

Spontaneous Pneumothorax in Children

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See also: *Chest injury in major trauma* for management of traumatic pneumothorax

Background

- Air in the pleural cavity. Uncommon in children.
- Small asymptomatic pneumothoraces may be an incidental finding on a chest x-ray

Primary pneumothorax

- Occurs when there is no underlying lung disease
- More common in boys in the adolescent age group but equal occurrence younger children.
- Typically occurs when at rest or with minimal exertion.
- Large pneumothorax may cause sudden onset sharp chest pain and dyspnoea, sometimes preceded by a popping sensation

Secondary pneumothorax

- complication of underlying lung disease, such as Cystic Fibrosis, asthma, FB aspiration, infection, interstitial lung disease

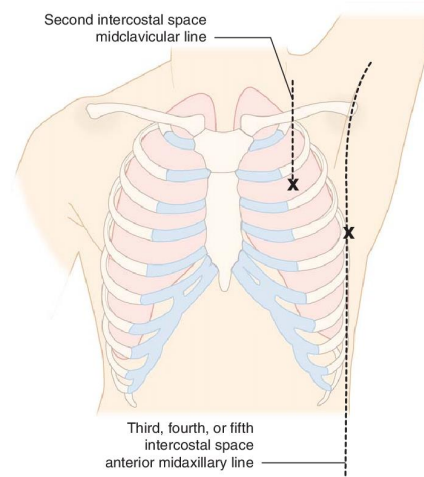
Assessment

Signs of tension pneumothorax (LIFE THREATENING)

- 🚩 Tracheal deviation (away from side of pneumothorax)
- 🚩 Tachycardia
- 🚩 Cyanosis
- 🚩 Hypotension
- 🚩 Quiet heart sounds

Immediately:

- move to resus and alert most senior CED clinician
- give 15L high flow oxygen via non rebreath mask
- Attach a syringe of sterile water to a large bore cannula (14g or 16g)
- Insert into the 2nd anterior intercostal space in the midclavicular line at 90° to skin, being careful to avoid the neurovascular bundle by going over the top of the 3rd rib.
- Aspirate the syringe until you are in the pleural space (air bubbles in syringe)
- Remove syringe and needle and secure cannula. Proceed to chest drain insertion (usually under GA in theatre) ASAP. Refer urgently to Paediatric Surgery Registrar



From Connors KM, Terndrup TE: Tube thoracostomy and needle decompression of the chest. In Henretig FM, King C (eds): *Textbook of Pediatric Emergency Procedures*. Baltimore: Williams & Wilkins, 1997, p 399

History / examination / investigations:

Ask about:

- Onset of symptoms – chest pain which may radiate to shoulder tip, dyspnoea, cough
- Recent infections
- Foreign body inhalation
- Use of recreational drugs (especially inhaled)
- In neonate - birth history (traumatic delivery)

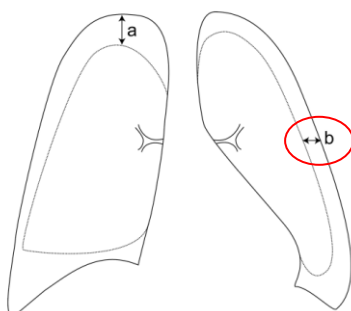
Look for:

- Reduced chest movement
- Hyper-resonant on percussion
- Decreased vocal fremitus
- Tachypnoea
- Increased work of breathing

Risk Factors

Male
Tall and thin
Smoking (tobacco or cannabis)
Cocaine inhalation
Family history
Connective tissue disorders e.g. Marfan's, Ehlers-Danlos syndrome

Investigate



a= apex to cupola distance - American Guidelines
b= interpleural distance at level of the hilum - British Guidelines

Adapted from BTS guidelines 2010

• Chest x-ray essential

Estimating pneumothorax size:

- In adolescents using measuring tool to measure widest part of pneumothorax (in cm) on chest x-ray. Rim of air >2cm = large.
- In younger children estimate percentage of hemithorax the pneumothorax fills (small = less than 30%, large= more than 30%)

