

Chapter 32

Upper respiratory tract infections

Infections of the upper respiratory tract are common and are primarily of viral origin and rarely serious.

Viral infections

Common cold

Aetiology

The majority of colds are caused by rhinoviruses. Other associated viruses are coronaviruses, influenza, parainfluenza viruses, respiratory syncytial virus (RSV), metapneumoviruses, adenoviruses and enterovirus. A number of systemic viral infections may present with similar upper respiratory tract symptoms, e.g. measles, mumps and rubella. Re-infections are common as a result of antigenic diversity within each of the viral groups.

Epidemiology

Transmission is by aerosol or large droplets or via virus-contaminated hands. Nasal discharge causes irritation and results in sneezing, facilitating spread.

Clinical features

The incubation period is 12 h to 2 days. Nasal discharge is often associated with cough, sneezing and non-specific symptoms, such as headache and malaise; fever is not a prominent feature. The nasal discharge may become purulent. Secondary bacte-

rial infection by the pneumococcus, *Haemophilus influenzae* or *Streptococcus pyogenes*, may result in sinusitis, otitis media or tracheobronchitis. Pharyngitis and conjunctivitis may occur with enterovirus or adenovirus infection.

Laboratory diagnosis

Virus isolation, direct antigen detection on nasopharyngeal aspirates or serological tests are usually not warranted because of expense and the benign course of the infection.

Treatment and prevention

There are no effective antiviral agents for treatment of the common cold viruses, except influenza; it is symptomatic treatment only. Hand washing helps prevent transmission.

Viral pharyngitis, tonsillitis and glandular fever syndrome

Aetiology

Many of the viruses associated with the common cold syndrome may also result in pharyngitis including rhinoviruses, coronaviruses, enteroviruses, adenoviruses, influenza and parainfluenza viruses and RSV. Epstein-Barr virus (EBV) and cytomegalovirus (CMV) cause glandular fever.

Epidemiology

Transmission is by aerosol and direct contact.

Clinical features

- Fever and pharyngeal discomfort with marked pharyngeal inflammation, occasionally with an exudate.
- The presence of vesicles on the soft palate indicates herpes simplex virus (HSV) or Coxsackie virus infection; conjunctivitis suggests influenza or adenovirus infection.
- Glandular fever syndrome: persistent pharyngitis with tiredness, malaise and cervical lymphadenopathy. This syndrome may be associated with an enlarged liver and/or spleen and jaundice. A maculopapular rash may occur after ampicillin or amoxicillin.

Laboratory diagnosis

Except in the case of glandular fever, laboratory diagnosis is rarely necessary. EBV and CMV infections may be diagnosed by specific serological assays.

Treatment

Symptomatic only.

Influenza*Aetiology*

Influenza viruses A and B.

Epidemiology

Transmission is via aerosols or direct contact. Infection peaks during the winter months. Epidemics and pandemics of influenza A are related to varying degrees of antigenic variation.

Clinical features

Abrupt onset of fever, myalgia, pharyngitis and dry cough, which resolve within a week. However, tiredness may persist for several weeks. Complications of influenza are rare and include: primary viral pneumonia; secondary bacterial pneumonia (most frequently staphylococcal, now rare); encephalitis; Guillain-Barré syndrome; myocarditis and pericarditis; post-viral fatigue.

Laboratory diagnosis

Virus isolation, antigen detection in nasopharyn-

geal aspirates, polymerase chain reaction (PCR) or serology is not attempted routinely, but is important in confirming influenza epidemics.

Treatment and prevention

Treatment is for symptomatic relief only; the antiviral agent amantadine is active only against influenza A and is rarely used now. The neuraminidase inhibitors zanamivir and oseltamivir are active against influenza A and B. They may shorten symptoms if given within 48 h of onset and are usually given only to those at increased risk of developing severe complications: people with chronic cardiac and pulmonary disorders; patients with other chronic disorders (e.g. renal dysfunction, immunosuppression); and elderly people (> 65 years). Annual immunization before the start of the flu season is indicated for patients in these risk groups, together with healthcare workers.

