A Practical Approach to Dizziness, Orthostatic Intolerance, and Syncope

J.R. Bockoven M.D., M.B.A.

Rachael Passodelis MSN, RN, CPNP

[Colleen Handwork MS[illegible]CPNP]

The He[illegible]
Akron Child[illegible]

Akron Ch[illegible]

Perspective and Direction

- Dizziness
- Lightheadedness
- Orthostatic Intolerance
- Syncope
- Postural Orthostatic Tachycardiac Syndrome

Syncope

Akron Chil al

Objectives

- Identify the classes of cardiac causes for dizziness/syncope
- Identify the “Red Flags” for possible cardiac causes for dizziness/syncope
- Describe the first line treatment for vasovagal dizziness/syncope

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

Akron Chil al

Syncope- Definition

- Defined as the transient loss of consciousness, associated with an inability to maintain postural tone, rapid and spontaneous recovery, without neurologic sequela
- Derived from the Greek word *Synkoptein (“syg-kopto”)* – meaning to cut short or interrupt

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

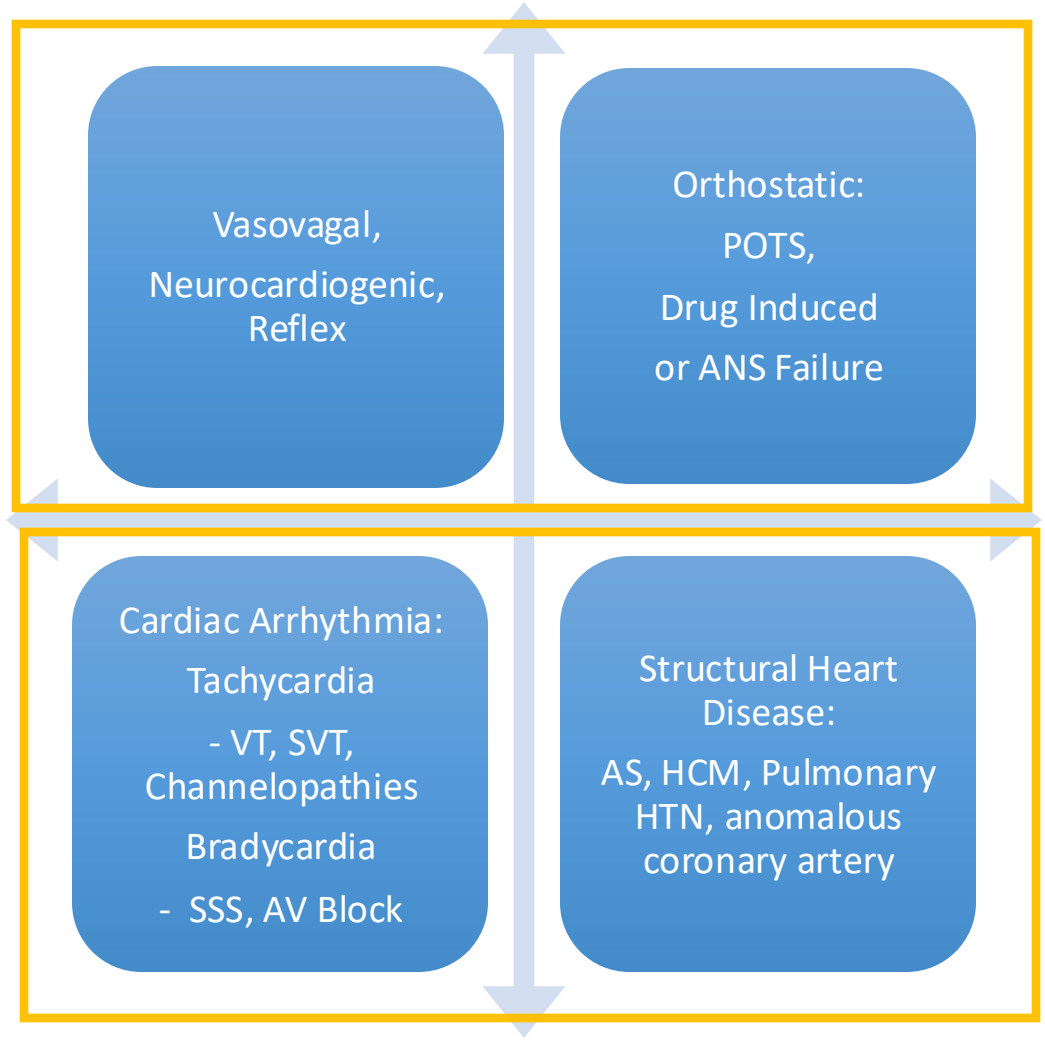
Etiology of Loss of Consciousness

- Circulatory abnormalities
- Psychological/Psychiatric abnormalities
- Cardiac abnormalities
- Neurologic abnormalities- will not discuss in this talk

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

Classification of Syncope



Akron Chil al

Psychological/Psychiatric Abnormalities

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

Circulatory Abnormalities

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

Evaluation of Syncope

- Getting a thorough history is <u>most important</u>
  - PMH/Medications
  - Frequency
  - Predisposing situations
  - Prodromal symptoms
  - Duration of syncope
  - Recovery time
  - Injury
  - Eye witness description

History: Predisposing Factors

- Prolonged standing, even sitting
- Decreased oral intake
- Hot shower/hot environment
- Recent illness
- Menses / pregnancy status
- Emotional distress
- Physical stress / exertional
- Pain
- Micturition, hair combing, cough, stretching, shaving, head turning, post prandial, roller coaster

Family History

- Any sudden unexpected death?
  - Age, detail of event, was an autopsy done
- Anyone in family with history of syncope or seizures?
- Anyone drowned or near drowning?
  - If yes, could they swim?
- Anyone in family born deaf?
- Anyone with congenital heart disease, cardiomyopathy, early hea
  attacks <50, pacemaker or defibrillator in anyone young

