

Epidemiology

- Enteric fever caused by Gram -ve organism *Salmonella enterica*
- Called Typhoid if caused by *S. typhi* or Paratyphoid when *S. paratyphi* types A, B & C
- It affects only humans (its reservoir) and is spread through stool-contaminated food.
- Typhoid fever is rare in developed countries (except travellers)
- It is endemic in developing nations:
 - Mostly in Asia, Africa, and Latin America, Indonesia and Papua New Guinea
 - Predominantly children affected

Presentation

Incubation period - 3-21d, normally 10-20d for *S. typhi*, and 1-10d for paratyphoid.

Symptoms

- Initially there may be intermittent diarrhoea.
- Insidious onset of fever in steps over a week with temperatures 38-40°C
- Headaches, non-productive cough and constipation may also occur.

Signs

- Rose spots - caused by bacterial emboli - crops of 2-4mm blanching macules on torso.
- Relative bradycardia - unexpected from the degree of temperature.
- Eye complications may occur which include corneal ulcers, uveitis, abscesses (eyelid or orbit), vitreous or retinal haemorrhage, retinal detachment, optic neuritis, extraocular muscle palsies, orbital thromboses.

Subsequent course

- By 2nd week: toxic appearance, apathy, sustained pyrexia. Mild abdomen distension and splenomegaly common.
- By 3rd week: weight loss, pyrexia persists, delirium. Marked abdominal distension develops and liquid, foul, green-yellow "pea soup diarrhoea" common. Prostration, weak pulse, ↑RR and crackles may develop over the lung bases. Death can occur at this stage from overwhelming toxæmia, myocarditis, intestinal haemorrhage, or perforation of the gut, usually at Peyer's patches.
- If untreated, in 4th week the fever, mental state and abdominal distension slowly improve over a few days, but intestinal complications may still occur. Convalescence is prolonged, and most relapses occur at this stage.

Differential diagnosis

- Amoebiasis
- Influenza
- Malaria
- Tuberculosis
- Typhus

Investigations

- Bloods: FBC (norm to ↓WCC, normocytic anaemia)
- Cultures: Blood (40-60%). Stool (30-60% 2nd week). Bone marrow (90%).
- Serology: Widal test - agglutinating Abs against flagellar (H) and somatic (O) antigens of *S typhi*. Indirect agglutination tests available and PCR tests being developed.

Management

- Supportive - Adequate rest, rehydration and correction of electrolyte disturbances
- Antipyretic therapy as required.
- Hygiene - meticulous with hand washing and the disposal of faeces and urine.
- Antibiotics shorten the course, reduce the rate of complications if begun early and reduce mortality. Drug resistance can be a problem.
 - **ciprofloxacin** 500mg (child: 15mg/kg up to 500 mg) PO bd for 7-10d **OR**
 - **ciprofloxacin** 400mg (child: 10mg/kg up to 400 mg) IV bd until PO tolerated.
- If resistance suspected use:
 - **ceftriaxone** 2g (child: 50mg/kg up to 2g) IV od **OR**
 - **azithromycin** 1g (child: 20mg/kg up to 1g) IV or PO od
- Once susceptibilities known usually PO **amoxicillin**, **azithromycin** or **cotrimoxazole** used.
- Surgical - If perforation of the bowel occurs it will require closure.

Chronic carrier state

- **Ciprofloxacin** 750mg bd and **norfloxacin** 400mg bd have both been effective.
- Bacteriological surveillance until 6 consecutive stool & urine cultures negative

Complications

- Haemorrhage (including DIC)
- Perforation of the bowel
- Jaundice may be due to hepatitis, cholangitis, cholecystitis, or haemolysis.
- Pancreatitis with acute renal failure and hepatitis with hepatomegaly are rare.
- Toxic myocarditis occurs in 1 to 5% of patients (ECG changes may be present).
- Toxic confusional states and other neurological and psychiatric disturbances.

Prognosis

Mortality without ABx is ~20%.

With ABx mortality falls to <5% overall, but infants & elderly still up to ~10%.

~10% treated with antibiotics have a relapse.

Prevention

- Provision of safe drinking water and disposal of sewage.
- Typhoid vaccine is 60% effective.
- There is no vaccine for *S. paratyphi A*.