Influenza and other flu illness

influenza

Influenza is an acute systemic viral infection that primarily affects the respiratory tract and carries a significant mortality.

etiology/pathophysiology:

- Transmission is via droplet spread.
- It is caused by influenza A virus or, in milder form, influenza B virus.
- Infection is seasonal, and variation in the haemagglutinin (H) and neuraminidase (N) glycoproteins on the surface of the virus leads to disease of variable intensity each year.
- Minor changes in haemagglutinin are known as 'genetic drift', whereas a switch in the haemagglutinin or neuraminidase antigen is termed 'genetic shift'. Nomenclature of influenza strains is based on these glycoproteins, e.g. H1N1, H3N2 etc.
- Genetic shift results in the circulation of a new influenza strain within a community to which few people are immune, potentially initiating an influenza epidemic or pandemic in which there is a high attack rate and there may be increased disease severity.

Clinical features

After an incubation period of 1–3 days,

uncomplicated disease

leads to fever, malaise and cough.

complications

Viral pneumonia may occur, although pulmonary complications are most often due to superinfection with Strep. pneumoniae, Staph. aureus or other bacteria.

Rare Extrapulmonary Manifestations:

- **Myositis**
- **Myocarditis**:
- **Pericarditis**:
- **Neurological Complications**:
  - **Reye Syndrome** in children
  - **Encephalitis**
  - **Transverse Myelitis**

Mortality

is greatest in older people, those with medical comorbidities and pregnant women. Polymorphisms in the gene encoding an antiviral protein, interferon-induced transmembrane protein 3 (IFITM3), are associated with more severe influenza.

Diagnosis

Acute infection is diagnosed by

- **PCR:** viral antigen or RNA detection in a nasopharyngeal sample.
- **Serology:** diagnosed retrospectively by serology.

Management and prevention

Management involves

early microbiological identification of cases and good infection control,
with an emphasis on hand hygiene and preventing dissemination of infection by coughing and sneezing.

Antiviral Treatment:
Medications: Administration of a neuraminidase inhibitor, e.g. oral oseltamivir, inhaled zanamivir, intravenous peramivir or the oral cap-dependent endonuclease inhibitor baloxavir, can reduce the severity of symptoms if started within 48 hours of symptom onset (or possibly later in immunocompromised individuals).
Prophylaxis: Antiviral drugs can be used to prevent infection in high-risk individuals during flu season.

Prevention relies on seasonal vaccination of

1. older age groups,
2. children 2–7 years of age and
3. individuals with chronic medical illnesses that place them at increased risk of the complications of influenza, such as chronic cardiopulmonary diseases or immune compromise,
4. health-care workers.

The vaccine composition changes each year to cover the 'predicted' seasonal strains but vaccination may fail when a new pandemic strain emerges

Avian influenza

Avian influenza is caused by transmission of avian influenza A viruses to humans.
Avian viruses, such as H5N1, possess alternative haemagglutinin antigens to seasonal influenza strains.
Most cases have had contact with sick poultry, and person-to-person spread has been limited to date.
There is a concern that adaptation of an avian strain to allow effective person-to-person transmission is likely to lead to a global pandemic of life-threatening influenza.
Infections with H5N1 viruses have been severe, with enteric features and respiratory failure.

Treatment

depends on the resistance pattern but often involves **oseltamivir**.
Vaccination against seasonal 'flu' does not adequately protect against avian influenza.

Upper respiratory tract infection

Upper respiratory tract infections (URTIs), such as coryza (the common cold), acute pharyngitis and acute tracheobronchitis, are the most common of all communicable diseases and represent the most frequent cause of short-term absenteeism from work and school.

Acute coryza (the common cold)

is the most common URTI

- **Cause**: usually rhinovirus.
- **Symptoms**:
  - general Malaise, nasal discharge, sneezing and cough.
  - Involvement of the pharynx cause a sore throat
  - Involvement of the larynx cause a hoarse or 'lost' voice.
- **Complications** if complicated by tracheitis or bronchitis, chest tightness and wheeze typical of asthma occur..
- **Management**:
- Symptomatic treatment;
  - specific investigation is rarely needed.
  - If repeated URTIs 'go to the chest', a more formal diagnosis of asthma ought to be considered

A variety of viruses causing URTI may also trigger exacerbations of asthma or COPD and aggravate other lung diseases.

