

Chest Pain

Essential History

Ask about:

- The location, duration, radiation, and quality of the pain
 - A description of the quality of pain can help determine its source
- Aggravating and alleviating factors
- Any associated signs and symptoms
- Any history of trauma, even if it occurred up to 3 months prior to onset of chest pain
- The child's perception of the pain
 - If possible, children should describe the pain in their own words
 - They should be asked what they think is causing the pain
- Pre-existing conditions including:
 - Kawasaki Disease and other cardiac conditions

Keywords / also known as: heartburn, indigestion, panic attack

'Red Flag' Symptoms and Signs

Ask about:

- Pain that awakens the child from sleep
 - More likely to have an organic cause
- Kawasaki Disease

Look for:

- Findings that suggest musculoskeletal and chest wall conditions
 - Signs of trauma, such as bruising
 - Splinting (bending over or holding the chest to protect against pain)
 - Abnormal breathing pattern
 - Reproduction of the pain complaint by palpation of a trigger point
 - Any chest wall deformities (eg, pectus excavatum or carinatum)
- Findings that suggest a parapneumonic effusion
 - Fever
 - Tachypnoea
 - Tachycardia
 - Pleural friction rub, and / or crackles
 - Dullness to percussion
- Findings that suggest a spontaneous pneumothorax

- Dyspnoea
 - Shoulder pain
 - Tachypnoea
- Findings that suggest a cardiac source
 - Any new clicks, rubs, or systolic murmur
 - Change in a previous murmur
- Findings that suggest myocarditis or pericarditis
 - Ill appearance
 - Fever
 - Dyspnoea (shortness of breath)
 - Changes in pain associated with the respiratory cycle
 - Third heart sound, or gallop audible in:
 - Myocarditis
 - Congestive heart failure
- Findings that suggest a hyperventilation syndrome
 - Carpopedal spasm
 - Paraesthesias / somatisations
 - Breast:
 - Male adolescent - gynaecomastia
 - Female adolescent - pregnancy, thelarche, mastitis or fibrocystic disease
- Where a patient with a history of Kawasaki Disease, findings that suggest thrombosis or myocardial ischaemia:
 - Chest, arm or abdominal pain
 - Unexplained crying
 - Unusual pallor
 - Restlessness
 - Sweating
 - Discolouration of skin

Differential Diagnosis / Conditions

- Most cases of chest pain in paediatrics involve injury to the musculoskeletal wall.
- Pulmonary disease accounts for one-fifth of cases
- Psychiatric, gastrointestinal, and cardiac disorders represent the remainder of identifiable causes
 - Undiagnosed cardiac disease causes chest pain in < 5% of patients.
 - **Excluding children with pre-existing heart disease, cardiac abnormalities are found in < 1% of patients.**
- Approximately 15% of cases remain idiopathic

- Musculoskeletal conditions
 - Costochondritis (common)
 - Localised, superficial, reproducible pain over costochondral junction
 - Exercise, muscle overuse, muscle strain (common)
 - Reproducible pain with use of affected muscle group
 - Protracted coughing or vomiting (common)
 - Intercostal muscle tenderness
 - Trauma (common)
 - Localised pain
 - Pain occurs with movement of affected areas
 - Stitch (common)
 - Sharp, crampy, costal pain that occurs with running
 - Precordial catch (uncommon)
 - Transient, stabbing pain at left sternal border; relieved by forced inspiration
- Respiratory conditions
 - Asthma (common)
 - Associated with cough, shortness of breath, wheezing, abnormal pulmonary function tests
 - Relieved by inhaled bronchodilators
 - Exercise-induced bronchospasm (common)
 - Abnormal findings on exercise tests
 - Improved by bronchodilators
 - Pneumonia (common)
 - Crackles, fever, cough
 - Pleural effusion (uncommon)
 - Pleural rub, fever, decreased breath sounds
 - Pulmonary embolus (rare)
 - Contraceptive use, recent abortion, pleuritic pain
 - Spontaneous pneumothorax (uncommon)
 - More common in chronic conditions, such as cystic fibrosis or Marfan's syndrome
 - Sudden pain, referred shoulder pain, [dyspnoea](#)
 - Can occur in tall, thin adolescents without specific pathology / cause
- Gastrointestinal conditions
 - Oesophagitis (common)
 - Retrosternal pain (relieved by antacids)
 - Gastro-oesophageal reflux (common)
 - Retrosternal burning pain (worse after eating and when reclining; relieved by antacids)

- Abnormality of peristalsis (uncommon): eosophageal spasm and achalasia
- Oesophageal foreign body (uncommon)
- Cardiac conditions
 - Kawasaki Disease
 - Hypertrophic cardiomyopathy (rare)
 - Syncope, family history, systolic ejection murmur
 - Pericarditis (rare)
 - Associated fever with acute onset of pain
 - Pain increases with movement
 - Narrow pulse pressure, distant heart sounds
 - Alleviated by leaning forward
 - Myocarditis (rare)
 - Precedent viral illness
 - Anorexia (see Appetite Loss)
 - Dyspnoea (shortness of breath)
 - Third heart sound or gallop
 - Cardiomegaly
 - Arrhythmia or conduction disorder (rare)
 - Gynaecomastia or breast pain in adolescents
 - Easily discernible on inspection, and palpation of developing breast tissue
- Emotional
 - Hyperventilation (common)
 - Associated light-headedness, paraesthesias, underlying anxiety
 - Non-organic (common)
 - Normal physical examination, sleep disturbances, family or school problems, life stresses, family history of chest pain, other somatic symptoms
- Idiopathic (common)
 - Haematological
 - SCD in acute chest crisis

Investigations

It is important to define whether the chest pain is secondary to an underlying physical abnormality, non-organic, or idiopathic.

