

Evaluation of Syncope: The Diagnostic Puzzle

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Definition and Prevalence of Syncope

- Syncope is the abrupt and transient loss of consciousness associated with absence of postural tone, followed by rapid and usually complete recovery.
- Prevalence is 19% in people over the age of 45 years
- Astronauts

The first order of business is to...

- Determine whether the patient had syncope or another state of altered consciousness
- Was it syncope or a seizure or vertigo?
- Differentials:
 - TIA
 - Traumatic
 - Intoxication
 - Metabolic disorders, eg - hypoglycemia
 - Cataplexy
 - Functional

Consequences

- Injuries occur in 35% of cases
- Psychologically hard for patient and witnesses as “looks like cardiac arrest”
- May interfere with return to work and other activities of daily living (i.e. driving)
- In the absence of underlying heart disease, syncope is not associated with excess mortality



Causes of Syncope

- 341 patients in a prospective study
- 58% neurally mediated
- 23% cardiac
- 18% unexplained
- 1% psychiatric

2017 Syncope Guideline Writing Committee

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1. Vasovagal syncope (VVS)

- Also known as neurocardiogenic syncope or neural syncope
- Syncope results from sudden reflex-mediated hypotension and bradycardia.
- Common triggers include hunger, pain, anxiety, cough, micturition, defecation, swallowing

2. Orthostatic hypotension (OH)

- Volume depletion
- De-conditioning
- Medications
- Parkinsonism and similar disorders
- Elderly more susceptible

3. Cardiac Causes

- Outflow obstruction
- Sudden decrease in LV function
- Rhythm

History

- Number of episodes?
- Associated symptoms (chest pain, SOB, n,v, diaphoresis, pallor, urination-defecation-cough)?
- Prodrome?
- Position?
- Duration of LOC and recovery time?
- Exertional?

History

- age
- preexisting medical conditions (DM, heart disease, panic attacks, HTN, trauma)
- medications used (Rx and OTC)
- drug use
- witness description?
- FHx (sudden death, syncope, arrhythmia)

Physical Exam

- Vital signs and must include supine, seated and erect pulse and blood pressure and try to have them quietly stand 2-5 minutes
- For the diagnosis of orthostatic hypotension you must have one or more of these:
 - a) systolic bp drop at least 20mmHg
 - b) diastolic drop at least 10mmHg
 - c) symptoms of cerebral hypoperfusion

