

## 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 1.** Diagnostic Categories for Chest Pain

	Patients		No. of Patients <12 yr	No. of Patients ≥12 yr
	No.	%		
Idiopathic	76	28%	42	34
Functional (anxiety)	45	17%	16	29
Musculoskeletal	39	15%	19	20
Costochondritis	26	10%	10	16
Gastrointestinal pathology, "esophagitis," "heartburn"	18	7%	7	11
Cough or upper respiratory tract infection	16	6%	13	3
Asthma	11	4%	4	7
Trauma	10	4%	8	2
Arrhythmia	7	3%	7	0
Pneumonia	6	2%	4	2
Other	13	4%	5	8
<b>Total</b>			<b>135</b>	<b>132</b>

## 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)
    - ✦ Do they have the pain at the time of evaluation
  - **Quality**
    - ✦ Sharp, stabbing pain, pressure
  - **Setting**
    - ✦ Rest or exercise

## Physical Exam

- Tachycardia, Fever
- Marfanoid
- Murmur/rub
- Tenderness over chostochondral 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

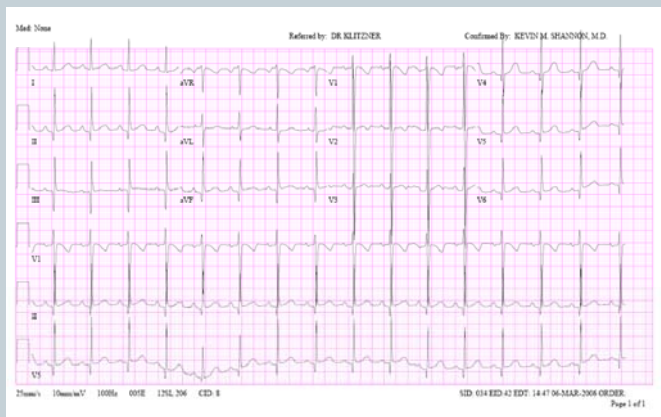
## Case 1

- **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 usually mild 3/10, primarily in upper left, but also in neck.
  - Does not occur every time he plays.
  - Pain can occur imediately 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.**

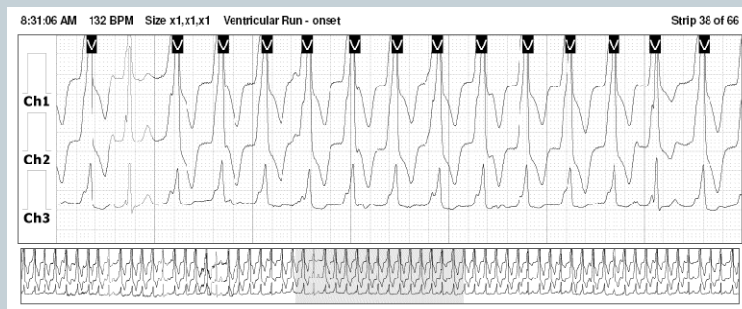
## Is Cardiac evaluation indicated?

