Aspiration Pneumonia

Aspiration pneumonia results from inhalation of stomach contents or secretions of the oropharynx, leading to lower respiratory tract infection. In many healthy adults, very small quantities of aspiration occur frequently but the normal defence mechanisms (cough, lung cilia) remove the material with no ill effects. However, aspiration may cause:

- Chemical pneumonitis: chemical irritation of the lungs, which may progress to acute respiratory distress syndrome and/or bacterial infection. Acute aspiration of gastric contents into the lungs can produce an extremely severe and sometimes fatal illness. This has been termed Mendelson’s syndrome and can complicate anaesthesia, particularly during pregnancy.
- Obstruction: large volumes of aspirated material may lead to obstruction of the respiratory tract.
- Bacterial infection: infection of the lower airways may lead to empyema, lung abscess, acute respiratory failure and acute lung injury. Persistent aspiration pneumonia is often due to anaerobes and it may progress to lung abscess or even bronchiectasis.

The usual site for an aspiration pneumonia is the apical and posterior segments of the lower lobe of the right lung. If the patient is supine then the aspirated material may also enter the posterior segment of the upper lobes.

Epidemiology

- It is common. One study of elderly patients implicated aspiration pneumonia in 10% or cases of community-acquired pneumonia[1].
- Aspiration pneumonia is relatively common in hospital and usually involves infection with multiple bacteria, including anaerobes.
- It is more common in men, young children and the elderly.

Pathogens

Pathogens of community-acquired aspiration pneumonia are often the normal flora of the oropharynx, including:

- *Streptococcus pneumoniae*.
- *Staphylococcus aureus*.
- *Haemophilus influenzae*.
- Anaerobes - eg, *Peptostreptococcus*, *Fusobacterium* and *Prevotella* spp.
- "Streptococcus milleri" group.
- *Klebsiella pneumoniae* - increasingly seen in those with a history of alcohol misuse.

Pathogens of nosocomial aspiration pneumonia include[2]:

- Oral anaerobes - as above.
- Gram-negative bacilli - eg, enterobacteria (*Klebsiella pneumoniae*, *Escherichia coli*, *Enterobacter* spp.), *Pseudomonas aeruginosa*.
- Meticillin-resistant *S. aureus* (MRSA).
Risk factors for aspiration pneumonia\(^3\)

In the absence of a tracheo-oesophageal fistula, significant aspiration usually occurs only during periods of impaired consciousness, with reflux oesophagitis with an oesophageal stricture, or in bulbar palsy. The following are considered to be independent risk factors for aspiration pneumonia:

- Impaired consciousness: drug or alcohol misuse, general anaesthesia, seizures, sedation, acute stroke, central nervous system lesions, head injury.
- Poor mobility, nil by mouth status, increasing age, chronic obstructive pulmonary disease (COPD), male gender and increasing number of medications\(^3\).
- Swallowing disorders: oesophageal stricture, dysphagia, stroke, bulbar palsy, pharyngeal disease (eg, malignancy), neuromuscular disorders (eg, multiple sclerosis).
- Other: tracheo-oesophageal fistula, ventilator-associated pneumonia, periodontal disease, gastro-oesophageal reflux\(^4\), post-gastrectomy, tracheostomy.

Nasogastric tube feeding is considered to be less of a risk than it used to be, due to modern nursing techniques (eg, avoiding feeding patients in the supine position)\(^5\).

Presentation

- Nonspecific symptoms - eg, fever, headache, nausea, vomiting, anorexia, myalgia, weight loss.
- Cough.
- Dyspnoea.
- Pleuritic chest pain.
- Purulent sputum.
- Signs may include tachycardia, tachypnoea, decreased breath sounds and dullness to percussion over areas of consolidation, pleural friction rub.
- Severe infection may lead to hypoxia and septic shock.

Differential diagnosis

Other causes of respiratory distress, including:

- Other causes of pneumonia.
- Bronchiolitis.
- Croup.
- Epiglottitis.
- Foreign body in respiratory tract.
- Asthma.
- Cardiovascular disease.

Investigations

- Blood count: neutrophil leukocytosis.
- Electrolytes and renal function: dehydration, electrolyte imbalance.
- Blood culture.
- Blood gases.
- Culture of sputum:
  - In patients with bacterial aspiration pneumonia, this may show organisms normally resident in the pharynx.
- CXR:
  - Right, middle and lower lung lobes are the most common sites.
  - Aspiration when upright may cause bilateral lower lung infiltrates.
  - Right upper lobe often shows consolidation in those with a history of alcohol misuse who aspirate in the prone position.
Lung CT is only very occasionally required.
Specimens obtained from bronchoscopy may help to guide choice of antibiotic treatment.

Management
- Mechanical obstruction: removal of the object, normally by bronchoscopy.
- Tracheal suction if seen early.
- Intubation with positive pressure ventilation may be required.
- Bacterial infection of lower airways (the choice of antibiotics will be influenced by any recent previous antibiotic treatment, microbiology culture results and the patient's condition):
  - Initial empirical antibiotic therapy while awaiting culture results.
  - Antimicrobial therapy should be based on the patient’s characteristics, the setting in which aspiration occurred, the severity of pneumonia, and available information regarding local pathogens and resistance patterns.
  - Community-acquired aspiration pneumonia is often initially treated with co-amoxiclav. Metronidazole may need to be added if there is evidence of complications - eg, lung abscess. See separate Pneumonia article for indications for hospital admission.
  - Hospital-acquired aspiration pneumonia: a suitable combination in patients who have already recently been treated with antibiotics is piperacillin with tazobactam.
- The role of steroids is uncertain and not of proven benefit.
- Supportive therapy with fluid management, bronchodilators and physiotherapy may help.
- Referral to speech and language therapists.

Complications
- Untreated, bacterial aspiration pneumonia may progress to lung abscess or bronchiectasis.
- Acute respiratory distress.

Prognosis
This depends on the underlying cause, general well-being of the patient, presence of complications, speed of diagnosis and effective treatment.

Prevention
- Keep the head of the bed at a 30° angle: this reduces the risk or aspiration pneumonia in those at risk.
- Nasogastric feeding for at-risk patients - eg, poor gag reflex, dysphagia.

Further reading & references
- Acute aspiration; BMJ Best Practice, 2016

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