Mediastinitis is an infection affecting the mediastinum. It can be a life-threatening condition and requires urgent surgical and medical intervention. Mediastinitis may be due to:[1]

- Infection originating from structures within the mediastinum.
- Infection descending from the oropharynx through the fascial planes in the neck (e.g., the carotid space, the prevertebral space). This descending infection is known as descending necrotising mediastinitis.
- A rare fibrotic reaction to granulomatous diseases such as histoplasmosis. This is known as fibrosing mediastinitis.

**Epidemiology**

- Mediastinitis is a relatively rare phenomenon in patients who have not undergone cardiothoracic surgery or another intervention. The rate of mediastinitis following cardiothoracic surgery was around 1% in one study of 10,000 patients.[2]
- Patients who have undergone a heart transplant are at much higher risk.[3]
- Since the introduction of antibiotics, descending necrotising mediastinitis has become rare in developed countries. In developing countries, mediastinitis is still a common complication of head and neck infections.[1]

**Risk factors**

- More common in men and in middle age.[1]
- Diabetes and immunocompromised.[4]
- Drug users.[5]

**Causative conditions**[1]

**Mediastinitis originating from structures within the mediastinum**

- **Oesophageal rupture** is the most common cause of mediastinitis. This may be due to:
  - Foreign body ingestion.
  - Spontaneous oesophageal rupture.
  - Local neoplastic spread.
  - Iatrogenic causes including:
    - Endotracheal intubation.
    - Bronchoscopy.
    - Cardiothoracic surgery (most cases of mediastinitis in the developed world follow cardiothoracic surgery).[3]
    - Upper gastrointestinal (GI) endoscopy.

- Blunt trauma to the chest/abdomen can cause mediastinitis.[3]
- There may be direct spread of infection into the mediastinum from:
  - Pulmonary infection.
  - Osteomyelitis of the sternoclavicular junction.
Granulomatous disease (including tuberculosis) in the mediastinal lymph nodes.

Descending necrotising mediastinitis
This may originate from:

- Pharyngitis.
- Tonsillitis, peritonsillar abscess and parapharyngeal abscess.\[6, 7, 8\]
- Otitis media.
- Sinusitis.
- Dental abscess.\[6\]
- Sialadenitis.
- Infection after head and neck surgery.\[3\]

Causative organisms
There is usually a polymicrobial infection with organisms such as Staphylococcus spp., Streptococcus spp., Bacteroides spp., Fusobacterium spp., Peptostreptococcus spp. and Pseudomonas aeruginosa.\[1\] Meticillin-resistant S. aureus (MRSA) may be implicated when mediastinitis occurs after cardiothoracic surgery.\[3\] Mediastinitis may also be caused by tuberculosis and fungal infections.

Presentation\[1\]
Onset can be insidious and patients may have been unwell for a few days before presentation to their GP or emergency department. There may be a history of:

- Recent cardiothoracic surgery or instrumentation.
- Upper GI endoscopy.
- Bronchoscopy.
- Recent dental or oropharyngeal infection.
- Upper respiratory tract infection.
- Ingestion of a foreign body (particularly button batteries by young children, which may cause oesophageal rupture).

Symptoms
- Fever and/or rigors can occur.
- Shortness of breath may be present.
- Retrosternal chest pain, usually described as pleuritic, may radiate to the neck or back.
- There may be a sensation of soreness or congestion in the neck if the condition is due to descending infection.
- The patient may notice that their neck is swollen.
- Confusion or disorientation may be present due to the onset of systemic sepsis.
- There may be evidence of sternal wound infection and sternal instability post-cardiothoracic surgery.\[3\]

Signs
- The patient can be systemically unwell and shocked.
- Fever may be evident.
- Oedema and/or erythema of the neck and face may be found.
- There may be crepitus of the skin of the chest and neck due to surgical emphysema.
- The mouth should be examined for evidence of pharyngeal infection or foreign bodies.
- Localised or diffuse swelling of the neck may be seen.
- Cranial nerve deficits may occur.
- Auscultation of the heart may reveal a crunching sound.\[1\]

Differential diagnosis
- Pulmonary embolism.
- Myocardial infarction.
- Spontaneous pneumomediastinum. \[9\]
- Mediastinal tumour and/or superior vena cava syndrome.
- Cellulitis of the neck.
- Necrotising fasciitis affecting the neck.
- Pneumonia ± empyema or lung abscess.
- Mediastinal tuberculosis.

