

Key Teaching Points: 16-year-old boy's presport physical - Mike

This page includes a summary of the key teaching points in the case. There are also additional, related teaching points that may not be directly included in the case. These additional teaching points are in a smaller font size.

Summary of clinical scenario: A healthy-looking 16-year-old male is in for a pre-sports physical, hoping to run track again. The case reveals that he had a fainting episode and some recurrent chest pain, and explores possible causes for both. The case shows how to perform an orthopedic exam, using a video in which the author demonstrates for the patient the desired movements. The case models how to ask questions in the HEEADSSS interview, how to determine Tanner staging in males and females, and reviews immunization needs for teenagers.

Preparticipation Physical

Primary Objectives: detect conditions that may predispose to injury; detect conditions that may be life-threatening or disabling; meet legal and insurance requirements.

Secondary Objectives: assess general health, counsel on health-related issues, and assess fitness level for specific sports.

Paramount is determining a teen's cardiovascular health. An important condition to R/O is **Hypertrophic Cardiomyopathy** (HCM), which is the #1 cause of sudden death in young athletes. It can first present with syncope. The ECG is abnormal in >90% of pts with HCM.

Components required in a sports preparticipation physical are found at the AAP Web site:

<http://www.aap.org/sections/sportsmedicine/spmedeval.pdf>

Evaluating Chest Pain

- Chest pain rarely associated with life-threatening diseases in children.
- Consider cardiac etiology (e.g. HCM, myocarditis, pericarditis or a respiratory cause such as exercise-induced asthma or bronchospasm) if:

1. Chest pain with exercise;
2. Radiation to the arm and neck;
3. Association with difficulty breathing, syncope or palpitations.

Look for:

- Hx : aggravating/relieving factors, frequency, severity, location, radiation, relation to meals and activity, body position and impact on lifestyle.
- Med Hx: non-prescription meds, OCPs and those causing gastric irritation.
- Social Hx: alcohol, tobacco, intoxicants, stimulants, cocaine or other drugs.
- PE: vital signs, body habitus (e.g. Marfan's).

Performing the heart exam: The cardiovascular exam begins with measuring the blood pressure, using an appropriately sized cuff. Palpation of the radial and femoral pulses is very important to assess for a possible coarctation of the aorta. Auscultation should be performed supine and standing. Standing is preferred, as the murmur of hypertrophic cardiomyopathy tends to be louder while standing. Murmurs are common in healthy adolescents, but any murmur louder than grade III/VI, any diastolic murmur, or any murmur that increases with standing or Valsalva deserves further evaluation.

Differentiating Chest Pain

Benign Types of Chest Pain:

1. Precordial catch syndrome: Is by far the most common cause of chest pain in children but is of unknown etiology. Occurs most commonly in adolescents and is characterized by sudden, sporadic onset of sharp pain, usually along the left sternal border, which is often exacerbated with deep inspiration. Pains are brief, lasting seconds to a few minutes, and resolve spontaneously. Pain is not related to exertion. The pain can often be "broken" with a forced deep inspiration.

2. Costochondritis: Pain with direct sternal pressure, usually due to an inflammatory process of the costochondral or costosternal joints that causes localized pain and tenderness. Any of the 7 costochondral junctions may be affected, and more than 1 site is affected in 90% of cases. The second to fifth costochondral junctions most commonly are involved. Exacerbated by trunk movement, deep inspiration, and/or exertion. The pain lasts hours or days. Reproducibility by direct pressure over costochondritis joints is diagnostic.

3. GI/GERD: Gastrointestinal causes of chest pain such as gastritis or esophagitis secondary to gastroesophageal reflux disease (GERD) may present as retrosternal, burning, non-radiating chest pain associated with meals.

Ischemic Pain: Dull, pressure-like or ache, substernal. Lasts 10-20 minutes, rarely less than 1 minute. Any child with history of severe chest pain only during exercise and not accompanied by wheezing or coughing and who has a history of syncope with exercise should be referred for cardiac evaluation.

Evaluating Syncope

- Definition: transient, brief LOC and loss of postural tone from inadequate cerebral perfusion. Usually self-limited and LOC <1 minute, followed by gradual return of cerebral perfusion and awakening.

- History: LOC and its duration are key to differentiate neurocardiogenic syncope from atypical syncope. Ask about: time of the day, last meal, weight changes, activities leading up to event, patient posture (sitting/standing/exercise) and associated symptoms (palpitations, chest pain, color change, headache, SOB, nausea, diaphoresis, visual changes and hearing changes).

- Drug History: prescription and OTC medicines, illicit drugs, alcohol and any accessible meds from other family members.

- Family History: h/o seizures, sudden death, MI in family members < 30 yo.

- PE: Vitals - orthostatic BP measurements (supine and upright). Detailed cardiac and neurological examinations should be performed.

Causes of Syncope/Fainting:

3 major categories of syncope in children:

1. Neurocardiogenic (Neurally mediated/vasovagal) - most common.

- Starts with prodrome (lightheadedness, dizziness, nausea, SOB, pallor, diaphoresis and visual changes), lasts several seconds to minutes, progresses to brief LOC, and ends with arousal to a previous level of alertness.

- Precipitators:

* Emotional stress: fear, anxiety, pain, phlebotomy.

* Physical states: anemia, dehydration, hunger, recent illness, physical exhaustion, motionless standing in crowded poorly ventilated confines.

