Enteric Fever

Aetiological Agents

- Salmonella typhi
- Salmonella paratyphi A & B

Incubation Period

- The incubation period for enteric fever is 3-60 days, but symptoms typically occur in 1-2 weeks.

Clinical Features

- Patients may present with high fever, which rises in a steplike fashion.
- Other symptoms include anorexia, abdominal pain, malaise, myalgias, headache, cough, diarrhea or constipation, and delirium.
- Typical finding of enteric fever is relative bradycardia for the height of the fever
- Hepatosplenomegaly may be found on examination.
- Patients with enteric fever may develop rose spots; these spots are blanching pink papules most commonly found on the anterior thorax. They usually fadeabout 3-4 days after appearance, are 2-4 mm in diameter, and occur in groups of 5-20.

Investigations

- Blood for CP-Leucopenia (20-25%), thrombocytopenia by 2nd week (10-15%)
- Blood culture (1st week) – Gold standard
- Stool culture (3r week) – Positive in 30%
- Serological tests (antibody detection)
    - Widal test
        - 2nd week
        - Can be negative up to 30%
        - 'O'and 'H'antibody for Salmonella typhi and Salmonella paratyphi A & B
        - Positive means Titre 1/160 or four fold rise after 10 days
    - Typhidot test (Enzyme lmmunoassay)

        - Detection of lg G and lg M against outer membrane protein of *S.Typhi*
        - Ig G cannot differentiate between acute and convalescent
    - Modified Typhidot M
        - Detect lgM antibodies of *Salmonella Typhi*
- Serological tests (antigen detection)
    - Enzyme immune-assay, counterimmune electrophoresis and coagglutination tests to detect somatic/flagella/Vi antigens of *Salmonella typhi*
- Molecular diagnostics
    - Polymerase chain reaction – Similar sensitivity to blood cultures and lower specificity

Treatment

More than 90% of patients can be managed at home with oral antibiotics, reliable careand close medical follow-up for complications or failure to respond to therapy.

Indication for hospitalization and parenteral antibiotics

- Systemic illness
- Persistent vomiting
- Severe diarrhoea and abdominal distension
- Other medical and surgical complications
- Supportive measures are important in the management of typhoid fever, such as
    - Oral or intravenous hydration
    - The use of antipyretics
    - Appropriate nutrition
    - Blood transfusions if indicated.
- Antibiotic therapy

Table 9.24 Treatment of uncomplicated enteric fever

Susceptibility	**First line**		**Second line**	
Drug sensitive	Cefixime 20 mg/kg Maximum 200 mg	10-14 days	Chloramphenicol50-75 mg/kg/day TMP-SMX TMP 8 mg/kg/day Amoxicillin 75-100/kg/day	14-21 days 14 days 14 days
Drug resistant	Cefixime 20 mg/kg Maximum 200 mg	10-14 days	Azithromycin 10-20 mg/kg/day	7-10 days

Resistance patterns have led to a shift toward the third generation cephalosporins azithromycin, and fluoroquinolones as empiric therapy fortyphoid fever while awaiting the results ofantimicrobial susceptibilities.

Sustained fever of >39°C with abnormal state of consciousness or shock are considered to have severe enteric fever

Table 9,25 Treatment of severe enteric fever

Susceptibility	**First line**		**Second line**	
Drug sensitive	Ceftriaxone/Cefotaxime 80-100 mg/kg/day	10-14 days	Amoxicillin75-100 mg/kg/day TMP SMX TMP 8 mg/kg/day Chloramphenicol 50-75 mg/kg/day	14 days 14 days 14-21 days
Drug resistant	Ceftriaxone/ Cefotaxime 80-100 mg/kg/day	10-14 days	Aztreonam 50-100 mg/kg/day	14 days

In patients with severe systemic illness, therapy should be initiated with a parenteral agent

Aztreonam and Imepenem are potential second line drugs. For life threatening infection resistant to all other recommended antibiotics, fuoroquinolones may be used.

- Corticosteroid therapy
    - Consider in children with altered mental state
    - Dexamethasone may decrease the likelihood of mortality in severe typhoid fever
    - Dexamethasone-3mg/kg stat followed by another 8 doses of 1mg/kg 6Hrly (adult dose)
    - Pediatric dose – not established yet
- Treatment of chronic carrier – High dose of Ampicillin 200 mg/kg/day for 4-6 weeks
- Fluids and electrolytes should be monitored and replaced diligently
- Oral nutrition with a soft digestible diet is preferable in the absence of abdominal distension or ileus

Complications

Both outpatients and inpatients with typhoid fever should be closely monitored for the development of complications, Timely intervention can prevent or reduce morbidity and mortality.

- GI Tract – intestinal haemorrhage, Perforation
- CVS – Toxic myocarditis, pericarditis
- Respiratory – Pneumonia,empyema
- Haematology – Haemolytic anaemia, haemolytic uremic syndrome
- CNS – Toxic encephalopathy, Guillian Barre Syndrome
- Miscellaneous – Metastatic abscesses, Otitis media, Tonsillitis

Indication for surgical consultafion when:

- suspected intestinal perforation
- Lower GI bleeding

- lf antibiotic treatment fails to eradicate the hepatobiliary carriage (Cholecystectomy in addition to antibiotics in order to achieve bacteriologica cure)

Preventive Measures

- Proper hand washing and personal hygiene especially for food handlers
- Environmental sanitation
- Availability of safe water
- Health education
- Detection and treatment of carrier
- Immunization
    - Two safe and effective vaccines are now licensed and available.
    - One is based on defined subunit antigens, the other on whole - cell liveattenuated bacteria.
    - Vi polysaccharide is given in a single dose subcutaneous (sc) or i.m. lt isapproved for persons aged over 2 years. Revaccination is recommended every three years.
    - Live oral vaccine Ty2la is available in enteric - coated capsule or liquid formulation. It should be taken in three doses two days apart on anempty stomach. It is approved for use in children aged at least 5 years. Revaccination is annually.