Syncope 2015: Evaluation and Treatment

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Syncope: Definition

- a syndrome in which loss of consciousness is:
  - relatively sudden,
  - temporary,
  - self-terminating
  - usually rapid recovery
- due to inadequate cerebral perfusion,
- most often triggered by a fall in systemic arterial pressure
Syncope: A Symptom, Not a Diagnosis

- Self-limited loss of consciousness and postural tone
- Relatively rapid onset
- Variable warning symptoms
- Spontaneous, complete, and usually prompt recovery without medical or surgical intervention

Underlying mechanism: transient GLOBAL cerebral hypoperfusion.
Syncope is only one of many conditions that cause transient loss of consciousness (TLOC)
Transient Loss of Consciousness

Trauma-induced
- Concussion

Not Trauma-induced
- Syncope
  - Seizures
  - Intoxications
  - Metabolic disorders

Not True TLOC
- TLOC mimics, without true loss of consciousness e.g.,
  - psychogenic “pseudo-syncope”
  - ‘drop attacks’
  - cataplexy
Causes of True Syncope

- **Neurally-Mediated Reflex**
  - VVS
  - CSH
  - Situational
    - Cough
    - Post-mic
  - 60%

- **Orthostatic**
  - Drug-Induced Ans Failure
    - Primary
    - Secondary
  - 15%

- **Cardiac Arrhythmia**
  - Bradycardia
    - Sinus pause/arrest
    - AV block
  - Tachycardia
    - VT
    - SVT
    - Long QT Syn
  - 10%

- **Structural Cardio-Pulmonary**
  - Aortic Stenosis
  - HCM
  - Pulmonary Hypertension
  - Aortic Dissection
  - 5%

**Unexplained Causes = Approximately 10%**
Syncope Mimics:
Real or Seemingly Real TLOC not due to Cerebral Hypoperfusion

- Acute Intoxication (e.g., alcohol)
- Seizures
- Sleep disorders
- Somatization disorder
  - psychogenic pseudo-syncope
- Trauma/concussion
- Hypoglycemia
- Hyperventilation
Impact of Syncope on Mortality Risk

- Vasovagal Syncope has low mortality risk
  - But recurrences are a concern

- Syncope of presumed cardiac cause is associated with high mortality risk
  - Most evidence suggests that risk is similar to that of patients without syncope but with similar severity of heart disease

Syncope: Epidemiological Data

- 40% population, presumed syncope at least once\(^1\)
- 1-6% of hospital admissions\(^2\)
- Approx 1% of ED visits per year\(^3,4\)
- 10% of falls by elderly are believed due to syncope\(^5\)
- **Injuries:**
  - 6% major morbidity (e.g., fractures, MVA)\(^1\)
  - Minor injury in 29%\(^1\)

Syncope & Collapse:
Emergency Department
US Data 2006

Emergency Department visits
• Primary diagnosis ~1.13 million
• Among all listed diagnoses >1.35 million

Hospital admission rate, IP or OBS ~40%
Impact of Syncope in USA: Annual Expenditures

- Syncope evaluation and treatment > $2.4 billion
  \(^1\)
- Estimated hospital costs > $5400/hospitalization
- Treating ‘falls’ in older adults \(^1\) > $7 billion
- Approximately 17% ‘falls’ are due to syncope

\(^1\) Benjamin C. Sun, MD, MPP, Jennifer A. Emond, MS, and Carlos A. Camargo, Jr., MD, DrPH “Direct medical costs of syncope-related hospitalizations in the USA Am J Cardiol 2005;95:668-671

Additional Diagnostic Tests:
Selected Use Based on Initial Examination and Risk Stratification

**Ambulatory ECG**
- Holter Monitoring
- Typical Event Recorder
- External MCOT Loop Recorder
  - Records & transmits ECG data with / without patient activation
- Insertable Loop Recorder **
  - Permits remote ‘downloading’
  - Wireless transmission in certain devices

**Highest diagnostic yield for infrequent symptom events**
Additional Diagnostic Tests: Selected Use Based on Initial Examination and Risk Stratification

- Head-Up Tilt Test (usually combined with CSM)
- Electrophysiology Study (EPS)
- Non-invasive Risk Stratification for Life-threatening ventricular tachyarrhythmias†
  - SAECG
  - HRV
  - HR turbulence
  - Microvolt Twave alternans

