

Pneumomediastinum

Definition / Supporting Information

Pneumomediastinum is a condition in which air is present in the mediastinum.

- It may be a primary event (rare) for which there is no obvious precipitating cause ('primary spontaneous pneumomediastinum') or occur secondary to underlying pathology
- Healthy young people do not often have severe symptoms or physical examination findings

Keywords / also known as: abnormal presence of air, air leak, free air in the chest

Essential History

Ask about:

- Risk factors for pneumomediastinum
 - Asthma
 - The most common cause of pneumomediastinum is bronchospasm related to respiratory tract infection.
 - Air travel
 - Lower respiratory tract infections (eg, pneumonia)
 - Blunt or penetrating trauma to the chest (eg, vehicular accidents, stab wounds)
 - Exaggerated Valsalva manoeuvres during:
 - Cough
 - Vomiting
 - Hiccups
 - Heavy lifting
 - Straining at stool
 - Illicit drug inhalation
 - Sports activities
 - Scuba diving
 - Other risk factors for oesophageal perforation (see Ingestion of Caustic Substances)
 - Ingestion of button batteries
 - Ingestion of caustic chemicals

'Red Flag' Symptoms and Signs

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed. Do not delay transfer to hospital if pneumomediastinum is suspected in the context of chest pain, respiratory distress, or signs of shock.

Ask about:

- Chest pain
- Cough
- Dyspnoea
- Dysphonia
- Dysphagia
- Neck pain

Look for:

- Subcutaneous air
- Evidence of respiratory distress
 - Tachypnoea
 - Grunting respirations
 - Accessory muscle usage
- Hypoxaemia
- Signs of cardiac tamponade
 - Raised jugular venous pressure
 - Muffled heart sounds
- Evidence of penetrating injury
 - Air can enter the mediastinum from a penetrating neck or chest wall injury.
- Cervical subcutaneous emphysema with crepitus
- 'Hamman' sign (mediastinal crunching sound synchronised with systole and associated with attenuation of heart sounds)
 - Uncommon

Differential Diagnosis / Conditions

- Spontaneous oesophageal perforation (Boerhaave's syndrome)
- Mediastinitis

Investigations

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric Intensive Care / Paediatric Respiratory Team(s)):

Imaging

- Chest X-ray
 - Recognised by air outlining mediastinal structures, such as the thymus (sail sign) and the superior surface of the diaphragm (continuous-diaphragm sign)
 - Usually bilateral
 - Does not move with decubitus positioning, which helps to differentiate it from anteromedial pneumothorax, although pneumothorax may also be present
- CT scan
 - CT scan can detect the presence of oesophageal perforation and can also be useful in the detection of mediastinal and pleural complications

Treatment Approach

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric Intensive Care / Paediatric Respiratory Team(s)):

- Exclude concomitant pneumothorax
- Initial therapy for pneumomediastinum is directed at the underlying disease process.
 - Children for whom the underlying cause of pneumomediastinum is unknown should undergo diagnostic pulmonary function tests after an acute episode.
- Observation is standard management because:
 - Mediastinal air decompresses into the cervical fascia
 - It rarely causes tamponade
- Continued air leakage among patients receiving mechanical ventilation may be decreased by:
 - Efforts to decrease intrathoracic pressures
 - Efforts to decrease tidal volume
- If signs of tamponade occur:
 - A mediastinal tube should be placed via echocardiographic guidance by a skilled specialist

When to Refer

Refer all patients with suspected pneumomediastinum to specialist practitioners (eg, Emergency Department / Paediatric Intensive Care / Paediatric Respiratory Team(s)) for evaluation and management.

- Any trauma victim with pneumomediastinum should be referred and admitted to a trauma centre for evaluation and management.
- Escalate care of infants and children with pneumomediastinum and signs of cardiac tamponade to Paediatric Cardiology / Paediatric Cardiac Surgery Team(s) able to place a mediastinal drain.

When to Admit

- All infants with pneumomediastinum should be admitted to hospital.

‘Safety Netting’ Advice

- All children presenting with pneumomediastinum will require outpatient follow-up on discharge.
- Any underlying medical conditions associated with the development of pneumomediastinum should be treated and followed up by the relevant team.
- Children and their families will need education to avoid risk factors associated with the development of pneumomediastinum (such as scuba diving or playing wind instruments).

Resources

National Clinical Guidance

MacDuff A, Arnold A, et al. Management of spontaneous pneumothorax: British Thoracic Society Pleural Disease Guideline 2010. *Thorax*. 2010;65(Suppl. 2):ii18-ii313 [[PubMed](#)]

Du Rand IA, Blaikley J, Booton R, et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults. *Thorax*. 2013;68(Suppl 1):i1-i44 [[PubMed](#)]

Kouritas VK, Papagiannopoulos K, Lazaridis G, et al. Pneumomediastinum. *Journal of Thoracic Disease* 2015; 7(Suppl 1): S44–S49 [[PubMed](#)]

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