Transient Loss of Consciousness
(The management and investigation of Syncope)

Dr Rhys Beynon
Consultant Cardiologist
University Hospital of the North Midlands
Royal Stoke University Hospital
TLOC

• Syncope
  - Syncope is a T-LOC due to transient global cerebral hypoperfusion characterized by rapid onset, short duration, and spontaneous complete recovery

• Epileptic seizures

• Psychogenic

• Metabolic causes - hyperventilaton with hypocapnea

• Vertebrobasilar TIA

• Traumatic - concussion

Incidence rates of TLOC according to age. N = 127,000 ED, OPD

Ruwald M H et al. Europace 2012;14:1506-1514
Distribution of TLOC according to gender and age.

Ruwald M H et al. Europace 2012;14:1506-1514
Causes of TLOC
Syncope

• Reflex
  - Vasovagal
  - Situational
  - CSM

• Orthostatic
  - Drug induced - vasodilators/diuretics
  - Volume depletion
  - Primary autonomic - Pure failure, Parkinsons, Multisystem atrophy, Lewy Body
  - Secondary autonomic - diabetes, amyloid, uraemia

• Cardiac
  - Bradycardias
  - Tachycardias
Vasovagal syncope

- Brought on by emotion or orthostatic stress, usually standing occasionally prolonged sitting
- Usually a prodrome; sweating, pallor, nausea
- Brief LOC 30secs - 5 mins
- Postdrome lasts minutes to hours (usually longer than cardiac syncope)
Tilt test

- Not very useful in patients with a clear history of VVS
  - Reproducibility questionable
  - Correlation between asystole with TT and syncope noted with ILR not great

- Most useful in intermediate group where you might want to investigate orthostatic hypotension - older patient group
Treatment of VVS and OH

- **Lifestyle measures**
  - hydration / salt / alcohol avoidance / medications / exercise?

- **Physical manoeuvres**
  - leg crossing / squatting / hand and arm squeezing / button clenching! - reasonable data

- **Tilt training**
  - progressively longer periods of standing - 4 RCTs all negative

- **Drugs**

- **Pacing**
Drugs for VVS

• **Midodrine**
  - half life 3-4 hours
  - 5mg BD to 10mg every 3-4 hours during daylight hours
  - Small and non randomised studies suggested benefit
  - \(^1\)Not shown to be of benefit for VVS in RCTs (*but is of benefit in OH*)
  - Practicalities of treatment

• **Beta Blockers**
  - POST trial - Large RCT showed no benefit
  - Meta analysis including POST trial showed benefit in older patients >42 years

Drugs for VVS

- **Fludrocortisone**
  - 0.1mg/day increasing to 0.3mg/day
  - Half life 18-36 hours
  - POST 2 trial - no difference between 0.2mg and placebo

- **SSRIs**
  - Paroxetine has been shown to useful in one RCT
Pacing for VVS

• ISSUE 3
  - >40 years with 3 syncopal episodes in 3 years
  - ILR placed
  - Syncope with >3 sec pause, or >6sec asymptomatic pause
  - 32% absolute and 57% relative RR at 2 years

• Pacing best guided by ILR not by Tilt test results
Situational syncope

- Syncope with stressful situations - needles
- Syncope during swallowing, micturition, coughing, defecation
- Usually due to ‘reflex syncope’
- Avoidance of trigger ???!!
- Other treatment similar to VVS
Orthostatic hypotension - drugs / autonomic failure

- **Classical OH** - decrease in systolic BP >20 mmHg and in diastolic BP >10 mmHg within 3 min of standing
- **Initial OH** - SBP >40mmg within 30sec of standing with BP quickly returning to normal
- **Delayed / progressive**
- **POTS**
- Symptoms usually presyncopal rather than syncope, with visual disturbance and fatigue
- **Treatment**
  - Lifestyle measures - 2-3 litres fluid / day 10g salt
  - Midodrine good data / Fludrocortisone observational data
  - Sleeping with head up 10 degrees
Carotid sinus hypersensitivity / massage

- Patients over 40yrs with history syncope
- Massage of R and L carotid body for 5-10sec - 1.5Hz
- Level of upper border of thyroid cartilage
- Best performed with beat to beat pulse and BP monitoring
- Positive if symptoms and >3sec pause or fall in BP of 50mmhg
- Avoid if previous TIA/Stroke (6 months) or carotid bruits

Pacing for carotid sinus hypersensitivity

- Reduction in syncopal episodes and severity in 2 RCTs
- Dual chamber pacing better than VVI

Subclavian steal / Vertebrobasilar TIA

- limb weakness
- Gait ataxia
- oculomotor palsies
- swallowing difficulties
Cardiac syncope investigations

