

Syncope – A Symptom, Not a Diagnosis

Definition – Beware of less specific symptoms !!

- Loss of consciousness and postural tone
- Self-limited and relatively rapid in onset
- Variable warning symptoms (pre syncope)
- Spontaneous, complete & prompt recovery
- There are many causative issues

Underlying mechanism is transient global cerebral hypo perfusion.

Syncope - Causes

I. Disorders of vascular tone or blood volume

- A. Vasovagal: vasodepressor, neurocardiogenic
- B. Postural (orthostatic) hypotension
 1. Drug induced (especially anti hypertensives)
 2. Peripheral neuropathy (diabetic, alcoholic)
 3. Idiopathic postural hypotension
- C. Carotid sinus hypersensitivity, Anemia
- D. Situational: Cough, Micturition, Valsalva, Bleed
- E. Glossopharyngeal, Trigeminal Neuralgia

A Diagnostic Plan is Essential

- Initial Examination
 - Detailed patient history
 - Physical exam
 - ECG
 - Supine and upright blood pressure
- Cardiac Imaging
- Special Investigations
 - Head-up tilt test (HUT)
 - Hemodynamic studies
 - Electrophysiology study
 - EP mapping / ablation
- Monitoring
 - Holter
 - Event Monitors
 - Insertable Loop Recorder (ILR)

Initial Exam: Detailed Patient History

- Details about Syncope
 - Situation & Position
 - Activity, Neck movem.
 - Prodromal Symptoms
 - Eye witness account
 - Manner of fall
 - Skin color, sweating
 - Jerky movements
 - Bladder, Tongue
 - Post syncope period
- H/o any medications
- Concomitant disease, especially cardiac
- Pertinent family history
 - Cardiac disease
 - Sudden death
 - Metabolic disorders
- Past medical history
 - Neurological history
 - Syncope

Initial Exam: Thorough Physical

- Vital signs
 - Heart rate
 - Orthostatic blood pressure change
- Cardiovascular exam: Is heart disease present?
 - ECG: Long QT, pre-excitation, conduction system disease
 - Echo: LV function, valve status, HCM
- Neurological exam
- Carotid sinus massage (CSM)
 - Perform under clinically appropriate conditions preferably during head-up tilt test
 - Monitor both ECG and BP

Carotid Sinus Massage (CSM)

- **Method**
 - Massage, 5-10 seconds
 - Don't occlude
 - Supine and upright posture (on tilt table)
- **Outcome**
 - 3 second asystole and/or 50 mmHg fall in systolic BP with reproduction of Sxs = Carotid Sinus Syndrome
- **Absolute contraindications**
 - Carotid bruit, known significant carotid arterial disease, previous CVA, MI in last 3 months
- **Complications**
 - Primarily neurological
 - Less than 0.2%
 - Usually transient

Other Diagnostic Tests

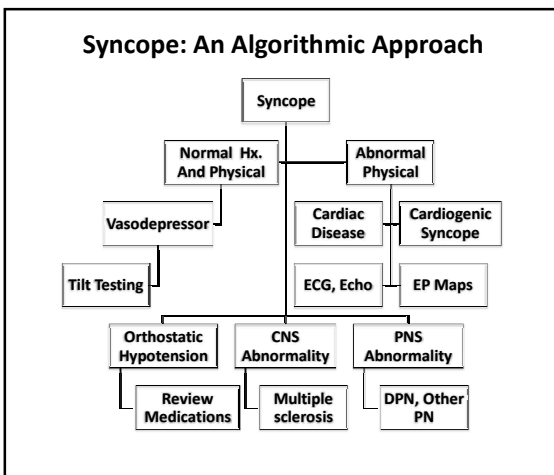
- **Ambulatory ECG**
 - Holter monitoring
 - Event recorder
 - Intermittent vs. Loop
 - Insertable Loop Recorder (ILR)
- **Head-Up Tilt (HUT)**
 - Includes drug provocation (NTG, Isoproterenol)
 - Carotid Sinus Massage (CSM)
- **Adenosine Triphosphate Test (ATP)**
- **Electrophysiology Study (EPS)**

