Chest Pain, When to Worry

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Demographics

• Selbst Pediatrics 75(6) June 1985
• Chest Pain accounts for 0.25% of pediatric ED visits
• Boys = Girls
• < 12 = Teens
Demographics of Chest Pain in Children

<table>
<thead>
<tr>
<th>TABLE 1. Diagnostic Categories for Chest Pain</th>
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<tbody>
<tr>
<td>Category</td>
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<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Idiopathic</td>
</tr>
<tr>
<td>Functional (anxiety)</td>
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<tr>
<td>Musculoskeletal</td>
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<tr>
<td>Costochondritis</td>
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<tr>
<td>Gastrointestinal pathology, “esophagitis,”</td>
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<tr>
<td>“Heartburn”</td>
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<tr>
<td>Asthma</td>
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<tr>
<td>Trauma</td>
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<tr>
<td>Arrhythmia</td>
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<tr>
<td>Pneumonia</td>
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<tr>
<td>Other</td>
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<tr>
<td>Total</td>
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</tbody>
</table>

Cardiac Causes of Chest Pain

- Arrhythmias
- Pericarditis/ myocarditis
- Hypertrophy
  - HCM/HOCM
  - LVOTO
- Coronary artery anomaly
  - Anomalous origin
  - Kawasaki's
- Aortic dissection
- Mitral Valve Prolapse Syndrome
When do You Worry?

- In all cases of a cardiac etiology, history and physical exam led to appropriate diagnostic tests.
- **Historical Findings**
  - **Location**
    - Localized or diffuse, Radiating or non-radiating
  - **Duration**
    - Recent onset of brief episodes (seconds to minutes)
  - **Quality**
    - Sharp, stabbing pain, pressure
  - **Setting**
    - Rest or exercise

Physical Exam

- Tachycardia, Fever
- Marfanoid
- Murmur/rub
- Tenderness over costochondral joints
- Tachypnea/signs of pneumonia
Cardiac Evaluation

- Tailor evaluation to history and physical
  - ECG
    - WPW
    - Pericarditis/ myocarditis
    - HCM
  - Echocardiogram
    - Pericarditis/ myocarditis
    - HCM
  - Stress Testing
    - Exercise induced symptoms
  - Holter Monitor/event recording

Case 1

- 13 yo male presents after quitting a tennis tournament secondary to chest pain
  - Has been having this pain with competition for 3-4 months.
  - Pain is a diffuse ache over entire precordium.
  - Starts after at least one set.
  - Pain resolves with 4-5 min. of rest.
  - Recently received an injection of growth hormone.

- No concerning family history
- Normal physical exam
What next?

Which is the most appropriate course of action.

A. Reassurance, discharge to home
B. Non-invasive cardiac evaluation with an ECG and Echo
C. Trial of Ibuprofen for Costochondritis
D. Find a new tennis coach to change his serve

ECG
Echocardiogram

- Dynamic LV function
- Concentric Hypertrophy with septal thickness of 16 mm and free wall thickness of 11 mm
- SAM with peak LVOTO gradient of 115 post exercise.

Next Test?

A. Genetic testing for HCM genes
B. MRI
C. Stress Echocardiogram
D. PFT’s to rule out asthma
Case 2

- Small (30 Kg) 8 yo year old male is referred for evaluation of chest pain while playing basketball.
  - Complains of chest pain after 2-3 min. of playing basketball with friends. Pain is usuallly mild 3/10, primarily in upper left, but also in neck.
  - Does not occur every time he plays.
  - Pain can occur immediately after exercise, but never at rest.
  - Can continue to play with the pain, but gets very tired.
- Family history is completely normal.
- Physical exam is normal.

Is Cardiac evaluation indicated?

A. Yes
B. No
What tests would be most appropriate

A. Treadmill  
B. Echocardiogram  
C. Holter  
D. ECG  
E. All of the above

Unable to do a treadmill, Echocardiogram and ECG are normal. Holter is ordered
What Next?

A. Invasive EP Study
B. Coronary imaging.
C. Hemodynamic catheterization with coronary imaging and cardiac biopsy.
D. MRI to assess for scarring/myocarditis, coronary anatomy

TEE
Anomalous Coronary Artery

- Incidence of .3 to 1.3 %
- ANGIOGRAPHIC
  - Yildiz et al Clin Cardiology.2010 Dec;33(12)E60-4
  - Left arising from right 1/12457
  - Right arising from left 10/12457
- CT Angiography
  - Right from left 27/5869
  - Left from right 4/5869
Case 3

- 16 yo male
- High school football player
- Complains of chest pain, after practice.
- Never during practice.
- Feels weak and tired, thinks heart rate takes too long to come down when he is having the pain.
- Normal history otherwise, normal physical exam.

Additional workup?

A. Yes
B. No
Which Tests

A. Treadmill
B. Holter
C. Event recorder
D. ECG
E. Echocardiogram

ECG

A. Normal
B. Abnormal
Returns to ED when heart rate did not come down after practice

Immediately prior to cardioversion
Last Case

- 14 yo girl
- c/o chest pain every few weeks for last 6 months
- Pain is sharp, stabbing pain over heart with no radiation.
- Starts suddenly fades away within 2 min.
- No other symptoms
- Pain is 5/10
<table>
<thead>
<tr>
<th>Diagnosis</th>
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<tbody>
<tr>
<td>A. Costochondritis</td>
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<tr>
<td>B. Precordial catch syndrome</td>
</tr>
<tr>
<td>C. Arrhythmia</td>
</tr>
<tr>
<td>D. Ischemia</td>
</tr>
<tr>
<td>E. Supratentorial</td>
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