The Congenital Heart Collaborative

University Hospitals
Rainbow Babies & Children's
Nationwide Children's Hospital

Identifying and Treating Chest Pain

University Hospitals

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When your child needs a hospital, everything matters.℠

The Congenital Heart Collaborative

University Hospitals Rainbow Babies & Children's Hospital and Nationwide Children's Hospital have formed an innovative affiliation for the care of patients with congenital heart disease from fetal life to adulthood. The Congenital Heart Collaborative provides families with access to one of the most extensive and experienced heart teams – highly skilled in the delivery of quality clinical services, novel therapies and a seamless continuum of care.

Pediatric Chest Pain

In pediatrics, chest pain has a variety of symptomatic levels and causes. It can range from a sharp stab to a dull ache; a crushing or burning sensation; or even pain that travels up to the neck, jaw and back. Chest pain can be cause for alarm in both patients and parents, and it warrants careful examination and treatment.

Pediatric chest pain can be broadly classified as cardiac chest pain or noncardiac chest pain.

Cardiac Chest Pain

Chest pain due to a cardiac condition is rare in children and adolescents, with a prevalence of less than 5 percent. The cardiac causes of chest pain include inflammation, coronary insufficiency, tachyarrhythmias, left ventricular outflow tract obstruction and connective tissue abnormalities.

Noncardiac Chest Pain

Noncardiac chest pain is, by far, the most common cause of chest pain in children and adolescents, accounting for 95 percent of concerns. Patients are often unnecessarily referred to a pediatric cardiologist for symptoms. This causes increased anxiety and distress within the family. Noncardiac causes of chest pain are musculoskeletal, pulmonary, gastrointestinal and miscellaneous.

The most common cause of chest pain in children and adolescents is musculoskeletal or chest-wall pain. Reassurance, rest and analgesia are the primary treatments for musculoskeletal chest pain. In most circumstances, allaying the fears of the patients and parents by counseling them about the benign nature of the condition helps to relieve concern and reduce the degree of chest pain.

Cardiac Condition	Description
Inflammatory Causes	Inflammatory causes of cardiac chest pain include pericarditis, myocarditis and endocarditis.
Left Ventricular Outflow Tract Obstruction	Aortic valve stenosis is characterized by a harsh ejection systolic murmur with radiation to the neck, which is heard on auscultation.
Tachycardias	Oftentimes children report tachycardias as chest discomfort or pain; prolonged ventricular arrhythmia can lead to ischemia.
Kawasaki Disease (KD)	Coronary artery abnormalities are a well-known complication of KD, and patients who have been treated for KD should be monitored for heart problems. The rare complication of KD is coronary insufficiency that also presents with anginal symptoms.
Aortic Dissection	Connective tissue disorders such as Marfan syndrome, Loeys-Dietz syndrome, etc., are at risk for dissection. Pain is often severe – "worst pain of my life" – that radiates to the flank or back.
Coronary Artery Abnormalities	Myocardial ischemia in patients who have abnormal coronary artery connections present initially with anginal chest pain, usually associated with exertion. Characterized by squeezing sensation, tightness, pressure, constriction, burning or fullness in the chest. Infant patients also usually present with irritability, drawing of their knees up to their abdomens after feeding, pallor, diaphoresis and circulatory shock. These infants are often misdiagnosed as having colic.
Hypercholestrolemia	Nonfasting serum total cholesterol concentration should be tested per AAP guidelines. Hypercholesterolemia leading to coronary artery abnormalities may present within the first 20 years of life in patients with homozygous familial hypercholesterolemia. While this is the case, it is quite rare.

Evaluating Your Patient

In order to best determine the cause of chest pain, gathering information from the patient history, physical examination and recommended tests is essential to evaluating your patient before referral.

Physical Examination

- [ ] Vital signs
- [ ] Dysmorphic features
- [ ] Peripheral pulses
- [ ] Chest inspection
- [ ] Reproducible chest pain
- [ ] Hyperdynamic precordium
- [ ] Irregular heart beats
- [ ] Distant heart sounds
- [ ] Abnormal loud second heart
- [ ] Systolic clicks or murmurs
- [ ] Gallops
- [ ] Absent femoral pulses
- [ ] Dynamic auscultation

Test

A chest radiograph may be performed to evaluate for:

- [ ] Bony lesions
- [ ] Cardiomegaly
- [ ] Airways
- [ ] Lung parenshyma
- [ ] Pleural lesions

ECG is useful for evaluation of:

- [ ] Rate and rhythm
- [ ] Signs of ischemia
- [ ] Pericarditis
- [ ] Chamber hypertrophy

Tox screen:

- [ ] Cocaine
- [ ] Marijuana

When to Refer to a Pediatric Cardiologist

Patients who have the clinical features of musculoskeletal chest pain and no other noteworthy findings do not require additional evaluation or referral. Those who have a significant history or abnormal findings on physical examination should have additional diagnostic evaluations and a referral to a pediatric cardiologist if cardiac disease is suspected.

Description of Chest Pain

- [ ] Any child or adolescent patient who has chest pain associated with exertion, palpitations, sudden syncope (especially during exercise) or abnormal findings on cardiac examination or ECG

Medical History

- [ ] Recent cardiac surgery or transcatheter intervention, including device closure or stent placements
- [ ] Kawasaki disease
- [ ] Congenital heart disease
- [ ] Cardiomyopathy
- [ ] Heart transplantation who experience myocardial ischemia who show symptoms of nausea or vomiting with eating or activity
- [ ] Antecedent viral illness with abnormal examination
- [ ] Chest trauma

Family History

- [ ] Genetic syndrome
- [ ] Sudden cardiac death
- [ ] High risk for coronary artery disease
- [ ] Cardiomyopathy
- [ ] Hypercholesterolemia
- [ ] Aortic aneurysm/Marfan syndrome

Physician-to-Physician Consultation Line

216-UH4-ADOC (216-844-2362)

Physician Access Line

(Patient transfers, admissions referrals, emergency department referrals, appointments)
216-UH4-PEDS (216-844-7337)

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