SYNCOPE …

AMBULATORY PERSPECTIVE

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SYNCOPE – SYMPTOM NOT DISEASE ..!

‘SYNCOPE OCCURS DUE TO GLOBAL CEREBRAL HYPOPERFUSION’.. Factors influencing this are:

- Cardiac output
- Systemic Vascular Resistance
- Mean arterial Pressure
- Cerebrovascular Resistance & Autoregulation

**Syncope Mimics:** Metabolic disorders, Sleep disorders, Seizures, Somatisation disorders
SYNCOPE – IMPACT ON E.D

- 40% will experience syncope at least once in a lifetime
- 1-6% of hospital admissions per year
- 1% of emergency room visits per year
- Major morbidity reported in 6%
  e.g. fractures, motor vehicle accidents
- Minor injury in 29%
  e.g. lacerations, bruises

SYNCOPE – SECONDARY CARE BURDEN

• 5th Common presentation to ED
• Cause unknown in 40% of cases (approx. 1.5 million people world-wide)
• Often a benign cause .. Nevertheless potentially lethal outcome
• Associated with considerable morbidity & Social impact – Delays in Transfer of Care
• 10% of falls in elderly attributable to Syncope (Carpenter et al, Age & Ageing- 1981)
• U.S. National Ambulatory Medical Care 10 year survey (patients > 18yrs): Acad. Emer. Med 2009
  - Common reason for attending ED (1.5 million patients / year & 2.5 billion $ spent annually)
  - Diagnosis of syncope based on ICD-9 criteria, accounted for only 30.1 % (more so in elderly)
SYNCOPE – IMPACT ON NHS HOSPITALS


- 74,813 Hospital attendance for syncope and collapse
- 80% required hospital admission
- Average length of stay: 6.1 days
- 327,201 hospital bed days, second only to senility

(2008 -2009) - 119,781 Hospital admissions

- Misdiagnosis of Epilepsy (all party report )
SYNCOPE – WHY AN AMBULATORY APPROACH?

- Ambulatory Emergency Care is ‘clinical care that is not provided within the traditional bed-base

- SEEDS - randomized intermediate-risk patients to an (ED)-based syncope protocol vs. inpatient admission.  
  56%, reduction in hospitalisation and 54% reduction in total patient hospital days (Circulation 2004)

- ED Observation Syncope Protocol (EDOSP)- randomised trial: 77% reduction in hospitalization and a 40% reduction in hospital LOS (Annal Emer.Med 2013). ‘Study provided the benchmark data for Ambulatory – ED pathways!

- ‘Ambulatory based Protocols helps reduce Hospital admissions, reduce cost & improve patient outcomes’.  
  (Cardiology Clin. Journal 2013)
<table>
<thead>
<tr>
<th>Model/Location</th>
<th>Description</th>
<th>References</th>
<th>Management</th>
<th>Support</th>
<th>Referral</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>The functional Syncope Unit in a cardiology department</td>
<td></td>
<td></td>
<td>Cardiologist with rapid access to other specialists</td>
<td>Trained nurses</td>
<td>Outpatients, fast track from ED, other departments</td>
<td>Functional unit in the hospital</td>
</tr>
<tr>
<td>The Day-Care Syncope Evaluation Unit and Fall and Syncope Services</td>
<td></td>
<td>References</td>
<td>Geriatrician/internist</td>
<td>Other specialists and general practitioners, specialized nurses</td>
<td>Community, ED, other departments</td>
<td>Day-care multidisciplinary medical approach, specialized nurses</td>
</tr>
<tr>
<td>The Rapid Access Blackouts Triage Clinic (T-LOC Triage Clinic)</td>
<td></td>
<td>References</td>
<td>Specialized nurses (arrhythmias, falls, epilepsy) Supervision: cardiologist/neurologist</td>
<td>Cardiologists</td>
<td>General practitioners, specialists (cardiology, neurology), ED</td>
<td>Rapid assessment outpatient clinic</td>
</tr>
<tr>
<td>Tertiary referral SU</td>
<td></td>
<td>References</td>
<td>One syncope specialist (neurologist, internist, cardiologist)</td>
<td>Technicians, specialized nurses</td>
<td>Most referrals from cardiologists and neurologists</td>
<td>Outpatient clinic</td>
</tr>
<tr>
<td>The Syncope Observational Unit in the ED</td>
<td></td>
<td>References</td>
<td>Experienced emergency physician</td>
<td>Specialized nurses, electrophysiologist's, other specialists</td>
<td>ED (only intermediate risk patients were included in the SEEDS and EDOSP studies)</td>
<td>6–24 h of observation</td>
</tr>
<tr>
<td>The web-based standardized care pathway for Faint and Fall patients (Faint and Fall Clinic)</td>
<td></td>
<td>References</td>
<td>Cardiologist and geriatrician with rapid access to a neurologist</td>
<td>Nurse practitioner</td>
<td>Outpatients and ED</td>
<td>Fixed unit with rapid access</td>
</tr>
</tbody>
</table>

