

# Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

## PEDIATRIC CHEST PAIN

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BRS HOSPITAL

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### Introduction:

Seeing a Pediatric patient with chest pain can be quite concerning.

The cause of most pediatric chest pain is unknown or selflimiting causes eg musculoskeletal pain While the pain is often non-cardiac in origin, there is always a lingering fear of overlooking a potential cardiac condition.

The goal of assessment is to rule out serious causes

Issue of Medi quest attempts to give an diagnostic framework that can differentiate between life threatening causes of chest pain from benign ones

In Children, cardiac related causes account for as few as 1% of children who present with chest pain the cause of chest pain is both cardiac and non-cardiac

Non cardiac causes are most often

Musculoskeletal, respiratory, gastrointestinal and psychogenic

### Evaluation of the patient

#### Clinical History

Thorough history includes the following

1. Symptom onset (acute onset with more likely to have identifiable cause)
2. Duration of symptoms.
3. Site of pain.
- 4.Pain Associated with exercise or position
5. Quality crushing central pain (Myocardial infarction,Dissecting aneurysm)
6. Radiation
7. Associated symptoms (dizziness, shortness of breath palpitation)
8. Aggravating and relieving factors
9. Recent Injury
10. Recent illness or vaccination ( eg myopericarditis secondary to COVID -19 mRNA vaccination)
11. Underlying condition Duchenne muscular dystrophy , Marfan's syndrome
12. Family History of sudden death , cardiac or pulmonary condition

## Red Flags in Pediatric Chest pain

Symptoms	Potential underlying cause
<p>Exertional chest pain</p> <p>Syncope</p> <p>Chest pain radiating to arm / back</p> <p>Chest pain on lying down relieved by sitting up and leaning forward</p> <p>Sudden onset tearing chest pain radiating to the back</p> <p>Dizziness palpitations</p> <p>New or worsening - Heart murmur</p> <p>Profuse sweating</p> <p>Pallor</p>	<p><b>Cardiac cause</b></p> <p>Cardiomyopathy</p> <p>Congenital coronary anomalies</p> <p>Aortic stenosis</p> <p>Acute myocardial inflammation</p> <ul style="list-style-type: none"> <li>* MI (rare in children)</li> <li>* Pericarditis</li> </ul> <p>Dissecting Aneurysm</p> <p>Arrhythmias includes QT syndrome</p> <p>Valvular heart disease, Congenital heart defect</p> <p>Myocardial ischemia, Severe arrhythmia</p>
<p>Sudden onset</p> <p>Chest pain with</p> <p>Dyspnoea</p> <p>Cough, Fever, Difficulty breath</p>	<p><b>Pulmonary cause</b></p> <p>Pulmonary embolism</p> <p>Pneumothorax ( Spontaneous)</p> <p>Pneumomediastinum</p> <p>Pneumonia</p> <p>Bronchitis</p> <p>Pleuritis</p>
<p>Associated abdominal pain</p> <p>Associated with persistent recurrent vomiting</p>	<p><b>Gastrointestinal causes</b></p> <p>GERD, Gastritis, Esophageal FB</p> <p>GERD Esophagitis</p>
<p>Severe sharp chest pain</p>	<p><b>Musculoskeletal cause</b></p> <p>Precordial catch Syndrome</p> <p>Costochondritis</p>

**Musculoskeletal causes** are the most common source of non cardiac chest pain in children with an incidence ranging from 50-68% .

**Precordial catch syndrome** – presents as sudden sharp chest pain localised to a small area near the heart usually over an intercostal space and is exacerbated by breathing or movement resolves spontaneously within a few minutes . Occurs in children , swimmers and adolescents. Cause is unknown thought to be irritation of the nerves in the chest wall.

### **Slipping Rib syndrome**

Caused when lower rib slips under an adjacent rib

### **Costochondritis**

Costochondritis results in sharp anterior chest pain over multiple costochondral or costosternal joints.

Tietze syndrome involves localised swelling and pain typically at a single costosternal or costochondral junction.

Herpes Zoster and breast related condition can contribute to chest wall pain

## **Physical Examination in Pediatric Chest Pain**

Palpation of chest , tenderness to palpation and well localised pain suggest a musculoskeletal cause, while bruising indicates trauma.

Check for murmur, tachycardia, bradycardia , gallop , rub and clicks

Auscultation of lungs checking air entry and added sounds.

**General examination** – tall stature in Marfan's syndrome , xanthomas

## **Investigations**

### **ECG**

ECG is a fundamental component in the investigation of pediatric chest pain  
ECG can detect acute myocardial infarction , myocarditis and potential fatal arrhythmias . Given its utility in identifying serious cardiac issues .

## **Chest Radiography**

Reveals conditions like pneumonia, pneumomediastinum , pneumothorax , and cardiomegaly

The CTR can be a valuable tool in the evaluation of chest pain, in infants and small children a CTR of 0.55 to 0.6 is considered normal and in older children and adolescents a normal CTR is between 0.42-0.5. Beyond this age specific thresholds consider conditions like cardiomegaly , pericardial effusion or other heart related abnormalities

### **Echocardiogram**

Echocardiogram assesses ventricular systolic function, pericardial effusion and anatomic abnormalities.