† Generally exhibit high negative predictive value but low positive predictive value
Head-Up Tilt Test (HUT)

- Protocols vary
- Performed with or without provocative drugs

Goals:
- Unmask VVS susceptibility
- Reproduce symptoms
- Patient learns VVS warning symptoms
- Patient more confident of diagnosis

Not useful for predicting treatment benefit
Induction of VVS by Upright Posture
Cardioinhibitory & Vasodepressor Components

From Wieling W et al.........(with permission)
Neurological Tests for TLOC:
EEG, Head CT / MRI

- Not useful for syncope evaluation
- Imaging may be warranted if there is concern about head injury from ‘fall’
- May be useful in non-syncope TLOC patients but neurological consultation is advised prior to tests
Yield of Tests for TLOC:

<table>
<thead>
<tr>
<th>Test</th>
<th>Patients (N=433)</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>History &amp; Physical Examination</td>
<td>140</td>
<td>32%</td>
</tr>
<tr>
<td>ECG</td>
<td>30</td>
<td>7%</td>
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<tr>
<td>EPS</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>GXT</td>
<td>2</td>
<td>0.5%</td>
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<tr>
<td>Carotid Massage</td>
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<td>46%</td>
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<tr>
<td>Cardiac Catheterization</td>
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<td>3%</td>
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<tr>
<td>Cerebral Angiography</td>
<td>2</td>
<td>0.5%</td>
</tr>
<tr>
<td>Electroencephalogram</td>
<td>2</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

A Diagnostic Plan is Essential

Modified after ESC Syncope Task Force, 2004
SPECIFIC SYNCOPE GROUPS
High-Risk Children

- Family history of sudden cardiac death or aborted cardiac arrest in youth
- Child with history of known or suspected congenital heart disease
- Syncope triggered by loud noise, fright, or extreme emotional stress
- Syncope during exercise
- Syncope without prodrome, while supine or sleeping or preceded by chest pain or palpitations
Syncope in Athlete

- Conditions predisposing to syncope or SCD
  - Hypertrophic cardiomyopathy
  - Arrhythmogenic right ventricular dysplasia
  - Dilated cardiomyopathy
  - Catecholaminergic polymorphic VT
  - Long QT syndrome
  - Anomalous coronary arteries
  - Myocardial bridge
  - Aortic dissection
  - WPW syndrome
  - LV noncompaction
Syncope in Elderly

Common causes

- Orthostasis
- Carotid hypersensitivity
- Paroxysmal AV block
- Vertigo
- Aortic stenosis
- Pulmonary embolism
Syncope in Elderly

- Drugs commonly used
  - ACEI
  - Calcium blockers
  - Phenothiazines
  - Bromocriptine
  - Opiates
  - Hydralazine
  - Nitrates
  - MAO-inhibitors

- Alpha-blockers
- Beta blockers
- Tricyclic antidepressants
- Ethanol
- Diuretics
- Ganglionic blockers
- Sildenafil
Other Types of Syncope

- Situational Syncope
  - Deglutition or swallow syncope
  - Defecation syncope
  - Micturition syncope
  - Tussive/cough syncope

- Other
  - Postprandial syncope
  - Psychogenic syncope
  - Hyperventilation syncope
  - Subclavian steal
TREATMENT OF SYNCOPE
Non-pharmacologic Treatment

- Avoid large meals, carbohydrates, alcohol
- Avoid Valsalva maneuver
- Physical counter maneuvers
- Increase fluid/salt intake
- Avoid excessive caffeine use
- Abdominal binder and compression garments
- Aerobic and resistance exercise
Pharmacologic Therapy

Volume expanders
- Fludrocortisone
- desmopressin
- Erythropoetin

Vasoconstrictors
- Midodrine
- Phenylephrine
- Droxidopa
- Methylphenidate
Pharmacologic Therapy

Vasoconstrictors
- Octreotide
- Clonidine

Negative inotropes
- Metoprolol
- Propranolol
- Nadolol

Norepinephrine reuptake inhibitors
- Paroxetine
- Sertaline
Pacing Therapy

- Not indicated for majority of patients
  - Asystole during testing does not justify pacing
- Consider in patients >40yo with minimal prodrome, bodily injury or MVA, HUT or implanted monitor has shown asystole, and medical and non-pharmacologic therapy has failed