

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “[Approach to Pediatric Syncope](#).” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedscases.com/podcasts.

Approach to Pediatric Syncope

Developed by Vishal Puri, Dr. Joseph Atallah and Dr. Mel Lewis for PedsCases.com.
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Hello everyone. You are listening to the PedsCases podcast series. My name is Vishal Puri. I am a medical student at the University of Alberta and in this podcast I will be discussing the approach to pediatric syncope. This podcast was developed in collaboration with Dr. Joseph Atallah and Dr. Mel Lewis. Dr. Joseph Atallah is a pediatric cardiologist and Dr. Mel Lewis is a general pediatrician, both staff at the Stollery Children’s Hospital in Edmonton, AB.

Objectives

As with other PedsCases presentations, information will be presented in the context of clinical cases. The objectives of this podcast are to:

1. Develop an approach to evaluate a pediatric patient presenting to the emergency department with syncope
2. Distinguish life threatening and benign causes of syncope
3. Recognize red flags, historical, physical and ECG findings.

Case 1

Let’s begin with a case. Aila is an eight-year-old female with no significant past medical history, who presented to the emergency department for a sudden and brief loss of consciousness. At the time, she was walking home from school on a hot summer day with a friend, when she began to feel nauseous, lightheaded and dizzy. Aila’s friend witnessed the fall and added “she looked white as a ghost”. The loss of consciousness lasted less than a minute and she noticed a few jerking leg movements. She was brought in to the ED by her mother. She is concerned something serious is going on, as Aila has never fainted before.

“Syncope” is defined as the sudden and transient loss of consciousness involving the loss of postural tone from which there is spontaneous recovery. The pathophysiology entails global cerebral hypo-perfusion secondary to a number of causes, most of which are entirely benign. It is important to develop an approach for this common, anxiety provoking chief complaint in order to recognize rare life threatening cardiac causes, avoid unnecessary investigations and provide reassurance to families.

The causes of syncope can be sub-classified as cardiac or benign. Cardiac causes include congenital heart disease, cardiomyopathies or electrical disturbances in the form of arrhythmias. Benign etiologies for syncope are vasovagal or orthostatic. Vasovagal syncope is preceded by a prodrome of nausea, warm clamminess, light-headedness and/or visual changes secondary to a trigger such as pain, anxiety, distress, heat or prolonged standing. Orthostatic

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syncope presents with a similar prodrome alongside a reflex tachycardia and hypotension upon standing secondary to medications, drugs and intravascular hypovolemia, or in otherwise healthy individuals.

The evaluation of syncope in the emergency department entails careful screening of patients through focused history and physical exam. Those with a clinical suspicion for a cardiac etiology of syncope should proceed to get an ECG and be seen by pediatric cardiology urgently.

The Approach to Pediatric Syncope entails:

- 1) Clearly defining that the reported event represents loss of consciousness vs. decreased LOC
- 2) Differentiating the chief complaint as syncope from a seizure.
- 3) Differentiating the etiology of syncope as cardiac vs noncardiac
- 4) Disposition planning and appropriate management.

On history, syncope may have a prodromal state, generally short and acute in onset (<1 minute) but lacks a postictal state. A focused history with the patient and collateral should explore associated symptoms, the context of the event, duration, prodrome, and post ictal state. The absence of prodromal symptoms, prolonged syncope, syncope during exertion, congenital heart disease, QT prolonging medications, family history of sudden unexplained death, preceding chest pain, dyspnea and/or palpitations should raise red flags for a cardiac cause of syncope. The modified Calgary score is a decision tool that can be used with a sensitivity of 96.3% to differentiate cardiac syncope from other benign causes of syncope.

On focused physical exam, it is important to auscultate for a pathologic outflow murmur screening for aortic stenosis or hypertrophic cardiomyopathy. The heart rate should be palpated for regularity and rate. Keep in mind most pulse irregularities in children are due to sinus arrhythmia, which is a common and benign finding. Standing and supine heart rate and blood pressure changes can help confirm the diagnosis of orthostasis. A neuro exam screening for neurologic deficits raises concern for an underlying neurologic process such as a seizure or complex migraine. Lastly, a screening exam looking for signs of trauma should also be included.

Investigations are rarely indicated in syncope. The latest 2017 Canadian Pediatric Cardiology Association position statement recommends an ECG is indicated when the history is not suggestive of benign syncopal etiologies and there are features suggestive of a cardiac cause such as absence of a prodrome, midexertional event, family history of early-life sudden death or heart disease, abnormal physical examination, or if the patient began a new medication with potential cardiotoxicity. This is different from the current practice in which EDs obtain an ECG when a patient presents with syncope. Routine labs are also not indicated.

When there is a cardiac suspicion, there are 4 key ECG findings you MUST BE looking for to diagnose electrical abnormalities:

1. WPW or ventricular pre-excitation. Characteristic short PR and delta wave.
2. Prolonged QTc, as primary or secondary to medications or idiopathic causes. Corrected ratio >500
3. Second or third degree heart block.
4. Significant ventricular hypertrophy or depolarization abnormalities marked by ST segment changes or T wave inversions.
5. Arrhythmias such as tachycardias or frequent PVCs.

