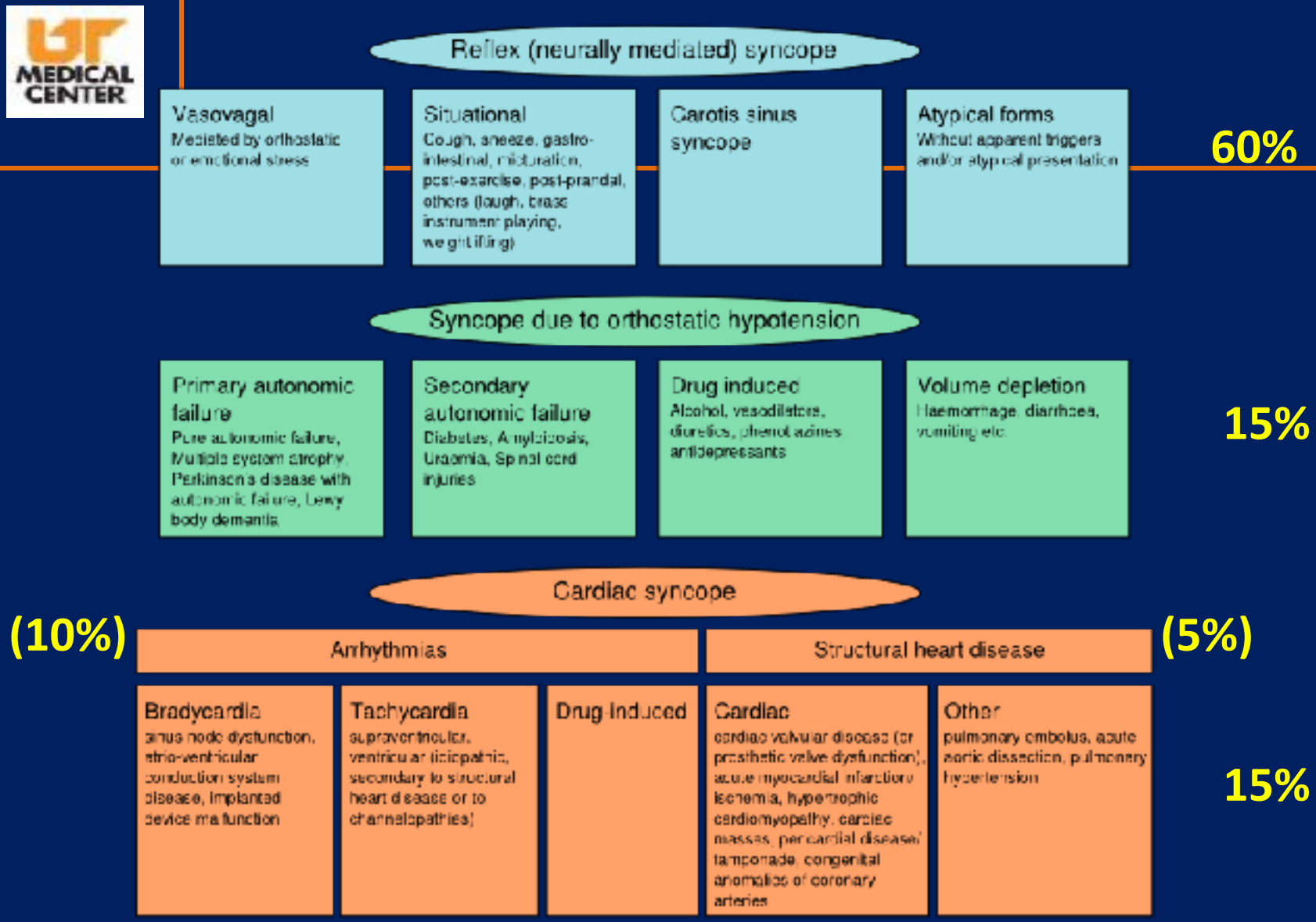
SYNCOPE

Madhur A. Roberts
PGY-5, Cardiovascular Disease
4/22/2015

Definition

- Syncope: Transient, self-limited loss of consciousness associated with loss of postural tone.
  - Onset - relatively rapid
  - Recovery - spontaneous, complete and usually prompt
  - Mechanism - transient global cerebral hypoperfusion.

- Should be differentiated from other causes of LOC that are not caused by transient cerebral hypoperfusion.