- 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

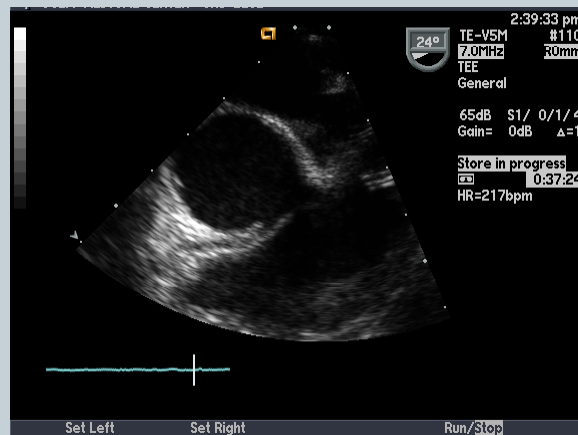


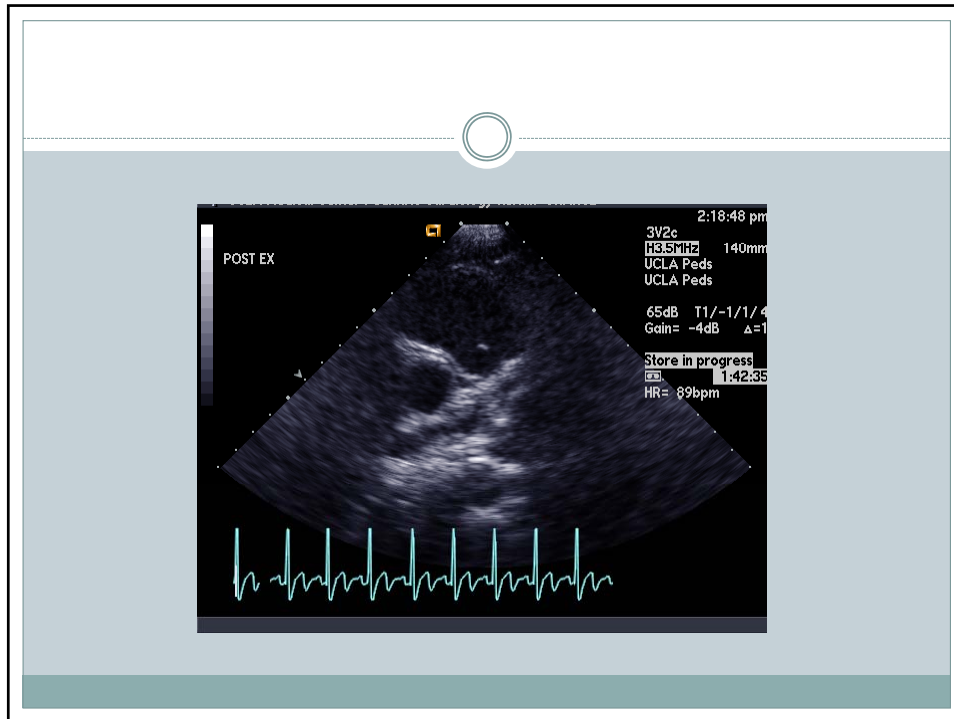


## What Next?

- 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.

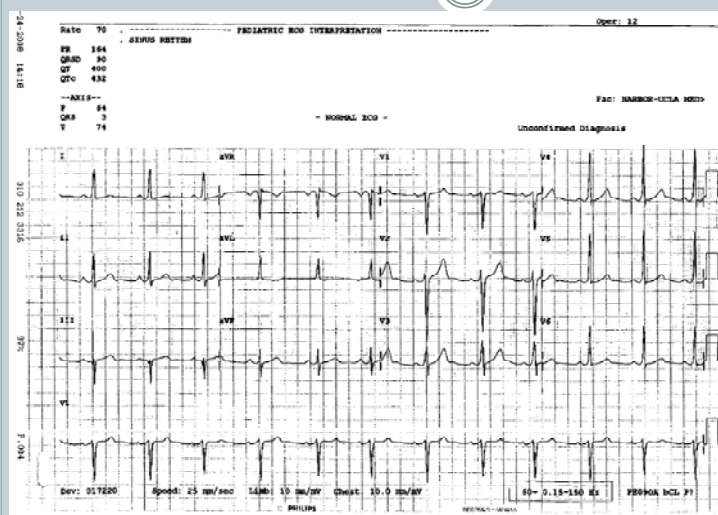
### Additional workup?

- A. Yes
- B. No

## Which Tests

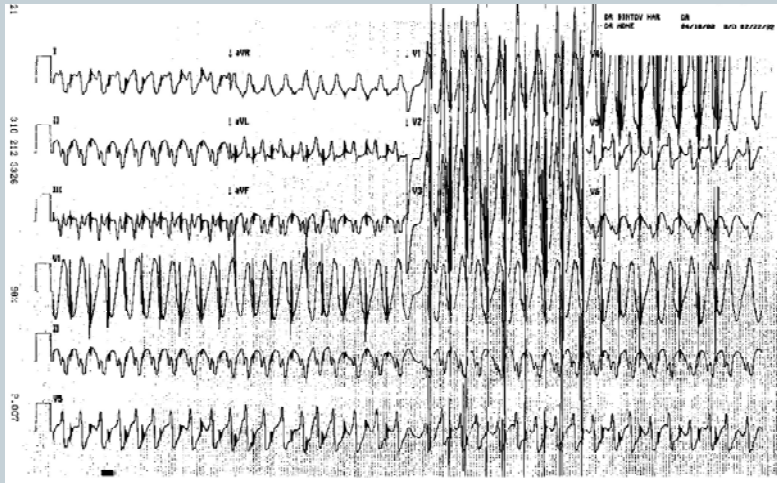
- A. Treadmill
- B. Holter
- C. Event recorder
- D. ECG
- E. Echocardiogram