Bordetella pertussis whooping cough

- **Cause**: *Bordetella pertussis* bacteria. important cause of URTI
- **Symptoms**: Mild illness resembling acute coryza, but some individuals develop paroxysms of coughing that can persist for weeks to months, earning whooping cough the designation of 'the cough of 100 days'.
- **Diagnosis**: Confirm with bacterial culture, PCR from nasopharyngeal swab, or serological testing.
- **Management**: Early treatment with macrolide antibiotics can improve the course.
- **Vaccination** confers protection and is usually offered in infancy, but its efficacy wanes in adult life and the infection is easily spread.

Rhinosinusitis

- **Symptoms**: Nasal congestion, blockage or discharge, may be accompanied by facial pain/pressure, or loss of smell.
- **Examination**: Erythematous swollen nasal mucosa; possible pus; Nasal polyps should be sought and dental infection excluded..
- **Management**:

- Topical glucocorticoids, nasal decongestants, and regular nasal douching are usually sufficient.
- although bacterial infection is often present, antibiotics are indicated only if symptoms persist for more than 5 days.
- Persistent symptoms or recurrent episodes should prompt a referral to an ear, nose and throat specialist.

Measles

Definition: measles is an RNA viral infection transmitted by droplet spread. It is highly contagious, but the introduction of the MMR vaccine has greatly reduced its incidence in the population.
Natural illness produces life-long immunity.

Clinical features

incubation period of 6–19 days.
A prodromal illness occurs, 1–3 days before the rash, with upper respiratory symptoms, conjunctivitis and the presence of the pathognomonic Koplik's spots: small white spots surrounded by erythema on the buccal mucosa (Fig. 13.9A).

- **Rash**: As natural antibody develops, the maculopapular rash appears, spreading from the face to the extremities
- **Additional Symptoms**: Generalized lymphadenopathy, diarrhea are common.
- **Complications**: more common in older children and adults
  - Common: Otitis media, bacterial pneumonia, transient hepatitis, pancreatitis and clinical encephalitis (0.1% of cases)
  - Rare but serious: subacute sclerosing panencephalitis (SSPE) (occurs up to 7 years post-infection).

Vulnerable Populations:

- **Severe Disease**: More serious in malnourished, vitamin-deficient, or immunocompromised individuals.
- **Pregnant Women**: Disease may be more severe but does not cause congenital malformations.

Interactions with Other Diseases:

- **Tuberculosis**: Measles can suppress cell-mediated immunity, potentially exacerbating tuberculosis. for this reason, Measles vaccination should be deferred until after starting antituberculous treatment.

Diagnosis

Clinical diagnosis is challenging but supported by detection of antibodies (immunoglobulin (Ig) M and IgG) and/or measles RNA in oral fluid.

Management and prevention

1. **Immunoglobulin Therapy**:
   - **Indications**: Used to attenuate measles in:
     - **Immunocompromised Individuals**: regardless of vaccination status.
     - **Non-Immune Pregnant Women**: Helps mitigate disease severity.
   - **Timing**: Must be administered within 6 days of exposure to be effective.
2. **Vaccination**:
   - **Use During Outbreaks**:.
   - **Vaccine Type**: children receive the combined (MMR) vaccine.
   - **Vaccination Schedule**:
     - **First Dose**: At 1 year of age.
     - **Booster Dose**: At 4-6 yrs.
3. **Vitamin A**: improve outcomes in uncomplicated measles
4. **Antibiotic Therapy**: is reserved for bacterial complications.

