Typhoid Fever

(*Enteric Fevers*)

Dr Piyush B. Tailor

Associate Professor

GMC, Surat

Enteric Fevers

- Salmonella Typhi
- Salmonella Paratyphi A, B,C

Historical landmarks in Typhoid

- In 1880s, the typhoid bacillus was first observed by Eberth in
  - **Spleen sections**
  - **Mesenteric lymph nodes** from a patient who died from typhoid.

Typhoid Mary

- A famous example is "Typhoid" Mary Mallon, who was a food handler
- Responsible for infecting 78 people, killing 5.

Typhoid Mary

- "Typhoid Mary," real name Mary Mallon, worked as a cook in New York City in the early 1900s.
- After discovering that she was the common link among many people who had become ill from typhoid fever She was traced to typhoid outbreaks a second time.
- So she was put in prison again where she lived until she died.

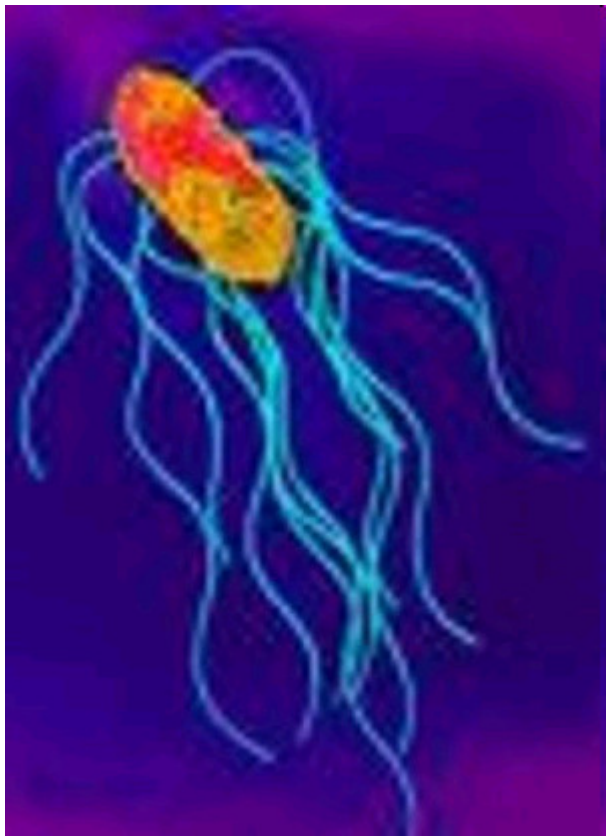
Etiology of Typhoid fever

- Typhoid fever is a bacterial disease, caused by *Salmonella typhi*.
- Transmitted through
  - Ingestion contaminated food & drink by the faeces or urine of infected people.
- Para typhoid fevers are produced by other species named

  Paratyphi A, B, C

Bacteriology –Typhoid fever

- Salmonella belong to Enterobactericiae
- Gram negative bacilli
- Antigen on structure



Antigenic structure of Salmonella

- Two sets of antigens
- Detection by serotyping

1 Somatic or 0 Antigens

contain long chain polysaccharides

2 Flagellar or H Antigens

Strongly immunogenic

Induces antibody formation rapidly

High titers following infection or immunization.

How a Typhoid fever spreads

- *Salmonella* Typhi lives only in humans.
- Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract.
- In addition, a small number of persons, called carriers , recover from typhoid fever but continue to carry the bacteria.
- Both ill persons and carriers shed *S.* Typhi in their feces (stool).

Pathogenesis of Enteric fever

- Caused by S. Typhi & S. Paratyphi A , B or C
- The organisms penetrate ileal mucosa
- Reach mesentric lymph nodes via Lymphatics
- Multiply in lymph nodes
- Invade Blood stream via thoracic duct
- In 7 – 10 days through blood stream infect Liver, Gall Bladder, spleen, Kidney, Bone marrow.
- After multiplication bacilli pass into blood causing secondary and heavier bactermia

- Through the blood , it reaches to liver & gall bladder
- From Gall bladder further invasion occurs in intestines
- Involvement of peyr's patches, gut lymphoid tissue
- Lead to inflammatory reaction & infiltration .
- Leads to Necrosis, Sloughing and formation of chacterstic typhoid ulcers intestine