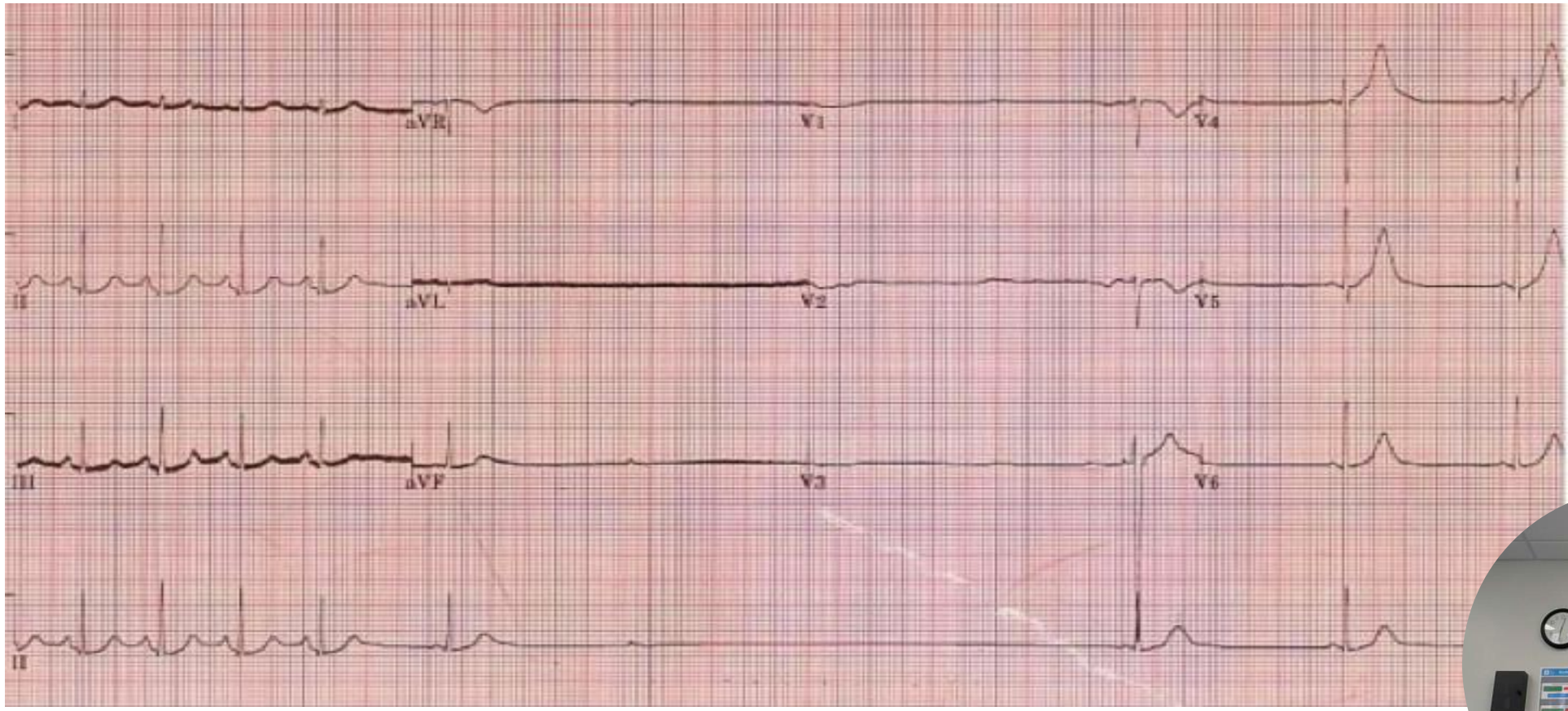
Evaluation

- Physical exam including orthostatic vital signs
- EKG
- Echocardiogram**
- Complete Blood Count, ferritin, basic metabolic panel, thyroid studies
- Tilt Test**
- Exercise Stress Test