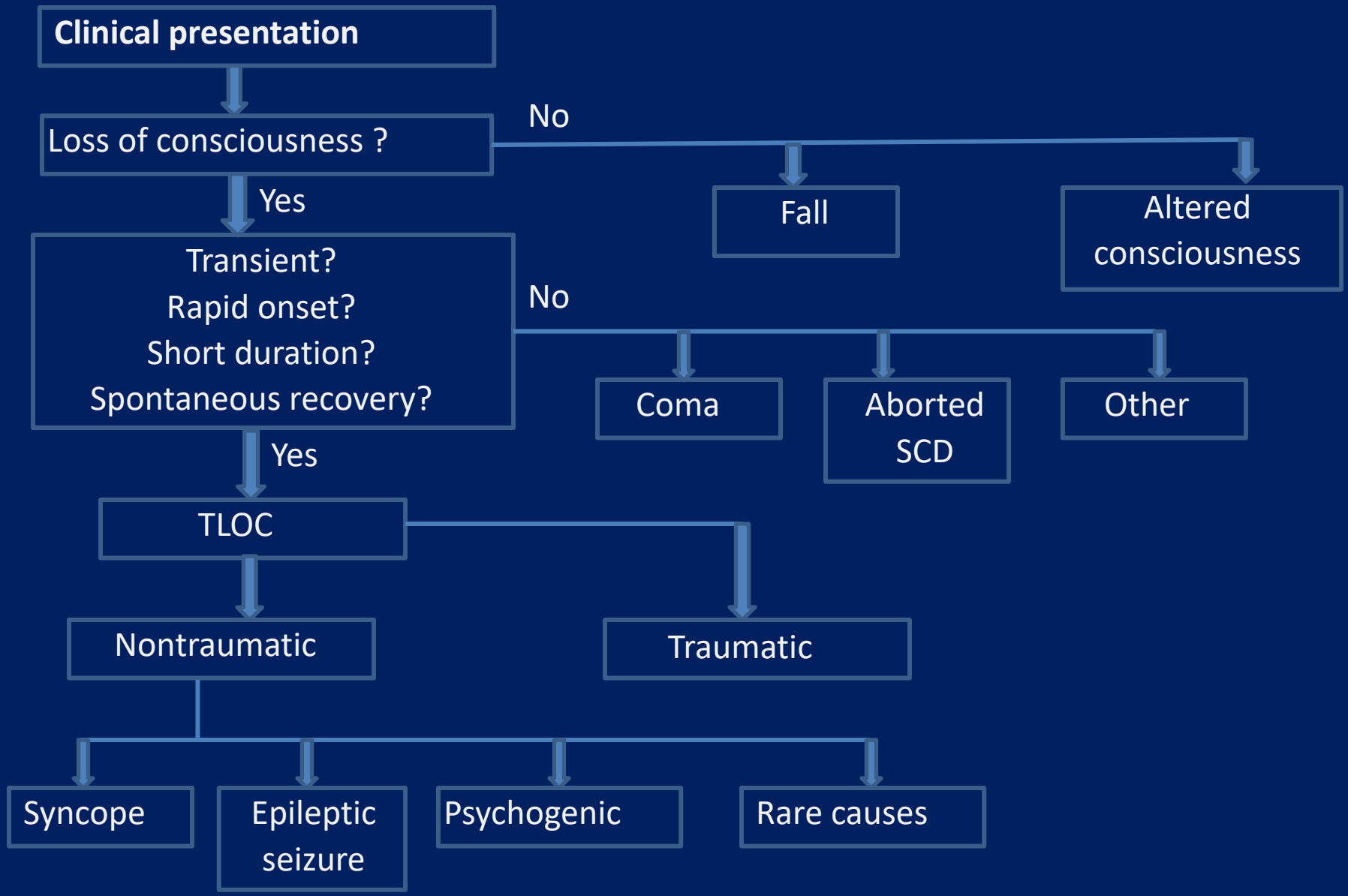


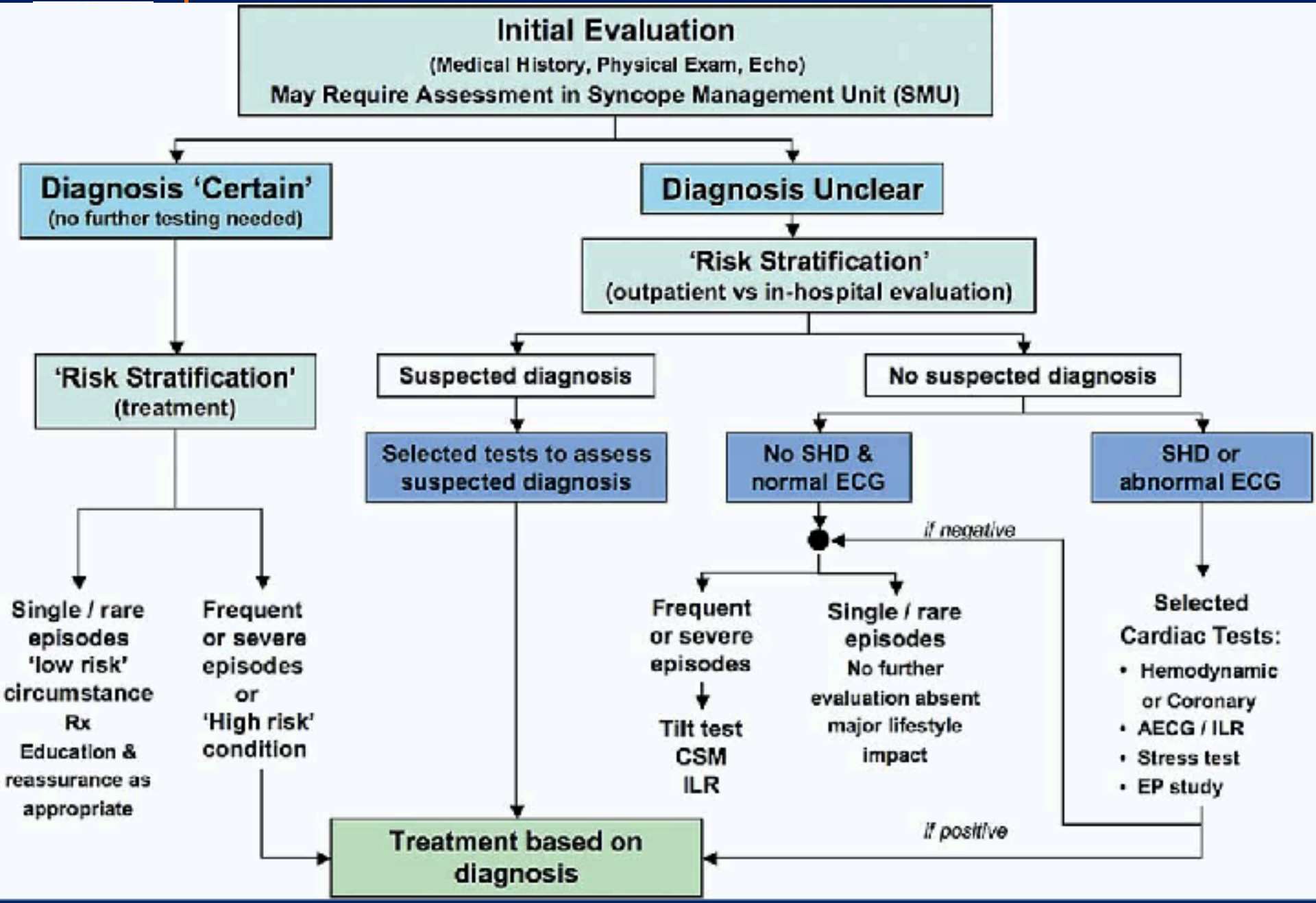
Unknown etiology: 10%

Epidemiology

- 1% of ED visits
- High recurrence rate - 35% within 3 year
- Aproximately 10-20 % adults over lifetime
- Females > Males
- $ 12-15000 / hospitalization

Evaluation


Clinical presentation
Loss of consciousness ?
No
Fall
Altered consciousness
Yes
Transient?
Rapid onset?
Short duration?
Spontaneous recovery?
No
Coma
Aborted SCD
Other
Yes
TLOC
Nontraumatic
Traumatic
Syncope
Epileptic seizure
Psychogenic
Rare causes


