SYNCOPE

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- Transient loss of consciousness
- Altered blood flow to the brain
  - Quality
  - Quantity
- Postural collapse

European Society of Cardiology. Guidelines for the Diagnosis and Management of Syncope. European Heart Journal. 2009. 30:2631


SYNCOPE - INCIDENCE

- 71.9 - 125.8/100,000 adolescents
- 22.3% of USAF basic trainees
- 7% USAF personnel (avg. age 29)
- 47% of 871 chemistry students


SYNCOPE - Prevalence

- 3% of men/3.5% of women over 30 years
- 6%/yr of 77-87 year old
- 23% of 77-87 year olds over 10 year period
- 1% of hospital admissions
- 3% of ER visits


SYNCOPE - Prevalence

- Vasovagal 18%
- Situational 5%
- Carotid sinus 1%
- Orthostatic hypotension 8%
- Medications 3%
- Psychiatric 2%
SYNCOPE - Prevalence

- Neurologic: 10%
- Organic heart disease: 4%
- Arrhythmias: 14%
- Unknown: 34%

Day et al., *American J. of Medicine*. 1982. 73.15

SYNCOPE - DDx

- Inadequate vasoconstrictor mechanisms
- Hypovolemia
- Mechanical reduction of venous return
- Reduced cardiac output
- Arrhythmias
- Altered state of blood to the brain
- Cerebral

- Vasovagal
- Postural hypotension
- Primary autonomic insufficiency
- Sympathectomy (meds vs. surgery)
- Central and peripheral nervous system disease
- Carotid sinus syncope
A 60 year old male presents with syncope after loading his suitcases for vacation. He had a stent placed (LAD) 6 months ago……

What would you do next?

He had a cardiac evaluation in the ED
- CXR, EKG, CK, Troponin all normal
- Hgb 9

“Come admit the patient for a cardiac rule out”

Completed Cardiac Rehab successfully
Taking his meds – BB, ACE, ASA, Clopidogrel

ROS – “I have diarrhea – 1 formed stool a day”
(normal for him was once a week)

Vitals and exam were normal.

Now what would you do?
Orthostatics +
Heme +
Hgb dropped to 7 after IVF
‘asymptomatic Gastric Ulcer’

SYNCOPE - DDx
• Hypovolemia
  • Blood loss
  • Adrenal disease

SYNCOPE - DDx
• Mechanical reduction of venous return
  • Valsalva
  • Cough
  • Micturition
  • Atrial myxoma
  • Laughing
  • Swallowing
A 50 year old female with DM and HTN presents to an Emergency with a complaint of syncope. She passed out for a few seconds then was fine. She was monitored for a few hours, had normal lab then told to watch her sugars more closely……

She presents a few weeks later again with syncope for a few seconds. This time she was admitted for observation. Vitals (including orthostatics) and exam were normal. Lab, CXR, DSE, Telemetry, Blood sugars, MRI brain, carotid Doppler all normal.

She was told to go home and watch her sugars……
She again presented the following week with syncope for a few seconds. Swears her sugars are good. Brings in a log book. 120 to 200. No lows. No warning. In between syncopal episodes she does chores and feels fine.

What would you do next?
SYNCOPE - DDx

- Arrhythmias
  - Bradyarrhythmias
  - Tachyarrhythmias
SYNCOPE - DDx

- Altered state of blood to the brain
  - Hypoxia
  - Anemia
  - Diminished carbon dioxide
  - Hypoglycemia

SYNCOPE - DDx

- Cerebral
  - CVA
  - Vertebral-basilar insufficiency
  - Spasm of cerebral arterioles (hypertensive encephalopathy)
  - Anxiety/emotional disturbances
SYNCOPE - Evaluation
- Lab
- ECG
- ECHO
- CT
- TELE
- Carotid US
- EP study
- Tilt
- EEG
- VQ

SYNCOPE - Evaluation
- History
  - Activity and position prior to syncope
  - Associated symptoms
    - Cardiac, GI, CNS
  - Duration of warning period
  - Precipitating factors
  - Duration of LOC
  - Report from witnesses
  - Postsyncope symptoms
  - Past medical history/meds

SYNCOPE - Evaluation
- Drugs causing syncope
  - Vasodilators
  - Adrenergic antagonists
  - Diuretics
  - Phenothiazines
  - Antidepressants
  - Nitrates
  - Calcium channel blockers
  - CNS Depressants (barbiturates)
SYNCOPE - Evaluation

- Drugs causing syncope
  - Vincristine
  - Antiarrhythmics
  - Digitalis
  - Insulin
  - Marijuana
  - Alcohol
  - Cocaine

SYNCOPE - Evaluation

- Physical
  - Orthostatics
  - Carotid
  - Murmur
  - Hemoccult
  - Focal neurologic deficit
  - Pulse oximetry

SYNCOPE - Evaluation

- Lab
  - Hgb
  - Sodium
  - Glucose
  - Cardiac enzymes
SYNCOPE - Evaluation

- History and physical
- ECG
- Lab
  - Routine labs not recommended
  - Only helps confirm clinical suspicion


