Chest pain

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Publication date: May 2017
Review date: May 2019

To skip straight to the **management algorithm**, click **here**

Background

- Common. Affects approximately equal numbers of children under and over 12, with no particular gender bias[1]
- May lead to restriction of activities
- Cause for anxiety in parents, patients and health care professionals, however, underlying cardiac pathology is rare.

Causes	Approx. percentage
Musculoskeletal	24–56
Respiratory	7-20
Idiopathic	12–52
Psychogenic	1–9
Gastrointestinal	3–6
Cardiac	0.6–1
Miscellaneous	4–11

Assessment

All children presenting with chest pain should have an ECG in CED.

Diagnostic approach:

1. Rule out cardiac causes
2. Look for 3 common non-cardiac causes of chest pain (45-65%)
   - Costochondritis
   - Musculoskeletal
   - Respiratory

Cardiac Red Flags

- Past or current history of acquired or congenital cardiac disease
- Exertional syncope or cardiac-type chest pain
- Hypercoagulable or hypercholesterolaemic state
- Family history of: sudden death < 35 years of age, young onset ischaemic heart disease, inherited arrhythmias e.g. long QT syndrome or Brugada
- Implantable cardioverter defibrillators in situ
- Connective tissue disorders
- History of cocaine / amphetamine use

History

Key questions:

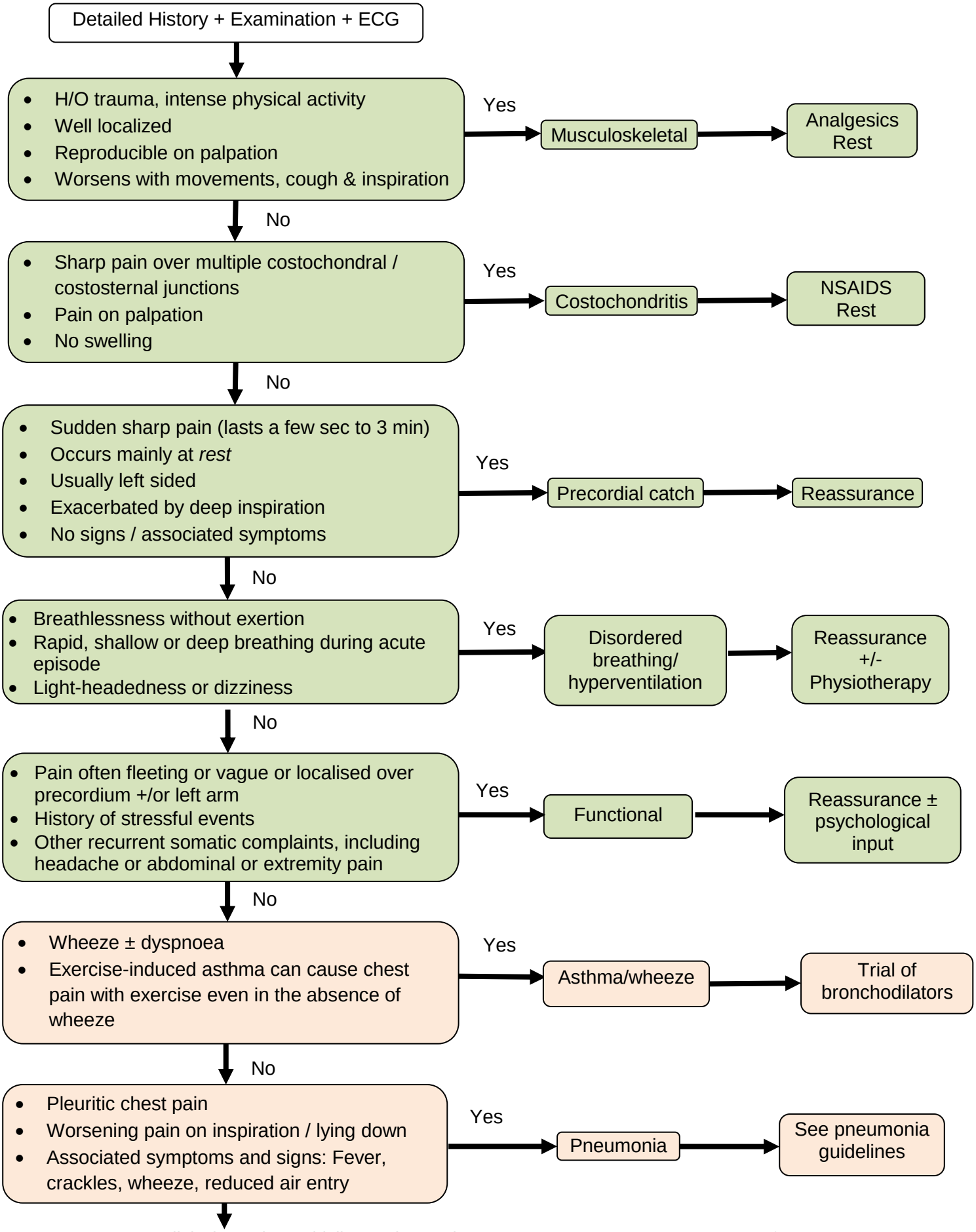
- History of trauma or preceding new or intense physical activity?
- Pain associated with any particular activities such as eating or exercise?
- Exacerbating factors, e.g. exercise, certain positions, movement and coughing?
- Alleviating factors e.g. positional changes, rest, analgesics and antacids?
- Dyspnoea, cough, wheeze or other respiratory symptoms?
- Associated constitutional symptoms such as fever, anorexia and weight loss?
- Cardiac-related symptoms or risk factors, including palpitations, syncope, family history of sudden death, implantable cardioverter defibrillators (ICD), arrhythmias, previous Kawasaki disease or congenital heart disease?
- Vomiting, heartburn, dysphagia, water brash or other gastrointestinal symptoms?
- Underlying medical conditions that may be associated with chest pain such as asthma, Kawasaki disease and sickle cell disease?
- History of possible substance abuse?
- Recent stressors at home or school? Any problems with anxiety?
- Oral contraceptive pill use / family history of VTE?

