Faints, Fits and Fakes
Approach to the student who falls out at school

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Disclosures

- I have no conflicts of interest, financial or otherwise, to disclose.
- Nothing said here should be thought to supersede BCPS policies and procedures.
Goals and Objectives

- To improve the ability to assess and manage a child with apparent syncope by increasing knowledge of:
  - The **causes** of syncope in children and adolescents
  - The **initial management** of the child with a apparent syncope
  - The **need for emergency treatment** in cases of potentially life threatening syncope
Cases to Consider

- Write down your first impressions about what may be going on – your first and second most likely diagnoses for this child
- Write down what you, as the nurse responding, are going to do FIRST
- Write down what further information you want about the child and circumstances
Bettina Biology

- 14 yo girl who faints in Biology lab
- Occurred at 0845 while she was standing at the lab table
- Friend says she just slumped over toward him, and the friend caught her and laid her on the floor, where her arms jerked a couple of times.
Larry Latinscholar

- 12 yo boy who fell out of his chair in class
- Happened at 1:10 while reciting Latin declensions.
- Students next to him say he was fine, then seemed to glaze over for a few seconds and then fell out of the chair.
- Now on the floor, on his side, eyes twitching and body jerking a little.
Hiliary Hallwalker

- 15yo girl who was walking in the hall between classes with her boyfriend
- Students report that she cried out, dropped her bookbag, grabbed her boyfriend and then passed out
- Boyfriend held her up until a friend told him to lay her flat on the floor, where she is now, eyes twitching and arms jerking.
Freddy Football

- 15 yo male faints on the field during football practice
- Occurred 15 minutes into the scrimmage on a warm September afternoon
- Bystanders say he had complained of “feeling funny” before he fell over while running a play. Had a couple of jerking movements after he fell.
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Differential for Passing Out

- Syncope – Faints
- Seizure - Fits
- Spells - Fakes
Syncope – “Faint” - Definition

- Greek “synkoptein” meaning to cut short.
- Temporary loss of consciousness and postural tone, resulting from an abrupt, transient, diffuse and reversible disturbance of cerebral function due to a sudden reduction in delivery of substrate to the brain.
- Synonyms – Fainting, blacking out spell, passing out, falling out
- Syncope is a SYMPTOM – not a diagnosis
Seizure – “Fits” - Definition

- Transient, involuntary alteration of consciousness, behavior, motor activity, sensation and/or autonomic function caused by an excessive rate and hypersynchrony of discharges from a group of cerebral neurons.
“Fakes”

- Pseudoseizures
- “Nonepileptic seizures”
- Conversion disorders
- Behavioral
  - attention seeking, malingering
- Hyperventilation/panic attack
“Fakes”

- Often associated with stressors
  - Physical abuse
  - Sexual abuse
  - Depression and suicidality
  - Anorexia nervosa
- VS usually normal
- Not always volitional or conscious
- Counseling and care needed
Syncope and Seizure vs “Fake”

- History, progression, associated complaints, circumstances all important to uncovering the true diagnosis
- May still require further medical evaluation to delineate.
- Can be very challenging....
Syncope vs Seizure - Comparison

- Some overlap in clinical presentation
- Both may have jerking of muscle groups
- Both may involve confusion on regaining consciousness
- Both may involve loss of tone
- History and progression will delineate usually, but may require EEG, EKG and even prolonged monitoring
Syncope - Classification

- **Autonomic**
  - Vasovagal syncope
  - Excessive vagal tone
  - Volume depletion
  - Reflex
  - Pregnancy

- **Cardiovascular**
  - Structural heart disease
  - Tachyarrhythmias
  - Bradyarrhythmias
  - Vertebrobasilar insufficiency

- **Metabolic** –
  - Hypoglycemia,
  - Hypoxia
  - CO, NH3
Autonomic - Vasovagal Syncope

- Synonyms – neurocardiogenic syncope, vasodepressor syncope, fainting spell
- Accounts for >50% of childhood syncope
- Prognosis is benign
- Prophylactic management
Autonomic/Vasovagal Syncope Mechanism

- Decrease in systemic venous return and decreased preload (cardiac filling)
  - Standing with venous pooling, dehydration
- Increased circulating catecholamines
  - Compensatory, but sometimes in response to a stimulus
- Hypercontractility of LV with stimulation of cardiac C fibers
- Vagal nerve response (parasympathetic enhancement)
  - Vagal tone increases reflexively - Bradycardia
- Decreased sympathetic tone --- Hypotension
- Bradycardia and Hypotension beget SYNCOPE
Autonomic - Vasovagal syncope