- 24 hour Holter or Event Monitor
- Implantable Loop Recorder

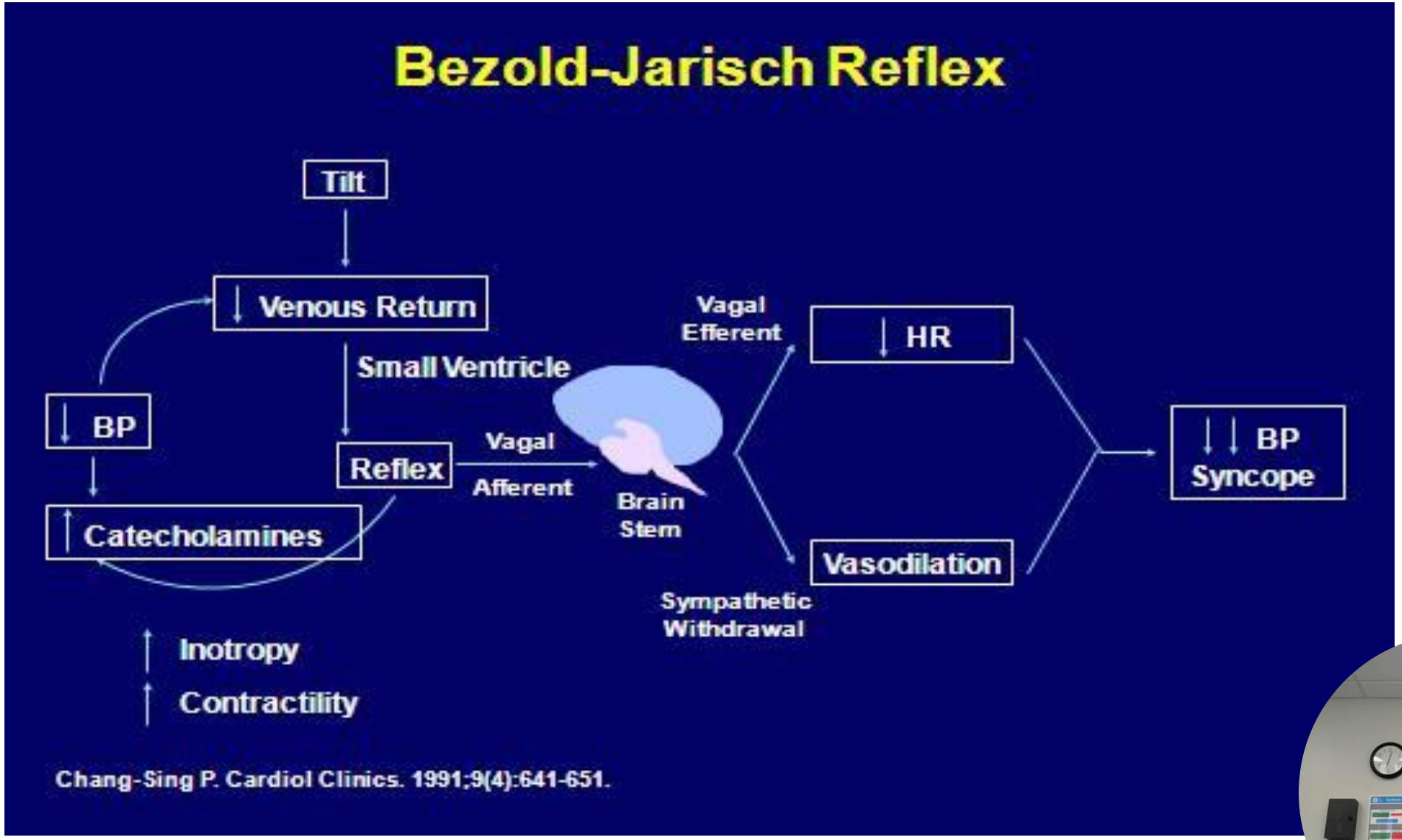
2017 ACC/AHA/HRS guidelines for the evaluation and management of patients with syncope
A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society

