Evaluation of Syncope

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Objectives

• Be able to recognize common causes of syncope and the management of patients with syncope.

No Relevant Disclosures
Facts About Syncope

~40% of the population will have at least one syncopal event in their lifetime\(^1\)

10% of falls by elderly are believed due to syncope\(^2\)

Major morbidity reported in 6\%\(^1\) (e.g., fractures, motor vehicle accident)

Minor injury reported in 29\%\(^1\) (e.g., lacerations, bruises)

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Syncope and Quality of Life

Etiology of Syncope

- Syncope remains unexplained in approximately 1/3 of cases.
- Pulmonary embolism was identified in 45 of the 355 patients (12.7%) who had an alternative explanation for syncope and in 52 of the 205 patients (25.4%) who did not.

What is the cost of syncope?

• In 2011, 579 Medicare patients presented to single ER with syncope and were discharged with a primary diagnosis of syncope (ICD-9: 780.2)
  – 396 (68%) patients were hospitalized
  – Observation status (n=71 [18%])
  – Inpatient status (n=325 [82%])
  – The 325 inpatients, 56% of the total cohort, accounted for 86% of the total costs spent on patients with syncope
  – The care of each inpatient resulted in an ~$1800 deficit to the hospital

Mittal et al. AHA 2012
Osservatorio Epidemiologico sulla Sincope nel Lazio (OESIL)

- **Variables (score)**
  - Age > 65 years (1)
  - History of cardiovascular disease (1)
    - SHD, CHF, PVD, TIA/stroke
  - Syncope without prodrome (1)
  - Abnormal ECG (1)
    - Everything but a truly normal ECG

- 12-month all-cause mortality by score
  - 0: 0.0%
  - 1: 0.8%
  - 2: 19.6%
  - 3: 34.7%
  - 4: 57.1%

Colivicchi F et al. Eur Heart J 2003; 24: 811-819
Evaluation of Syncope (VANOOM)

- Vasovagal Syncope (30%): Get the history.
- Arrhythmia (20%): EKG and Echo
- Neurologic
- Orthostatic Hypotension (30%):
  - Drug Induced: 28%
  - Autonomic Failure: 27%
  - Age-related: 20%
  - Multiple System Atrophy: 13%
  - Parkinson’s disease: 5%
  - Unclassified: 2%
- Organic Heart Disease: Stenotic Valves, Cardiomyopathy (including HOCM)
- Medications (look for BPH med changes)
Is it vasovagal syncope?  
Calgary Syncope Symptom Score

*Distinguishes between VVS syncope and syncope due to other causes in patients without structural heart disease. Use scoring criteria:*

1. History of one of the following: bifascicular block, asystole, SVT, DM2 (-5)
2. Bystander noted patient turned blue with faint (-4)
3. Syncopal episodes started at age 35 years or older (-3)
4. Any memory of being unconsciousness (-2)
5. Pre-syncope or syncope with prolonged sitting or standing (+1)
6. Pre-syncope or syncope with pain or in medical settings (+3)

If the total point score is $\geq -2$, the point score correctly diagnosis patients with VVS with 89% sensitivity and 91% specificity

*Sheldon R et al Eur Heart J 2006; 27: 344-350*
Arrhythmogenic Causes of Syncope

Figure 2. Electrograms of arrhythmias recorded with the ICM. A. Paroxysmal second- to third-degree AV block. At the time of the recording, the patient felt dizzy but did not activate the ICM, which was automatically activated at ▲. The patient received a pacemaker 5 days later. B. This patient experienced a severe syncopal attack and did not manage to use the activator. Two episodes of nonsustained VT are recorded: the second episode provokes polymorphic VT degenerating to VF. The episode is automatically activated at ▲. The VF converted back to polymorphic VT, which terminated spontaneously (not shown). The patient subsequently received an ICD.
Neurologic Causes of Syncope

• Epilepsy: 107 adults seen in four Italian epilepsy were seen for “possible” or “drug-resistant” epilepsy, and were assessed for recurrent syncope of unknown cause
  – Overall, about 42.1% had isolated syncope, 19.6% had isolated epilepsy, and 37.4% had coexistent syncope and epilepsy.

