emDocs

The EM Educator Series

Mini-Case: Why does my patient keep passing out?

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A 54-year-old male presents with recurrent syncopal episodes. He has been experiencing multiple episodes of passing out with convulsions that last less than 20 seconds. There is no post ictal state or incontinence. The family and patient are concerned about seizures. However, this is sounding more and more like something other than a seizure…

Questions for Learners:

1) Syncope & EKG findings you should consider

2) Is there utility in obtaining orthostatic vital signs?

3) What is the ED work-up of syncope? Do you need a troponin and head CT?

4) What is the risk stratification of syncope patients, and what red flags should you consider?

5) What patients are appropriate for discharge? Who requires admission?

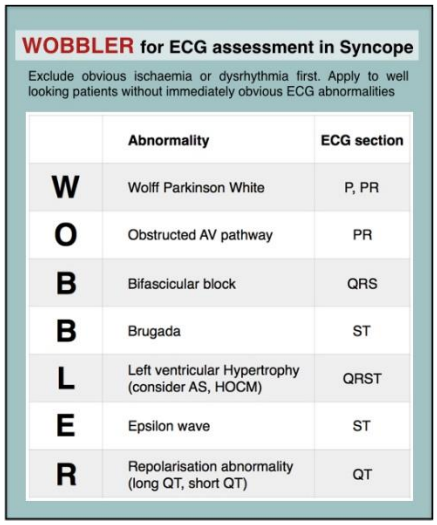
6) Syncope chameleons/mimics… What else should you consider?

Suggested Resources:

- ✓ Articles:
  - https://lifeinthefastlane.com/ecg-library/smacc-workshop-deadly-diagnoses/
  - http://www.emdocs.net/syncope-ed-updates-2017-aha-acc-hrs-clinical-policy/
  - http://hqmeded-ecg.blogspot.com/2015/04/ed-syncope-workup-after-h-and-p-ecg-is.html
  - https://lifeinthefastlane.com/futility-orthostatic-measurements/
  - https://emlyceum.com/2015/06/17/syncope-answers/
  - http://rebelem.com/predicting-dysrhythmias-after-syncope/
  - https://www.aliem.com/2013/04/management-of-syncope-aka-done-fell-out/
  - http://www.emdocs.net/syncope-the-latest-on-clinical-work-up-and-management/
  - http://www.emdocs.net/vascular-causes-of-syncope/
  - https://www.ncbi.nlm.nih.gov/pubmed/29110977
- ✓ Podcast:
  - https://emergencymedicinecases.com/episode-25-pediatric-adult-syncope/
  -
- ✓ Calculators:
  - https://www.mdcalc.com/egsys-evaluation-guidelines-syncope-study-score-syncope
  - https://www.mdcalc.com/san-francisco-syncope-rule

Answers for Learners:

1) Syncope & EKG findings you should consider



Via Cliff Reid from http://resus.me/wobbler/

Killer ECG Patterns – Deadly Diagnosis Not to Miss

It's all about the intervals!

- short PR: WPW
- long PR: AV conduction block
- narrow, deep QRS: HCM
- wide QRS + Epsilon waves: arrhythmogenic RV hypertrophy wide QRS: Vtach,WPW, BBB
- QT interval: long QT syndrome, (also short QT)

Also, look for Brugada, ACS, myocarditis, and PE changes on ECG

2) Is there utility in obtaining orthostatic vital signs?

Assess for orthostatic symptoms, not BP changes → Watch @EMSwami take on this.

3) What is the ED work-up of syncope? Do you need a troponin and head CT?

Always evaluate with:
1. Good History and Physical exam, including
   a. Orthostatic vitals
   b. Heart auscultation (aortic stenosis);
   c. FHx of sudden death.
2. ECG

Consider in some patients:
Ultrasound of aorta / heart
Abd free fluid (FAST exam)
Hgb

Urine Pregnancy Test in women of child bearing age
BNP
Troponin – *"As a diagnostic screening test for AMI in syncope patients without chest pain or EKG changes, a single troponin is inadequate and does not appear to be helpful in risk stratification. Admitting syncope patients for serial troponins, or 'rule-out AMI,' is also low-yield and should be considered only in conjunction with patients' symptoms and significant risk factors such as known CAD or CHF, older age, syncope preceded by palpitations or without prodrome. However, the value of a positive troponin is not limited to diagnosis of AMI. The value of a troponin as a predictor of adverse outcome may have utility for an inpatient team and potentially in the ED as high sensitivity troponins become more ubiquitous. Whether obtaining this prognostic data significantly improves outcomes is not clear." Via EMLyceum*
D-Dimer
Head CT – "For patients presenting to the Emergency Department with a chief complaint of syncope, a NCHCT is of low yield and should only be considered in patients with focal neurologic deficits, complaints of headache, or signs of head trauma. This is consistent with the ACEP clinical policy for syncope, which states that no test should be routinely used in the absence of specific findings on physical exam or history (ACEP 2007)." *Via EMLyceum*

4) What is the risk stratification of syncope patients, and what red flags should you consider?

"It is our job as emergency physicians to NOT identify a precise cause of syncope. Instead, we should aim to risk-stratify our patients: Who needs to be hospitalized (high risk) versus who can be safely discharge home (low risk) with outpatient follow up? The keys are:

1.) Use clinician judgment aided partly by risk stratification scores.
2.) Remember ACEP's recommendations on syncope admissions." Via Salim Rezaie from ALiEM

ACEP 2017 Guidelines for high-risk factors:

Older age and associated comorbidities*
Abnormal ECG†
Hct <30 (if obtained)
History or presence of heart failure, coronary artery disease, or structural heart disease

*Different studies use different ages as threshold for decisionmaking. Age is likely a continuous variable that reflects the cardiovascular health of the individual rather than an arbitrary value.