- **Circumstances**
  - Standing or change from supine to upright
  - Frequently a prodrome or warning phase
  - May be triggered by catecholamine release
  - May be aborted in presyncope phase by putting head down below heart – supine

- **Treatment**
  - Prevention
  - Supportive
Variations on Autonomic Syncope

- **Volume depletion (orthostasis)**
  - Hemorrhage, anemia, dehydration, diuretic abuse

- **Excessive vagal tone**
  - Athletes with very low resting HR

- **Pregnancy**
  - Combination of factors

- **Reflex syncope**
  - Breath holding spells
    - Infants to 5 year olds
  - Situational - micturition, defecation, cough
    - Occurs during episodes of rapid emptying of bladder, valsala with defecation or cough, rare in children

- **POTS**
  - Recurrent episodes, a whole other lecture...
Cardiac Syncope

- Not benign, does require evaluation
- Far less common than autonomic syncope
- Suspect this when
  - Known heart disease or family Hx of sudden cardiac death
  - Fainting with exercise
  - Incontinence during fainting spell
  - Injury during fainting spell
  - Sudden fainting with no prodrome
Cardiac Syncope - Types

- Structural heart disease
  - Congenital heart anomalies
  - Acquired heart anomalies
    - Hypertrophic cardiomyopathy, pericarditis, dilated cardiomyopathy, myocarditis

- Tachyarrhythmias
  - WPW, SVT, Long QT syndrome, VT, drugs

- Bradyarrhythmias
  - AV block, sinus node disease, drugs

- Vascular anomalies
  - Vertebrobasilar insufficiency
Structural Cardiac Anomalies

- Congenital heart disease
  - Tetralogy of Fallot – R to L shunting
  - Coarctation of the aorta – obstruction, HTN
  - Valvular stenosis – aortic, pulmonic – obstruction
  - Single ventricle disorders – shunting, <EF

- All lead to blockage of appropriate blood flow, or reversal of flow from right to left

- Can be associated with dysrhythmias
Structural Cardiac Anomalies

- Acquired
  - Hypertrophic cardiomyopathy
    - Walls/septum thicken with abnormal cardiac muscle
    - Ineffective squeeze + not enough blood in the ventricle + abnormal electrical conduction + LVOT obstruction = BAD
  - Dilated cardiomyopathy
    - Ventricles like balloons, abnormal cardiac muscle, ineffective squeeze, risk for clots in ventricles and atria
  - Inflammation
    - Myocarditis – ineffective squeeze, arrhythmias
    - Pericarditis – tamponade
  - All can be associated with dysrrhythmias
Normal Heart Diagram
Hypertrophic Cardiomyopathy
Dilated Cardiomyopathy
Pericarditis and Tamponade

Cardiac Tamponade
A build-up of blood or other fluid in the pericardial sac puts pressure on the heart, which may prevent it from pumping effectively.
Electrical Conduction in the Heart

http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/electrical
Aberrant Electrical Conduction in SVT
Aberrant Conduction in WPW
WPW Conduction
Final Common Pathways of Cardiac Syncope

- Obstruction to outflow of blood leading to lack of delivery of blood and oxygen to the brain
- Abnormal electrical pathways leading to abnormal cardiac contraction and dysfunctional rhythm
- Both
Treatment of Cardiac Syncope

- LOVE THE AED – USE IT!
  - Defibrillation for VT or fibrillation
  - Synchronous cardioversion for SVT
- Early detection
  - Family history, good PE
- Attempts at prevention with activity restriction, hydration, medication
- Ablation &/or ICD for certain cases
Metabolic syncope

- **Hypoglycemia**
  - Relative insulin overdose, anorexia nervosa, teens eating no breakfast, toddlers taking grandmas metformin...

- **Hypoxia**
  - Strangulation games, respiratory distress

- **CO poisoning**
  - Poorly ventilated areas with CO leak

- **Hyperammononemia**
  - Metabolic diseases, liver failure
Life-threatening Causes of Syncope

- Cardiac arrhythmias
  - VT, SVT, severe bradycardia
- Hypoglycemia not treated
- Hypoxia not treated
- Depression not treated
So What is a School Nurse to Do?!