Viral laryngotracheobronchiolitis (croup)*Aetiology*

Parainfluenza viruses are the most frequent cause of croup; other viruses associated with upper respiratory tract infections can occasionally cause croup.

Epidemiology

Transmission is by aerosol spread. Most cases occur in the autumn and winter and the infection is restricted to children aged < 5 years.

Clinical features

Distinctive deep cough ('bovine cough'), frequently with inspiratory stridor, dyspnoea and, in severe cases, cyanosis.

Laboratory diagnosis

Virus isolation and antigen detection in nasopharyngeal aspirates (rarely performed).

Treatment

Symptomatic relief by mist therapy is often recommended, but there is no scientific proof of its effectiveness; antibiotics are of no benefit except when croup is complicated by bacterial infection. In

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severe cases, hospitalization is required and ventilatory support may be necessary.

Bacterial infections

Normal flora

Many of the bacteria found as part of the normal flora of the mouth are also present in the pharynx. Other commensal bacteria include neisseriae, *Haemophilus* spp. and *Streptococcus pneumoniae*. *Staphylococcus aureus* is carried in the anterior nares of about 30% of humans and may also be isolated from the pharynx. β -haemolytic streptococci colonize the upper respiratory tract of about 5% of individuals.

Streptococcal pharyngitis

Aetiology

Streptococcus pyogenes and occasionally other β -haemolytic streptococci (groups C and G).

Epidemiology

Approximately 5–10% of the population carry *S. pyogenes* in the pharynx; carriage rates are higher among children, particularly during the winter. Spread is by aerosol and direct contact, and is common within families; epidemics of streptococcal pharyngitis may occur occasionally in institutions, e.g. boarding schools.

Clinical features

Similar to viral pharyngitis; some features (e.g. systemic upset, purulent exudate) are claimed to be more prominent with streptococcal pharyngitis, but, in practice, it is difficult to separate viral from bacterial causes on clinical grounds alone.

Complications

- Local: peritonsillar abscess (quinsy), sinusitis, otitis media.
- Systemic: scarlet fever; rheumatic fever; acute glomerulonephritis, septicaemia and Henoch-Schönlein purpura.

Laboratory diagnosis

Throat swabs are taken for culture. Direct antigen

detection tests are available for rapid diagnosis. Serology (detection of anti-streptolysin O antibodies—'ASO titres') may be useful in patients presenting with post-streptococcal complications (rheumatic fever, glomerulonephritis).

Treatment

Penicillin, or erythromycin for penicillin-allergic patients; local analgesia—aspirin gargle.

Epiglottitis

Epiglottitis is an acute, severe infection of the epiglottis caused almost exclusively by *H. influenzae* type b. Since the introduction of the Hib vaccine, this infection has almost completely disappeared in the UK. Less common causes of epiglottitis include non-capsulated *H. influenzae*, *S. pneumoniae* and *S. pyogenes*.

Epidemiology

Before the Hib vaccine this infection was normally limited to children aged < 5 years, and spread by respiratory droplets. Adults may now rarely present with other causes of epiglottitis.

Clinical features

There is acute onset of fever, sore throat and respiratory distress with stridor. Lateral radiographs of the neck may show the enlarged epiglottis. Note that when the disease is suspected, direct visualization of the epiglottis should not be attempted, except where facilities for immediate intubation are available.

Laboratory diagnosis

Isolation of the organism from throat swabs or blood cultures.

Treatment and prevention

Intubation and ventilation may be necessary. Intravenous antibiotic therapy should be instituted immediately; second- or third-generation cephalosporins (e.g. cefuroxime, cefotaxime) are the current treatment of choice. Ampicillin should not be used as sole therapy, because 10% of strains of *H. influenzae* produce β -lactamase. Family con-

tacts of cases of *H. influenzae* b infection should be given rifampicin prophylaxis when there is a child in the family aged < 5 years old.

Vincent's angina

This is an uncommon throat infection caused by a mixture of anaerobic bacteria (e.g. fusobacteria, spirochaetes) normally found in the mouth. As with acute ulcerative gingivitis, with which it may coexist, it is associated with poor oral hygiene and underlying conditions such as immunodeficiency.

