

INFECTIONS

1-Bronchiolitis

- ❖ **Bronchiolitis**, a lower respiratory tract infection (LRTI) that primarily affects the small airways (bronchioles), is a common cause of illness and hospitalization in infants and young children.
- ❖ Bronchiolitis is seasonal, with **peak activity during winter and early spring**.
- ❖ Bronchiolitis occurs almost **exclusively during the first 2 years of life**, with a peak age at 2 to 6 months.
- ❖ Acute bronchiolitis is characterized by bronchiolar **obstruction with edema, mucus, and cellular debris**.

Etiology

1-Acute bronchiolitis is predominantly a viral disease. **Respiratory syncytial virus (RSV)** is responsible for more than 50% of cases.

2-Other agents include parainfluenza, adenovirus, *Mycoplasma*, and occasionally other viruses.

Clinical Manifestations.

1-The infant first develops a mild upper respiratory tract infection with **sneezing and clear rhinorrhea**. This may be accompanied by diminished appetite and fever.

2-Gradually, respiratory distress ensues, with paroxysmal **wheezy cough, dyspnea**, and **irritability**. The infant is often **tachypneic**, which interferes with feeding.

3-As a result of limited oral intake due to coughing combined with fever, infants are frequently **dehydrated**.

Diagnosis

The diagnosis of bronchiolitis is based primarily on **history and clinical findings**.

Treatment

1-The mainstay of treatment is **supportive**. Therapy of bronchiolitis primarily consists of administration of supplemental **oxygen** and replacement of fluid deficits (**hydration**) as needed.

2-The risk of aspiration of oral feedings may be high in infants with bronchiolitis owing to tachypnea and the increased work of breathing. **The infant may be fed through a nasogastric tube**.

3-A number of agents have been proposed as adjunctive therapies for bronchiolitis: **A-Bronchodilators** produce modest short-term improvement in clinical features. **Nebulized epinephrine may be more effective than β -agonists.**

B-Corticosteroids, whether parenteral, oral, or inhaled, are widely used despite **conflicting studies.**

C-Ribavirin, is a compound with antiviral activity against RSV administered by **aerosol**, has been used for infants with congenital heart disease (CHD) or chronic lung disease (CLD) although **its benefit is uncertain** ⁽⁵⁾.

D-Antibiotics have no value unless there is secondary bacterial pneumonia.

Prophylaxis

Palivizumab is a monoclonal antibody to RSV and can be used as prophylaxis initiated just before the onset of the RSV season (monthly IM injection for 5 months starting in October) confers some protection from severe RSV disease

2-Pneumonia

1-Pneumonia is defined as **infection of the lung parenchyma** (that is of the alveoli rather than the bronchi or bronchioles) and **characterized by consolidation.** (**Consolidation** is a pathological process in which the alveoli are filled with a mixture of inflammatory exudate, bacteria and WBCs that on chest X-ray appear as an opaque shadow in the normally clear lungs)

Etiology

Viruses alone account for 14–35% of all community acquired pneumonia in childhood. *M. pneumoniae* and *Chlamydia pneumoniae* are principal causes of **atypical pneumonia**. Common infecting bacterial agents by age are :

1-**Neonates:** group B streptococcus, *Escherichia coli*, *Klebsiella*, *Staphylococcus aureus*.

2-**Infants:** *Streptococcus pneumoniae*, *Chlamydia*.

3-**School age:** *Streptococcus pneumoniae*, *Staphylococcus aureus*, group A streptococcus, *Bordetella pertussis*, *Mycoplasma pneumoniae*.

Clinical Manifestations

In many cases these symptoms are preceded by minor upper respiratory tract infection symptoms. The patient may also be complaining of pleuritic chest pain or abdominal pain. The typical history will have:

- **Temperature** ≥ 38.5 °C;
- **Tachypnea and Shortness of breath;**
- **Cough;** [with sputum production in older children (>7yrs)].

Diagnosis

- Diagnosis of pneumonia in many cases is made based on the **presence of clinical signs and symptoms.**
- **Chest x-ray** are often used to confirm the diagnosis.

Treatment .

1-Oral antibiotics are safe and effective in the treatment of community acquired pneumonia. IV antibiotics are used in children who cannot absorb oral antibiotics or in those with severe symptoms.

