SYNCOPE

APPROACH TO DIAGNOSIS

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Definition

Transient loss of consciousness

Rapid onset

Short duration

Spontaneous complete recovery

Caused by global cerebral hypoperfusion
Category of causes

Reflex syncope
- Vasovagal = common faint
- Situational (physical)
- Carotid sinus syncope

Cardiac syncope
- Arrhythmia
- Structural
- Pulmonary embolism

Orthostatic syncope
- Drug-induced
- Volume depletion
- Primary and secondary autonomic failure
Causes of LOC

<table>
<thead>
<tr>
<th>Cause</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
</tr>
<tr>
<td>Vasovagal</td>
<td>19.8</td>
</tr>
<tr>
<td>Orthostatic</td>
<td>8.6</td>
</tr>
<tr>
<td>Cardiac</td>
<td>13.2</td>
</tr>
<tr>
<td>Seizure</td>
<td>7.2</td>
</tr>
<tr>
<td>Stroke/TIA</td>
<td>4.3</td>
</tr>
<tr>
<td>Medication</td>
<td>6.3</td>
</tr>
<tr>
<td>Other</td>
<td>9.5</td>
</tr>
<tr>
<td>Unknown</td>
<td>31.0</td>
</tr>
</tbody>
</table>

Incidence of syncope

Figure 1. Incidence Rates of Syncope According to Age and Sex.

Soteriades et al. NEJM 2002.
### Causes of Syncope – Age and Risk Considerations

<table>
<thead>
<tr>
<th></th>
<th>Young</th>
<th>Old</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benign</strong></td>
<td>• Vasovagal</td>
<td>• Vasovagal</td>
</tr>
<tr>
<td></td>
<td>• Situational</td>
<td>• Orthostatic</td>
</tr>
<tr>
<td></td>
<td>• Psychogenic</td>
<td>• Drug</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multifactorial</td>
</tr>
<tr>
<td><strong>Malignant</strong></td>
<td>• Inherited</td>
<td>• Arrhythmias</td>
</tr>
<tr>
<td></td>
<td>• Electrical - LQT, BS, CPVT etc</td>
<td>• Bradycardia</td>
</tr>
<tr>
<td></td>
<td>• Mechanical - ARVC, HCM, DCM</td>
<td>• Tachycardia</td>
</tr>
</tbody>
</table>
“PE is rarely considered as a possible cause of syncope”

Cross sectional study to determine the prevalence of syncope in patients who were hospitalised with first episode of syncope

PE was found in 52/205 (25%) of patients with unexplained syncope
Pathogenesis

Inappropriate reflex, arrhythmia, structural heart disease, volume depletion, ANS disorders
→
Fall in CO and/or SVR
→
Fall in BP (BP = CO × SVR)
→
Global cerebral hypoperfusion
→
Syncope
Reflex syncope

- C fibers
- Brainstem + Vagal efferents
- Hypotension
- Vigorous contraction of a poorly filled ventricle
- Sympathetic activation
- Venous pooling
- Bradycardia
How **not** to evaluate syncope
How not to evaluate syncope

Routine hospitalization

Routine investigations
- CT scan (head and/or chest)
- Carotid Dopplers
- EEG
- Troponin, d-dimer, BNP

Low yield, high cost, notoriously useless, still used
Transient loss of consciousness*

Suspected syncope

Evaluation as clinically indicated

Initial evaluation: history, physical examination, and ECG (Class I)

Cause of syncope certain

Risk assessment

Cause of syncope uncertain

Treatment

Further evaluation

ACC/AHA/HRS Syncope guidelines 2017
**Historical Criteria That Distinguish Syncope From Seizures**

Robert Sheldon, MD, PhD,* Sarah Rose, PhD,* Debbie Ritchie, MN,* Stuart J. Connolly, MD,† Mary-Lou Koshman, RN,* Mary Anne Lee, MD,‡ Michael Frenneaux, MD,§ Michael Fisher, BSc,* William Murphy, MD‡

<table>
<thead>
<tr>
<th>Question</th>
<th>Points (If Yes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At times do you wake with a cut tongue after your spells?</td>
<td>2</td>
</tr>
<tr>
<td>At times do you have a sense of déjà vu or jamais vu before your spells?</td>
<td>1</td>
</tr>
<tr>
<td>At times is emotional stress associated with losing consciousness?</td>
<td>1</td>
</tr>
<tr>
<td>Has anyone ever noted your head turning during a spell?</td>
<td>1</td>
</tr>
<tr>
<td>Has anyone ever noted that you are unresponsive, have unusual posturing or have jerking limbs during your spells or have no memory of your spells afterwards? (Score as yes for any positive response)</td>
<td>1</td>
</tr>
<tr>
<td>Has anyone ever noted that you are confused after a spell?</td>
<td>1</td>
</tr>
<tr>
<td>Have you ever had lightheaded spells?</td>
<td>-2</td>
</tr>
<tr>
<td>At times do you sweat before your spells?</td>
<td>-2</td>
</tr>
<tr>
<td>Is prolonged sitting or standing associated with your spells?</td>
<td>-2</td>
</tr>
</tbody>
</table>