SYNCOPE: CASES SEEN – PATIENT PERSPECTIVE

- ‘I don’t feel right but my doctor does not take me seriously’ – diagnosed with paroxysmal SVT

- ‘I get recurrent thumping headaches with flashing lights & pass out’ – diagnosed with Syncopal Migraine

- ‘I Feel my heart racing & get light headed at times’ – detailed Ix suggestive of benign palpitations

- ‘I have low BP, get palpitations & panic attacks with dizziness’ – Cardiology Ix to exclude PoTS
SYNCOPE – QUALITY OF LIFE

(ROSE M, ET AL. J CLIN EPIDEMIOL. 2000)

% Prevalence

- **Mobility**: 3% (UK), 26% (Syncope)
- **Usual Activities**: 4% (UK), 37% (Syncope)
- **Self-Care**: 1% (UK), 9% (Syncope)
- **Pain/Discomfort**: 19% (Syncope), 49% (Syncope)
- **Anxiety/Depression**: 43% (Syncope)

UK Population Norms vs. Patients with Syncope
SYNCOPE – COMMON SCENARIO.

- Palpitations
- Dizziness
- Chest pain
- Breathlessness
- Disease Complications e.g. Embolic episode, CVA
SYNCOPE – HISTORY: KEY ELEMENTS IN CONSULTATION

• Situtional Precipitant factors?
• Activity patient involved in prior to event?
• Position patient was in when event occurred?
• Was LOC complete?
• Was LOC rapid in onset & short duration?
• Was recovery spontaneous, complete, and without sequelae?
• Was postural tone lost?
• Let the patient tell the story … & ask for collateral witness Hx
SYNCOPE — HISTORY SUGGEST A VASOVAGAL EVENT

- Posture: Usually on feet
- Prodromal: nausea, heat, slow thumping pulse, sounds distant, feeling faint
- Precipitant: standing, hot crowded noisy room, pain, other illness
- Situational: micturition, cough, fear, emotion, instrumentation
- Often no injury in fall
SYNCOPE – HISTORY SUGGEST AN EPILEPTIC EVENT

- Prodromal: aware attack is coming on, aura starts with head turn & absence of pallor
- Body tone: maintained during attack, automatic sounds
- Seizure: lateral tongue biting, incontinence (can occur with other causes)
- Post-ictal state: takes some hours for full recovery after cessation e.g. nausea headache
SYNCOPE – HISTORY SUGGESTIVE OF ARRHYTHMIA

History is often more important than investigations...

- Sinus tachycardia: anxiety, not clearly defined attacks, there all the time, have it now, pulse <110 during attacks
- Ectopic beats: missed beats and thumps, go away when active, worst at rest, in bed
- SVT: very clearly defined attacks, minutes or hours, can see the pulse or the heart beating, rate often >120
- Paroxysmal AF, may last up to days at a time, totally out of rhythm, often SOB, chest pain
- Presence of structural heart disease - OR - History of chest pain, SOB when NOT having palpitation.
- Syncope (especially on exercise) & Family Hx of sudden Cardiac death
SYNCOPE – OF UNCERTAIN AETIOLOGY

- Often referred to as ‘Asystolic Neurally Mediated Syncope’ – recurrent unexplained syncope.