Physical Exam

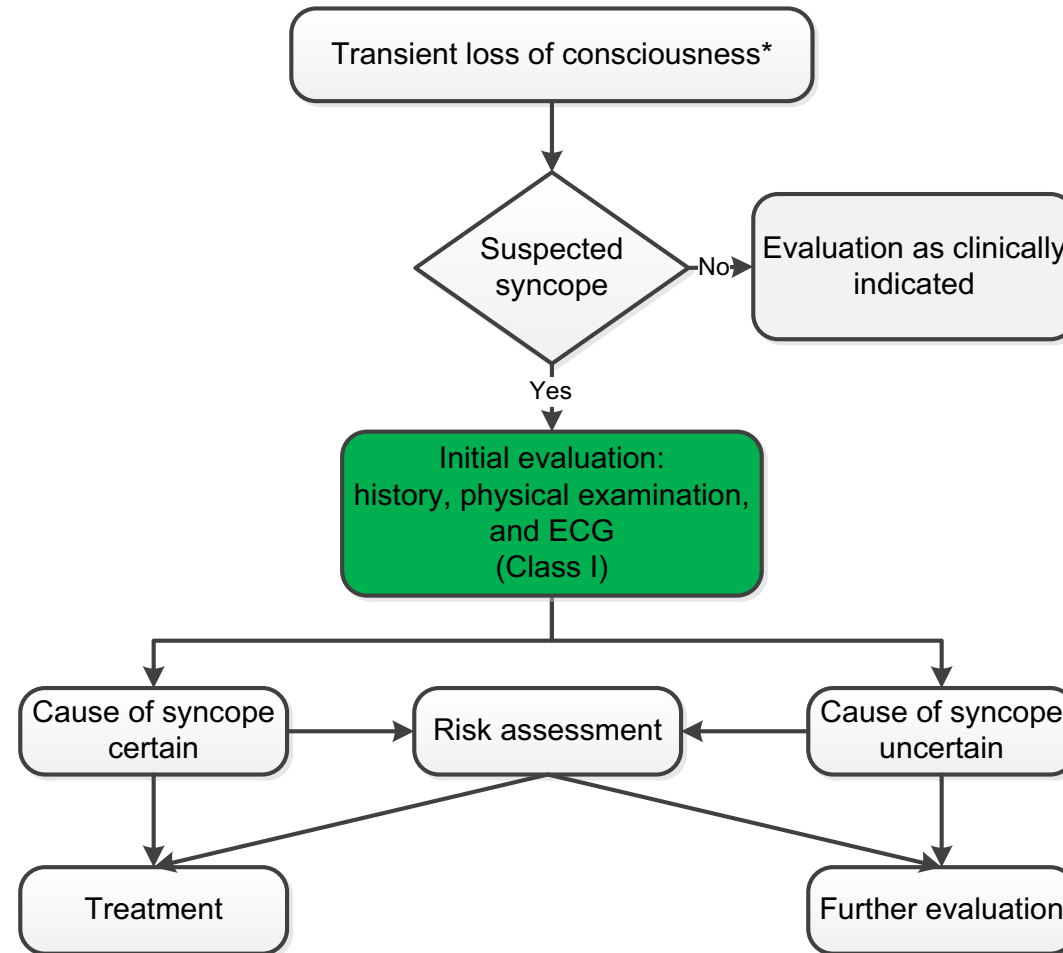
- **Carotid Sinus Massage**
- age >40 (if etiology unknown)
- avoid if bruit or history carotid disease
- 5-10 seconds at angle of jaw
- continuous ECG and bp monitoring
- + if asystole > 3 seconds and/or fall in systolic > 50mmHg.

Physical Exam

- Hyperventilation can be seen with pulmonary embolism or anxiety.
- Valsalva maneuver can increase the murmur of hypertrophic cardiomyopathy.
- Guaiac / FOB stool

General Principles

Syncope Initial Evaluation



Evaluation of Guidelines in Syncope Study (EGSYS)

- Diagnostic Predictive Score
 - Palpitations preceding syncope +4
 - Heart disease, abnormal ECG or both +3
 - Syncope during effort +3
 - Syncope while supine +2
 - Precipitating or predisposing factors (Warm crowded location, prolonged orthostasis, fear, pain emotion) -1
 - Autonomic prodromes (nausea, vomiting) -1
- risk of cardiac cause of syncope in validation cohort of 256 consecutive patients
 - 2% for score < 3 points
 - 13% for score = 3 points
 - 33% for score = 4 points
 - 77% for score > 4 points

ECG's suggesting an arrhythmic causes for syncope

- Q waves c/w prior MI
- bradycardia <50/min or SA block
- Mobitz II AV block or 3rd degree AV block
- BBB and/or bifascicular block
- Prolonged QTc
- Preexcitation QRS, Brugada syndrome, IVCD

Long QT Syndrome

- QTc prolonged $> .45$ seconds and the longer the prolongation the higher the risk of sudden death.
- Avoid meds that prolong the QT (Cipro, Biaxin, Celexa, Diflucan, Elavil...etc.)
- Beta-blocker therapy, is indicated as a first line therapy