- 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.

Girl getting blood drawn



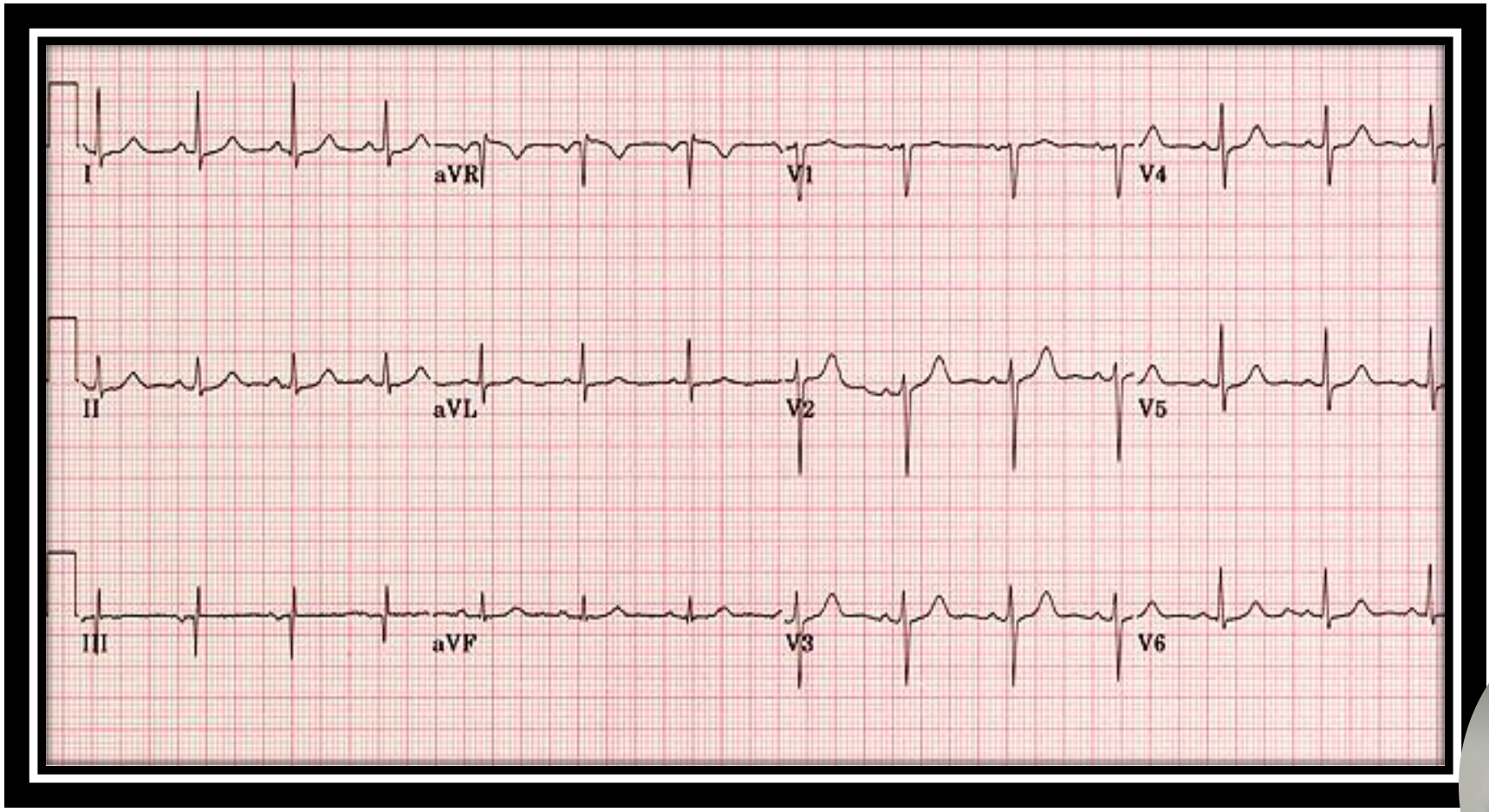
Akron Chil al


Bezold-Jarisch Reflex
Tilt
Venous Return
Small Ventricle
BP
Reflex
Vagal
Afferent
Brain
Stem
Catecholamines
Vagal
Efferent
HR
BP
Syncope
Vasodilation
Sympathetic
Withdrawal
Inotropy
Contractility
Chang-Sing P. Cardiol Clinics. 1991;9(4):641-651.