Initial Evaluation
(Medical History, Physical Exam, Echo)
May Require Assessment in Syncope Management Unit (SMU)
Diagnosis 'Certain'
(no further testing needed)
Diagnosis Unclear
'Risk Stratification'
(outpatient vs in-hospital evaluation)
'Risk Stratification'
(treatment)
Suspected diagnosis
No suspected diagnosis
Selected tests to assess suspected diagnosis
No SHD & normal ECG
SHD or abnormal ECG
if negative
Single / rare episodes 'low risk' circumstance
Rx
Education & reassurance as appropriate
Frequent or severe episodes or 'High risk' condition
Frequent or severe episodes
Tilt test
CSM
ILR
Single / rare episodes
No further evaluation absent major lifestyle impact
Selected Cardiac Tests:
• Hemodynamic or Coronary
• AECG / ILR
• Stress test
• EP study
if positive
Treatment based on diagnosis

Initial Evaluation: H & P

- Detailed history:
  - Age, sex
  - Position during syncope
  - Triggers
  - Recovery
  - PMHx
  - Medications
  - Family Hx

- Thorough physical exam

Initial Evaluation: Testing

- "Routine" Testing:
  - Labs: CBC, electrolytes, Glucose
  - EKG
- "Elective" Testing: Depends on clinical presentation
  - Echo
  - Holter monitoring
  - Loop recorder
  - Tilt-table Testing
  - EP study
  - Neurologic testing
- Initial evaluation alone often yields a probable diagnosis to direct therapy

“Risk” Assessment

- General features favoring in-hospital evaluation
  - Suspected underlying problem is associated with high risk of early mortality and/or injury
  - Proposed treatment requires in-hospital care
  - Affected individual is unable to care for himself or herself

High risk - hospitalization

- Clinical picture of AMI, aortic dissection, CHF, PE, SHD (e.g., AS, HOCM)
  - Abnormal ECG
  - History of structural heart disease or clinical findings suggestive of heart failure
- Syncope during exercise
- Syncope causing MVA / severe injury
- FH of premature sudden death
- EKG abnormalities (e.g., pre-excitation, high-grade AVB, prolonged pauses [typically 3 to 5 s], VT)
- Channelopathy (long/short QT, Brugada)

Intermediate risk

- First syncope at age > 50 yrs
- Suspected implanted cardiac device malfunction(Pacemaker/ICD, prosthetic valve)

Low risk

- Absence of evident SHD and a normal ECG
- History of recurrent syncope over many years
- Suspicion of “syncope mimic” (e.g., psychogenic pseudo-syncope)

Clinical Findings suggestive of Cardiac Etiology

- Exam / ECHO evidence of severe SHD
- Syncope during exertion or while in supine position
- Palpitations at the time of syncope
- History of heart failure
- Acute or prior AMI
- Evidence of LV dysfunction
- Abnormal EKG findings

EKG suggesting Arrhythmogenic Syncope

- Third-degree AVB
- Intermittent AVB (i.e., high-grade, Mobitz II, Mobitz I in elderly patients)
- Sustained severe SB (< 40 beats/min) while awake, SA block, or sinus pause ≥ 3 sec
- Pre-excitation (e.g., WPW syndrome)
- Long/short QT interval, Brugada pattern
- Negative T waves in right precordial leads, epsilon waves, and ventricular late potentials suggestive of ARVD
- ST-segment or T-wave changes suggesting acute myocardial infarction/ ischemia

Tilt-Table Testing

- Pathophysiology of vasovagal syncope is incompletely understood- but it is generally accepted that physical or emotional stress trigger a chain of events that culminates into vasodilatation or bradycardia (or both)