- Assess status now
  - Vital signs, mental status, D-stick, pulse ox

- ABCs always come first
  - Assess and intervene as necessary
  - One must often intervene with imperfect knowledge!

- Gather history as able
  - Prodrome? Inciting events? Medications? Last meal. Chronic conditions? Length of episode and characteristics such as loss of bladder or bowel control, description of episode from bystander. Can student give a history of the episode as well?
Management at School

- Place student in position of safety
  - Supine or on side, head lower than feet
- Put student on oxygen if still unresponsive
- Place AED if available and still unconscious or pulse abnormal
- Administer glucose paste if hypoglycemic
- Activate EMS for ABN VS, cardiac rhythm abnormalities, hypoxia, hypoglycemia or episode lasting longer than a few minutes.
So now back to our students…
Bettina Biology

- 14 yo girl who faints in Biology lab
- Occurred at 0845 while she was standing at the lab table
- Friend says she just slumped over toward him, and the friend caught her and laid her on the floor, where her arms jerked a couple of times.
Bettina Biology

- On arrival – she is lying flat, opening eyes and asking what happened.
- VS – HR 115 RR 18 BP 95/60
- Did not eat breakfast or drink anything prior to school. Little sleep last night
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
On arrival she is still lying flat, limp, eyes closed, she has bitten her lip

Friend reports they had gone out for breakfast before school

Friend reports that she had been complaining of her chest feeling like her heart was racing at breakfast and for the whole lab.

VS – HR 180-200? Pulses thready, lips pale, pupils 5 mm and reactive, no nystagmus, shallow respirations, she will look at you but seems glazed over
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Freddy Football

- 15 yo male faints on the field during football practice
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- Bystanders say he had complained of “feeling funny” before he fell over while running a play. Had a couple of jerking movements after he fell.
Freddy Football

- On arrival you find him lying flat, groggy but beginning to arouse.
- He complains of a headache and feeling nauseous and he says he cannot remember what happened.
- VS – HR 50 RR 20
Management

○ What do you do first?

○ What do you want to know?

○ What do you do next?

○ Would you call EMS?
Freddy Football- 2

- On arrival you see him supine, trainer doing CPR.
- Pulse – not palpable or audible
- Respirations - absent
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Larry Latinscholar

- 12 yo boy who fell out of his chair in class
- Happened at 1:10 while reciting Latin declensions.
- Students next to him say he was fine, then seemed to glaze over for a few seconds and then fell out of the chair.
- Now on the floor, on his side, eyes twitching and body jerking a little.
Larry Latinscholar

- On arrival, he is lying on the floor, eyes closed, arms and legs contracted and stiff. He has urinated on himself.
- VS – HR 150 RR 12 BP -?
- Eyes are deviated up to the right, with twitching movements, pupils small and equal.
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Larry Latinscholar - 2

- On arrival, he is lying on the floor, eyes closed, starting to mumble
- Friends report he has been feeling sick today, and has vomited twice
- VS – HR 125 RR 16
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Hiliary Hallwalker

- 15yo girl who was walking in the hall between classes with her boyfriend
- Students report that she cried out, dropped her bookbag, grabbed her boyfriend and then passed out
- Boyfriend held her up until a friend told him to lay her flat on the floor, where she is now, eyes twitching and arms jerking.
Hilary Hallwalker

- On your arrival she is lying on the floor, limbs jerking, eyes closed.
- A large crowd has gathered.
- Airway clear
- Breathing hiccupping and gasping respirations, moaning “No”
- Heart RR at 95
- Suppressible limb movements, eyelids squeezed shut, pupils equal, 6mm-4mm reactive.
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Hilary Hallwalker - 2

- On your arrival she is lying on the floor, rhythmic jerking of flexed arms. Legs stiff.
- VS – shallow respirations, irregular at about 10, HR 145
- Pupils 2 mm, eyes up right
Management

- What do you do first?
- What do you want to know?
- What do you do next?
- Would you call EMS?
Your Differential?
Conclusions

- Syncope is not rare in children and teens
- Syncope and seizures have some overlap in presentation
- Most syncope in children/teens is benign
- Cardiac syncope is not benign
- Assessment includes history, circumstances and evolution of the case
- Initial management is the ABC’s
- Not all syncope requires EMS
References

- http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/electrical