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

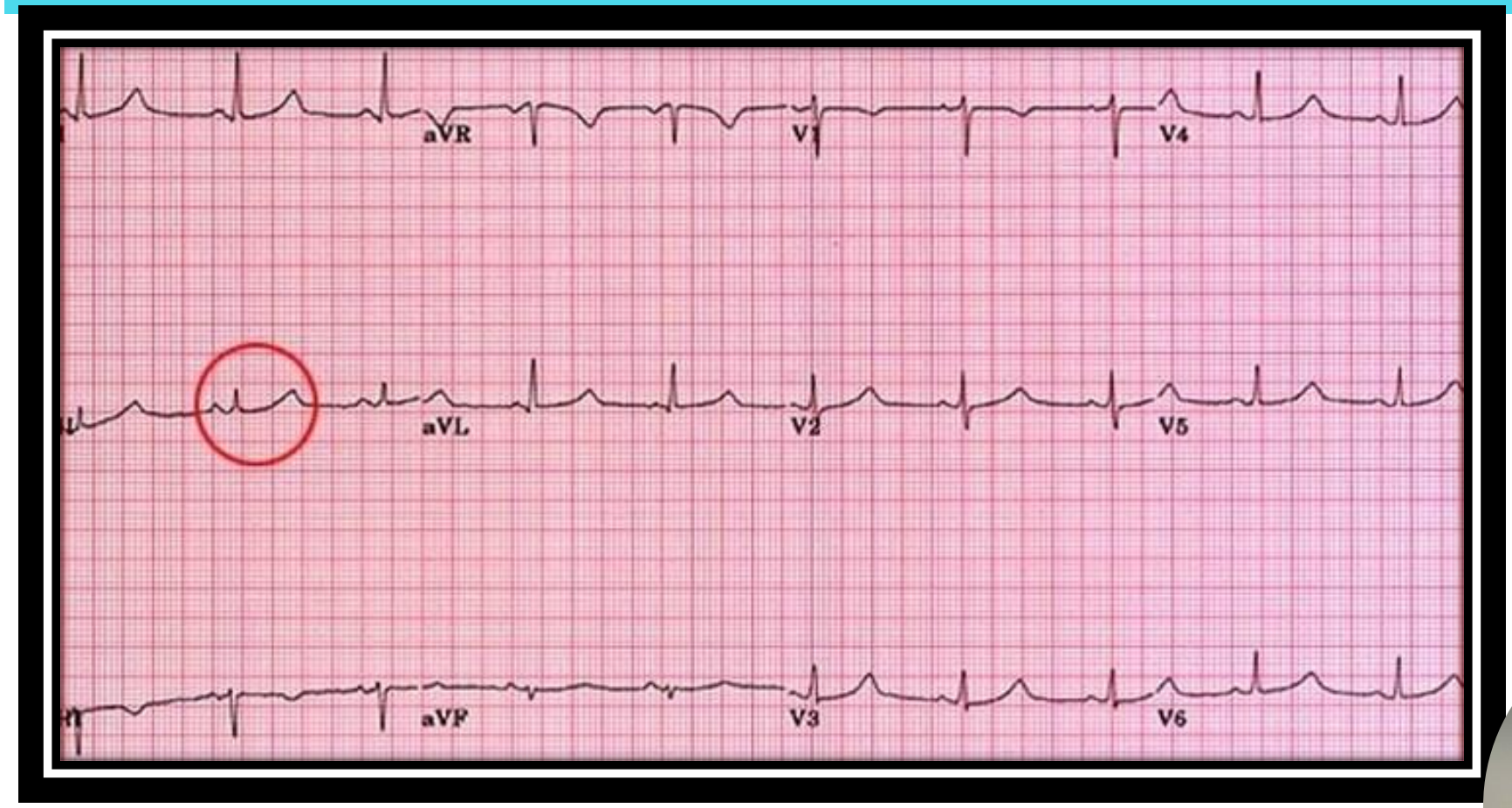


Case Study #2

- 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

Akron Chil al

EKG #2



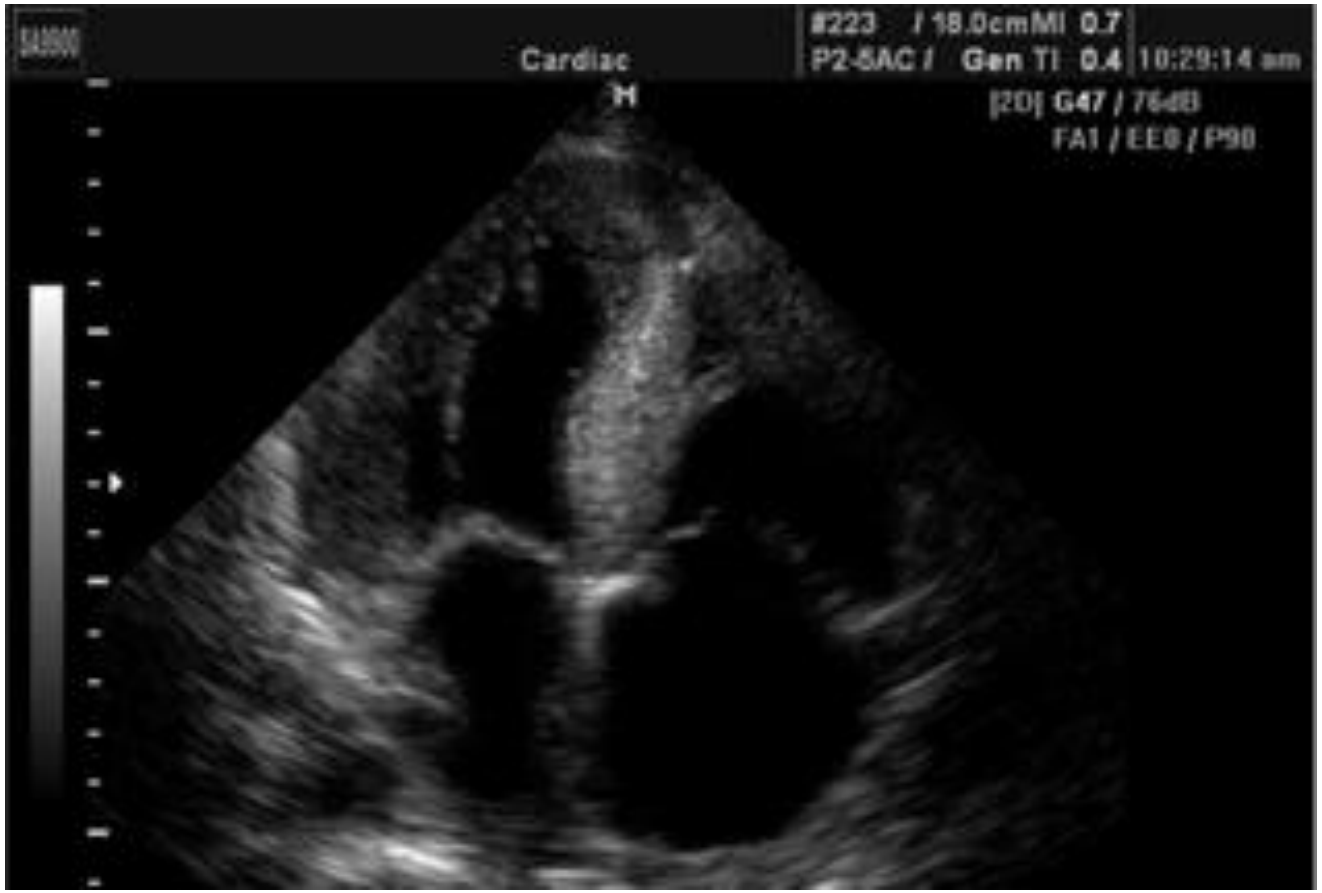
QTc 480 msec

Akron Chil al

Case Study #3

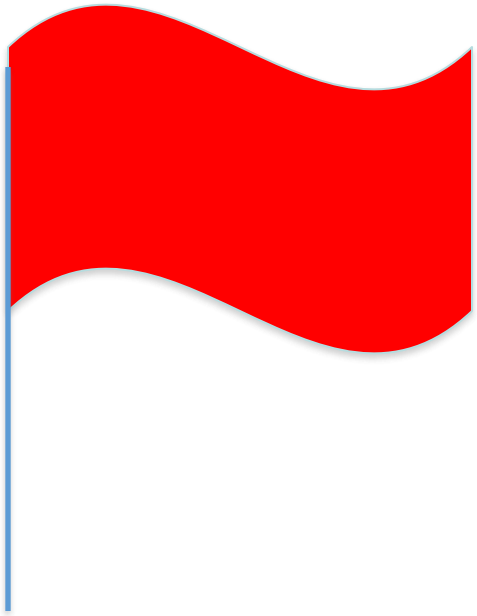
- CB: 10 y/o male, otherwise healthy
- 2 episodes of syncope during exercise
- Reported chest pain prior to syncope
- EKG shows LVH

Case #3


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

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



Akron Chil al

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

Akron Chil al

Non-pharmacologic Management

- Encourage increased fluid and salt intake
- Daily goal: 80-100 ounces of fluid per day, avoid caffeine & sugary drinks
- Recommend electrolyte containing fluids & salty snacks
- Provide Note for school

Non-pharmacologic Management

Exercise

- Cardiovascular exercise

- Resistance training of the lower extremities

  recumbent cycling, rowing machines and swimming (water walking, kicking, floating)