Antibiotic therapy for pneumonia

Under 5yrs

Streptococcus pneumoniae is the most likely pathogen. The causes of atypical pneumonia are *Mycoplasma pneumoniae* and *Chlamydia trachomatis*

- **First-line treatment:** amoxicillin
- **Alternatives:** co-amoxiclav or cefaclor for typical pneumonia; erythromycin, clarithromycin, or azithromycin for atypical pneumonia

Over 5yrs

Mycoplasma pneumoniae is more common in this age group

- **First-line treatment:** amoxicillin is effective against the majority of pathogens, but consider macrolide antibiotics if mycoplasma or chlamydia is suspected
- **Alternatives:** if *Staphylococcus aureus* is suspected consider using a macrolide, or a combination of flucloxacillin with amoxicillin

Severe pneumonia

Co-amoxiclav, cefotaxime, or cefuroxime IV

2-Supportive therapies Consider whether any of the following are needed:

- **Antipyretics** for fever.
- **IV fluids:** consider if dehydrated or not drinking.
- Supplemental **oxygen.**

3-Meningitis

1-Meningitis is an inflammation of the membranes (the meninges), whereas **encephalitis** is an inflammation of the brain tissue. **75% of cases of meningitis are believed to occur in those <15yrs of age.**

2-Three organisms (*Streptococcus pneumoniae*, *Neisseria meningitides* and *Haemophilus influenzae* type b) account for 80% of the cases. [In newborns,

Group B streptococcus , *E. coli*, and *Listeria monocytogenes* are the most common pathogens].

Clinical Manifestations

1- In **young infants symptoms may be non-specific** including fever, poor feeding, lethargy.

2-In older children clinical features include:

- **General:** fever, with headache.
- **Central:** irritability, disorientation, altered mental state.
- **Seizures:** occur in 30%.
- **Neck stiffness:** more common in older children.
- **Kernig** and **Brudzinski** signs of meningeal irritation are often positive in children older than 12 months.

Diagnosis

1-If bacterial meningitis is suspected, a **lumbar puncture** should be performed . Routine CSF examination includes a white blood cell count, differential, protein and glucose levels, and Gram stain.

Treatment

1-Treatment of bacterial meningitis focuses on **sterilization of the CSF by antibiotics**.

2-Duration of treatment is 5 to 7 days for *N. meningitidis*, 7 to 10 days for *H. influenzae*, and 10 to 14 days for *S. pneumoniae*.

3-Steroids In bacterial meningitis:

- Do not use corticosteroids in children younger than 3mths.
- There is benefit from the use of dexamethasone and the dosing schedule is 0.15mg/kg qds for 4 days **to reduce the severity of neurological sequelae, particularly deafness**, after bacterial meningitis).
- If dexamethasone was not given before the first dose of antibiotics, but was indicated, try to give the first dose within 4hr of starting antibiotics, but do not start dexamethasone more than 12 hours after starting antibiotics ^b.

Table 1: Initial Antimicrobial Therapy by Age for Presumed Bacterial Meningitis

AGE	RECOMMENDED TREATMENT	ALTERNATIVE TREATMENTS
Newborns (0–28 days)	Cefotaxime or ceftriaxone plus ampicillin with or without gentamicin	Ampicillin plus gentamicin Ceftazidime plus ampicillin
Infants and toddlers (1 mo–4 yr)	Ceftriaxone or cefotaxime plus vancomycin	Cefotaxime or ceftriaxone plus rifampin
Children and adolescents (5–13 yr) and adults	Ceftriaxone or cefotaxime plus vancomycin	Cefepime or ceftazidime plus vancomycin

4-Encephalitis

1-Encephalitis is an inflammation of the brain tissue . **Viruses are the principal causes** of acute infectious encephalitis ⁽¹⁾.

Clinical Manifestations

1-Acute infectious encephalitis usually is preceded by a prodrome of several days of nonspecific symptoms such as sore throat, fever, and headache followed by the **characteristic symptoms** of progressive **lethargy**, **behavioral changes**, and **neurologic deficits**. **Seizures are common** at presentation.

Diagnosis

The diagnosis of viral encephalitis is supported by **examination of the CSF**.

Treatment

1-With the exception of HSV, varicella-zoster virus, cytomegalovirus, and HIV, there is no specific therapy for viral encephalitis. **Management is supportive**.