- ISSUE-2 (International Study on Syncope of Uncertain Etiology-2), showed that the use of an ICM effectively diagnosed Asystolic syncope - ISSUE-3 study was needed to confirm the Screening & Treatment phases.

- ISSUE-3 (Medtronic sponsored study) found that patients who suffered from fainting due to ANMS had fewer fainting occurrences when treated with a dual chamber pacemaker – 57% relative reduction of fainting recurrence in patients at two years follow up.
SYNCOPE – WHAT ARE PALPITATIONS..?

• A noticeably rapid, strong, or irregular heart beat.
• Less than 10% of patients with palpitations have significant arrhythmias.
• It presents a poor correlation between symptoms and arrhythmia.
• Significant arrhythmias are no more reliably reported than benign palpitations.
SYNCOPE – RISK STRATIFICATION

OESIL Syncope Score: *European Heart Journal* 2003

- CVD in history
- Syncope without prodrome
- Abnormal ECG
- Age >65

- Italian study, prospective review of 270 patients & followed over 1 year.
- Sensitivity: 97%, Specificity: 73%

Predicts death within 1 year: Score 1 (0.8%) / Score 4: (58.1%)
SYNCOPE – RISK STRATIFICATION

SAN FRANCISCO SYNCOPE RULES :- Sensitivity of 74 – 98% & Specificity of 56%

- Hx of CCF, HCT < 30 %, New abnormal ECG changes, Dyspnoea, Systolic BP < 90 (Emer. Med journal 2004)

  SCORE 1: 0.4 % vs SCORE 5: 10%

- Serves as predictor of serious 30 day outcome in patients with no apparent cause for syncope.

- External Canadian ED review study suggest specificity of 33% - Thereby increasing unwanted Hosp. admissions. Further research needed to determine the accuracy of the San Francisco Syncope Rule! (Ann. Emer. Med 2010)
SYNCOPE – RISK STRATIFICATION

**ROSE Study**: prospective cohort study over 3 months, Edinburgh Royal Infirmary ED, 2005

- A study to derive and validate a UK ED syncope clinical decision rule is feasible – 1st UK ED syncope study
- This pilot study had evaluated the OESIL score, the SFSR and ED guidelines, and did show that each is able to identify an increased probability of medium-term serious outcome in patients with syncope.
- Included BnP as a marker to predict cardiac outcome.
- Study concluded it was not sufficiently sensitive to be able to reduce admissions without missing patients who later go on to develop a serious outcome.
- Undoubtedly, there is a need for a simple UK-derived clinical score & further validated studies (*Emer.Med 2007*)
Risk stratification

- Skipped beats
- Thumping beats
- Short fluttering
- Slow pounding AND
- Normal ECG AND
- No Family History AND
- No Structural Heart Disease

- History suggests recurrent tachyarrhythmia
  - Palpitations with associated AND/OR symptoms
  - Abnormal ECG AND/OR
  - Structural heart disease

- Palpitations during exercise
- Palpitations with syncope/near syncope
- High risk of structural heart disease
- Family history of inheritable heart disease/SADS
- High degree AVblock
## SYNCOPE – AMBULATORY CRITERIA

<table>
<thead>
<tr>
<th>Inclusion Criteria for Ambulatory Care</th>
<th>Exclusion Criteria (Admit and refer to general medicine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Blood test normal (sodium levels etc)</td>
<td>▪ Altered GCS</td>
</tr>
<tr>
<td>▪ &gt;16 years old</td>
<td>▪ Persisting acute focal neurology</td>
</tr>
<tr>
<td>▪ Clear history of temporary loss of consciousness but who have made spontaneous and complete recovery</td>
<td>▪ Patient found on floor and did not recover spontaneously</td>
</tr>
<tr>
<td>▪ GCS 15</td>
<td>▪ Known seizure disorder presenting with typical recurrence</td>
</tr>
<tr>
<td>▪ Symptoms consistent with reflex-mediated or vasovagal syncope</td>
<td>▪ Patents &lt;16 years</td>
</tr>
<tr>
<td>▪ Normal cardiovascular examination</td>
<td>▪ Normal ECG findings</td>
</tr>
</tbody>
</table>
SYNCOPE – AMBULATORY PATHWAY