- No physical restrictions

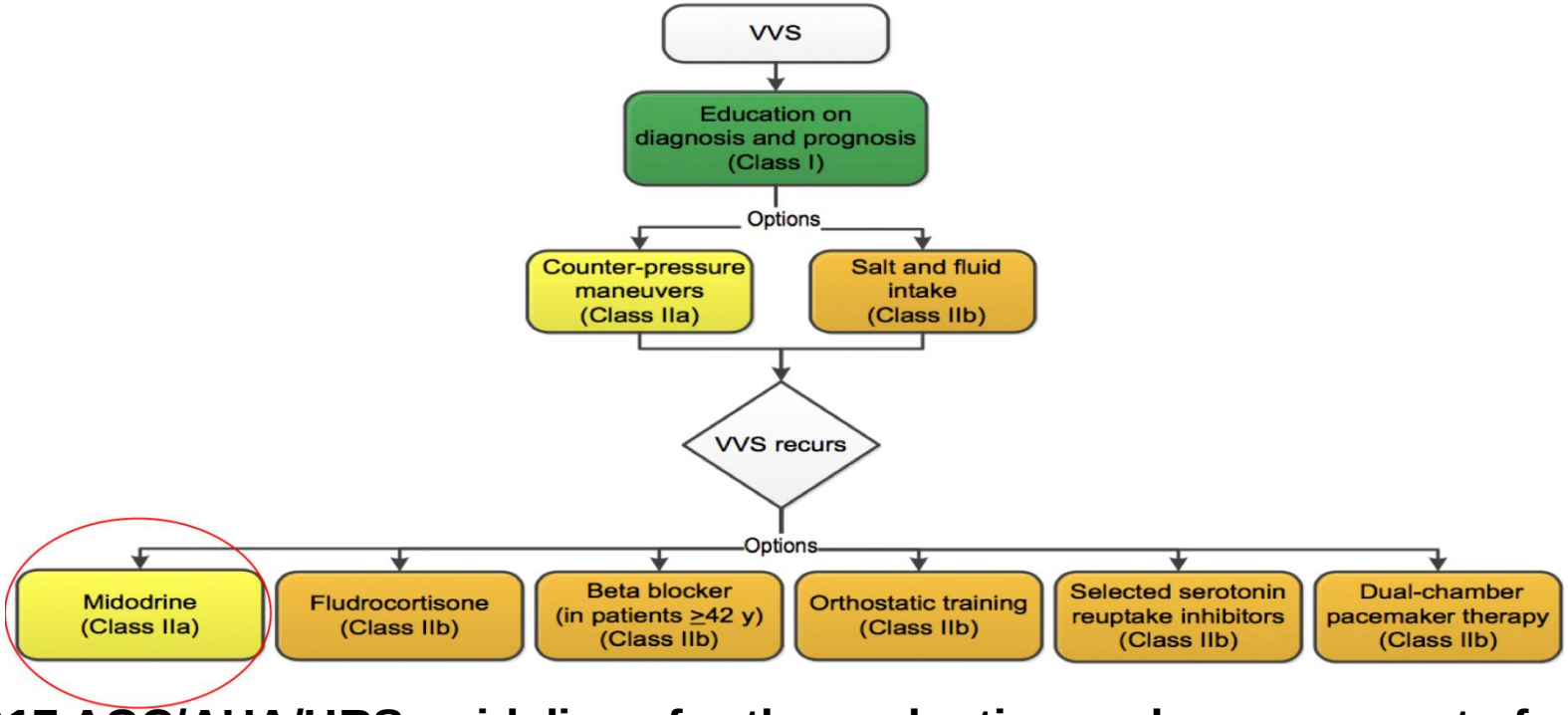
Non-pharmacologic Management

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

Summary of Treatment of Vasovagal Syncope & POTS

- **Fluids** 2-3 liter/day (80-100 oz)
- Increase **salt** in diet: 2-3gm/day
- Take **precautions when changing positions** from laying to sitting or sitting to standing
- Eat well balanced diet, eating smaller meals throughout the day, avoid skipping meals or eating large amounts of simple carbohydrates
- Avoid caffeine & alcohol
- Avoidance of **"triggers"**
- Aerobic **exercise** 3-6 days/30 minutes
  - Rowing, swimming, recumbent bike
- Isometric counter-maneuvers
- Wearing support tights or compression stockings with 20-30 mmHg compression
- **Medications**

Pharmacologic Management



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

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

Akron Chil al

Medications

- Increase blood volume
  - **Fludrocortisone 0.05-0.2 mg daily**
  - DDAVP 0.1-0.2 mg
  - Oral contraceptives
  - Clonidine 0.1 – 0.2 mg 1-2 times a day
- Improve venous constriction
  - **Midodrine 2.5 mg -10 mg 3 times a day**
  - Modafinil 100 mg once a day
  - Methylphenidate 10 mg 3 times a day
  - Erythropoietin –stimulates RBC production, also a vasoconstrictor

Medications

- Block response to catecholamines (lower HR)
  - **Beta blockers**
    - Atenolol 25- 50 mg 1-2 times a day
    - Metoprolol 25 – 50 mg once day
    - Propranolol 10 – 20 mg 3 times a day
      - Watch for depression
- Assist neurotransmitters (serotonin, norepinephrine) in the CNS to regulate ANS
  - **Antidepressants**
    - Sertraline start at 25 – 50 mg daily
    - Fluoxetine 10-20 mg daily
    - Citalopram 10 -40 mg daily

Smart Set for Dizziness/Syncope

- Age < 8 years with syncope- not classic Breath Holding Spells
- 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

Summary

- Syncope is common in healthy adolescents
- The most common etiology is benign vasovagal/neurocardiogenic syncope
- Cardiac and neurologic abnormalities should be considered but very rare
- Extensive testing is not usually necessary
- Most patients respond to reassurance and Fluids