Approach to Syncope
A (brief) review of the European Society of Cardiology guidelines

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Guidelines for the diagnosis and management of syncope (version 2009)

The Task Force for the Diagnosis and Management of Syncope of the European Society of Cardiology (ESC)

Developed in collaboration with, European Heart Rhythm Association (EHRA)¹, Heart Failure Association (HFA)², and Heart Rhythm Society (HRS)³
Objectives

- What this presentation should be:
  - An overview of the initial approach to transient loss of consciousness (T-LOC) and syncope
  - A brief discussion of mechanisms of syncope
  - A review of clinical features concerning for high-risk syncope, and risk of sudden cardiac death (SCD)

- What this presentation shouldn't be:
  - A detailed discussion of management issues
  - An excruciating analysis of every evidence-based recommendation made in the ESC guidelines
Definitions

• “Syncope is a T-LOC due to transient global cerebral hypoperfusion...”
  – Rapid onset
  – Short duration
  – Spontaneous, complete resolution
  – The definition includes the pathophysiologica l cause
    • Not enough blood to brain
  – There might be prodromal symptoms
  – Sometimes there might be retrograde amnesia
  – Patients might be fatigued post-event
Syncope in the context of T-LOC

Clinical presentation

- Loss of consciousness?
  - No
    - Falls
    - Altered consciousness
  - Yes
    - Transient? Rapid onset? Short duration? Spontaneous recovery?
      - No
        - Coma
        - Aborted SCD
        - Other
      - Yes
        - T-LOC
          - Non-traumatic
            - Syncope
          - Traumatic
            - Epileptic seizure
            - Psychogenic
            - Rare causes
Syncope Mimics

- Not an actual loss of consciousness
  - Cataplexy
  - Drop attacks
  - Functional/psychogenic

- Consciousness is truly and transiently lost, but for a reason other than global cerebral hypoperfusion
  - Seizure
  - Metabolic (hypoxia, hypoglycemia)
  - Intoxication
  - Usually not TIA (unless vertebrobasilar)
Pathophysiological Classification of Syncope

- Reflex (neurally-mediated) syncope
  - Vasovagal
  - Situational
  - Carotid Sinus Syncope

- Syncope due to orthostatic hypotension (OH)
  - Primary or secondary autonomic failure (ANF)
  - Drug-induced OH
  - Volume depletion

- Cardiac Syncope: arrhythmia or structural disease
I had trouble with this...

• What's the difference between reflex-mediated syncope, and syncope due to OH?
  – Don't they both involve low BP as cause of syncope?

• Reflex syncope: normal cardiovascular reflexes controlling circulation become intermittently inappropriate in response to a trigger

• Orthostatic hypotension: chronic impairment of vasomotor tone, leading to deficient vasoconstriction
  – Remember, OH is defined as abnormal drop in SBP on standing
More about Cardiac Syncope

• Arrhythmias as primary cause
  – Bradycardia
    • sinus node dysfunction – bradycardia/tachycardia syndrome
    • AV conduction system disease
    • malfunction of implanted device
  – Tachycardia
    • Supraventricular
    • Ventricular – idiopathic, secondary to structural heart disease, channelopathies
  – Drug-induced bradycardia and tachyarrythmias
More about Cardiac Syncope

• Structural disease
  – Cardiac
    • Valvular disease (aortic stenosis)
    • Acute myocardial ischemia/infarction
    • Hypertrophic cardiomyopathy
    • Cardiac masses
    • Pericardial disease/tamponade
  – Others
    • Pulmonary embolism
    • Acute aortic dissection
    • Pulmonary hypertension
Approaching the Patient

- Was it a syncopal event?
- What are common causes of syncope?
- What are dangerous causes of syncope?
- What types of investigations should I pursue?
- (how can I manage syncope)?
How to Diagnose Syncope

• Answer the following questions:
  – Was there complete LOC?
  – Was it a transient LOC with rapid onset and short duration?
  – Was there complete and spontaneous recovery?
  – Was there loss of postural tone?

