New Wearable/Portable Devices: Does it Matter for Syncope??

STARS Syncope and RAS Patients Day

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Disclosures

• Research Grant from the Cardiac Arrhythmia Network of Canada (CANet) – The Canadian Syncope Atlas: tool for surveillance, patient engagement and monitoring.

• NO CONFLICTS RELATED TO THIS TALK
Outline

1. What is the rationale for a monitoring device?
2. Who should get a monitoring device?
3. Review current and new wearable/portable devices to help with diagnosis and management.
4. Review guideline recommendations about how monitoring devices should be used in the syncope work-up?
Prevalence in General Population

Overall Prevalence of Syncope = 19%

The Challenge of Syncope

• Syncope may be the final common presentation for a variety of conditions ranging from benign to life-threatening and determining etiology can often be challenging.

• Identify patients at risk for arrhythmia-related syncope because pharmacological and interventional therapies exist for prevention of further events.
Possible Cardiac Etiology

- During exertion or when supine
- Sudden onset palpitation immediately followed by syncope
- Family history of unexplained sudden death at young age
- Presence of structural heart disease or coronary artery disease

ECG findings suggesting arrhythmic syncope:
- Bifascicular block (defined as either left or right BBB combined with left anterior or left posterior fascicular block)
- Other intraventricular conduction abnormalities (QRS duration ≥0.12 s)
- Mobitz I second-degree AV block and 1° degree AV block with markedly prolonged PR interval
- Asymptomatic mild inappropriate sinus bradycardia (40–50 b.p.m.) or slow atrial fibrillation (40–50 b.p.m.) in the absence of negatively chronotropic medications
- Non-sustained VT
- Pre-excited QRS complexes
- Long or short QT intervals
- Early repolarization
- ST-segment elevation with type 1 morphology in leads V1-V3 (Brugada pattern)
- Negative T waves in right precordial leads, epsilon waves suggestive of ARVC
- Left ventricular hypertrophy suggesting hypertrophic cardiomyopathy

Brignole et al. Eur Heart J 2018;39;1883–1948
Additional Evaluation

Syncope additional evaluation and diagnosis

- Initial evaluation: history, physical exam, ECG (Class I)
  - Initial evaluation clear
    - No additional evaluation needed*
  - Initial evaluation unclear
    - Targeted blood testing (Class IIa)†
      - Initial evaluation suggests neurogenic OH
        - Referral for autonomic evaluation (Class IIa)†
    - Initial evaluation suggests CV abnormalities
      - Initial evaluation suggests CV abnormalities
        - Tilt-table testing (Class IIa)†
          - Cardiac monitor selected based on frequency and nature (Class I)
        - Options
          - Stress testing (Class IIa)†
          - TTE (Class IIa)†
          - EPS (Class IIa)†
          - MRI or CT (Class IIb)†
    - Initial evaluation suggests reflex syncope
      - Options

Option: Syncope additional evaluation and diagnosis

Shen et al. J Am Coll Cardiol 2017;70:620-663.
External Cardiac Monitors

1. Holter Monitor
2. External loop recorder
3. Mobile cardiac outpatient telemetry
4. Patch recorders
5. New portable/wearable monitors
Holter Monitor

- Portable, battery-operated device.
- Continuous recording for 24-48 h.
- Symptom rhythm correlation through patient event diary.
- Yield of Holter monitoring in syncope may be as low as 1-2%.
Holter monitoring should be considered in patients who have frequent syncope or presyncope (> 1 episode per week).

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<td>Holter monitoring should be considered in patients who have frequent syncope or presyncope (&gt; 1 episode per week).</td>
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External loop recorders

- A device that transmits patient activated data – only records when monitor is triggered by symptoms; auto-trigger feature (asymptomatic arrhythmias).
- Memory loop feature – captures period of time prior to (3-14 min) and after (1-4 min) event monitor is triggered.
- Frequent, spontaneous symptoms likely to recur within 2-6 weeks.
Mobile Cardiac Outpatient Telemetry

- Device that records and transmits data (up to 30 days) from preprogrammed arrhythmias or patient activation to a communication hub at the patient’s home.
- Significant arrhythmias are detected; the monitor automatically transmits the patient’s ECG data through wireless network to a central monitoring station attended by trained technicians.
- Real-time feedback to a healthcare provider for evaluation
- Spontaneous symptoms related to syncope and rhythm correlation
- In high-risk patients who require real-time monitoring.
MCOT versus LOOP

<table>
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<tr>
<th>Monitoring Method</th>
<th>MCOT</th>
<th>LOOP</th>
<th>All Subjects</th>
<th>P Value</th>
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<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n (%)</td>
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<tr>
<td>Patients with Syncope/Presyncope</td>
<td>62</td>
<td>51</td>
<td>113</td>
<td>0.008</td>
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<tr>
<td>Confirmation or Exclusion, n (%)</td>
<td>55 (88.7)</td>
<td>35 (68.6)</td>
<td>90 (79.6)</td>
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<td>Nondiagnostic, n (%)</td>
<td>7 (11.3)</td>
<td>16 (31.4)</td>
<td>23 (20.4)</td>
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External loop recorders should be considered, early after the index event, in patients who have an inter-symptom interval $\leq 4$ weeks.
External patch recorders

- Continuously records and stores rhythm data, with patient-trigger capability.
- No leads or wires, adhesive to chest wall.
- Records 2-14 days.
- Consider as an alternative to external loop recorder.
Intermittent recording devices
The new Apple Watch has a heart monitor and the FDA approves

Health apps can help patients take charge of their health, says the American Heart Association, which also supports the EKG app.
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<td>Further research is needed for the role of patch recorders and intermittent recording devices for syncope</td>
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Multi-sensor devices

- Neurally-mediated syncope prediction by early and non-invasive measurement of underlying circulatory adjustments (drop in blood pressure; change in heart rate).

Summary

• Additional cardiac monitoring may be needed for patient’s at risk for arrhythmia-related syncope.
• Type of monitors should be based on frequency of syncope events and the ability to capture event if patient is had sudden incapacitation.
• Technology for specific abnormal rhythms exist – data in syncope is lacking; requires ability for patient activation
• Early work being done on multi-sensors for predictors of MNS.