Patient Presents with:
A Fall or suspected Syncope

History & Examination
In patients with dementia, collateral is essential.
Include bone health assessment

Investigations
CXR, ECG, L/S BP, medication review, Dispsstick, BM

Red Flags:
History suggestive of Syncope or injuries requiring inpatient Treatment

Yes

Consider Admission

No

Clinical Criteria to Consider Prior to Ambulatory Care:
Functionally safe to go home, unlikely cardiac syncope, injuries do not require inpatient treatment

Yes

Discharge Patient

No
SYNCOPE – AMBULATORY MANAGEMENT

Observations:
- Pulse
- BP Hourly, lying then 0,1,3 minutes after standing

Has specific cause been identified?
- Yes → Treatment for cause
- No → Post investigations review against discharge criteria

Discharge Criteria:
- No examination findings of unstable IHD, CCF, ventricular arrhythmia, cardiomyopathy or significant vascular disease
- Normal ECG
- Patient feels well after 4 hours of observation
Please directly refer for *Specialist Cardiovascular* assessment within 24 hours for anyone with TLOC who also has any of these RED flags:

- An ECG abnormality
- Heart failure (history or clinical signs)
- TLOC during exertion
- Family history of Sudden Cardiac Death in people younger than 40 years and/or an inherited cardiac condition
- New or unexplained breathlessness
- A new heart murmur
Please directly refer patients who present with one or more of the following features (strongly suggestive of epileptic seizures) for an assessment by a Neurologist within 2 weeks:

• Bitten tongue
• Head-turning to one side during TLOC
• No memory of abnormal behavior that was witnessed before, during or after TLOC by someone else
• Unusual posturing
• Prolonged limb-jerking, rhythmic or non-random (note that brief seizure-like activity can often occur during uncomplicated faint)
• Confusion following the event or Prodromal déjà vu / jamais vu
SYNCOPE – REFERRAL QUESTIONNAIRE: HISTORY

• Presenting Complaint: ..............................................................

• True TLOC (Transient Loss of Consciousness)?

• 1st Event? - If No: How many previous episodes?

• Warning symptoms present? - If Yes, please specify:

• TLOC during exercise? Yes / No

• TLOC in supine position? Yes / No

• Chest pain before/after TLOC? - If Yes, please explain:

• Has the patient ever sustained major injuries? - If Yes, please explain:
SYNCOPE — REFFERAL QUESTIONNAIRE: EXAMINATION

Physical Exam:

**Cardiovascular Examination**
- Blood pressure (Supine): / mm HG  Heart rate (Supine): bpm
- Blood pressure (Standing): / mm HG  Heart rate (Standing): bpm
  (NB: > 20 mmHg Systolic Difference = Orthostatic Hypotension)
- Peripheral arterial pulses: Normal - If No, Provide details:
- Heart Sounds: Normal - If No, Provide details:
- Audible cardiac murmur: If Yes, Provide details:
- Any other relevant cardiovascular feature:

**Neurological Examination**
- Audible carotid bruit: If Yes, please specify: Left / Right / Bilateral
- Any other neurological sign(s) present:
SYNCOPE — REFERRAL QUESTIONNAIRE: PAST HISTORY

• Past Medical History ➔ Cardiac
  • Ischemic Heart Disease (MI / PCI / CABG / Congenital Heart Disease / etc):  - If Yes, Provide details
  • Valvular Disease incl. Previous Repair / Replacement / endocarditis / HOCM:  - If Yes, Provide details
  • Cardiac Pacemaker / Cardiac Defibrillator (ICD) / CRT/ Reveal Device in-situ: Yes / No
    If Yes, Provide details of latest device check:
  • Previous Catheter Ablation:  - If Yes, Provide details:
  • Family history of Sudden Cardiac Death:  - If Yes, Provide details:
SYNCOPE – REFERRAL QUESTIONNAIRE: PAST HISTORY

• ➤ Neurological
  • Previous Cerebral Injury / Trauma / Intracranial Bleed / Tumour / Congenital Disease / etc: - If Yes, Provide details:
    • ▪ Epilepsy: - If Yes, Provide details:
    • ▪ Previous TIA / Stroke:
    • ▪ Any other neurological disorder or relevant information?