There is no universal guideline as to when to order a ECHO

### **Cardiac Troponin**

Cardiac Troponin a highly specific and sensitive biomarker for myocardial injury used commonly to diagnose myocardial infarction in adults can be used identify myocarditis and pericarditis in pediatric patients . Either Troponin I or Troponin T can be measured. However as it may be elevated in non cardiac conditions like bronchopneumonia, asthma, sepsis and status epilepticus measurement of Troponins should be considered when there is strong suspicion of cardiac involvement

### **Holter Monitoring**

Not recommended for routine cardiac evaluation, consider for episodic chest pain associated with palpitations or syncope in well appearing patient with normal ECG.

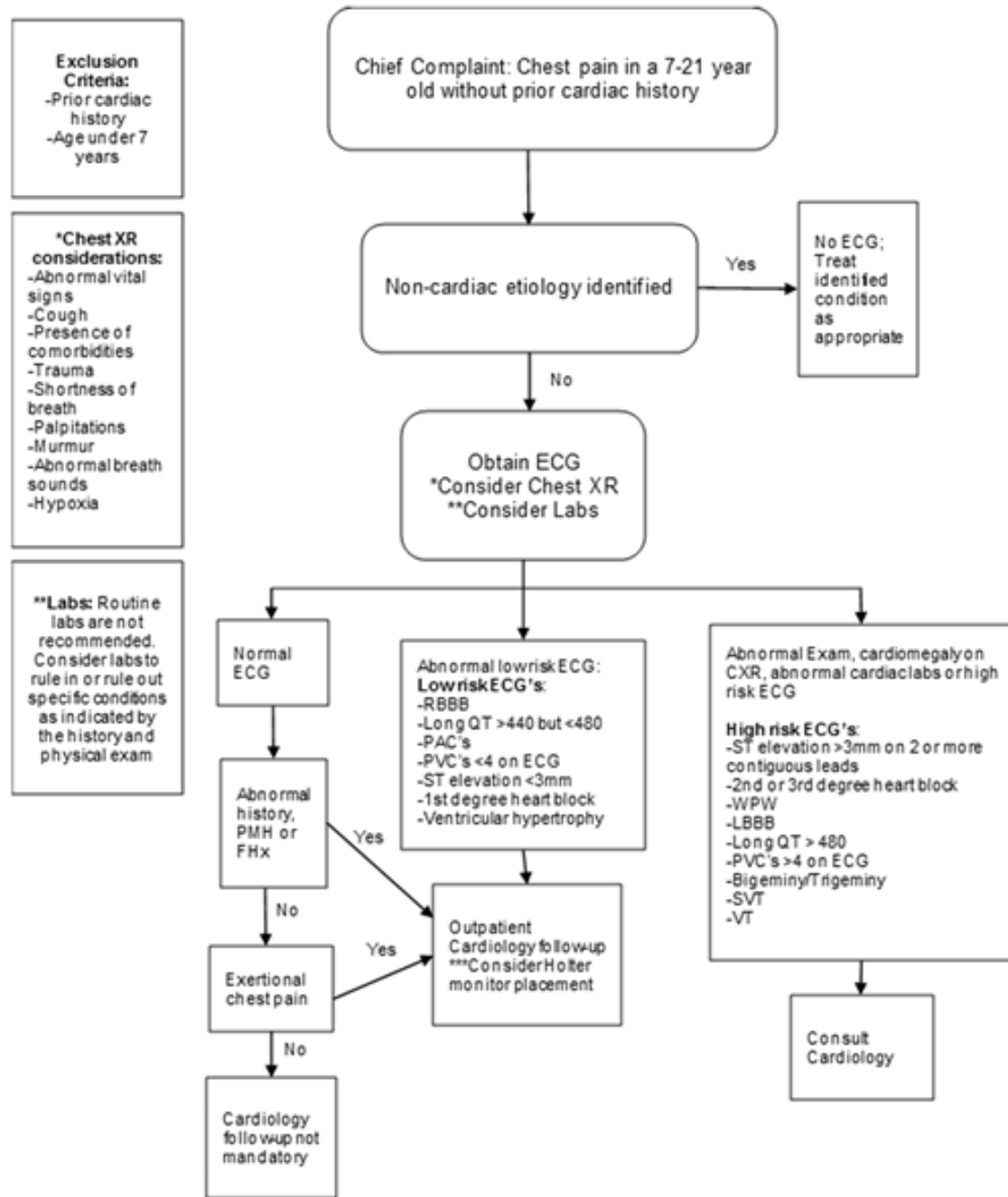
### **Cardiac Stress Testing**

Not routinely advised in pediatric practice

### **Cardiac Magnetic Resonance imaging**

Useful in detecting inflammation in myocardium or pericardium , congenital coronary artery anomalies , evaluation of cardiomyopathies or when mass or tumor is suspected

Johns Hopkins All Children's Hospital  
**EC Chest Pain Clinical Pathway**



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