Clinical features include pharyngitis with a necrotic pharyngeal exudate. Microscopy of the exudate shows typical fusobacteria and spirochaetes. Treatment is with penicillin or metronidazole.

Diphtheria

Aetiology

An upper respiratory tract infection, caused by toxin-producing strains of *Corynebacterium diphtheriae*, with central nervous system and cardiac complications mediated by the exotoxin. Toxin is carried in pathogenic strains of *C. diphtheriae* in lysogenic bacteriophage. Occasionally skin infection may occur and result in the systemic effects of the toxin. Invasive infection has occurred in intravenous drug users.

Epidemiology

The organism is transmitted by aerosol spread. After the introduction of immunization, diphtheria is now rare in the developed world, but still common in developing countries.

Pathogenesis

The organism colonizes the pharynx, multiplies and produces toxin. The toxin inhibits protein synthesis. It acts locally to destroy epithelial cells and phagocytes, resulting in the formation of a prominent exudate, sometimes termed a 'false membrane'. Cervical lymph nodes become grossly enlarged ('bull-neck' appearance). The toxin also spreads via the lymphatics and blood, resulting in myocarditis and polyneuritis.

Clinical features

Fever and pharyngitis with false membrane (Plate 58) that may cause airway obstruction; enlarged cervical lymph nodes; myocarditis with cardiac failure; and polyneuritis. In skin infections chronic ulcers with a membrane form, and toxicity is mild. Such ulcers can act as reservoirs for respiratory infection and carriage.

Laboratory diagnosis

By isolation of the organism from throat swabs, followed by demonstration of toxin production by the Elek test, or more recently detection of toxin genes by PCR. PCR may also be used to detect toxin genes directly from throat swabs. Demonstrating toxin or the presence of the toxin gene is essential because non-toxin-producing strains of *C. diphtheriae* do not cause diphtheria.

Treatment and prevention

Patients with suspected diphtheria should be isolated in hospital. In suspected cases, treatment should be commenced before laboratory confirmation and includes antitoxin and antibiotics (penicillin or erythromycin). Diphtheria is a notifiable infection in the UK. Close contacts should be investigated for the carriage of the organism, given prophylactic antibiotics (erythromycin) and immunized. Childhood immunization with diphtheria toxoid has resulted in the virtual disappearance of diphtheria from developed countries.

Acute otitis media

Aetiology and pathogenesis

Upper respiratory tract infection may result in oedema and blockage of the eustachian tube with subsequent impaired drainage of middle-ear fluid, predisposing to viral or bacterial infection (acute otitis media). About 50% are caused by respiratory viruses; common bacterial causes include *Strep. pneumoniae*, *H. influenzae*, β -haemolytic streptococci and *S. aureus*.

Epidemiology

It occurs worldwide and is most common in

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children aged < 5 years with an increased incidence in winter months.

Clinical features

Fever and earache, aural discharge. The eardrum appears reddened and bulging and, if untreated, drum perforations with subsequent purulent discharge may occur.

Laboratory diagnosis

By culture of discharge. Needle aspiration of middle ear fluid (tympanocentesis) is performed occasionally.

Management

Antibiotics prescribed include amoxicillin or erythromycin. Follow-up is important because residual fluid in the middle ear ('glue ear') can result in hearing impairment.

Otitis externa

Infections of the external auditory canal are frequently caused by *S. aureus* and *Pseudomonas aeruginosa*. Topical treatment with antibiotic-containing eardrops is often effective.

Acute sinusitis

Acute sinusitis follows impaired drainage of the sinus cavity and may complicate viral upper respiratory tract infections; it is also predisposed to by cystic fibrosis, nasal polyps, septal deviation and dental abscess. Bacterial causes are similar to otitis media. It presents with fever, facial pain and tenderness over affected sinuses; radiographs show fluid-filled sinuses. Management is with antibiotics (see 'Acute otitis media' above); occasionally sinus drainage is required.