• ➤ Psychiatric disorders : - If Yes, Provide details

• ➤ Any other relevant medical history:
### SYNCOPE - DIAGNOSTIC ASSESSMENT & YIELDS

<table>
<thead>
<tr>
<th></th>
<th>Yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>History, Physical Exam</td>
<td>48 - 84</td>
</tr>
<tr>
<td><strong>Other Tests/Procedures</strong></td>
<td></td>
</tr>
<tr>
<td>Head-Up Tilt</td>
<td>27</td>
</tr>
<tr>
<td>External Cardiac Monitoring (Holter, ELR)</td>
<td>5-13</td>
</tr>
<tr>
<td>Insertable Loop Recorder (ILR)</td>
<td>43-88</td>
</tr>
<tr>
<td>EP Study</td>
<td>&lt;2-5</td>
</tr>
<tr>
<td>Exercise Test</td>
<td>0.5</td>
</tr>
<tr>
<td>ECG</td>
<td>1-11</td>
</tr>
<tr>
<td>MRI</td>
<td>No data available</td>
</tr>
</tbody>
</table>
SYNCOPE – AMBULATORY DIAGNOSTIC WORK-UP

- Careful history is more likely to yield arrhythmia diagnosis than investigations
- 24 hour tape only useful if symptoms frequent (most of the time, on most days)
- 7 day ECG monitoring a minimum requirement.
- Devices now widely available in primary care that doesn’t need Holter technician review – Omron HCG 801 ( £250, attached during episodes & downloaded to PC)
- If attacks infrequent, but suggest arrhythmia on history – Refer for ILR
- If initial Holter monitoring is inconclusive due to low frequency of symptoms - Second line investigations should be considered i.e. ILR
SYNCOPE – AMBULATORY ECG : KEY INDICATIONS

Main indications for Amb. ECG monitoring is detection and characterization of arrhythmias to:

• Attempt to correlate a possible arrhythmia with patient symptoms and/or other cardiac symptoms

• Determine the risk of the arrhythmia in the individual clinical setting: **Low- Medium risk meet ACU criteria**

• Detect, assess and manage Atrial fibrillation: **Ambulatory A.Fib Pathway**

• Monitor the efficacy of pharmaceutical therapy (e.g., antiarrhythmic therapy): **Ambulatory A.Fib Pathway**

• Patients with Structural HD, Conductive HD, Family Hx of SCD, <19yrs - **Do Not Meet Amb. criteria**

## Syncope – Diagnostic Value of Amb. ECG Monitoring

<table>
<thead>
<tr>
<th>Symptoms present during monitoring</th>
<th>Arrhythmia documented during monitoring</th>
<th>Arrhythmia as cause of symptoms likely excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Symptoms attributable to arrhythmia</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Asymptomatic arrhythmia</td>
<td>Test non-diagnostic</td>
</tr>
</tbody>
</table>
## SYNCOPE - AMBULATORY ECG DEVICES

<table>
<thead>
<tr>
<th>Method</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holter (24-48 hours)</td>
<td>Useful for frequent events</td>
</tr>
<tr>
<td>Event Recorder (7-30 Days)</td>
<td>• Useful for infrequent events</td>
</tr>
<tr>
<td></td>
<td>• Limited value in sudden LOC</td>
</tr>
<tr>
<td>Loop Recorder (ELR / ILR)</td>
<td>• Useful for infrequent events</td>
</tr>
<tr>
<td></td>
<td>• Implantable type more convenient (ILR)</td>
</tr>
<tr>
<td>Wireless (internet) Event Monitoring</td>
<td>In development (Nuvant Mobile, Piix Patch)</td>
</tr>
</tbody>
</table>
SYNCOPE – AMBULATORY ECG.. ADMIT OR NOT?