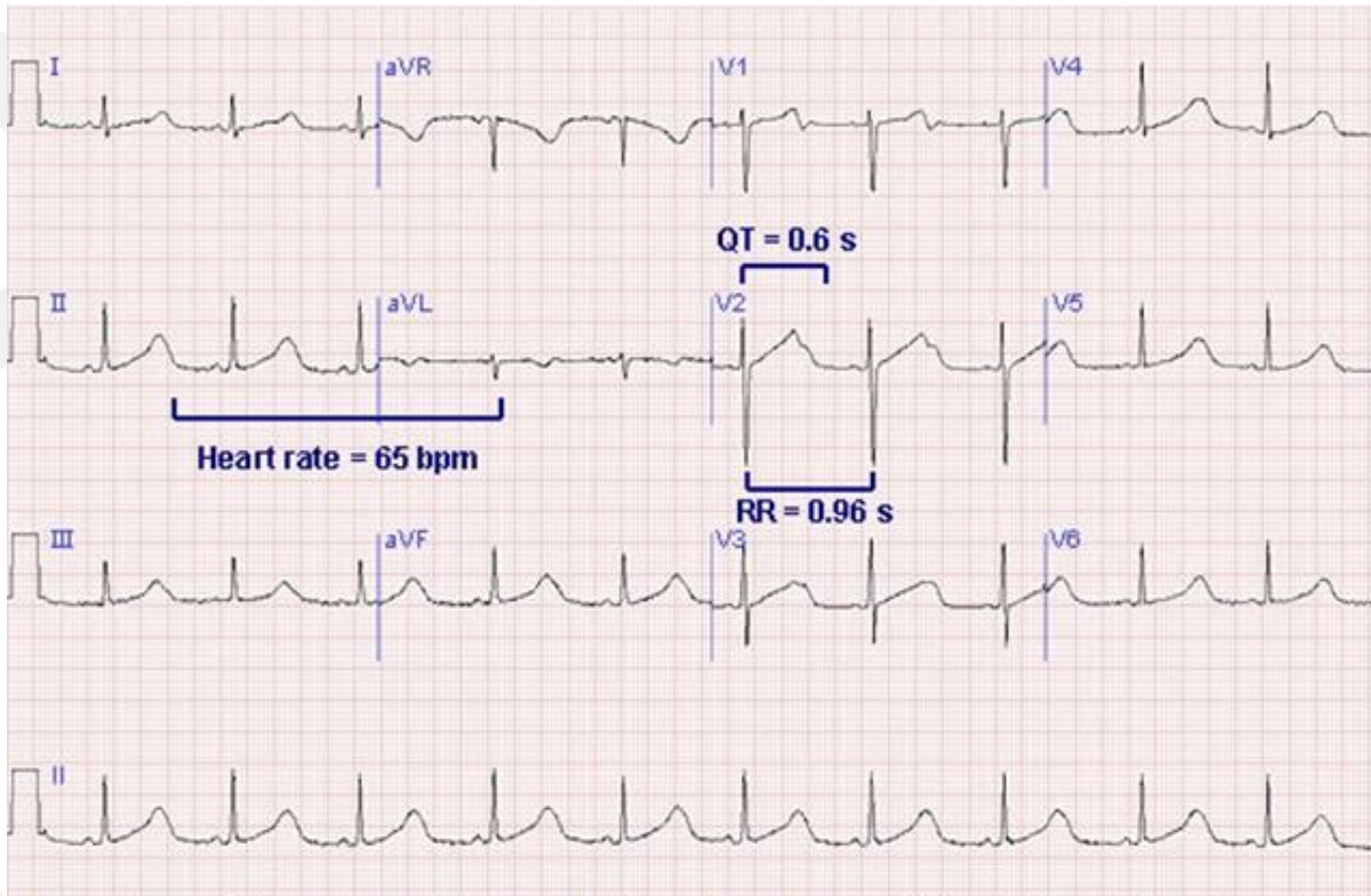