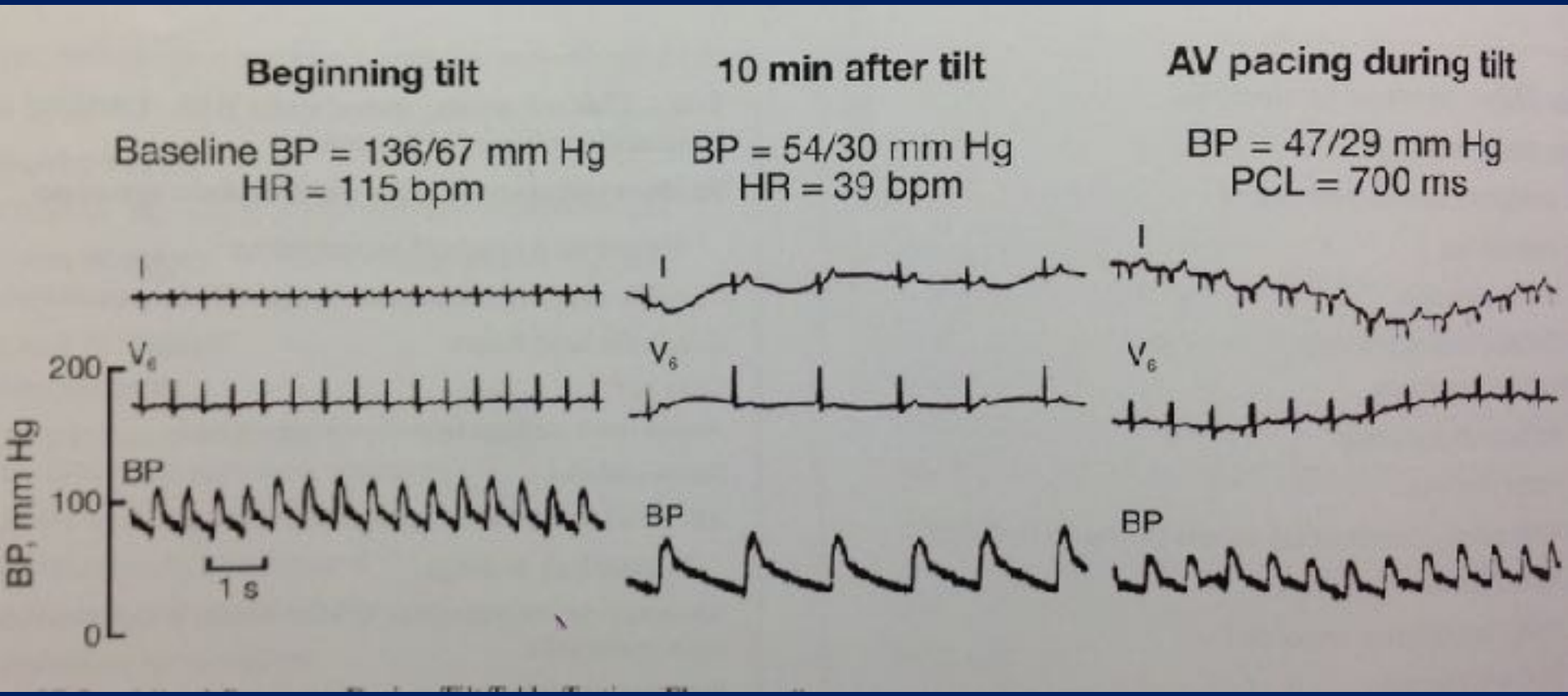
- This leads to hypotension and LOC associated with vasovagal syncope

- It is believed that tilt-table testing provokes a vasovagal response by venous pooling and orthostatic distress
  - Provocative agents can also be used: isoproterenol, nitroglycerin