Management

See flow chart on page 3

Ensure ALL patients are on continuous O₂ sats monitoring

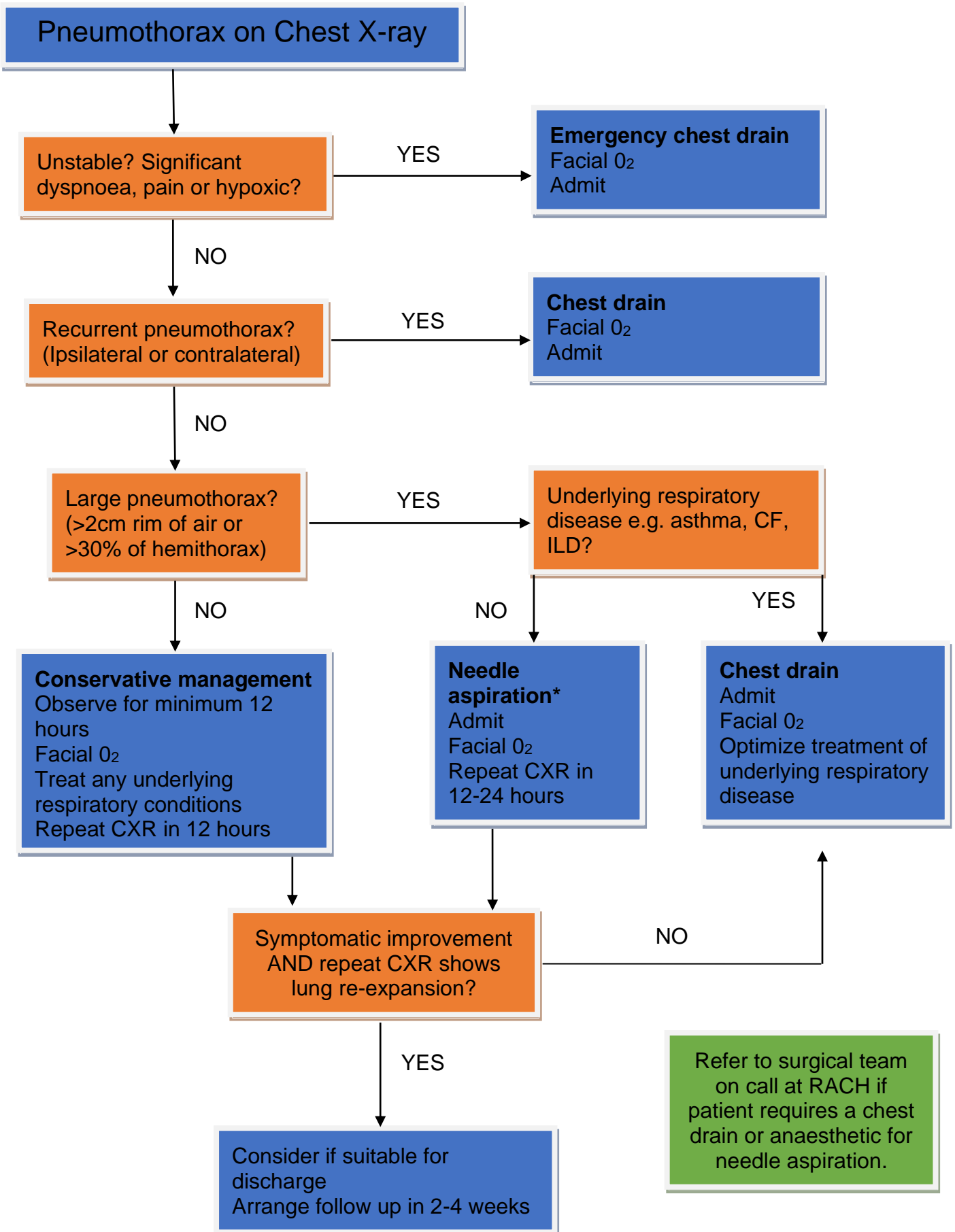
Treatment depends on size of pneumothorax, level of respiratory distress and any underlying lung pathology.

Deliver oxygen via non-rebreathe mask (**not nasal cannula**) as this enhances the reabsorption of air in the extra-pleural space.

Summary:

1. *Small pneumothorax in stable patient* - conservative management with minimum 12 hours observation.
2. *Large pneumothorax in stable patient* - needle aspiration* and admission.
3. *Pneumothorax in unstable patient* - urgent chest drain and admission.
4. *Recurrent pneumothorax* (previous history of pneumothorax) - chest drain and admission.
5. *Pneumothorax in patient with underlying respiratory disease* - chest drain if large pneumothorax, conservative management if small and patient stable.

Management flow chart



*** Needle aspiration for large primary pneumothorax in stable patient:**

- Insert a large bore cannula with a three-way tap attached into the 2nd intercostal space in the mid-clavicular line.
- Air is withdrawn manually until no more can be removed.
- Once no more air can be aspirated secure the cannula to the chest wall.
- If there is continuous aspiration of air this indicates an air leak and chest drain may be required.
- Observe for minimum of 24 hours and repeat chest x-ray.
- If re-accumulation of pneumothorax has occurred the patient will require a chest drain.

Follow up

On discharge, advise patient to return to hospital if increasing breathlessness develops.

- Refer patients who required admission or chest drain to respiratory team
- Advise avoidance of air travel until full resolution, and diving permanently unless the patient has undergone bilateral surgical pleurectomy and has normal lung