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SYNCOPE - Evaluation

- Electroencephalography
  - Not recommended for unselected patients
  - 8 of 535 patients with syncope had + EEG
  - 2 of the 8 had a history of seizures
  - History was not specified in the other 6


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SYNCOPE - Evaluation

- CT/MRI
  - Diagnostic yield of 4% out of 195 patients studied
  - Focal neurologic signs
  - Witnessed seizure
  - MRI has not been studied

Syncope - case

• 71 year old white male – syncope X 2
• Echo – LVH with preserved EF
• Cath, EP, EEG, Normal Telemetry
• Doppler – 80-99% (L)ICA, 60-79% (R)
• MRA – 65% (L)ICA, 70% (R)
• Angio – 80% (L)ICA, 90% (R)
• Stent placed – 95% bilateral disease

SYNCOPE - Evaluation

• Carotid Doppler
  Not well studied
  Carotid Bruit, delayed upstroke, ‘stroke age’ patient or focal neurologic findings
  “Ultrasonography identified cerebrovascular lesions that may have contributed to the syncopal process in only 2 of 140 patients, but the lesions were unlikely to have been the primary cause of syncope in either patient”

SYNCOPE - Evaluation

• Echocardiography
  • Not well studied
  • Unsuspected findings only 5% - 10%
  • Exertional syncope
  • Murmur
  • Abnormal ECG
  • Abnormal CXR
  • Always do echo prior to stress test
SYNCOPE - Evaluation

- Telemetry/holter/event recorder
  - 4% of patients correlate sx. with arrhythmia
  - 15% had arrhythmia but no sx.
  - Use during inpatient observation
  - No prodrome
  - Brief loss of consciousness
  - Palpitations
  - Extended monitoring increases yield for arrhythmias
  - Highest yield diagnostic arrhythmias in structural heart dz

  Bass et al. Archives of Internal Medicine. 1990. 150.1073

SYNCOPE - Evaluation

- Electrophysiology studies
  - Serious organic heart disease
  - CHF
  - Elderly with conduction abnormalities on ECG

SYNCOPE - Evaluation

- Carotid sinus massage
  - Most useful in patients > 60 years of age
  - Complication rate < 0.2%
  - High false positive rate
  - Cardioinhibitory
  - Vasodepressor
  - Tissue scars, enlarged lymph nodes, carotid body tumors
  - Parotid, thyroid and head and neck tumors

  Munro et al. J. of Am. Geriatric Society. 1994.42.1248
SYNCOPE - Evaluation

• Tilt table
  • Sudden tilt to 60 degrees
  • Isoproterenol
  • Cardioinhibitory or vasodepressor response
  • Positive test only if patients typical sx. reproduced
  • Stress test prior to tilt?


SYNCOPE - Evaluation

• Psychiatric evaluation
  • Younger patients with recurrent syncope
  • 35% of syncopal patients have psychiatric diagnosis
  • Anxiety, depression, conversion disorder
  • False positive Tilt table

Grubb et al. Clinical Cardiology. 1992.15.839

HOSPITALIZATION

• Indicated
  • Associated with MI, stroke, or arrhythmias
  • History of CAD, CHF, or ventricular arrhythmias
  • Chest pain
  • Significant physical exam finding
    • Murmur, CHF, stroke
  • ECG findings
    • Ischemia, arrhythmia
    • Increased QT interval
    • Bundle branch block

HOSPITALIZATION

- Often indicated
  - Sudden loss of consciousness with injury
  - Exertional syncope
  - Frequent spells
  - Suspicion of CAD or arrhythmia
  - Moderate to severe orthostatic hypotension
  - Older than 70 years of age


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**Table 2. Potential Therapies for Neurocardiogenic Syncope.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Use and Dosage</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resting</td>
<td>About 10 hrs/day</td>
<td>Poor compliance, frequent medication</td>
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<tr>
<td>Lift exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical therapy</td>
<td>Isometric or contractile, leg exercise</td>
<td>Unable in absence of problems</td>
</tr>
<tr>
<td>Tilt training</td>
<td>120 min/day</td>
<td>Poor compliance</td>
</tr>
<tr>
<td>Drugs and devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midodrine</td>
<td>2.5-10 mg 3 times daily</td>
<td>Nausea, scalp pruritis, hypertension</td>
</tr>
<tr>
<td>Intravenous</td>
<td>0.1-0.2 mg/kg/min</td>
<td>Blushing, hypotension, headache</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>Drugs such as metoprolol (10 mg) or tenoprilat (17 mg/day)</td>
<td>Propranolol, fatigue, hypotension</td>
</tr>
<tr>
<td>Selective serotonin-reuptake inhibitors</td>
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<tr>
<td>Permanent cardiac pacing</td>
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<td>Inappropriate, ventricular fibrillation</td>
</tr>
</tbody>
</table>

*This treatment has been reported to be effective in at least one randomized clinical trial. For beta blockers, other non-drug trial data provided no benefit.*

**Note:** Patients who are not candidates for pacemakers can be treated with other methods including external defibrillator training.

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Treatment

- Fix underlying problem