**Salmonella infection**

**Salmonella infections include:**

* Typhoid fever and Paratyphoid fever (Enteric fever): salmonella enterica species- S. Typhi, S. Paratyphi A, B, and C
* Salmonella gastroenteritis (food poisoning or enterocolitis): S. Typhimurium and Enteritidis.
* Salmonella bacteraemia&/or septicaemia with metastatic abscesses: S. Cholerasuis
* Localized salmonella infection.

**Typhoid and paratyphoid fevers (Enterica)**

**Incubation period:**

Usually 7-14 days but it may be as short as 3 days or as long as 21 days depending upon the dose of the inoculums.

**Reservoir of infection:**

Man is the only known reservoir of infection - cases or carriers.

**Period of communicability:**

A case is infectious as long as the bacilli appear in stool or urine.

**Mode of transmission:**

The disease is transmitted by faeco - oral route or urine – oral routes – either directly through hands soiled with faeces or urine of cases or carriers or indirectly by ingestion of contaminated water, milk, food, or through flies.

Contaminated ice, ice-creams, and milk products are a rich source of infection.

Enteric Fever is characterized by prolonged fever, invasion of liver, spleen, kidney and gallbladder.

Gallbladder is frequent sites of persistent infection in carriers.

**Classic clinical picture**

**During 1st week:**

* Insidious onset
* Headache
* Abdominal discomfort
* High grade fever (gradually rising)
* Slow dicrotic pulse
* Persistent cough (common)
* Constipation:

**During 2nd week:**

* High grade fever (usually no sweat)
* Marked abdominal discomfort
* Diarrhea
* Weakness and lassitude.
* Coated tongue.
* Facial pallor
* Rose spots (few on the abdomen usually).
* Soft hepatosplenomegally.

**During 3rd week:**

* Fever remains high.
* Weakness and delirium.
* Abdominal distension. A condition formely called “typhoid state” (delirium+distension)

**During 4th week:**

* Fall of temperature gradually.
* Listless and anorexia
* Relapse in 10%

**Complications:**

**During the 3rd week:**(Usually gastrointestinal)

* The typhoid state.
* Lower GI bleeding (may be fatal)
* Perforation.
* Cholecystitis. (faecal carrier).

**Other comlications:**

* Toxic Myocarditis, heart failure, shock.
* Pyelonephritis, may lead to urinary carriers
* DVT
* Pneumonia, empyema
* Splenic, hepatic, renal, ovarian, testicular, CNS, pulmnary and soft tissue abcesses:
* Neuropsychatriccompliations (status typhosus).
* Osteitis (ribs, vertebrae,...), typhoid spine, spondylitis, muscular hyaline degeneration.
* Relapse and/or chronic carriers.

**Diagnosis**:

* **1st week** →blood culture and BM culture
* **2nd and 3rd week** →faeces and urine culture
* **CBC** →normal, leucocytosis, or leucopenia (not common) with relative lymphocytosis.
* **Widal test** →during the 2nd week and afterward.
* **ELISA, immunoblot, and PCR tests**

**Widal test:**

* Two serum samples, separated by 10 days
* Rising titre indicate active enteric fever.
* High titres of O (somatic Ag) &H (flagellar Ag) or rising titre → active infection.
* High titres of H only →past vaccination or past infection

**Diagnosis of carriers:**

* Isolation of the organism from stool after cholagogue to empty gall bladder.
* isolation from urine
* need repeated samples.
* Vi agglutinins in S.Typhi carriers.

**Treatment:**

* **General** →bed rest, diet, IV fluids,…
* **Symptomatic** →headache, fever, hge, …
* **Specific:**
* Quinolones (7-10 Ds).
* Chloramphenicol (14 Ds).
* Ampicillin
* Trimethoprim- sulphamethoxazole (14 Ds).
* 3rd generation cephalosporin (cetriaxone, cefotaxime).

**Prevention:**

* Good sanitary conditions.
* Carriers detected, prevented from food handling, and treated
* **Vaccines :**
* Oral living attenuated vaccine (Vivotif).
* Inactivated single-dose vaccine containing Vi Ag (IM)
* Old inactivated whole cell vaccine (TAB), 2 SC doses.

**Chronic salmonellosis**.

* Prolonded remittent or intermittent fever and bacteremia in bilharizial Pts.

**Chronic urinary salmonellosis:**

* Complicating S.haematobium
* Dysuria and terminal haematuria common.
* Hepatosplenomegaly not uncommon.
* D. →repeated blood and urine cultures during fever, Widal test.

**Chronic gastrointestinal salmonellosis:**

* Usually complicate S. mansoni infection.
* Frequent attacks of chills, fever, and diarrhea.
* Pt. looks toxic and ill.
* Generalized lymphadenopathy and HSM is common.
* Jaundice, lower limps edema, patechial and purpuric eruption.

**Diagnosis:**

 →repeated blood cultures (S. Typhi common).

 →CBC, normal WBCs or leucocytosis, anemia, thrombocytopenia, raised ESR.

→Widal test.

→hypergammaglobulinaemia.

**Salmonella gastroenteritis
(food poisoning)**

The most common

Affects all ages.

Non- typhoidal salmonella (S. Typhimurium& S. Enteritidis).

Contaminated undecooked meat, eggs,...

**IP** →12-72 hs.

**C/P** →fever, nausea, vomiting, diarrhea, may dehydration and collapse

**Diagnosis**: →stool analyais and culture

**Treatment:** →general &specific(neonates immunocompromised, and with chronic diseases)

**Septicaemia with metastatic abcesses**

By S. Choleraesuis

In immunocompromised or pt. with chronic disease.

Follow oral infection →bacteraemia →seedding of many organs (osteomelitis, pueumonia and meningitis)

Abcesses occur on top of damaged tissue

Positive blood cultures.

**Treatment:** →as in typhoid fever.