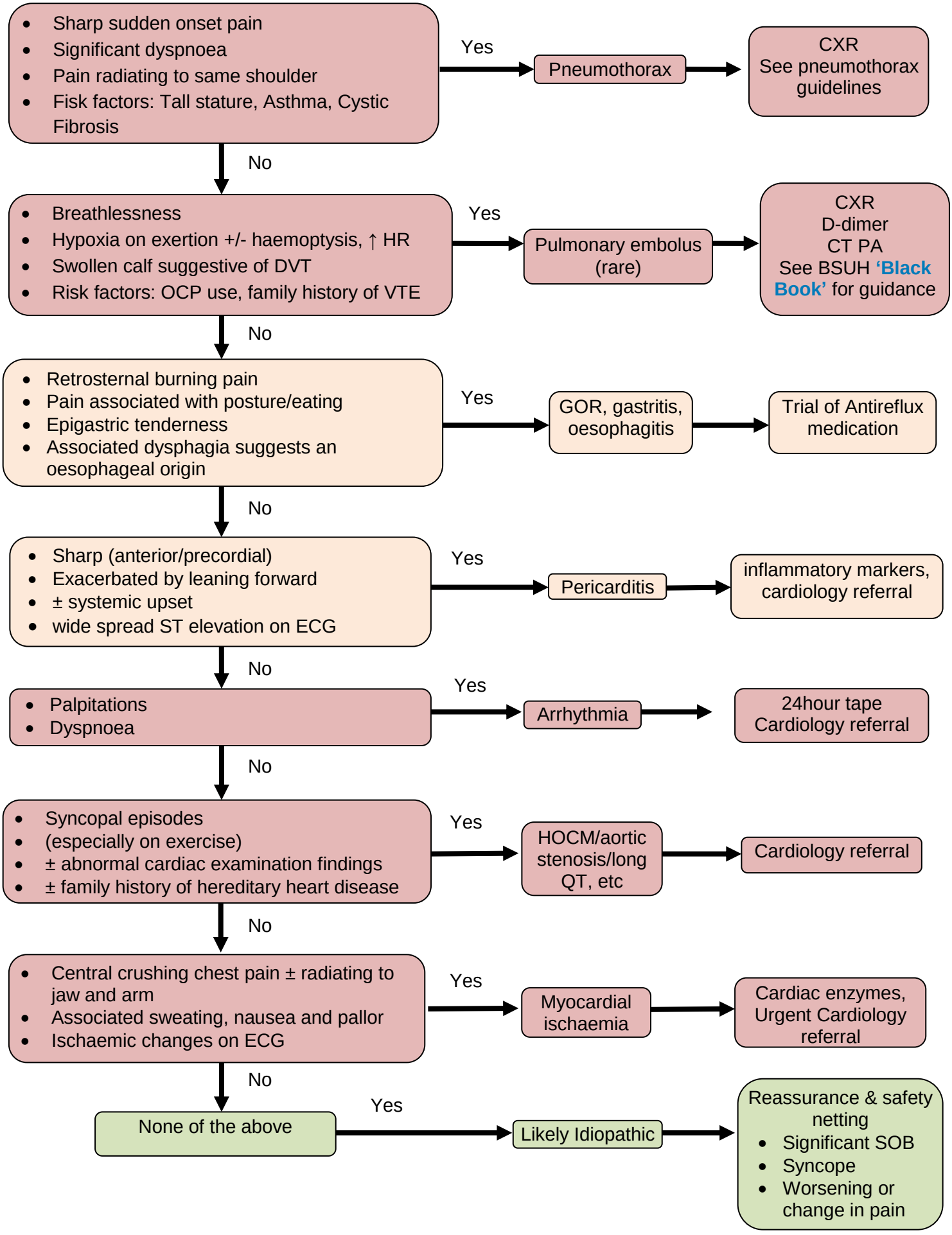
Management

Investigation / intervention	Indication
CXR	Acute onset of severe pain Pain awakening from sleep History of drooling, foreign body ingestion Cough Fever Dyspnoea History / signs of significant trauma Abnormal pulmonary / cardiac auscultation
Trial anti-reflux medication	Gastrointestinal-type pain Epigastric tenderness
Referral to paediatric cardiology	Cardiac-type chest pain (particularly exertional) Abnormal ECG Potentially inherited cardiac disease Abnormal cardiovascular examination Exercise-induced syncope or dizziness Palpitations or cyanosis

Urgent or acute Cardiology referral: Evelina Children's Hospital Cardiology Registrar via switchboard
Non-urgent: Referral to paediatric Cardiology at BSUH using yellow OP referral form with letter.

Diagnostic management algorithm following presentation with chest pain




Sharp sudden onset pain
Significant dyspnoea
Pain radiating to same shoulder
Fisk factors: Tall stature, Asthma, Cystic Fibrosis
Yes
Pneumothorax
CXR
See pneumothorax guidelines
No
Breathlessness
Hypoxia on exertion +/- haemoptysis, ↑ HR
Swollen calf suggestive of DVT
Risk factors: OCP use, family history of VTE
Yes
Pulmonary embolus (rare)
CXR
D-dimer
CT PA
See BSUH 'Black Book' for guidance
No
Retrosternal burning pain
Pain associated with posture/eating
Epigastric tenderness
Associated dysphagia suggests an oesophageal origin
Yes
GOR, gastritis, oesophagitis
Trial of Antireflux medication
No
Sharp (anterior/precordial)
Exacerbated by leaning forward
± systemic upset
wide spread ST elevation on ECG
Yes
Pericarditis
inflammatory markers, cardiology referral
No
Palpitations
Dyspnoea
Yes
Arrhythmia
24hour tape
Cardiology referral
No
Syncopal episodes
(especially on exercise)
± abnormal cardiac examination findings
± family history of hereditary heart disease
Yes
HOCM/aortic stenosis/long QT, etc
Cardiology referral
No