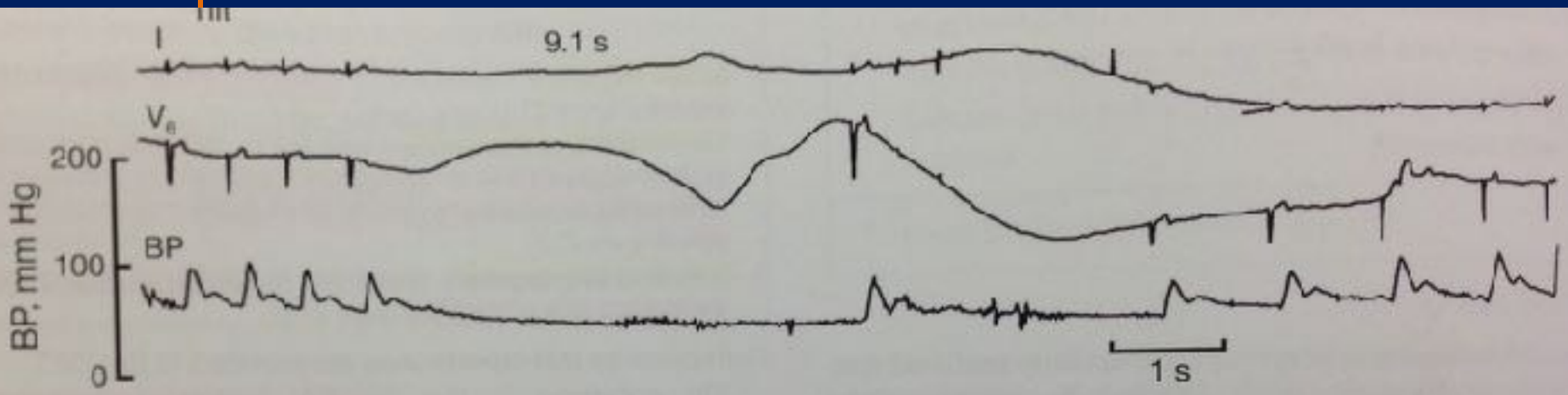
Tilt-Table Testing

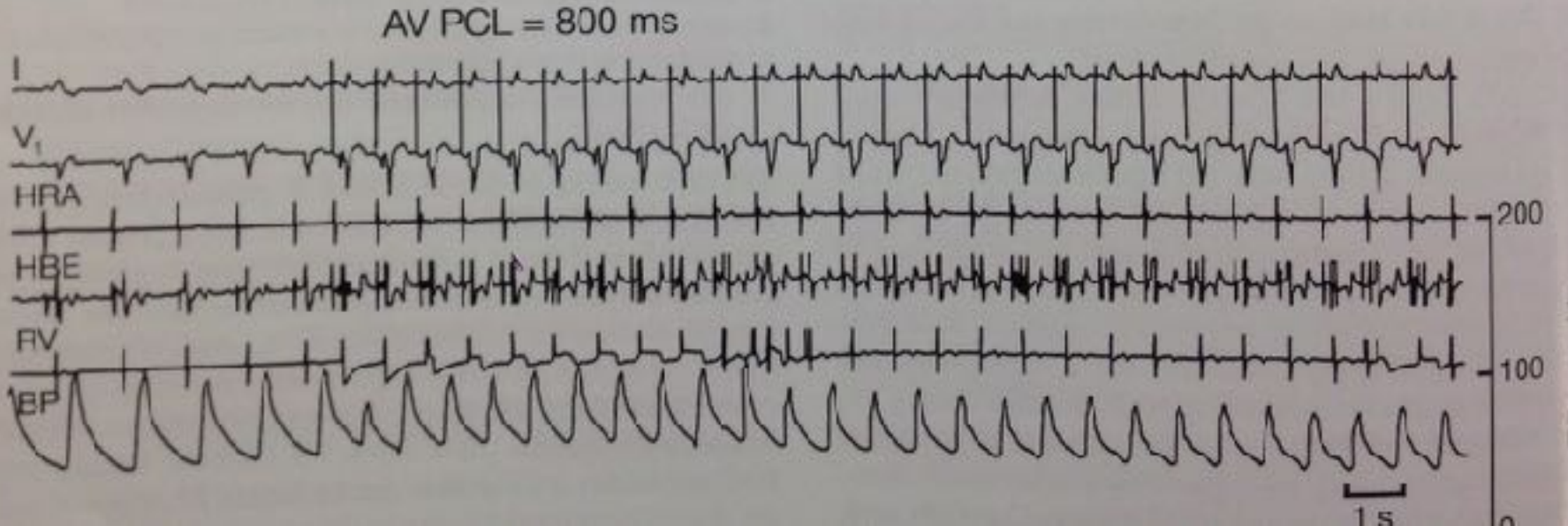
- Types of Positive responses:
  - Mixed response:
    - HR decreases but doesn't go <40 or decreases to <40 for <10s with or without asystole <3sec
    - BP decreases before HR decreases.
  - Cardioinhibition (i.e.. primary bradycardia/pauses):
    - HR decreases to <40 bpm for >10sec with or without asystole >3sec
  - Vasodepressor (i.e.. primarily low BP):
    - HR doesn't decrease >10% from its peak at syncope