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team) or specialist practitioners (eg, Emergency Department / Paediatric Team(s)) depending on availability:

- Screening laboratory tests are usually not helpful in establishing a specific diagnosis.

- A thorough history and physical examination should guide the clinician in ordering tests.
 - A chest radiograph is indicated if the clinician suspects:
 - Pneumothorax
 - Pericarditis (pericardial effusion)
 - Pneumonia
 - Pleural effusion
- Electrocardiography will help to exclude a cardiac diagnosis
 - A negative result can reassure child and parent / carer
- Holter monitoring or 24 hour ECG monitoring
- Pain on exercise / exertion
 - Exercise testing, a therapeutic trial of bronchodilators or spirometry may help uncover underlying asthma or exercise-induced bronchospasm
- Where a patient with a known history of Kawasaki Disease
 - Full observations
 - 12 Lead electrocardiogram (ECG)
 - Troponin
 - Full blood count and blood chemistry
 - Obtain intravenous (IV) access
 - Follow Patient Specific Protocol (PSP) and arrange immediate urgent transfer to paediatric emergency department
 - Immediate electrocardiogram (ECG)
 - Administer aspirin orally if not regularly taking this
 - If there is ST-Elevation Myocardial Infarction (STEMI), patient needs immediate cardiac catheterisation
 - Contact on call paediatric cardiology consultant

Treatment Approach

To be undertaken by non-specialist practitioners (eg, GP Team):

- To many adolescents, chest pain means heart disease; therefore, this issue should be addressed.
 - If no cardiac cause is discovered, unequivocally explain to the adolescent and family that the heart is normal
- Treatment of non-organic chest pain
 - Explain that no organic cause for the pain has been elicited
 - Acknowledge that the pain is real to the child
 - Reassure that no long-term sequelae exist
- Idiopathic chest pain
 - Clinical presentation of oesophagitis can be non-specific
 - Consider trial of antacids or H₂-receptor antagonists such as ranitidine

Specific Treatment

- Exercise-induced bronchospasm
 - Bronchodilators
 - Improve exercise capacity
 - Encourage sport and social activity
- Hyperventilation syndrome
 - In an acute episode
 - Instruct the child to breathe into a paper bag to relieve hypocapnia
 - Encourage child to learn this technique
 - Chronic management
 - Train children to understand their anxiety and regain control of their emotional state (this may require referral for psychological support)
 - Where a patient with a known history of Kawasaki Disease, specialist intervention will be required

When to Refer

Refer to secondary care (eg, Emergency Department / General Paediatric Team(s)) if:

- The following occurs, which may warrant referral acutely or possible admission:
 - Chest pain with exercise
 - Palpitations
 - Syncope
 - Fever, chills, weight loss, malaise, anorexia (see Appetite Loss)
 - Recent elective abortion, calf pain, oral contraceptive use
 - Pica, foreign body aspiration
- Signs seen include the following:
 - Cyanosis, toxic appearance, or respiratory distress
 - Murmur that increases with Valsalva manoeuvre
 - Pleural or pericardial friction rub
 - Pulsus paradoxus
 - Cardiac clicks, thrills, gallop, or third heart sound
- Clear indications for referral (eg, General Paediatric / Paediatric Cardiology Team(s)):
 - Child with chest pain and family history of sudden death
 - History of Kawasaki's disease, Turner's syndrome, Marfan's syndrome, sickle cell disease, or cystic fibrosis
 - Family history of hypertrophic obstructive cardiomyopathy, or unexplained syncope

‘Safety Netting’ Advice

- Patients with persistent symptoms should be advised when to return
- Patients with non-organic or idiopathic chest pain
 - Follow-up regularly
 - Advise to see their GP if new or further symptoms appear.

Patient / Carer Information

****Please note: whilst these resources have been developed to a high standard they may not be specific to children.***

- [Heart health](#) (Web page), British Heart Foundation
- [Chest Pain](#) (Web page), Patient

Resources

Suggested Resources

****Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

Thull-Freedman J. Of 3700 children thought to have non-cardiac chest pain at initial paediatric cardiology clinic evaluation, none suffered cardiac death over a median of 4 years follow-up. *Evid Based Med* 2012;17:190–191. [[PubMed](#)]

Collins SA, Griksaitis MJ, Legg JP. 15-minute consultation: A structured approach to the assessment of chest pain in a child. *ArchDis Child Educ Pract Ed.* 2014;99:4 122-126. [[PubMed](#)]

[TEMPERS! Awareness Raising Leaflet](#) (PDF), Societi

[Pain Management](#) (eLearning - requires log-in), RCPCH Compass [Time to ‘Think Kawasaki Disease’](#) (Webinar), Royal College of Paediatrics and Child Health

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