**Recommendations**

<table>
<thead>
<tr>
<th>Indications</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG monitoring is indicated in patients who have clinical or ECG features suggesting arrhythmic syncope (listed in Table 10). The duration (and technology) of monitoring should be selected according the risk and the predicted recurrence rate of syncope:</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Immediate in-hospital monitoring (in bed or telemetric) is indicated in high risk patients defined in Table 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holter monitoring is indicated in patients who have very frequent syncope or pre-syncope (≥1 per week)</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>ILR is indicated in:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An early phase of evaluation in patients with recurrent syncope of uncertain origin, absence of high risk criteria listed in Table 11 and a high likelihood of recurrence within battery longevity of the device</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>High risk patients in whom a comprehensive evaluation did not demonstrate a cause of syncope or lead to a specific treatment</td>
<td>I</td>
<td>B</td>
</tr>
</tbody>
</table>

**Short-term high risk criteria which require prompt hospitalization or intensive evaluation**

- **Severe structural or coronary artery disease** (heart failure, low LVEF, or 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 ≥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
Reveal devices

- 3 year battery life
- Automatic recording
- Symptomatic recording
- Cost £1800
Pseudosyncope

- Psychogenic non epileptic seizures account for up to 30% of epilepsy clinics
- Pseudosyncope may occur in up to 6% of syncope
- Usually longer than syncope - up to 15 mins
- Multiple attacks / day
- Eyes usually closed (open often in syncope)
  - eyes closed in 97% psuedo vs 7% VVS - tilt table test with symptoms
- Pulse and BP tend to increase with symptoms

Epilepsy and its variants

- Tonic clonic
- Myoclonic
- Clonic
- Atonic - rare and usually starts in childhood
- Tongue biting / post ictal phase
Sinus node disease
Pacing in sinus node disease

• CLASS 1
  Permanent pacemaker implantation is indicated for SND with documented symptomatic bradycardia, including frequent sinus pauses that produce symptoms. (Level of Evidence: C)

CLASS IIa
  Permanent pacemaker implantation is reasonable for SND with heart rate less than 40 bpm when a clear association between significant symptoms consistent with bradycardia and the actual presence of bradycardia has not been documented. (Level of Evidence: C)

CLASS IIb
  Permanent pacemaker implantation may be considered in minimally symptomatic patients with chronic heart rate less than 40 bpm while awake. (Level of Evidence: C)

CLASS III
  Permanent pacemaker implantation is not indicated for SND in asymptomatic patients.
Av node disease
Pacing in AV block

- So this is very age dependant
- Guidelines suggest that symptom rhythm correlation is important - definitely in the young
- Cardiologist are much more relaxed in the Elderly
  - PPM battery life - 10 years
  - Leads last 25 years
  - Risks low : 3%
    infection/bleeding/punctured lung/lead displacement
Risk stratification of TLOC in the ED

- TLOC 1% of presentations to the ED
- San Francisco Syncope Rule
  - C – History of congestive heart failure
  - H – Haematocrit < 30%
  - E – Abnormal findings on 12-lead ECG or cardiac monitoring (new changes or non-sinus rhythm)
  - S – History of shortness of breath
  - S – Systolic blood pressure < 90 mm Hg at triage

- 30 day < 2% risk of death, myocardial infarction, arrhythmia, pulmonary embolism, stroke, subarachnoid haemorrhage, significant haemorrhage or any condition causing or likely to cause a return visit to the emergency department and admission to hospital for a related event

- 45% of patients estimated to be high risk

Risk stratification of syncope in the ED

- The ROSE rule - BBRACES
  Admit if any of the following are present:
  - B BNP level $\geq 300$pg/ml
  - B Bradycardia $\leq 50$ in Emergency Department or pre-hospital
  - R Rectal examination showing faecal occult blood (if suspicion of gastrointestinal bleed -13% performed in study)
  - A Anaemia - Haemoglobin $\leq 90$ g/l
  - C Chest pain associated with syncope
  - E ECG showing Q wave (not in lead III)
  - S Saturation $< 94\%$ room air

- 30 day <1.5% of death, myocardial infarction, arrhythmia, pulmonary embolism, stroke, subarachnoid haemorrhage, significant haemorrhage
- 46% estimated to be high risk

TLOC pathway

TLOC
- History, examination, ECG and echocardiogram

Syncope
- OH
  - Individualized management
- Reflex mediated syncope
  - Individualized management
- Cardiac
  - Diagnosis and specific management
- Unknown cause

Non-syncope
- Diagnosis and specific management

Risk stratification
- Low risk
  - Isolated event
  - Reassure, no further investigation
- Recurrent or high-risk occupation
- Intermediate risk
- High risk
  - Admit for ECG monitoring and/or provocative testing
  - Outpatient provocative testing and/or prolonged ECG monitoring
High risk features