• What pause is abnormal at night on a 24hr ECG:
  a) 1.8 secs
  b) 2.4 secs
  c) 2.9 secs
  d) 3.2 secs

• What would you see a run of VT lasting 4 beats in asymptomatic patient:
  a) Admit to hospital immediately
  b) Refer for investigation
  c) If 12 lead ECG normal ignore
  d) Start amiodarone immediately
SYNCOPE – CASE 1: V.V.S WITH RTA
SYNCOPE – CASE 2: HISTORY OF FALLS
‘If my Heart starts skipping a beat … they’ll have the longest normal base line recorded in history’ - Jeff Holter (Canadian Med. Assoc. Journal 1954)
AMBULATORY ECG DEVICES

Omron HCG 801 Heart scan

- SD memory card slot
- Power/Stop button
- Start Button
- Finger Electrodes
- Chest Electrode
- ECG complex
- 30 second wave/progress indicator
- Heart rate

12cms or 5”
How to use the unit

Press the \( \text{I/\(\text{O}\)} \) button to switch on the power, then place your finger **closely** on the two finger electrodes.

**Do not press the START button until you are ready to take a measurement.**

Appropriate Posture

Place the chest electrode on bare skin about 5 cm below your left nipple.

Taking a Measurement

**Start**
Press the START button while maintaining the same posture.

The unit beeps every second, **About 30 seconds**
Keep still and do not move until the measurement is complete.

**End**
The measurement ends automatically, indicated by 4 rapid beeps.

Power off
Press the \( \text{I/\(\text{O}\)} \) button for two seconds.
WIRELESS ECG DEVICE - PIIX MULTISENSORY PATCH
### SYNCOPE – DVLA GUIDELINES

<table>
<thead>
<tr>
<th>Type of Syncope</th>
<th>Group 1 (car, motorcycle etc.,)</th>
<th>Group 2 (passenger carrying, large goods)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple faint</td>
<td>No restrictions</td>
<td>No restrictions</td>
</tr>
<tr>
<td>Unexplained syncope with low risk of recurrence*</td>
<td>Allowed to drive 1 month after the event</td>
<td>Allowed to drive 3 months after the event</td>
</tr>
<tr>
<td>Unexplained syncope with high risk of recurrence &amp; cause identified, treated</td>
<td>Allowed to drive 1 month after the event</td>
<td>Allowed to drive 3 months after the event</td>
</tr>
<tr>
<td>Unexplained syncope with high risk of recurrence &amp; cause not identified</td>
<td>Licence is refused or revoked for 6 months</td>
<td>Licence is refused or revoked for 12 months</td>
</tr>
</tbody>
</table>
10 STEPS BEFORE YOU REFER (BR. JOURNAL CARDIO, 2010)

- The most important tool for the clinician is the history, not only from the patient but also from a witness of the collapse, if available.
- Clinicians should be aware of the possibility that a patient or carer may unwittingly lead him or her in the wrong direction in attempting to describe falls or fits.
- Misdiagnosis of epilepsy from syncope – Approx. 10% of patients diagnosed as having epilepsy probably suffer from syncope.
- Syncope does not have the general public awareness as MI, Stroke, or epilepsy.
- Patients can often feel embarrassed by their symptoms and choose not to go out for fear of collapsing in public.
SYNCOPE – THE VALUE OF AN AMBULATORY APPROACH…

- Using risk stratification guidelines, patients can be appropriately managed & discharged with 0 LOS
- Cost effectiveness with Admission Avoidance
- Widely published data Internationally on Amb. Care Approach using ‘Risk Criteria’s’ categorises patients into Low, Intermediate, High risk
- Reduction in Syncope Hospitalisation: Canada < 20 % admissions, Australia < 30 % admissions (Clin.Emer.Med.2015)
- Advancement in Ambulatory Monitoring - 7 day Novocor, Event monitor (Omron) etc. (Circ.AHA.Journal 2010)
- Allows for screening & appropriate referral to Specialist Syncope Clinics
- Can provide patient & carer support
SYNCOPE – THINK AMBULATORY APPROACH…

THANK YOU...!!