Diagnostic Assessment: Yields

	Yield (%)
Initial Evaluation	
History, Physical Exam, ECG, CSM	38-45
Other Tests/Procedures	
Head-Up Tilt	27
External Cardiac Monitoring	5-13
Insertable Loop Recorder (ILR)	43-88
EP Study	<2-5
Exercise Test	0.5
EEG	0.3-0.5
MRI/CT brain	Not useful

Seizure vs. Syncope

Observation	Seizure	Syncope
Onset	Sudden	More gradual
Duration	Minutes	Seconds
Jerks	Frequent	Rare
Headache	Frequent (after)	Occasional (before)
Confusion after	Frequent	Rare
Unconsciousness	May be ≥ 5 minutes	Short < 1 minute
Incontinence	Frequent	Rare
Eye deviation	Horizontal	Vertical (or none)
Tongue biting	Frequent	Rare
Prodrome	Aura	Dizziness
EEG	Often abnormal	Usually normal



- ### Syncope - Differential Diagnosis - Mimics
1. Anxiety Disorders, Panic attacks
 2. Hyperventilation syndrome, Drop attacks
 3. Seizures, Sleep Disorders- Narcolepsy, Cataplexy
 4. Hypoglycemia, Acute Alcohol Intoxication
 5. Acute hemorrhage, Trauma, Concussion
 6. Hysterical fainting, VBI TIA
- Internal hemorrhage, MI, Cardiac arrhythmias are emergencies. Need to be treated promptly

Syncope: Management Questions

Diagnostic challenges

- What is the best diagnostic test?
- How and when to rule out arrhythmia?
- How to diagnose neuro-cardiogenic syncope?
- How to decrease the proportion of idiopathic?

Management dilemmas

- When to admit? Is there SHD underlying?
- How are the elderly different?
- When to resume driving?

Treatment of Syncope

First Aid	<ul style="list-style-type: none"> • Supine, head to one side • Nil oral, Cold water sprinkling on face • Orthostatic hypotension – slow rising
General	<ul style="list-style-type: none"> • Cause specific, Avoid postural hypoten. • Avoid venous pooling, Salt replenishing
Drug Rx	<ul style="list-style-type: none"> • Scopolamine, Disopyramide, CBZ • Midodrine, Etilifrine, Anti arrhythmic Rx • EP Mapping, Ablation, Pacing

VVS: Incidence

- **Most common form of syncope**
 - 8% to 37% (mean 18%) of syncope cases
- **Depends on population sampled**
 - Young without SHD, ↑ incidence
 - Older with SHD, ↓ incidence
- **In general**
 - VVS patients younger than CSS patients
 - Ages range from adolescence to older adults (median 43 years)

VVS: General Treatment Measures

- **Optimal treatment strategies for VVS are a source of debate**
- **Treatment goals**
 - Acute intervention
 - Physical maneuvers eg: crossing legs or tugging arms
 - Lowering head
 - Lying down
- **Long-term prevention**
 - Tilt training
 - Education
 - Diet, fluids, salt
 - Support hose
 - Drug therapy
 - Pacing

VVS: Pharmacologic Treatment

<ul style="list-style-type: none"> • Fludrocortisone • Beta-adrenergic blockers <ul style="list-style-type: none"> – Preponderance of clinical evidence suggests minimal benefit¹ • SSRI (Selective Serotonin Re-Uptake Inhibitor) 		<p>Vasoconstrictors</p> <ul style="list-style-type: none"> Etilifrine Midodrine Etilifrine as IV drip 1-8 mg Midodrine 2.5 to 10 TID Fludrocortisone 0.1 OD
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CSS: Carotid Sinus Syndrome