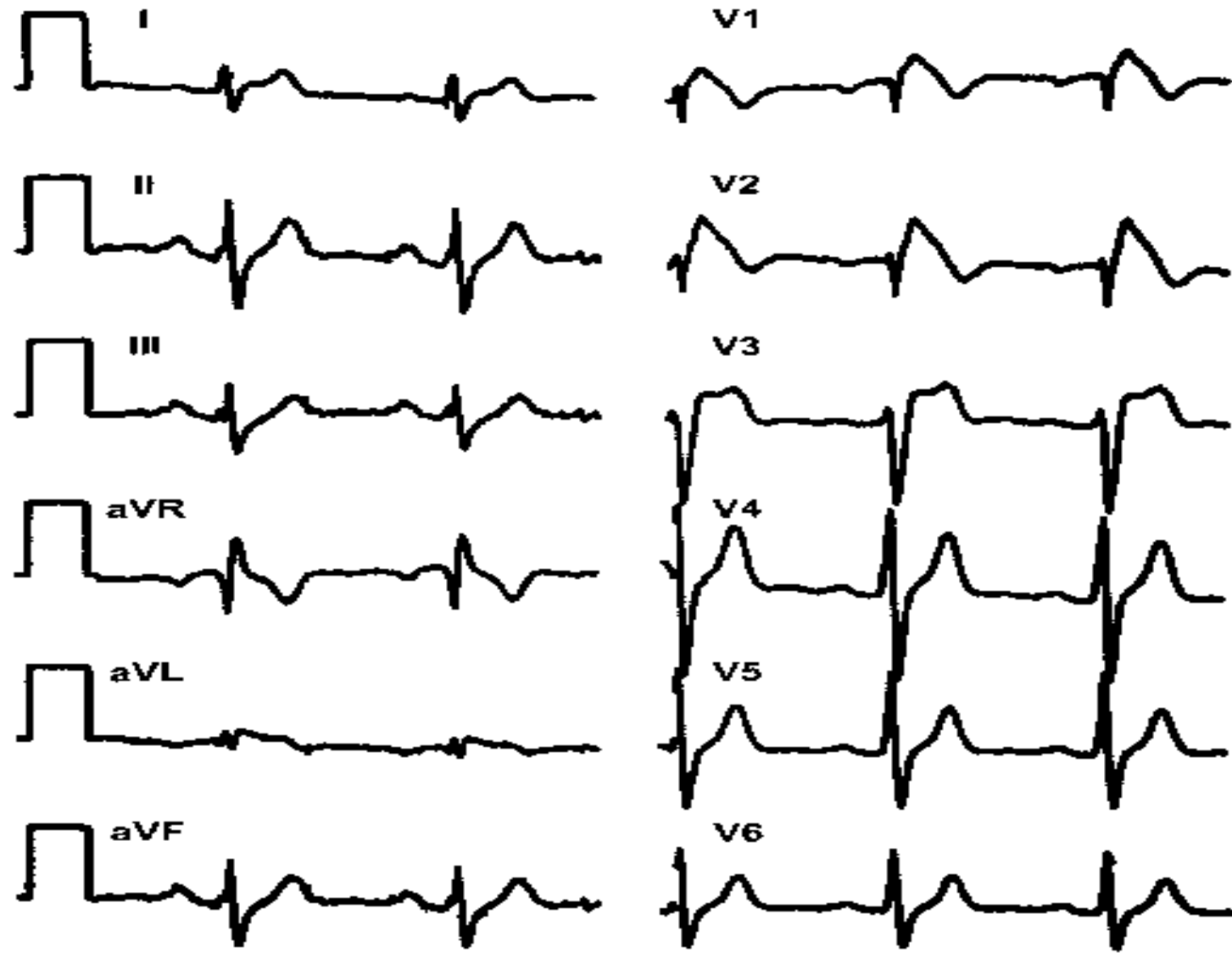