†ECG abnormalities, including acute ischemia, dysrhythmias, or significant conduction abnormalities.

AHA/ACC/HRS 2017 Guidelines:

Short-Term Risk Factors (≤30 d)	Long-Term Risk Factors (>30 d)
History: Outpatient Clinic or ED Evaluation	
Male sex (74,85,101,102)	Male sex (68,90)
Older age (>60 y) (88)	Older age (90)
No prodrome (68)	Absence of nausea/vomiting preceding syncopal event (93)
Palpitations preceding loss of consciousness (83)	VA (68,90)
Exertional syncope (83)	Cancer (68)
Structural heart disease (70,83,88,101,103)	Structural heart disease (68,103)
HF (74,83,85,88)	HF (90)
Cerebrovascular disease (70)	Cerebrovascular disease (68)
Family history of SCD (70)	Diabetes mellitus (104)
Trauma (68,101)	High CHADS-2 score (95)
Physical Examination or Laboratory Investigation	
	Abnormal ECG (84,90,93)
Evidence of bleeding (83)	Lower GFR
Persistent abnormal vital signs (70)	
Abnormal ECG (68,72,74,75,105)	
Positive troponin (75)	

5) What patients are appropriate for discharge? Who requires admission?

In determining high-risk patients, clinical decision rules alone are not reliable for clinical practice. A 2014 meta-analysis by Costantino et al compared the OESIL, SFSR, and EGSYS prediction tools with clinical judgment. The paper found clinical judgment had a sensitivity of 95% versus clinical decision rules sensitivity of 63-78% in predicting serious outcomes at 10 days. This data does not support the use of only clinical judgment, but sheds light on the inconsistency of clinical decision rules. However, clinical decision rules, medical society guidelines, and clinical judgment can help direct the emergency physician to high-risk patients requiring admission. Common red flags include from CDR and the literature include:

- Abnormal ECG
- Abnormal vital signs
    - Hypotension SBP <90 mmHg
    - Bradycardia <50 bpm
    - O2 saturation <94%
- History of cardiac disease
    - CHF
    - Structural
    - Ischemia
    - Arrhythmia
- Anemia
    - Hematocrit <30% or Hemoglobin <9g/dL
- Older age >60 years

6) Syncope chameleons/mimics… What else should you consider?

- **Reflex or Neurally Mediated**
- *Heterogeneous group consisting of various provoking stimuli leading to hypotension and vasodilation with relative bradycardia*
- Differentiating Features
    - Prodrome: warmth, diaphoresis, nausea, dyspnea, ringing in the ears, abdominal pain, fatigue
    - Syncope at rest, after exercise

    - Brief LOC (<5 min)
- **Vasovagal** – strong emotion or physical pain
    - Pain, medical procedures, prolonged standing, hot or crowded situations, valsalva, strong emotion
- **Situational** – distension of hollow viscera (esophagus, rectum, bladder)
    - Cough, micturition, defecation, swallowing, vomiting
    - Carotid sinus – seen in the elderly; neck stretching or shaving
- **Orthostatic Hypotension Mediated**
- *Orthostatic stress followed by insufficient peripheral vasoconstriction*
- Classified by within 3 minutes of standing
    - Decrease in Systolic blood pressure ≥20 mmHg
    - Decrease in Diastolic blood pressure ≥10 mmHg
- Investigate
    - Acute hemorrhage
        - Gastrointestinal bleeding
        - Menstrual bleeding/Ectopic pregnancy
        - Abdominal Aortic Aneurysm with leak/rupture
    - Septic Shock, Distributive Shock (such as anaphylaxis)
    - Excessive diuresis, diarrhea, vomiting
    - Addison's disease
- Aggravated by
    - Medication use
    - Advancing age
    - Diabetes mellitus
    - Primary autonomic dysfunction – Parkinson's, Lewy body dementia
- **Cardiovascular Mediated**
- Differentiating Features
    - **Brief or absent prodrome**
    - **May be preceded by palpitations**
    - **Syncope at rest or with exertion**
    - **Brief LOC (<5 min)**
    - **Rapid recovery**
- Dysrhythmia
    - Long QT Syndrome
    - Brugada Syndrome
    - Pre-excitation (such as WPW)
    - Ventricular tachycardia
    - Torsades de pointes
    - Supraventricular tachycardia
    - Atrial fibrillation/flutter
    - Second or Third degree AV block
    - Sick sinus syndrome
- Structural
    - Valvular heart disease – aortic, mitral, or tricuspid stenosis
    - Hypertrophic cardiomyopathy
    - Pulmonary embolism
    - Pericardial tamponade
    - Myocardial Infarction

    - Aortic dissection
    - Subclavian steal syndrome
    - Severe congestive heart failure
        - ACEP Level A rec: Use H&P to identify HF patients at risk[6]
    - Congenital heart disease
    - Myxoma
- **Non-syncopal Transient Loss of Consciousness**
- Seizures
    - Posturing, head turning, tongue biting, rhythmic limb jerking, eye deviation
    - Post-ictal confusion/state
- Vertebrobasilar TIA
- Subarachnoid hemorrhage
    - Headache, altered mental status, focal neurologic deficits
- Subdural/epidural hemorrhage, traumatic brain injury
- Metabolic
    - Most metabolic etiologies will have prolonged LOC or less likely to resolve without intervention
    - Medication/drug overdose
    - Hypoglycemia
    - Hypoxia/hyperventilation