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

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

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