Mixed Response

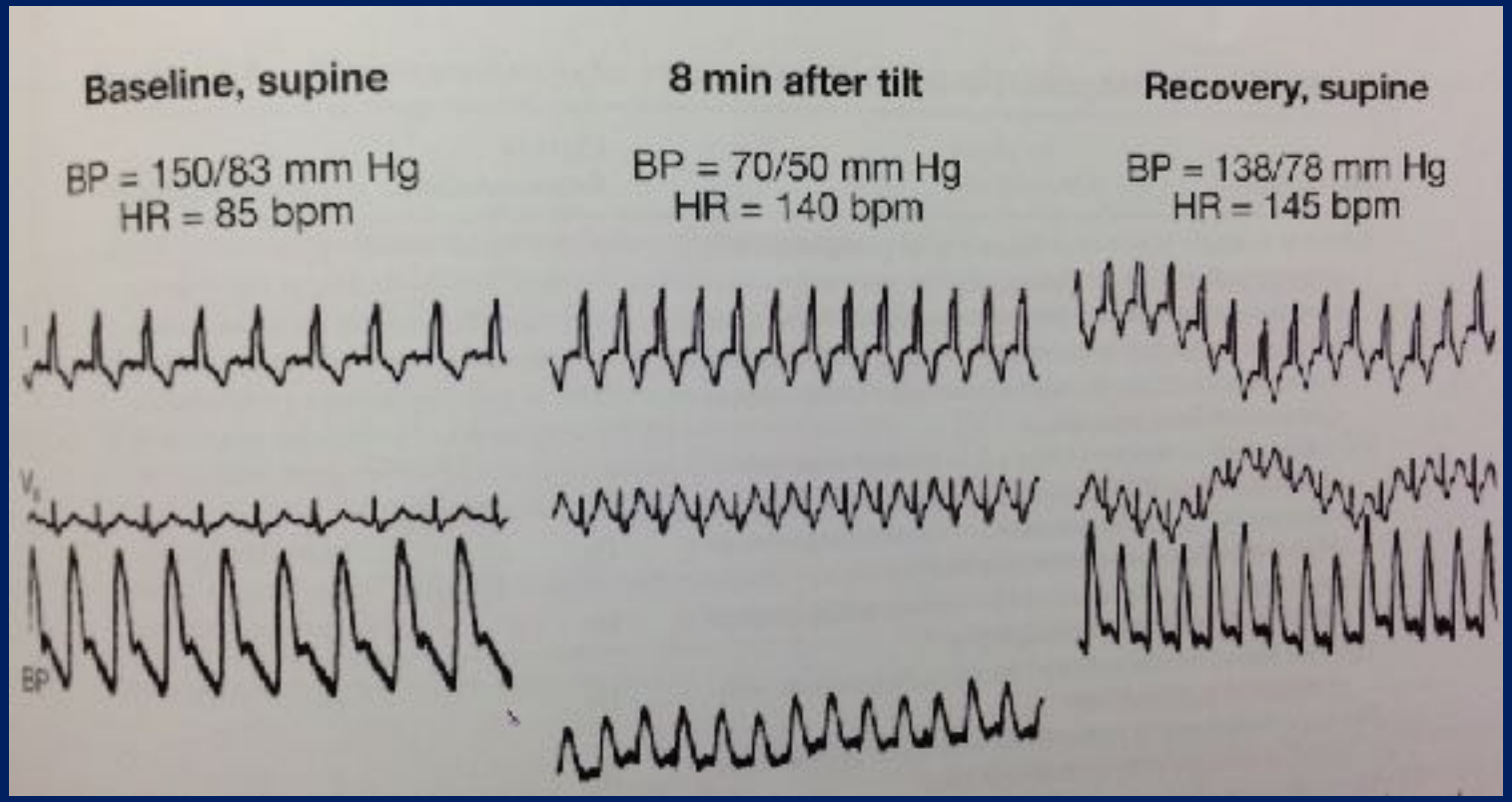


Cardioinhibitory Response





Vasodepressor Response



Indication for Tilt-Table

Indicated if patients have presumed vasovagal syncope or 1 or more of the following

- Syncope w/out evidence of organic heart disease
- One episode of syncope that occurred w/ an injury or a MVA or in high risk situation
- Syncope w/ a known cause and a treatment that vasovagal syncope could affect

Contraindication for Tilt-Table

- Critical obstructive cardiac disease
  - Critical stenosis of MV or proximal segment of coronary artery, severe obstruction of LV outflow tract
- Critical cerebrovascular stenosis

Interpretation of results

- Positive Test (in patients w/o SHD)
  - syncope assoc. with hypotension/bradycardia → Dx of reflex syncope
  - Hypotension/bradycardia without syncope → suggestive of reflex syncope
  - Progressive orthostatic hypotension with or without Sx's → Dx of orthostatic hypotensive syncope

- Other Results
  - Syncope without changes in blood pressure or heart rate → psychogenic pseudosyncope
  - Positive test in pt with structural heart disease → consider arrhythmias and other cardiac causes before declaring the positive test as diagnostic for reflex syncope

EP Study

- Should be considered if the risk of arrhythmic cause is high.