Central crushing chest pain ± radiating to jaw and arm
Associated sweating, nausea and pallor
Ischaemic changes on ECG
Yes
Myocardial ischaemia
Cardiac enzymes, Urgent Cardiology referral
No
None of the above
Yes
Likely Idiopathic
Reassurance & safety netting
Significant SOB
Syncope
Worsening or change in pain

Notes

Specific features in history based on likely source of pain:

Musculoskeletal:

- Usually well localised and can often be reproduced with palpation or gentle sternal pressure.
- Worse with movement, coughing and inspiration.

Respiratory:

- Pain from asthma often described as ‘tightness’, associated with wheeze, shortness of breath and dry cough.
- Pleuritic pain is usually sharp and localised, exacerbated by inspiration and coughing.
- Pain from pneumothorax will be ipsilateral and is often felt in the upper anterior part of the chest.

Psychogenic:

- Often recurrent with particular stressors.
- History of anxiety (particularly panic disorder) and/or stressful life events.
- May be associated with hyperventilation.

Gastrointestinal:

- Often retrosternal or epigastric, but may also be central.
- Typically burning or sharp in nature.
- May be exacerbated with eating or posture.
- Can be associated with heartburn, water brash (production of excess saliva in response to acid in the oesophagus) or dysphagia.

Cardiac:

- Centrally located and may radiate to the left arm/jaw region.
- Typically described as crushing pain or heaviness.
- Associated autonomic symptoms such as sweatiness, nausea or pallor.
- Chest pain on exertion is particularly significant, especially if the pain is of a typical cardiac nature.
- Associated presyncope, syncope and palpitations.

References:

1. Selbst SSM, Ruddy RMR, Clark BJ, et al. Pediatric chest pain: a prospective study. Pediatrics 1988;82:319–23.

2. Danduran MJ, Earing MG, Sheridan DC, et al. Chest pain: characteristics of children/adolescents. Pediatr Cardiol 2008; 29:775–81