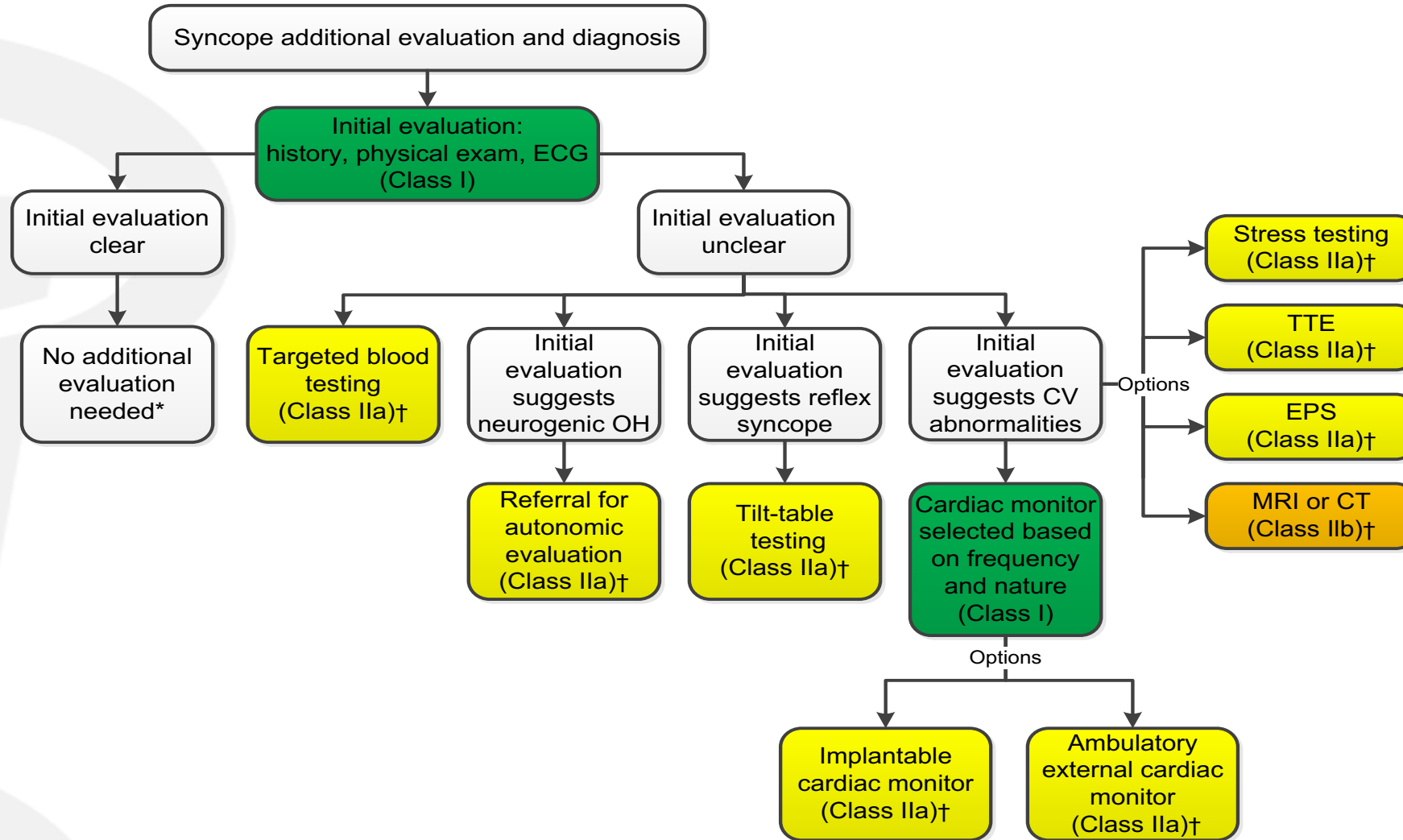
Image courtesy of ECG Wave-Maven: Self-Assessment Program for Students and Clinicians (<http://ecg.bidmc.harvard.edu>).