2-Intravenous **acyclovir** is the treatment of choice for **HSV** and **varicella-zoster virus** infections. **Cytomegalovirus** infection is treated with **ganciclovir**. HIV infections may be treated with a combination of antiretroviral agents.

Visceral Leishmaniasis (Kala-azar) (Black fever)

- ❖ Visceral Leishmaniasis (VL) is caused by the protozoon **Leishmania donovani**.
- ❖ Infection are introduced by the feeding female **sand fly**.
- ❖ The great majority of people infected remain asymptomatic. In visceral diseases the spleen, liver, bone marrow and lymph nodes are primarily involved.

Clinical features

- ❖ VL is predominantly a disease of small children and infants.
- ❖ The **first sign of infection is high fever**, usually accompanied by rigor and chills.
- ❖ **Splenomegaly** develops quickly in the first few weeks and becomes massive as the disease progresses. Moderate hepatomegaly occurs later. Lymphadenopathy may also seen .
- ❖ Blackish discoloration of the skin, from which the disease derived its name, kala-azar (the Hindi word for ‘black fever’), is a feature of advanced illness and is now rarely seen.
- ❖ **Pancytopenia** is a common feature.
- ❖ Without adequate treatment most patients with clinical VL die.

Diagnosis

- ❖ Demonstration of amastigotes in **splenic smears** is the most efficient means of diagnosis, with 98% sensitivity ; however, it carries a risk of serious haemorrhage in inexperienced hands.
- ❖ Serodiagnosis, by ELISA or indirect immunofluorescence antibody test (**IFAT**). A significant proportion of the healthy population in an endemic region will be positive for these tests due to past exposure.

Treatment

- ❖ The pentavalent antimony compound [**sodium stibogluconate** (Pentostam®)]. The daily dose is 20 mg/kg body weight, given either intravenously or intramuscularly **for 28 days**.
- ❖ Side-effects are common and include arthralgias, myalgias, raised hepatic transaminases, pancreatitis and ECG changes.
- ❖ **Amphotericin B** is very useful in the treatment of antimony-unresponsive VL

1-Acute Gastroenteritis (GE)

It is an infection of the small intestine, which present with a combination of **diarrhea** and vomiting ⁽¹⁾ , but sometimes present without vomiting ⁽²⁾ .

Etiology

1-**Rota virus** is the most common pathogen in children **under 2 years** ⁽³⁾ , other causes include:

A-Acute **bacterial infections** (shigellae, Salmonellae, E coli and Vibrio cholera which secrete enterotoxins) ⁽³⁾ .

B-**Parasites** like E. histolytica, and Giardia lamblia ⁽²⁾ .

Clinical Features

1-**Rotaviruse cause watery diarrhea . Respiratory illness** occur in about half of patients followed by vomiting and diarrhea ^(1,2) .

2-Acute **bacterial** infection cause invasion of GIT, so there is **fever**, and small volume **bloody stool** ⁽³⁾ .

Complication of Gastroenteritis

Dehydration, metabolic disturbances and even **death** ⁽⁴⁾ .

Treatment

1-Uncomplicated viral GE requires no specific treatment except attention to fluid and electrolyte replacement ⁽³⁾ Most of these episodes are self-limited ⁽⁴⁾ .

2-There is **no role for antiemetic or antidiarrheal** in GE ⁽¹⁾ .

3-**Antibiotics are rarely indicated** except for specific infections such as invasive salmonellosis, cholera , amebiasis or giardiasis ^(1,3) .

4-The **key management of GE is rehydration** with correction of fluid and electrolyte imbalance ⁽¹⁾ .

A-Unless the child has persistent vomiting,oral fluid is the best means for rehydration, smaller more frequent sips may be better tolerated and should be encouraged ⁽¹⁾ .

B-**Mild Dehydration**: ORS are used ⁽¹⁾ .

C-**Moderate dehydration**: Oral rehydration is still indicated if tolerated.

D-I.V fluid should be reserved for those **with vomiting or severe dehydration** ⁽¹⁾.

5-Zinc supplementation (10–20 mg for 10–14 days) has been recommended by the WHO for the treatment and prevention of diarrheal disease in children in developing countries ⁽⁴⁾.

6-Continuation of oral feeding, despite diarrheal episodes, decreases the duration of illness; and improves nutritional status ⁽⁴⁾.