The patient has seizures if the point score is ≥1, and syncope if the point score is <1.
<table>
<thead>
<tr>
<th></th>
<th>REFLEX</th>
<th>ORTHOSTATIC</th>
<th>CARDIAC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circumstance</strong></td>
<td>Pain</td>
<td>After standing</td>
<td>During exertion or supine</td>
</tr>
<tr>
<td></td>
<td>Prolonged standing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hot, crowded spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>After exertion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coughing, micturition,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>defecation, swallowing</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prodrome</strong></td>
<td>Warmth, sweating,</td>
<td>Very brief, absent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nausea, ringing in ears,</td>
<td>prodrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>abdominal pain</td>
<td>Rapid palpitations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>before syncope</td>
<td></td>
</tr>
<tr>
<td><strong>During LOC</strong></td>
<td>Pale, sweating</td>
<td></td>
<td>Cyanosis</td>
</tr>
<tr>
<td><strong>Postdrome</strong></td>
<td>Prolonged fatigue,</td>
<td>Rapid recovery of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>somnolence (hours)</td>
<td>mentation</td>
<td></td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
<td>Sudden death (&lt;50yrs)</td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td></td>
<td>Recent change in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>medication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parkinsonism,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>autonomic neuropathy</td>
<td></td>
</tr>
</tbody>
</table>
Diagnostic criteria for vasovagal syncope based on a quantitative history

Robert Sheldon¹*, Sarah Rose¹, Stuart Connolly², Debbie Ritchie¹, Mary-Lou Koshman¹, and Michael Frenneaux³ for the Syncope Symptom Study Investigators†

Table 5  Diagnostic questions to determine whether syncope is due to vasovagal syncope or to another cause of syncope

<table>
<thead>
<tr>
<th>Question</th>
<th>Points (if yes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a history of at least one of bifascicular block, asystole, supraventricular tachycardia, diabetes?</td>
<td>-5</td>
</tr>
<tr>
<td>At times have bystanders noted you to be blue during your faint?</td>
<td>-4</td>
</tr>
<tr>
<td>Did your syncope start when you were 35 years of age or older?</td>
<td>-3</td>
</tr>
<tr>
<td>Do you remember anything about being unconscious?</td>
<td>-2</td>
</tr>
<tr>
<td>Do you have lightheaded spells or faint with prolonged sitting or standing?</td>
<td>1</td>
</tr>
<tr>
<td>Do you sweat or feel warm before a faint?</td>
<td>2</td>
</tr>
<tr>
<td>Do you have lightheaded spells or faint with pain or in medical settings?</td>
<td>3</td>
</tr>
</tbody>
</table>

The patient has vasovagal syncope if the point score is ≥ -2.

Sensitivity 87%

Low Specificity 32% (+++ false positives)
What is the cause of syncope?
Is there a high-risk of SCD?

Syncope

- Reflex Orthostatic
- Cardiac
- Unknown

Trauma
Severe co-morbidities

Identify high-risk
Figure 2. Overall Survival of Participants with Syncope, According to Cause, and Participants without Syncope.
### Short-term high risk criteria which require prompt hospitalization or intensive evaluation

#### Severe structural or coronary artery disease
- Heart failure
- Low LVEF
- Previous myocardial infarction

#### Clinical or ECG features suggesting arrhythmic syncope
- Syncope during exertion or supine
- Palpitations at the time of syncope
- Family history of SCD
- Non-sustained VT
- Bifascicular-block (LBBB or RBBB combined with left anterior or left posterior fascicular block) or other intraventricular conduction abnormalities with QRS duration $\geq 120$ ms
- Inadequate sinus bradycardia ($<50$ bpm) or sinoatrial block in absence of negative chronotropic medications or physical training
- Pre-excited QRS complex
- Prolonged or short QT interval
- RBBB pattern with ST-elevation in leads V1–V3 (Brugada pattern)
- Negative T waves in right precordial leads, epsilon waves, and ventricular late potentials suggestive of ARVC