Brugada's Syndrome

- Inherited disorder
- RBBB with ST segment elevation in V1-3
- The ECG findings maybe intermittent
- If they experience syncope they have a 30% risk of sudden death in the next 2 years



Additional Evaluation and Diagnosis



*Applies to patients after a normal initial evaluation without significant injury or cardiovascular morbidities; patients followed up by primary care physician as needed.

Stress Testing

- To evaluate for ischemia if at risk.
- Consider doing exercise stress if event occurred during exercise

Ambulatory Monitoring (Holter or event recorders)

- Limited diagnostic value as often the symptoms do not occur when worn.
- An asymptomatic arrhythmia does not prove cause.
- Establish dx in only 2-3% of patients.
- Holter (24-48 hours) or external loop recorders (1 month).

Implantable Loop Recorder

- Can record the ECG for over one year (1-3 yrs)
- Placed like a pacemaker so is “invasive”
- Cost is \$\$\$ignificant

Echocardiogram

- Recommended in patients with syncope when structural cardiac disease is suspected.
- Echocardiogram makes a diagnosis in severe aortic stenosis, atrial myxoma, and HCM
- Echo findings maybe helpful in stratifying risk, such as with hypertrophic cardiomyopathy or LVH.

Tilt Table Testing

- **Class IIa indications:**
 - 1. If the diagnosis is unclear after initial evaluation for pts with suspected VVS
 - 2. If the diagnosis is unclear after initial evaluation for pts with suspected delayed orthostatic hypotension
 - 3. Reasonable to distinguish convulsive syncope from epilepsy in selected pts
 - 4. To establish a diagnosis of pseudosyncope
- **Class III:** Not recommended to predict response to medical treatments for VVS

Neurologic Testing

- Such as EEG, CT brain, MRI brain, Carotid ultrasound are often done yet rarely useful.
- Reviewed charts of 649 pts. 53% had at least 1 neurologic test yet only brain CT and EEG yielded diagnosis in 5 (2%) and 6 (2%) patients, respectively.
- Use these tests selectively

Cost Effectiveness of Testing

2106 consecutive pts 65 y/o or older admitted for syncope.

EKG 99%, Tele 95%, CE's 95%, CT brain 63% were the most frequent dx tests ordered

CE's, CT's, Echo, Carotid u/s, EEG affected dx or management in <5%

Orthostatic bp's were done in on 38% and yet helped with dx/tx in 20-30%

Reasons for Hospitalization

- **FOR DIAGNOSIS:**
- Suspected or known significant heart disease.
- EKG c/w arrhythmic syncope
- Syncope during exercise
- Syncope causing severe injury
- Family history of sudden death

Reasons for Hospitalization

- **FOR TREATMENT:**

- Syncope due to ischemia
- Syncope with focal neurologic finding
- Syncope due to structural heart disease
- Syncope due to arrhythmia planned for intervention (e.g. radiofrequency ablation or AICD or pacer)

San Francisco Syncope Rule

- A tool to help providers decide if admission medically needed or not. Often medico-legal concerns lead to admission.
- Designed to help identify those at risk for serious outcomes (death, MI, PE, CVA, SAH, significant bleed, anemia requiring transfusion, procedure needed to treat a related cause of syncope, or any condition causing a return to the ED)

San Francisco Syncope Rule

- C – Congestive heart failure
 - H – Hematocrit < 30%
 - E – EKG with either new changes or abn
 - S – Shortness of breath
 - S – Systolic b/p < 90 at triage
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- Sensitivities vary from 89-98% (few false negatives)
 - Specificities vary from 42-62% (many false positives)