<table>
<thead>
<tr>
<th>Short-term high risk criteria which require prompt hospitalization or intensive evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Severe structural or coronary artery disease</strong> (heart failure, low LVEF, or previous myocardial infarction)</td>
</tr>
<tr>
<td>2. Clinical or ECG features suggesting arrhythmic syncope</td>
</tr>
<tr>
<td>a. Syncope during exertion or supine</td>
</tr>
<tr>
<td>b. Palpitations at the time of syncope</td>
</tr>
<tr>
<td>c. Family history of SCD</td>
</tr>
<tr>
<td>d. Non-sustained VT</td>
</tr>
<tr>
<td>e. Bifascicular-block (LBBB or RBBB combined with left anterior or left posterior fascicular block) or other intraventricular conduction abnormalities with QRS duration ≥ 120 ms</td>
</tr>
<tr>
<td>f. Inadequate sinus bradycardia (&lt;50 bpm) or sinoatrial block in absence of negative chronotropic medications or physical training</td>
</tr>
<tr>
<td>g. Pre-excited QRS complex</td>
</tr>
<tr>
<td>h. Prolonged or short QT interval</td>
</tr>
<tr>
<td>i. RBBB pattern with ST-elevation in leads V1–V3 (Brugada pattern)</td>
</tr>
<tr>
<td>j. Negative T waves in right precordial leads, epsilon waves, and ventricular late potentials suggestive of ARVC</td>
</tr>
</tbody>
</table>
Investigation of TLOC

- History is key
- Clinical examination - murmurs
- Lying / standing BP
- CSM if >40 years
- ECG
- Bloods including glucose, electrolytes etc
- ECHO if history / ECG suggests
- ETT - if exercise induced
- Tilt testing
- ECG monitoring
OPD models of care

• The Newcastle Model
  • Falls and syncope and service
  • GP or geriatrician led
  • Same day ECG, Tilt test, CSM, echo
  • Tapes put on the same day
  • Referrals made for ILR / Specialist cardiology opinions

• The Manchester Model
  • Rapid Access Blackouts Triage Clinic
  • a rapid triage (within 2 weeks)
  • a structured clinical assessment
  • a 12-lead ECG
  • weekly, specialist nurse-lead
    • Arrhythmia/Electrophysiology Nurse
    • Falls Nurse
    • Epilepsy Nurse
TLOC and driving
# Transient loss of consciousness – solitary episode

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical vasovagal syncope</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>While standing</strong></td>
<td>May drive and need not notify the DVLA.</td>
<td>Must not drive and must notify the DVLA.</td>
</tr>
<tr>
<td><strong>While sitting</strong></td>
<td>May drive and need not notify the DVLA if there is an avoidable trigger which will not occur whilst driving. Otherwise must not drive until annual risk of recurrence is assessed as below 20%.</td>
<td>Must not drive for 3 months and must notify the DVLA. Will require investigation for identifiable and/or treatable cause.</td>
</tr>
</tbody>
</table>

| **Syncope with avoidable trigger or otherwise reversible cause** |         |         |
| (for cough syncope see page 27) |         |         |
| **While standing** | May drive and need not notify the DVLA. | Must not drive and must notify the DVLA. |
| **While sitting** | Must not drive for 4 weeks. Driving may resume after 4 weeks only if the cause has been identified and treated. Must notify the DVLA if the cause has not been identified and treated. | Must not drive for 3 months. Driving may resume after 3 months only if the cause has been identified and treated. Must notify the DVLA if the cause has not been identified and treated. |

| **Unexplained syncope, including syncope without reliable prodrome** |         |         |
| This diagnosis may apply only after appropriate neurological and/or cardiological opinion and investigations have detected no abnormality. |         |         |
| **While standing or sitting** | Must not drive and must notify the DVLA. If no cause has been identified, the licence will be refused or revoked for 6 months. | Must not drive and must notify the DVLA. If no cause has been identified, the licence will be refused or revoked for 12 months. |

| **Cardiovascular, excluding typical syncope** |         |         |
| **While standing or sitting** | Must not drive and must notify the DVLA. Driving may be allowed to resume after 4 weeks if the cause has been identified and treated. If no cause has been identified, the licence will be refused or revoked for 6 months. | Must not drive and must notify the DVLA. Driving may be allowed to resume after 3 months if the cause has been identified and treated. If no cause has been identified, the licence will be refused or revoked for 12 months. |
DVLA and more than one TLOC

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>car and motorcycle</td>
<td>bus and lorry</td>
</tr>
</tbody>
</table>

**Unexplained syncope, including syncope without reliable prodrome**

This diagnosis may apply only after appropriate neurological and/or cardiological opinion and investigations have detected no abnormality.

<table>
<thead>
<tr>
<th>While standing or sitting</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>🔄 Must not drive and must notify the DVLA. If no cause has been identified, the licence will be refused or revoked for 12 months.</td>
<td>🔄 Must not drive and must notify the DVLA. If no cause has been identified, the licence will be refused or revoked for 10 years.</td>
</tr>
</tbody>
</table>
Summary

• 1. Reflex syncope is the most frequent cause in any age group.

• 2. Syncope secondary to cardiovascular disease is the second most common cause. The number of the patients with cardiovascular causes varies widely between studies with higher frequencies in the emergency setting, in older subjects and in settings orientated towards cardiology.

• 3. In patients under 40, orthostatic hypotension is a rare cause of syncope, whereas it is frequent in very old patients.

• 4. DRIVING