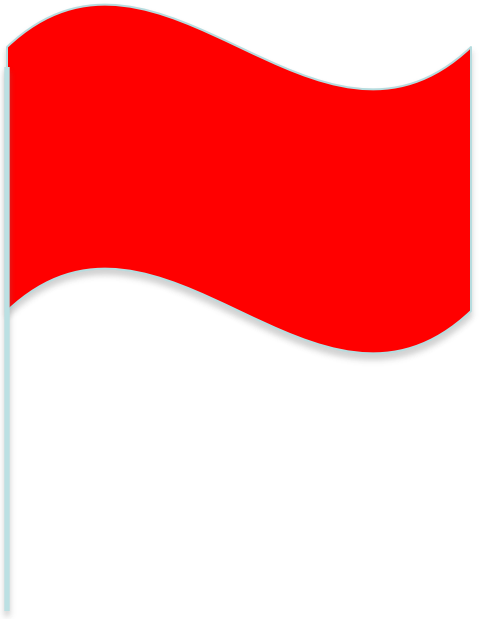
Diagnostic Evaluation

- Thorough physical examination
  - Cardiac and neurologic
- Electrocardiogram
- Tilt-table testing

- Tests with low diagnostic yield
  - Head imaging, blood work, radiographs, echocardiograms

Red Flags

- Syncope DURING exercise
- Preceded by chest pain
- Resulting in major injury from a fall
- Near drowning
- Seizure activity with post-ictal state
- Focal neurological finding after event
- Abnormal cardiac/neurologic examination
- Abnormal ECG
- Family history(1st degree)
    - Cardiomyopathy
    - Sudden death <50 year old
    - Channelopathy
    - Pacemaker or Defibrillator



Treatment

- Reassurance, reassurance, reassurance!
- Education
- Hydration and salt intake
- Regular exercise
- Avoid triggers
- Physical counter-maneuvers
- Medications

Non-pharmacologic Management

- Increase fluid and salt intake
- Encourage 80-100 ounces of fluid per day, avoid caffeine
- Recommend salty snacks
  - Note for school

Non-pharmacologic Management

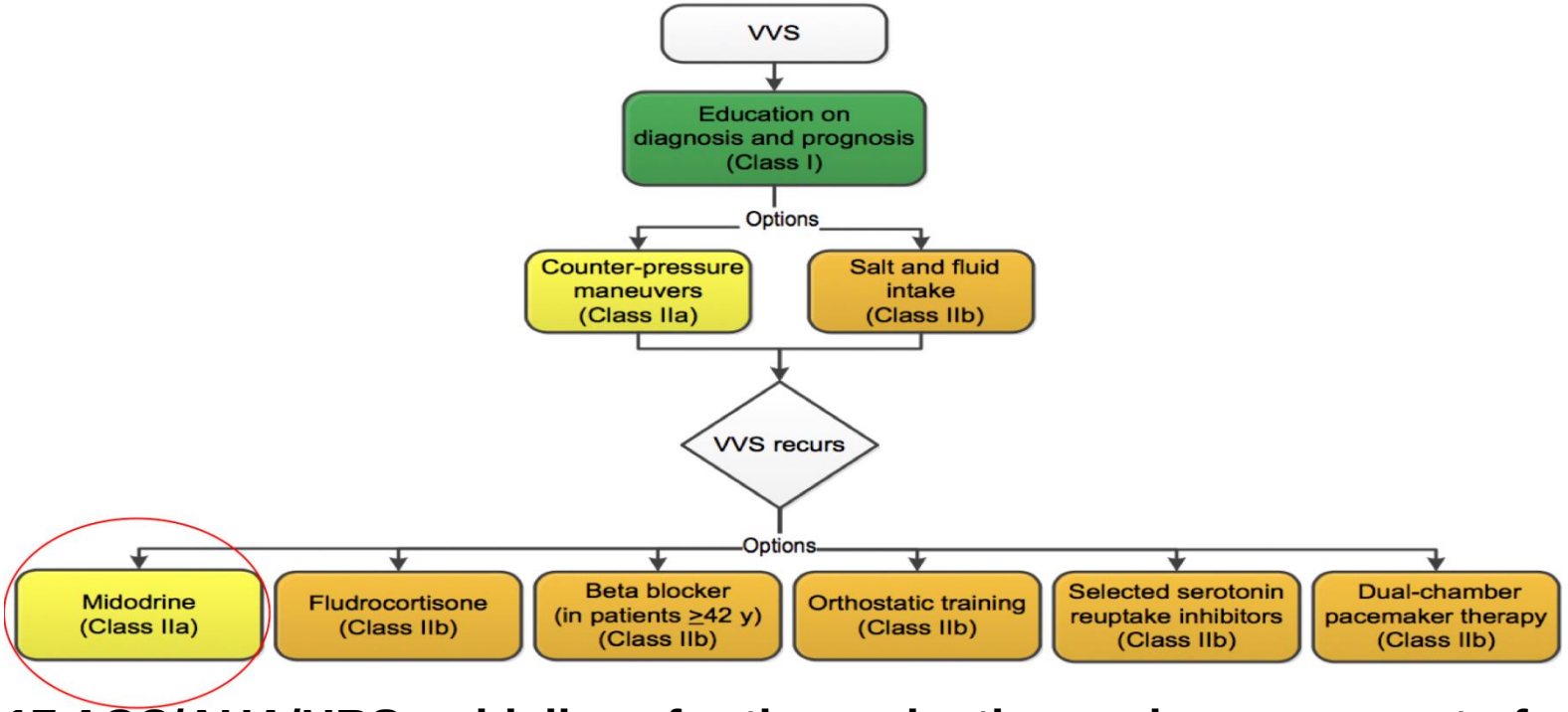
Exercise

- Cardiovascular exercise
- Resistance training of the lower extremities
- No physical restrictions

Non-pharmacologic Management

- Lifestyle changes/avoidance of triggers
  - Slow down position changes
  - Avoid heat: vasodilation and dehydration
  - Move during prolonged standing
  - Limit/avoid caffeine
  - Avoid alcohol
  - Other common triggers include physical and emotional stress
- Attention to symptoms
  - Sit or lie down if symptomatic
  - Utilize physical counter maneuvers

Pharmacologic Management



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Treatment of VVS

- Initial treatment:
  - Start hydration with 80-100 oz/day; daily exercise routine; increase salt intake 3-5 gm/day
- If symptoms continue:
  - Fludrocortisone 0.1 mg daily
  - Midodrine 2.5 – 10 mg TID
  - Consider Betablockers or SSRI's

Referral

Cardiology

- Age < 8 years with syncope
- Recurrent syncope
- Syncope during exercise, preceded by chest pain, or accompanied with a physical injury from sudden fall
- Family history of sudden death, cardiomyopathy, channelopathy, or PM/ICD
- Abnormal exam
- Near drowning

Neurology

- Seizure activity with post-ictal state
- Focal neurological finding after the event

Summary

- Syncope is common in healthy adolescents
- The most common etiology is benign vasovagal/neurocardiogenic syncope
- Cardiac and neurologic abnormalities should be considered
- Extensive testing is not usually necessary
- Most patients respond to reassurance and education
- Syncope clinic can be a resource for you