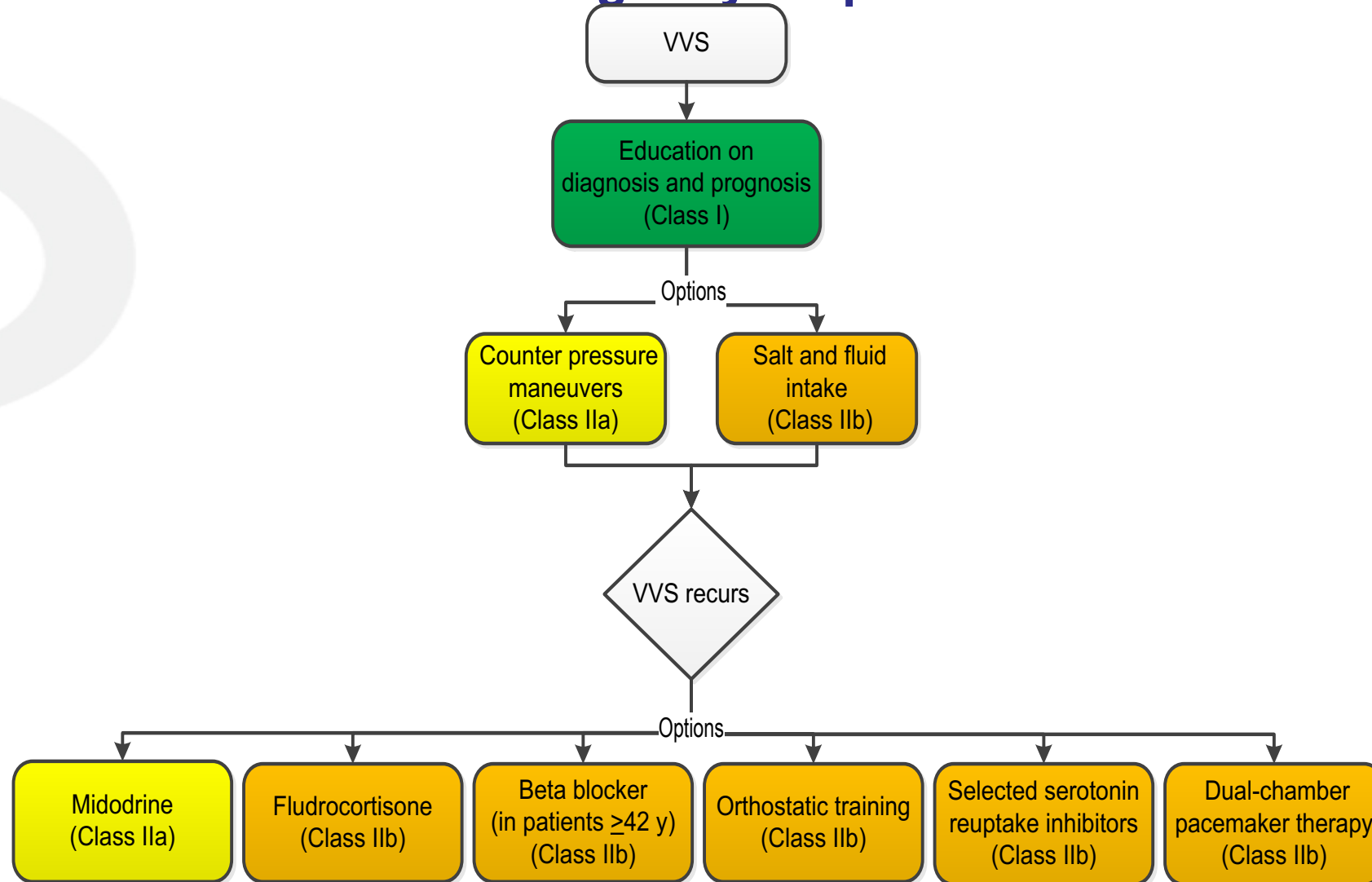
Simple maneuver to decrease vaso-vagal syncopal episodes

- If the patient has prodrome symptoms or can identify triggers that might cause syncope they were advised to:
 - 1. Cross legs and tense leg/ab/butt muscles
 - 2. Handgrip (a rubber ball or other object)
 - 3. Arm tense (grab one hand with the other while abducting both arms)