**Investigations**\[^{[1, 3]}\]

- **FBC**: white cell count is usually elevated.
- **Blood cultures** should be taken.
- Swabs of any obvious sources of sepsis in the mouth or neck tissues should be taken.
- X-ray of the neck and chest may show widening of the pre-cervical, retropharyngeal and paratracheal soft tissues. Pneumomediastinum and air-fluid levels may be seen on **CXR**. Mediastinal widening may be seen but is not a reliable sign.
- **CXR** may show lower lobe consolidation and/or pleural effusions.
- CT/MRI scan of the thorax can better delineate mediastinal abnormalities and may find evidence of the source of descending infection.

**Management**\[^{[1]}\]

- Patients with mediastinitis can be critically ill. Initial management should focus on **resuscitation**, including protecting the airway, maintaining adequate oxygenation with supplementary **oxygen**, ensuring adequate ventilation and vigorous intravenous fluid resuscitation.
- Patients are often severely ill and require management within intensive care.
- Where the patient has significant and worsening **hypoxia**, intubation and artificial ventilation may be required.
- Intubation is likely to be difficult to achieve so experienced anaesthetic input may be needed; emergency **cricothyroidotomy/tracheostomy** may be necessary.
- The patient's respiratory status must be stabilised before sending for investigations such as CT/MRI scan.
- **Antibiotics:**
  - High-dose broad-spectrum intravenous antibiotics should be started as soon as possible.
  - Broad-spectrum therapy is indicated and drugs used initially include **piperacillin** with **vancomycin**, or **ceftazidime** with **vancomycin**, or **vancomycin** with a **quinolone** and **clindamycin**. An **aminoglycoside** may be added.\[^{[1]}\]
  - Microbiological advice may be necessary as to the most appropriate antimicrobial agent(s), due to the polymicrobial nature of the infection.
  - Antibiotic regimes will be to be altered in line with results of culture results when available.
- **Surgery:**
  - Surgical referral is an urgent priority. Transfer to a cardiothoracic surgical centre is likely to be needed with advice from ENT surgery in cases of descending infection.
  - Extensive and aggressive debridement of necrotic tissues with exploration of all mediastinal fascial spaces may be required.\[^{[1]}\]
  - Surgery usually consists of urgent thoracotomy or access via a cervical approach.\[^{[10]}\]
  - Drainage of pus and necrotic material with tissue debridement is carried out as well as closure of any oesophageal rupture, or drainage of any cervical infective focus.\[^{[6]}\]

**Complications**\[^{[1, 3]}\]

- Overwhelming sepsis leading to multi-organ failure and death.
- Adult respiratory distress syndrome.
- Respiratory failure leading to death.
- Pericarditis.
- Secondary pneumonia.
- Pleural effusions and empyema.
- Pneumomediastinum, pneumoperitoneum and pneumothorax.
Prognosis[11]

- A recent review found an overall mortality of 11.1% (but is up to 50% in some series). In the presence of comorbid conditions, the mortality rate may be as high as 67%.
- Studies of descending necrotising mediastinitis in the last decade indicate mortality rates ranging between 11.1-34.9%.
- High clinical suspicion in susceptible individuals, early diagnosis and prompt aggressive management are the best way to reduce morbidity and mortality.[3, 6]

Further reading & references

- Mueller DK et al; Esophageal Rupture, Medscape, Sep 2008

1. Brandler ES et al; Mediastinitis in Emergency Medicine, Medscape, May 2010
3. Mueller DK et al; Mediastinitis, Medscape, June 2009

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