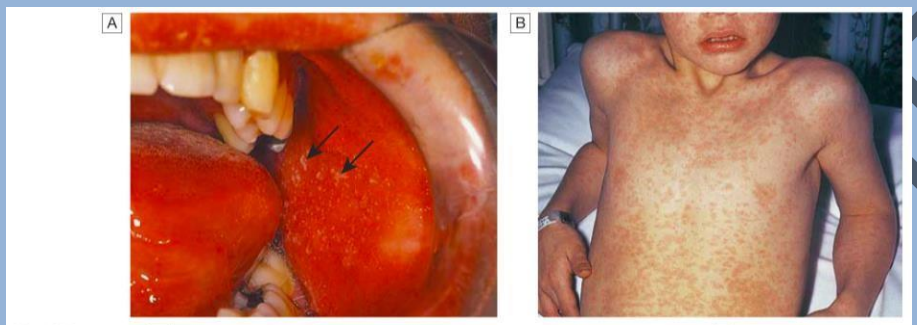

Fig. 11.8 Measles. A Koplik's spots (arrows) seen on buccal mucosa in the early stages of clinical measles. B Typical measles rash.

Rubella (German measles)

Rubella causes exanthem in the non-immunised.

Clinical features

- Rubella is spread by respiratory droplet,
- with infectivity from up to 10 days before to 2 weeks after the onset of the rash.
- The incubation period is 15–20 days.

In childhood,

- most cases are subclinical, although clinical features may include fever, maculopapular rash spreading from the face, and lymphadenopathy.
- Complications are rare but include thrombocytopenia and hepatitis. Encephalitis and haemorrhage are occasionally reported.

In adults,

- arthritis involving hands or knees is relatively common, especially in women.

Congenital Rubella Syndrome

- **Transmission to the fetus**: If transplacental infection takes place in the first trimester or later, persistence of the virus is likely and severe congenital disease may result (Box 11.27).

- **Consequences**: Even if the infant appears normal at birth, there is an increased risk of other conditions like diabetes mellitus later in life.

Diagnosis

- required if there has been contact with a pregnant woman.
- This is achieved either by detection of rubella IgM in serum or by IgG seroconversion.
- In the exposed pregnant woman, absence of rubella-specific IgG confirms the potential for congenital infection.

11.27 **Rubella infection: risk of congenital malformation**

Stage of gestation	Likelihood of malformations
1–2 months	65–85% chance of illness, multiple defects/ spontaneous abortion
3 months	30–35% chance of illness, usually a single congenital defect (most frequently deafness, cataract, glaucoma, mental retardation or congenital heart disease, especially pulmonary stenosis or patent ductus arteriosus)
4 months	10% risk of congenital defects, most commonly deafness
>20 weeks	Occasional deafness

Prevention

- All children should be immunised with MMR vaccine.
- Congenital rubella syndrome may be controlled by testing women of child-bearing age for rubella antibodies and offering vaccination if seronegative.

Mumps

Mumps is a systemic viral infection characterised by swelling of the parotid glands.

- Infection is endemic worldwide and peaks at 5–9 years of age.
- Vaccination has reduced the incidence in children.
- Infection is spread by respiratory droplets.

Clinical features

The median incubation period is 19 days, with a range of 15–24 days.

- **Prodrome**: Fever and headache
- **Parotitis**: Classical tender parotid enlargement, which is bilateral in 75%, Tender, bilateral parotid gland enlargement (75% of cases)
- **Complications**:
  - **Meningitis**: Occurs in up to 10% of cases; CSF analysis typically shows lymphocytic pleocytosis, but neutrophils can also be present
  - **Encephalitis**
  - **Transient Hearing Loss**
  - **Labyrinthitis**
  - **Electrocardiographic Abnormalities**:
  - **Pancreatitis**
  - **Arthritis**

rare

Complications Specific to Gender and Age

- **Post-Pubertal Males**:
  - **Epididymo-Orchitis**: Affects approximately 25%; testicular atrophy may occur, but sterility is unlikely
- **Females**:
  - **Oophoritis**: Less common than epididymo-orchitis
  - **Abortion**: Possible if infection occurs during the first trimester

Complications may occur in the absence of parotitis.

Diagnosis

1. The diagnosis is usually clinical.
2. In atypical presentations without parotitis, serology for mumps-specific IgM or IgG seroconversion (fourfold rise in IgG convalescent titre) confirms the diagnosis.
3. Virus can also be cultured from urine in the first week of infection
4. detected by PCR in urine, saliva or CSF.

Management and prevention

- Treatment is with analgesia.
- There is no evidence that glucocorticoids are of value for orchitis.
- Mumps vaccine is one of the components of the combined MMR vaccine.