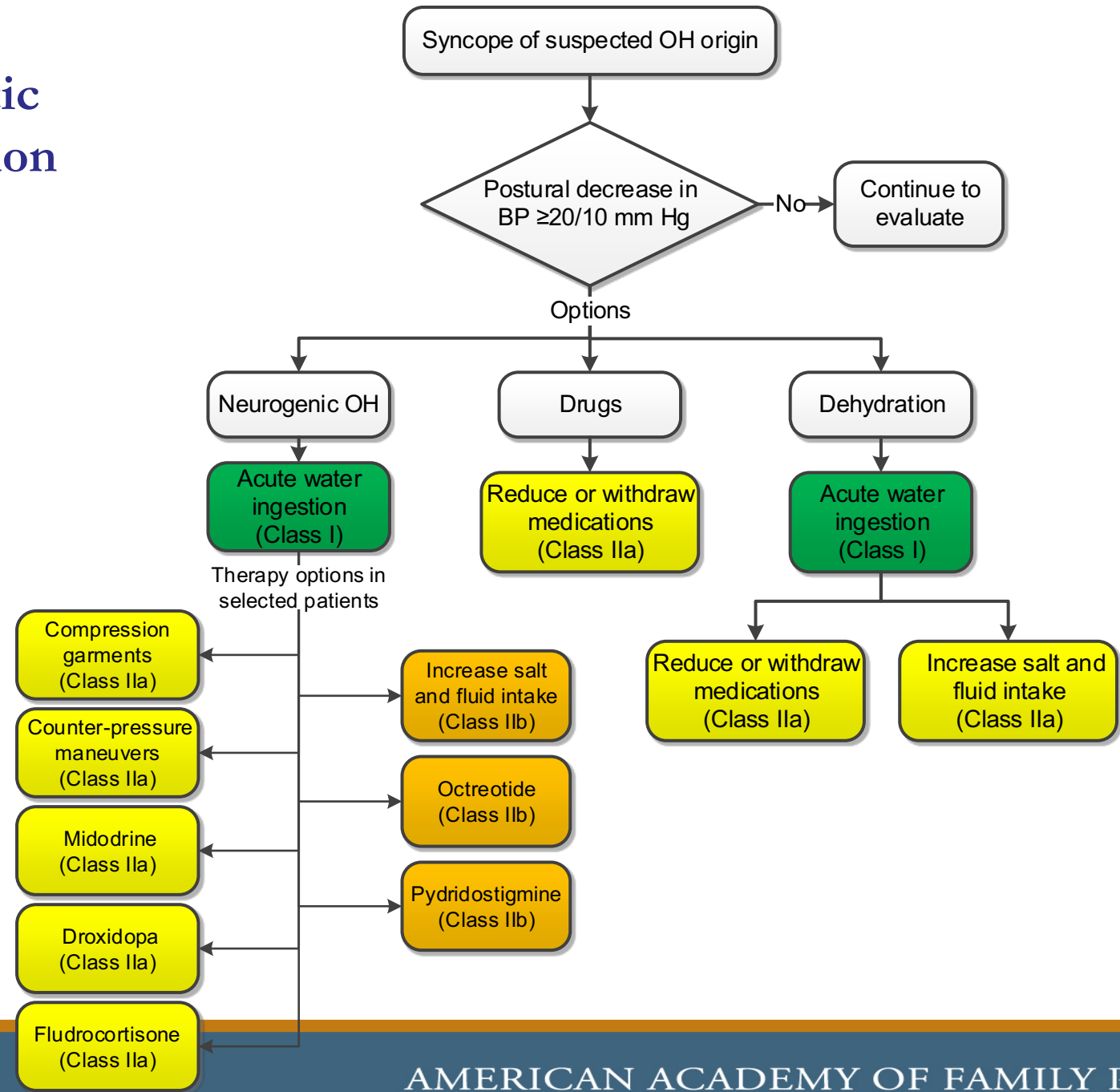
Maneuver to reduce vagal syncope

- In a trial 32% of those who did the maneuver had vagal syncope again versus 51% of those who did not try the maneuver.
- $NNT = 5$
- $NNT = 1/0.51 - 0.32$

Vasovagal Syncope



Orthostatic Hypotension



Colors correspond to Class of Recommendation in Table 1.
 BP indicates blood pressure; OH, orthostatic hypotension.

Dr. Tambunan's Three Pearls

3. Orthostatic vitals is essential

2. CHESS – it's your move Doc!

1. History, physical exam, & EKG

Citation

Journal of the American College of Cardiology
www.onlinejacc.org/lookup/doi/10.1016/j.jacc.2017.03.003)
and *Circulation*
(<http://circ.ahajournals.org/lookup/doi/10.1161/CIR.00000000000000499>).

The full-text guidelines are also available on the following Web sites: ACC (www.acc.org), AHA (professional.heart.org), and the Heart Rhythm Society (www.hrsonline.org).