## ECG

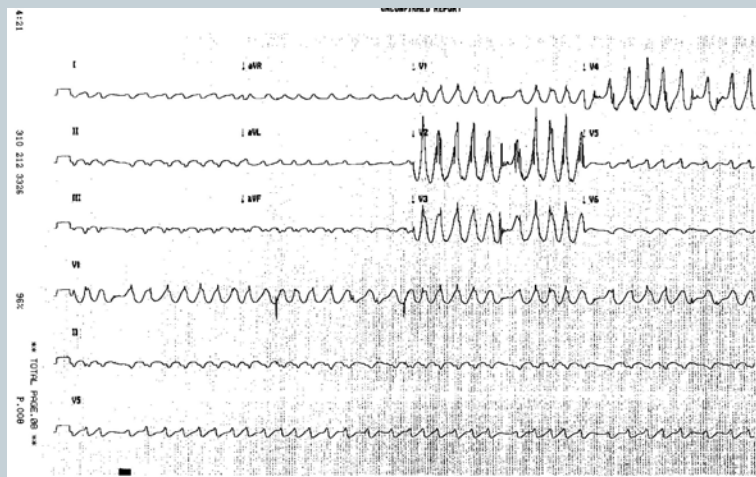


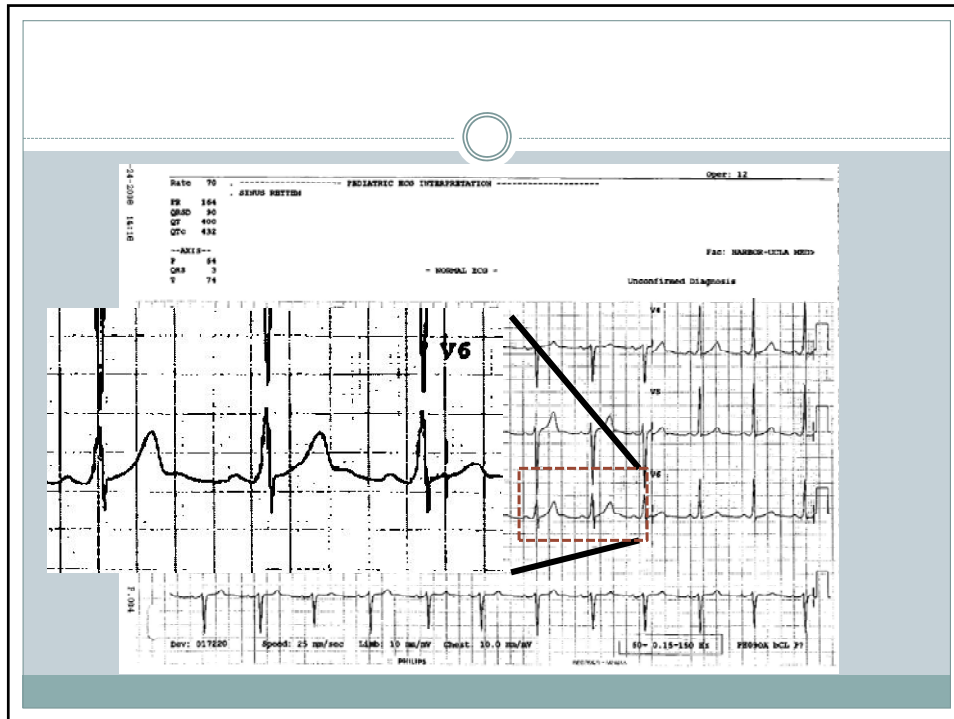
- A. Normal
- B. Abnormal

## 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

## Diagnosis

- A. Costochondritis
- B. Precordial catch syndrome
- C. Arrhythmia
- D. Ischemia
- E. Supratentorial