Let's review Case 1:

Aila's presentation is consistent with syncope. It was witnessed to have a significant prodrome triggered by heat, acute and brief in onset, and lack of a postictal state. There were no red flags on further history indicating a cardiac cause. She denied an exertional component, PMHx of heart disease, family history for unexplained death or cardiac disease, medications, or preceding symptoms of dyspnea, chest pain or palpitations. On exam, vitals including orthostatic vitals were normal. No pathologic outflow murmur was detected on auscultation. Again, this is to screen for aortic stenosis or hypertrophic cardiomyopathy. According to the latest 2017 CPC position statement, an ECG is not recommended. Despite this, the keen medical student ordered an ECG, which showed a normal sinus rhythm and no WPW or prolonged QTc. Aila and her mother were reassured regarding her benign cause of syncope and educated on preventing injuries when she recognizes the prodrome in the future. She was discharged with timely primary care follow up and provided with return to care precautions of a presentation consistent with cardiac syncope or seizure.

Case 2

J-WU is a 15-year-old athletic boy with no significant past medical history who presented to the emergency department for a syncopal fall during a high school basketball game. He was sprinting across the court when he suddenly collapsed. In the ED, J-WU recognized feeling short of breath prior to the fall. He denied chest pain, palpitations and headaches. His mom denied a family history of any unexplained or sudden deaths in the family. On exam, a systolic murmur at the left lower sternal border that becomes quite loud with Valsalva is appreciated. His ECG is unremarkable. J-WU is keen to return to play, as "ball is life". What do you do next?

In terms of disposition, anyone with a suspected cardiac cause for their syncope needs to be seen by a cardiologist for further investigations and management. They will likely need an echo and/or Holter. It is important to counsel the patient not to do anything active until seen by the cardiologist if it isn't possible to be seen immediately. Alternatively, patients with a benign cause of their syncope should be educated on appropriate prevention measures and return to care precautions. Close follow up with their primary care provider should also be arranged.

Let's end with a review of case 2.

J-WU contains a number of red flag symptoms concerning for a potentially life-threatening cause of cardiac syncope. On history, he presented with exertional-syncope lacking a vasovagal prodrome. In addition, he endorses feeling short of breath. Secondly, his physical exam is abnormal, as his murmur is characteristic of hypertrophic cardiomyopathy. Regarding disposition, the decision should be made in consultation with cardiology. Generally, a case such as this has a very low threshold for an admission. This patient requires more extensive investigations and management by cardiology because of his life-threatening risk for serious cardiac disease. Until he is seen by cardiology, it is imperative to stress avoiding all forms of exercise and exertion until evaluation is complete.

Conclusion

Before we go let's summarize the key points from this podcast:

Let's summarize the key takeaway points:

- 1) Syncope is defined as the sudden, transient loss of consciousness associated with loss of postural tone from which there is spontaneous recovery.
- 2) Most causes of syncope are benign (vasovagal and orthostatic). However, recognizing concerning features on history, physical exam and ECG is life saving.

- 3) Red flag features are exertional syncope, sudden in onset with no significant prodromal symptoms, a family history of sudden or unexplained death, abnormal cardiac physical exam, significant past medical history of structural or arrhythmogenic heart disease. Associated cardiac symptoms of chest pain, palpitations, and/or dyspnea; cardiac disease should also be explored.
- 4) Sinister cardiac causes can be broken down into structural and electrical etiologies. Structural causes include congenital heart disease, aortic stenosis, and hypertrophic cardiomyopathy. Electrical causes include WPW, Prolonged QT, ventricular arrhythmias and heart blocks.
- 5) A patient with a suspected cardiac cause should be advised to AVOID any exercise at all cost. Urgent follow up with a pediatric cardiologist should be arranged.
- 6) A patient with a benign cause should be educated on fall prevention, trigger recognition and reassured about their condition. Close follow up with their primary care physician and return to care precautions should be given.

That's it for this PedsCases podcast on pediatric syncope. Thank you for listening.

References

- 1) Sanatani, S., Chau, V., Fournier, A., Dixon, A., Blondin, R., & Sheldon, R. S. (2017). Canadian Cardiovascular Society and Canadian Pediatric Cardiology Association Position Statement on the Approach to Syncope in the Pediatric Patient. *Canadian Journal of Cardiology*, 33(2), 189-198. doi:10.1016/j.cjca.2016.09.006
- 2) Tretter, J. T., & Kavey, R. W. (2013). Distinguishing Cardiac Syncope from Vasovagal Syncope in a Referral Population. *The Journal of Pediatrics*, 163(6). doi:10.1016/j.jpeds.2013.07.023
- 3) Yeh, J. (2015). Syncope in children and adolescents. *Pediatric Annals*, 44(12), e287-291. doi:<http://dx.doi.org/login.ezproxy.library.ualberta.ca/10.3928/00904481-20151113-01>