• If the answer to all of these is YES, it is very likely to be syncope

• If there is a NO, it may be necessary to consider other causes of T-LOC
Prevalence of Causes of Syncope

- Reflex syncope is the most common in all settings
- Syncope due to cardiac causes is second most common
  - More common in older patients
  - More common in ER and cardiology settings
- Orthostatic hypotension is a frequent cause of syncope in the elderly
  - Rare cause in those < 40 yrs old
- High rate of unexplained syncope in all settings
<table>
<thead>
<tr>
<th>Setting</th>
<th>Source</th>
<th>Reflex, %</th>
<th>OH, %</th>
<th>Cardiac, %</th>
<th>Non-syncopal T-LOCs, %</th>
<th>Unexplained, %</th>
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<td>4–24</td>
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<table>
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<th>OH, %</th>
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<th>Non-syncopal T-LOCs, %</th>
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<td>-</td>
<td>9</td>
<td>Geriatric department. In diagnosis was multifac</td>
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Risk Stratification

- Main risk of mortality in syncopal patients is from sudden cardiac death (SCD)
- Several clinical scores have been designed using prospective population cohorts to identify risk factors for poor outcome
  - San Francisco Syncope Rule
  - OESIL score
  - EGSYS score
- Key factors predictive of worse outcome are abnormal ECG, increased age, history of CV disease
Some high-risk features in syncope should prompt hospitalization or intensive evaluation

- Severe structural cardiac disease
  - Heart failure
  - Low LVEF
  - Previous MI
- Features concerning for arrhythmia
  - Syncope during exercise or supine
  - Palpitations at time of syncope
  - ECG abnormalities
  - Family history of SCD
What are concerning ECG findings?

- Non-sustained VT
- Sinus bradycardia (excluding meds, athletes)
- “High-degree” AV node block
- Bifascicular block
  - LBBB, or RBBB plus LAFB or LPFB
- Pre-excited QRS
- Prolonged or short QT
- RBBB pattern with ST-elevation in leads V1-V3 (Brugada pattern)
Diagnostic Evaluation

- The guidelines discuss many different tests...
  - Carotid Sinus Massage
  - Orthostatic Challenge
    - Tilt Testing
  - ECG monitoring
  - Electrophysiological Studies
  - ATP testing
  - Echocardiography
Diagnostic Evaluation

• And yet more...
  – Exercise Stress Testing
  – Cardiac catheterization
  – Psychiatric evaluation
  – Neurologic evaluation
• ...and there's not the time to discuss them all
• But the etiology of syncope can often be determined on initial evaluation without further tests
  – 23-50% of the time
Clinical Features Suggesting Etiology

- Reflex syncope (neurally mediated)
  - Absence of heart disease
  - History of recurrent syncope
  - Emotional trigger
  - Prolonged standing, hot/crowded places
  - Associated with nausea, vomiting
  - During a meal or post-prandial
  - Associated with pressure on carotid sinus (tight shirt collar, shaving, tumors)
  - After exertion
Clinical Features Suggesting Etiology

- Syncope due to orthostatic hypotension
  - Syncope after standing up
  - Related to starting or changing medications
    - Anti-hypertensives, anti-anginals, diuretics
  - Prolonged standing in hot, crowded places
  - Standing after exertion
  - History of autonomic nervous failure (autonomic neuropathy, Parkinsonism, MSA)
Clinical Features Suggesting Etiology

- Syncope due to cardiac disease
  - Known structural heart disease
  - Family history of SCD or channelopathy
  - During exertion, or when supine
  - Abnormal ECG (see previous slides)
  - Sudden onset palpitations, followed by syncope
- ...these clinical features are very similar to the “high-risk” features discussed earlier
Diagnostic Evaluation

• Further tests to pursue, if initial assessment does not diagnose the cause

• Discussion of selected modalities to follow
  – Carotid sinus massage
  – Orthostatic challenge
  – ECG monitoring
  – EP studies
  – Echocardiography
  – Psychiatric or neurologic evaluation
Diagnostic Evaluation