#### Important co-morbidities
- Severe anaemia
- Electrolyte disturbance
Congenital Long QT syndrome
Hypertrophic cardiomyopathy
Brugada syndrome
WPW
ARVD
Bifascicular block with prolonged PR
How to evaluate syncope

- **Tilt test**
  - Reflex or OH suspected

- **24 Hour Holter**
  - Arrhythmias suspected

- **Loop recorder**
  - Arrhythmias suspected

- **Exercise stress test**
  - Exercise induced syncope

- **Echocardiogram**
  - Structural heart disease suspected

When initial evaluation is unclear
Guided by clinical scenario
Will the test change management?
Reflex/orthostatic syncope

Positive tilt test
Hypotension (vasodepressive type) and/or bradycardia (cardioinhibitory type) with reproduction of syncope

Sensitivity 65%, specificity 93%*
A negative test does not exclude a diagnosis of reflex syncope

-> Intermediate pre-test probability of VVS

* Benditt et al. JACC 1996
Carotid sinus syncope

Carotid sinus massage

Carotid sinus syncope = ventricular pause > 3s and/or fall in systolic BP > 50mmHg with syncope

Perform supine and erect

Carotid sinus hypersensitivity common in the elderly

Spontaneous syncope and a positive test is highly predictive of occurrence of spontaneous asystolic episodes*

Cardiac (arrhythmic) syncope

Aim of monitoring is attack-ECG correlation

**In-hospital telemetry**
- Who? Life-threatening arrhythmia suspected
- Yield: low (16%)\(^1\)

**24-hour Holter**
- Who? Attacks >= 1/week
- Yield: very low (1%)\(^2\)

Cardiac (arrhythmic) syncope

Implantable loop recorder

Who? Unexplained syncope
High-risk patients

Yield: Unexplained syncope*

Systematic review of 4381 patients

* Solbiati et al. Int J Cardiol 2016

Diagnostic yield (44%)
Arrhythmia syncope (26%)
Time to diagnosis: 134 days
Cardiac (arrhythmic) syncope

EP study has a limited role

Disease dependent

Structural heart disease

Sustained MMVT

BBB

HV time > 70ms

Suspected SVT (unusual)

SVT
Treatment

Goals
- Prolong survival if possible
- Limit injuries
- Prevent recurrences

Goals dependent on cause of syncope
Treatment of Syncope

**Reflex/Orthostatic**
- Unpredictable or high frequency: Specific therapy or delayed treatment guided by ECG documentation
- Predictable or low frequency: Education, reassurance, avoidance of triggers usually sufficient

**Cardiac**
- Arrhythmias: Specific therapy of culprit arrhythmia
- Structural (cardiac or cardiopulmonary): Treat underlying disease

**Unexplained and high risk of sudden cardiac death**
- CAD, DCM, HOCM, ARVC, channelopathies: Consider ICD therapy according to guidelines

*European Guidelines EHJ 2009*
Reflex syncope

* Van Dijk et al., JACC 2006
Counterpressure manoeuvres

Benditt et al. JACC 2009
Reflex syncope – beta-blockers

Negative trial

* POST trial. Circulation 2006
Reflex syncope - pacing

3 RCTs pacing trials negative

VPS II (JAMA 2002)

ISSUE 3 (circulation 2012)

>=40 years
Asystole >=3 seconds with symptoms or asystole >=6s with no symptoms

57% reduction in syncope recurrence with DDD pacing compared to placebo

Consider in older patient with recurrent episodes of documented asystole
Reflex syncope

Why pacing may not help
Orthostatic syncope

Hydrate with fluid (2-3L/day) and 2tsp salt/day including acute water ingestion

Avoid drugs that lower BP

Support stockings

Drugs effective
  Midodrine (5-20mg 3x/day)
  Consider fludrocortisone (0.1-0.3mg/day)
Arrhythmic syncope

With attack-arrhythmia correlation, treat culprit arrhythmia

Who to pace?
Sinus node dysfunction
Second-degree or complete AV block
Bifascicular block
BBB and HV >70ms

Catheter ablation
SVT, VT (with no/minimal structural heart disease)

ICD
VT with structural heart disease
References

**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)

European Heart Journal (2009) 30, 2631–2671

**2017 ACC/AHA/HRS guideline for the evaluation and management of patients with syncope**

A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society

**REVIEW**

An approach to the clinical assessment and management of syncope in adults


NA B Ntusi, FCP (SA), DPhil; CB I Coccia, MB ChB; BJ Cupido, FCP (SA); A Chin, FCP (SA), MPhil