2. Neuropsychiatric Syncope/ Non-cardiac Syncope

- Seizures

- Migraines

- Breath-holding spells
- Orthostatic
- Drugs: prescriptions - antihistamines (prolonged QT Sd), antihypertensives, diuretics, beta blockers and antiarrhythmics); street drugs (cocaine, marijuana, opiates, inhalants and alcohol)
- Metabolic: hypoglycemia, hyperventilation/ panic attacks/ histrionic personality/ conversion
- Other: CNS trauma, tumors, CVA/AVM

3. Cardiac Syncope

- Primary: structural defect leading to obstruction of ventricular outflow.
- Secondary: e.g. myocardial dysfunction, ventricular dysfunction and arrhythmias (most common cardiac cause, and the most silent and lethal).
- Arrhythmias:
 - * primary: SVT, VT and heart block (congenital, postsurgical, or acquired as in Lyme disease.
 - * secondary: prescription medications, illicit drugs.

Tests for Syncope - EKG indicated for any patient with syncope.

Serious Syncopal Signs

- 1) Facial cyanosis, aura, frothing at the mouth, tongue biting, slow recovery or postictal drowsiness and prolonged mental status changes or confusion.
- 2) All syncope associated with exercise or exertion.
- 3) Exercise-induced syncope, recumbent position, little or no prodrome, prolonged LOC (> 5 min), association with CP or irregular heart rate or palpitations, abnormal cardiac examination, recurrent syncope, h/o cardiac disease (aortic stenosis, hypertrophic or dilated cardiomyopathy) and family h/o sudden death.
- 4) Syncope in the supine position; convulsion before LOC; warm, flushed or cyanotic skin color rather than pallor and diaphoresis.

Indications for Cardiology Referral: atypical syncope, abnormal cardiovascular findings on ECG, any syncope DURING exercise or family h/o sudden death or prolonged QT syndrome.
Urgent referral indicated if CP associated with syncope, palpitations or exercise.

Interviewing Teens

HEEADSSS - Home, Education/employment, Eating, Activities, Drugs, Sexuality, Suicide/depression, Safety (including "savagery" to discuss violence).

Guidelines

- Questioning should be nonjudgmental.
- Teen often looking for practitioner who is a sensitive and mature resource, not someone who is "one of the gang." Be supportive advocate.
- Emphasize positives.
- Listening is often the key to developing rapport with an adolescent:
 - * Stay focused on conversation.
 - * Ask questions to move conversation along.
 - * Refrain from giving advice before being asked for it.
 - * Try to understand teen's perspective.
- Emphasize that teen is responsible for his own care. If necessary, mirror back to the teen what he says so he can hear inconsistencies in his behavior.
- Let adolescent feel your interest and concern.

Confidentiality - important to establish confidentiality with adolescents.

- Limits of confidentiality vary depending on the type of medical practice and current state laws.
- Explain to parent and teen up front that it's common to conduct part of interview alone to

respect teen's privacy and discuss confidential matters.

- Set tone at beginning of visit or at end of interview while parent present.
- Reassure parent that if there are any serious problems that could threaten the patient's life or health, the parent will be informed.
- Tell parents that you encourage pts to discuss certain issues with their parents.
- If parent refuses to leave room, explore the parent's concern and advocate for respecting adolescent's privacy. Encourage parent to communicate reasons for refusal to leave room, and address these concerns.

Anticipatory Guidance: Advice to Parents

- Establish expectations and reach agreement with adolescent about rules, limits, consequences and decision-making.
- Enhance adolescent's self-esteem, minimize criticism and respect adolescent's privacy.
- Continue to show interest in adolescent's plans and activities; and continue to affirm family values.
- Be a role model for responsible behavior, safe driving practices, and discuss healthy behavior, avoiding substance abuse and living responsibly.

GU Exam: Important to do in a male preparticipation physical to check for inguinal hernia, undescended testicle and Tanner staging. Presence of an inguinal hernia would preclude the patient from taking part in sports involving weightlifting or sprinting. If a patient has an undescended testicle, the physician should recommend a special protective cup. Tanner staging is used to "match" athletes, because Tanner staging is more accurate than age or weight in determining whether a youngster has adequate muscle mass to take part in particular sports.

Tanner Staging

Stage 1 - Prepubertal: childlike phallus, testicular volume <1.5 ml; no pubic hair.

Stage 2 - Childlike phallus, testicular volume 1.6-6 ml, reddened thinner and larger scrotum, small amount of fine hair along the base of scrotum and phallus.

Stage 3 - Increased phallus length, testicular volume 6-12 ml, greater scrotal enlargement, moderate amount of more curly, pigmented, coarser hair extending laterally.

Stage 4 - Increased phallus length and circumference, testicular volume 12-20 ml, further scrotal enlargement and darkening, and coarse curly adultlike hair that doesn't yet extend to the medial surface of thighs.

Stage 5 - Adult scrotum and phallus, testicular volume >20 ml. adult-type hair extending to medial surface of thighs.

[See Card 19 for images]

Immunizations

The only vaccines that might have not been given earlier (IPV should be complete at age 6; HBV in infancy at 6 or 12 months; HAV after age 2, before age 3) are Td and Meningococcal vaccine. Currently meningococcal vaccine is not routinely recommended for early adolescents. There is some data to support later adolescent administration, but not enough at present for the American Academy of Pediatrics or the Centers for Disease Control to recommend routine administration. Teens going to college, especially those living in dormitories, should consider receiving the vaccine prior to college enrollment.

While many adolescents HAVE received the Hepatitis B vaccine on schedule, many have not received it because they were already in school when universal immunization was initiated. Unfortunately, some school districts are not as aggressive as they should be at ensuring immunization for children already enrolled in the district. Reviewing whether the adolescent has had the recommended series is very important, and if in doubt, the healthcare provider should re-vaccinate, or even check a hepatitis B surface antibody level in the blood.