Syncope

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Syncope

- Syncope – loss of consciousness
- Vertigo – sensation of motion
- “Drop attacks” – fall without loss of consciousness seizure
Figure 1. Cumulative Survival of Patients with Syncope Due to a Cardiovascular Cause (Circles), Syncope Due to a Noncardiovascular Cause (Triangles), and Syncope of Unknown Origin (Squares) (Kaplan–Meier Estimates).

At 12 months mortality was 30.6.7 per cent in patients with a cardiovascular cause of syncope—significantly different from the 12.4.4 per cent mortality in patients with a noncardiovascular cause (P < 0.02) and the 6.4.2.8 per cent mortality in patients with syncope of unknown origin (P < 0.0001). There was no significant difference between mortality in patients with a noncardiovascular cause and in patients with syncope of unknown origin (P = 0.16).
Syncope

Constatino n=670
Short term (with in 10 days) outcomes
Multi-variant Analysis

- Abnormal EKG
- Trauma
- Absence of previous symptoms
- Male gender
Syncope

Long term (1 year) outcomes

- Mortality 6%
- “Severe” outcome 3.3%

Multi-variate Analysis

- Age > 65
Table Title:

One-Year Mortality HRs Stratified by Age Groups Adjusted for Sex, Age, Comorbidity, and Pharmacotherapy
Table Title:

Long-Term Mortality HRs Stratified by Age Groups Adjusted for Sex, Age, Comorbidity, and Pharmacotherapy

<table>
<thead>
<tr>
<th>Age Group</th>
<th>HR</th>
<th>95% CI</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>1.601</td>
<td>1.03-2.68</td>
<td>0.0197</td>
</tr>
<tr>
<td>26-44</td>
<td>2.291</td>
<td>1.87-2.80</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>45-74</td>
<td>1.231</td>
<td>1.15-1.31</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>&gt;75</td>
<td>0.980</td>
<td>0.94-1.01</td>
<td>0.2063</td>
</tr>
<tr>
<td>All age</td>
<td>1.061</td>
<td>1.10-1.17</td>
<td>0.0033</td>
</tr>
</tbody>
</table>
Figure Legend:

Cumulative Incidence Plot of Long-Term All-Cause Mortality in the Age Group 45 to 74 Years: Syncope Versus Control Group

A significant difference in the risk of all-cause mortality in the age group 45 to 74 years indicates that this age group may have syncope as a first symptom of future cardiovascular disease and adverse outcome.
A significant difference in the risk of future cardiovascular hospitalization across all age groups indicates that syncope in healthy individuals may be the first symptom of future cardiovascular disease and increased hospitalization compared with the background population.

Figure Legend:
Competing Risk Model of Patients With Syncope Compared With Control Subjects and the Cumulative Incidence of Cardiovascular Hospitalization
From: Prognosis Among Healthy Individuals Discharged With a Primary Diagnosis of Syncope


There was a significant difference in the risk of insertion of a pacemaker (PM) or implantable cardioverter-defibrillator (ICD) when comparing syncope patients and control subjects. The increase in risk was particularly dramatic within the first year after discharge for syncope, after which the curves became parallel.

Figure Legend:
Competing Risk Model of Patients With Syncope Compared With Control Subjects and the Cumulative Incidence of Implantation of a Pacemaker or ICD
Competing Risk Model of Patients With Syncope Compared With Control Subjects and the Cumulative Incidence of Stroke

Stroke as an indicator of future cardiovascular disease was significantly increased across all age groups in the healthy syncope population compared with the control population.
The Baroreflex

- Afferent pathway:
  - Baroreceptor
  - Carotid sinus
  - Aortic arch

- Efferent pathway:
  - PVN
  - SON
  - Vasopressin
  - RVLM
  - NTS
  - NA
  - A1
  - CVLM
  - Sympathetic ganglion
  - Sinus node
  - Heart
  - Blood vessel

References:
Standing

- 300~1000cc blood displaced to splanchnic, lower extremity circulation (1/4~1/3 volume)
- Decreased venous return to heart
- Decreased cardiac output
- Decreased blood pressure
The Baroreflex

Afferent pathway

Baroreceptor
Carotid sinus
Aortic arch

Efferent pathway

PVN
SON
Vasopressin
RVLM
NTS
NA
CVLM

Sinus node
Heart
Sympathetic ganglion
Blood vessel


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Baroreceptor Activation

↑ Sympathetic Outflow

↓ Vagal N activity

↑ PVR

↑ VR ↔ ↑ CO ↔ ↑ BP

↑ HR
Standing

Contraction of leg/calf muscles

VR

Transmural capillary pressure

Fluid filtration into tissue

- Steady state approximately 30min
Neurocardiogenic Syncope

- System “failure”
- Cardiac “hyper contractile” state

Mechanoreceptors
- Normally respond only to stress
- Paradoxic bradycardia & PVR
Reflex Syncopes

- Neurocardiogenic
- “Trigger”
  - Prolonged standing, fear, emotional distress, pain, standing in hot areas.
- Situational
  - Micturition, defecation, cough
- Carotid sinus hypersensitivity
Reflex Syncopes

- **Prodrome**
  - Lightheadedness, nausea, diaphoresis, headache, weakness, flushing
- **Sudden, brief LOC**
- **Rapid recovery** (weak, fatigue)

**Caveat** *1/3 patients, especially elderly~no prodrome*
Cardiac Causes of Syncope

- LV outflow obstruction
  - AS, HOCM, LA Myxoma, MS
- RV/Pulmonary flow obstruction
  - PE, PS, RA Myxoma
- Pump failure/LV dysfunction
- Cardiac tamponade
- Aortic dissection
- Congenital HD
- ARVD
Cardiac Causes of Syncope

- Brady dysrhythmias
- Tachy dysrhythmias
- Long QT syndrome
- Brugada syndrome
- Torsades De Pointes
- Electrolyte abnormalities
History

- “Situation”
- LOC duration
- Recovery
- Volume status
- Disorders of autonomic nervous system
- Medications
- Blood loss
- Diabetic ?blood sugar?
Prodrome

- Neck pain
  - "Coat hanger headache"
    - Ischemia to trapezius & neck muscles
- Dyspnea
  - V/Q mismatch
- Chest pain
  - Impaired myocardial perfusion does not necessarily indicate CAD
Cardiac Related History

- Palpitations
- Prior/known cardiac meds
- Cardiac meds (anti-arrhythmics, diuretics)
- Phenothiazines/tricyclics
- OTC meds

🌟 Exertional ???
🌟 Family History of sudden/unexplained death
EKG

- Rhythm & AV conduction
  - Bradycardia, tachycardia, BBB, higher degree AVB
- QRS complex
  - Delta wave, QT segment
- Ischemia
- ARVD ★
- Brugada syndrome
Exam

- Carotid bruits
- Pulses – symmetry??
- Murmur
  - Aortic stenosis
  - Duration/peak
  - S2/P2
- Dynamic murmur
Echo

- LV function
- Valvular heart disease
- HOCM
- Congenital heart disease
- ARVD
- Pulmonary embolus
• Targeted diagnostics
• Targeted therapy
Conclusions

• Know what you are looking for
• Know correct, directed questions to ask
• “Start at the top”
• History
  - Prodrome/”situation”
  - Duration LOC
  - Recovery
• Cardiac testing driven by history & PE findings
Conclusions

- Exertional syncope is BAD!!!!!