• Syncope and TIA: These patients tend to be elderly males with high incidence of ischemic heart disease and hypertension. The concurrent neurologic symptoms, leading to the diagnosis, represent mainly vertebrobasilar territory ischemia.

Patients at high risk for major CV events or SCD

- **Severe structural or coronary artery disease**
  - Heart failure; low ejection fraction; previous myocardial infarction
- **Clinical or ECG features suggesting arrhythmic syncope**
  - Syncope during exertion or while supine
  - Palpitations at the time of syncope
  - Family history of sudden cardiac death
  - Non-sustained VT
  - Bifascicular block
  - Inadequate sinus bradycardia
  - Pre-excited QRS complex; short or prolonged QT interval; RBBB pattern with ST elevation (Brugada pattern); negative T waves in right precordial leads, epsilon waves, ventricular late potentials (suggestive of ARVC)
- **Important co-morbidities: Severe anemia or electrolyte disturbance**

ECG Patterns in Syncope

Long QT

Hypertrophic CMP

Brugada Patterns

RBBB/LAFB

Bifasciular Block not just RBBB alone!!

ECG’s from Lifeinthefastlane.com
Mitral Annular Calcification

- Mitral annular calcification (MAC) is often noted on echo reports or even visible on chest x-rays.
- MAC is also associated with symptomatic bradyarrhythmias such as atrial fibrillation and sinus node dysfunction.
  - Nair et al [NAI82] examined 68 consecutive patients requiring pacemakers and the incidence of MAC in this group was 83-93%; of these patients, 22% had AV block, 34% had atrial fibrillation with slow ventricular response, and 44% had intermittent sinus arrest.
- MAC is associated with carotid vascular disease. [ADL98, ADL01]
- This is important because carotid sinus hypersensitivity (CSH) in elderly patients is also associated with carotid vascular disease [OMA95] and may be associated with 45-50% of elderly patients that present with falls. [OPMA95, CRI97, SHA97]
Carotid Sinus Hypersensitivity (20%)

- **Carotid Sinus Massage:**
  - **Absolute Contraindications:**
    - MI within 3 months.
    - TIA/CVA within 3 months.
  - **Relative:**
    - Previous VT/VF
    - Presence of carotid bruit

- Kenny and Perry, “Syncope-related falls in the elderly,” J Geriatric Cardiology, V. 2, No. 2 (June 2005), pp. 74-83.
Orthostatic Hypotension (30% of syncope):

- Drug Induced: 28%
- Autonomic Failure: 27%
- Age-related: 20%
- Multiple System Atrophy: 13%
- Parkinson’s disease: 5%
- Unclassified: 2%
Medications Associated with Syncope

• Polypharmacy is associated with falls in the elderly.
• Common offenders: BPH meds, Nitrates, Calcium channel and beta blockers.
• Consider temporal relation of these medications and prolonged standing.
Yields of Testing Options

<table>
<thead>
<tr>
<th>Test/Procedure</th>
<th>Yield*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG</td>
<td>2-11%</td>
</tr>
<tr>
<td>Holter Monitoring</td>
<td>2%</td>
</tr>
<tr>
<td>External Loop Recorder</td>
<td>20%</td>
</tr>
<tr>
<td>Tilt Table</td>
<td>11-87%</td>
</tr>
<tr>
<td>EP Study without structural heart disease</td>
<td>11%</td>
</tr>
<tr>
<td>EP Study with structural heart disease</td>
<td>49%</td>
</tr>
<tr>
<td>Neurological (CT scan, carotid doppler)</td>
<td>0-4%</td>
</tr>
<tr>
<td>Loop Recorder (studied with Reveal)</td>
<td>43-88%</td>
</tr>
</tbody>
</table>

*(Based on mean diagnosis time of 5.1 mos.)*

Randomized Assessment of Syncope Trial

Methods:

- 60 patients with unexplained syncope and LV EF >35% were randomized to conventional testing or a Reveal ILR
- If patients remained undiagnosed after their assigned strategy, they were offered a crossover to the alternate strategy

Results:

- Combining primary strategy with crossover, the diagnostic yield was 52% for ILR only versus 19% for conventional only
- Cost/diagnosis of ILR was 26% less than conventional testing

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