• Carotid Sinus Massage (CSM)
  – Can be used to diagnose Carotid Sinus Hypersensitivity (CSH)
  – CSH is defined as a ventricular pause >3sec or fall in SBP >50mmHg in response to CSM

• CSH associated with spontaneous syncope is termed Carotid Sinus Syncope (type of reflex syncope)

• Avoid CSM if there are carotid bruits!
  – Unless carotid U/S shows no significant stenosis
  – Avoid if prior TIA, or prior stroke in last 3 months
Orthostatic Challenge

- Very simple to do in office/ward setting to diagnose OH as a cause of syncope
  - Active standing with intermittent BP measurements for 3 minutes
  - The test is diagnostic if there is a **symptomatic** decrease in SBP $\geq 20$mmHg, or DBP $\geq 10$mmHg, or if SBP falls below $90$mmHg
  - If BP drop is **asymptomatic**, the diagnosis is still likely
- Tilt table testing is out of the scope of this talk
**ECG monitoring**

- More useful when there is a high pre-test probability of finding an arrhythmia associated with syncope
  - Syncope during exercise or when supine
  - Palpitations preceding syncope
  - Family history of SCD
  - Abnormalities on initial ECG
- Many techniques available: Holter monitors, in-hospital monitors, event recorders, loop recorders (external or internal), remote telemetry
ECG monitoring

- ECG monitoring is diagnostic when there is correlation between syncope and a documented arrhythmia
  - Absence of arrhythmia during syncope excludes arrhythmic syncope
- Some arrhythmias are likely the cause of syncope even if they aren't correlated with a syncopal episode
  - Mobitz II or 3rd degree AV block
  - ventricular pause >3sec
  - rapid prolonged paroxysmal VT/VT
Electrophysiological Studies

- As with ECG monitoring, diagnostic utility is highly dependent on pre-test probability
- Positive findings on EPS occur mostly in patients with structural heart disease
- EPS is no longer indicated in setting of very low LVEF, as these patients should have an ICD regardless of syncope mechanism
- EPS is not recommended for patients with normal ECG, no heart disease, and no palpitations
Electrophysiological Studies

- When might EP studies be indicated?
  - Patients with ischemic heart disease suspected to have arrhythmic cause of syncope (unless they should just get an ICD)
  - When other non-invasive tests have failed to make a diagnosis of syncope, in the setting of:
    - Bundle branch block
    - Syncope preceded by palpitations
  - In select cases of Brugada syndrome, arrhythmogenic right ventricular cardiomyopathy, and hypertrophic cardiomyopathy
Echocardiography

- Indicated for patients suspected of having structural heart disease
  - Useful for diagnosis and risk stratification (LVEF)
- In a few cases, echocardiography alone will diagnose the cause of syncope
  - Aortic stenosis
  - Obstructive tumor/thrombus
  - Pericardial tamponade
  - Aortic dissection
  - Congenital anomalies of coronary arteries
Neurological Evaluation

- When should a neurologist be involved in the evaluation of syncope?
  - Patient suspected to have a cause of T-LOC other than syncope (ie seizure)
  - Syncope due to a neurological disorder causing autonomic nervous failure
- Carotid U/S, CT or MRI imaging of the brain, EEG are not indicated for work-up of T-LOC thought to be due to syncope
- TIA is a rare cause of T-LOC, and it will be accompanied by focal deficits if it causes T-LOC
Psychiatric Evaluation

• Not all syncopal episodes in psychiatric patients are “functional” or psychogenic
  – Many psych meds prolong the QT interval
  – Reflex syncope still common in this population

• Clues to pseudosyncope
  – Long episodes, high frequency
  – Lack of recognizable trigger
  – Injuries from falls don't preclude pseudosyncope

• Documenting normal parameters (EEG, BP, HR, muscle tone) during attacks is very helpful
What about treatment?
Summary Points

- Syncope is a transient loss of consciousness caused by global cerebral hypoperfusion
- Three main causes are reflex syncope, orthostatic hypotension, and cardiac disease
- Cardiac disease is the main cause of mortality in syncope
  - Risk stratification
- Many investigations available, not always necessary
- I didn't review specific treatments today