- The yield of EP study varies;
  - No underlying heart disease or abnormalities of EKG: <10-20%
  - Higher yield in patients with underlying heart disease, LV dysfunction and abnormal EKG

Table 27.2. Recommendations for Electrophysiologic Study

Indication	*Class of Recommendation*	*Level of Evidence*
For patients with ischemic heart disease, EPS is indicated when initial evaluation suggests an arrhythmic cause of syncope unless there is already an established indication for ICD	I	B
For patients with bundle branch block, EPS should be considered when noninvasive tests have failed to make the diagnosis	IIa	B
For patients with syncope preceded by sudden and brief palpitations, EPS may be performed when other noninvasive tests have failed to make the diagnosis	IIb	B
For selected patients with Brugada syndrome, ARVC, and hypertrophic cardiomyopathy, an EPS may be performed	IIb	C
For selected patients with high-risk occupations for whom every effort to exclude a cardiovascular cause of syncope is warranted, an EPS may be performed	IIb	C
EPS is not recommended for patients with a normal electrocardiogram, no heart disease, and no palpitations	III	B

Abbreviations: ARVC, arrhythmogenic right ventricular cardiomyopathy; EPS, electrophysiologic study; ICD, implantable cardioverter-defibrillator.

Previously published. See "Credit Lines" section.

- EPS Findings with strong correlation with susceptibility to Syncope
  - Sustained monomorphic VT / SVT
  - Prolonged (>100ms) HV interval (His bundle to Ventricle conduction interval)
  - Sinus Bradycardia w/ Prolonged SNRT (Sinus node recovery time)

Treatment: reflex syncope

- Conservative management
- Education and reassurance
- Avoid identifiable triggers / Desensitization
  - Orthostatic/Tilt training programs
- Hydration / Salt intake
- Exercise
- Support stockings

Treatment: reflex syncope

- Pharmacotherapy
- Volume expanders
- Adrenergic antagonists
- Vaso/veno constrictors
- SSRI's
- Miscellaneous - Disopyramide, Pure anticholinergics (scopalamine) and Theophylline

Adrenergic antagonists

- Beta-blockers
- POST study (Sheldon et.al. Circ 2006) showed no benefit
- Post hoc analysis - some benefit in older pt > 42yrs

Vaso/veno constrictors

Midodrine

- *Drug with most evidence*
- Orthostatic Hypotension and Vasovagal Syncope

Methylphenidate

- Alternative for Midodrine intolerance
- But crosses BBB

Role of PPM

- It was listed as a class IIA indication in 2002 guidelines for vasovagal syncope

- Reasonable for patients with recurrent syncope, age > 40 years, and documented cardioinhibitory response during monitoring

Driving Restrictions

Group 1: private drivers of cars, motorcycles, or other small vehicles; **Group 2**: professional drivers of vehicles over 3.5 tons, or passenger carrying vehicles (exceeding 8 seats). Note: drivers of taxi's, ambulances, etc, are in an intermediate group.

Recommendations for driving in patients with syncope

Diagnosis	Group 1 (private drivers)	Group 2 (professional drivers)
Cardiac arrhythmias		
[illegible] antiarrhythmia, medical treatment	After successful treatment is established	After successful treatment is established
Pacemaker implant	After one week	After appropriate function is established
Successful catheter ablation	After successful treatment is established	After long term success is confirmed
ICD implant	In general low risk, restriction according current recommendations	Permanent restriction
Reflex syncope		
Single/mild	No restrictions	No restriction unless it occurred during high risk activity*
Recurrent and severe*	After symptoms are controlled	Permanent restriction unless effective treatment has been established
Unexplained syncope	No restrictions unless presence of syndrome, occurrence during driving, or presence of severe structural heart disease	After diagnosis and appropriate therapy is established

Summary

- Syncope is only one of many causes of TLOC
- History and Physical gives highest diagnostic yield
- Allow the diagnosis and prognosis to direct treatment
- Try conservative treatment initially
- Don’t forget to consider about driving restrictions

Thank you