- Syncope clearly associated with carotid sinus stimulation is rare (≤1% of syncope)
- CSS may be an important cause of unexplained syncope/falls in older individuals
- Stretching of neck, shaving the neck, tight collar
- Prevalence higher than previously believed
- Carotid Sinus Hypersensitivity (CSH)
 - No symptoms
 - No treatment

Orthostatic Hypotension

Etiology

- Drug-induced (very common)
 - Diuretics (volume depletion)
 - Vasodilators (CCBs), α Blockers
 - Clonidine, Hydralazine
- Primary autonomic failure
 - Multiple system atrophy (MS)
 - Parkinson's Disease
 - Postural Orthostatic Tachycardia Syndrome (POTS)
- Secondary autonomic failure
 - Diabetes
 - Alcohol
 - Amyloid
 - Adrenal insufficiency
 - Steroid withdrawal
 - Internal Bleeding

Treatment Strategies for Orthostatic Syncope

- Patient education, injury avoidance
- Hydration
 - Fluids, salt, diet, avoid hot baths
 - Minimize caffeine/alcohol
- Sleeping with head of bed elevated
- Tilt training, leg crossing, arm pull
- Support hose
- Drug therapies
 - Fludrocortisone, midodrine, erythropoietin
- Tachy-Pacing (probably not useful)

Brignole M, et al. Europace. 2004;6:467-537.

Syncope Due to Structural Cardiovascular Disease: Principle Mechanisms

- Acute MI/Ischemia
 - 2° neural reflex bradycardia – Vasodilatation, arrhythmias, low output (rare)
- Hypertrophic cardiomyopathy
 - Limited output during exertion (increased obstruction, greater demand), arrhythmias, neural reflex
- Acute aortic dissection
 - Neural reflex mechanism, pericardial tamponade
- Pulmonary embolus/pulmonary hypertension
 - Neural reflex, inadequate flow with exertion
- Valvular abnormalities
 - Aortic stenosis – Limited output, neural reflex dilation in periphery
 - Mitral stenosis, atrial myxoma – Obstruction to adequate flow

Syncope Due to Cardiac Arrhythmias

- Bradyarrhythmias
 - Sinus arrest, exit block
 - High grade or acute complete AV block
 - Can be accompanied by vasodilatation (VVS, CSS)
- Tachyarrhythmias
 - Atrial fibrillation/flutter with rapid ventricular rate (eg, pre-excitation WPW syndrome)
 - Paroxysmal SVT or VT
 - Torsade de pointes

Treatment of Syncope: Due to Tachyarrhythmia

- Atrial tachyarrhythmias
 - AVRT due to accessory pathway – Ablate pathway
 - AVNRT – Ablate AV nodal slow pathway
 - Atrial fib – Pacing, linear/focal ablation for paroxysmal AF
 - Atrial flutter – Ablate the IVC-TV isthmus of the re-entrant circuit for 'typical' flutter
- Ventricular tachyarrhythmia
 - Ventricular tachycardia – ICD or ablation where appropriate
 - Torsade de pointes – Withdraw offending drug or implant ICD (long QT/Brugada/short QT)
- Drug therapy may be an alternative

Drug-Induced QT Prolongation

(List is continuously being updated)

<ul style="list-style-type: none"> • Antiarrhythmics <ul style="list-style-type: none"> – Class IA ...Quinidine, Procainamide, Disopyramide – Class III...Sotalol, Ibutilide, Dofetilide, Amiodarone, N Acetyl Procainamide NAPA • Antianginal Agents <ul style="list-style-type: none"> – Bepridil • Psychoactive Agents <ul style="list-style-type: none"> – Phenothiazines, Amitriptyline, Imipramine, Ziprasidone 	<ul style="list-style-type: none"> • Antibiotics <ul style="list-style-type: none"> – Erythromycin, Pentamidine, Fluconazole, Ciprofloxacin and its relatives • Nonsedating antihistamines <ul style="list-style-type: none"> – Terfenadine, Astemizole • Others <ul style="list-style-type: none"> – Cisapride, Droperidol, Haloperidol
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