Clinical feature

- Incubation Period : Ingestion to onset of fever varies from 3 – 50 days. (2 weeks)
- Insidious start, early symptoms are vague
- Dull continuous head ache
- Abdominal tenderness
- Abdominal discomfort
- *May progress and present with step ladder pattern temperature*

Clinical features

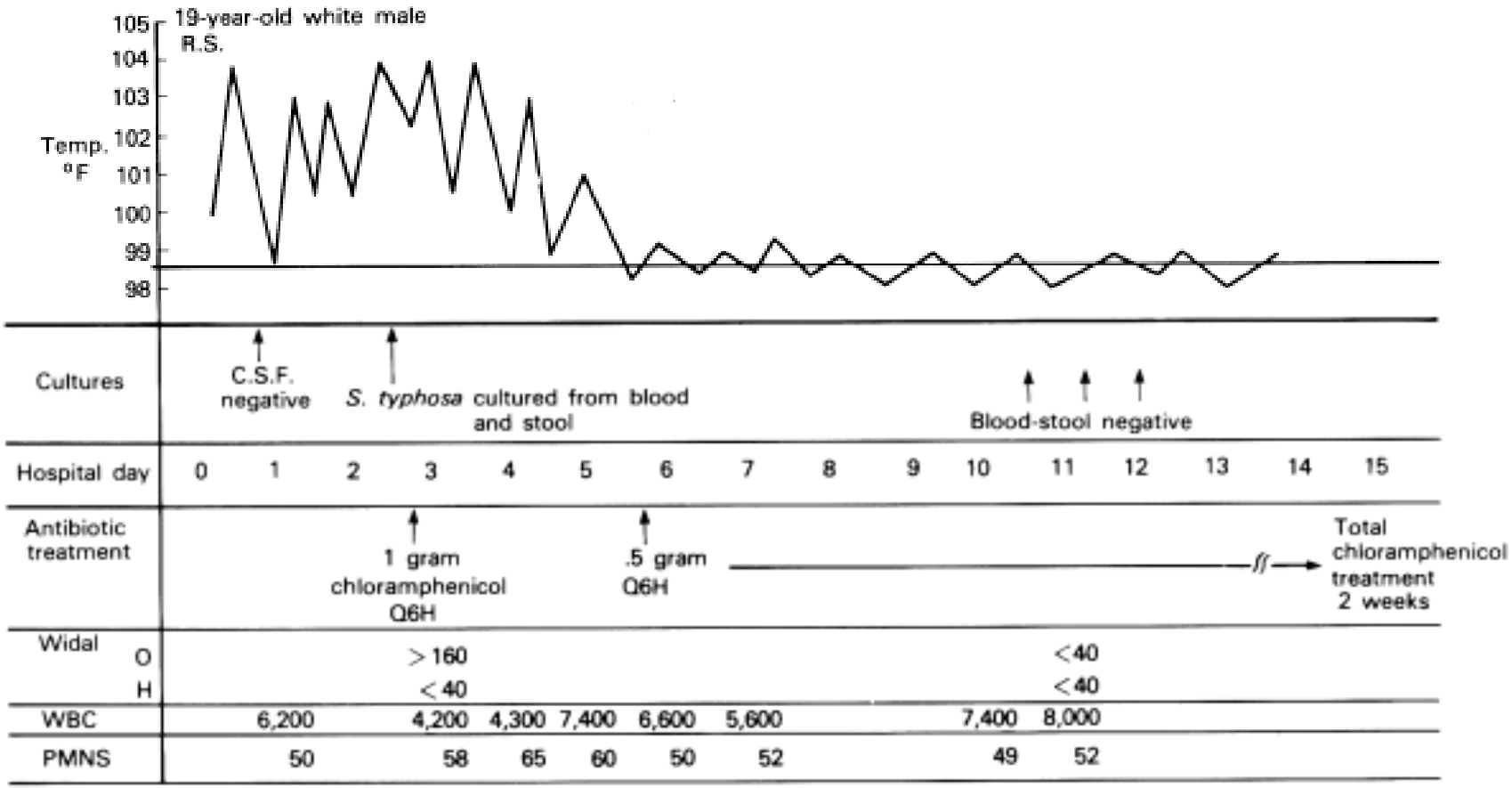
- Typhoid fever (enteric fever) is a septicemia
- Characterized initially by
  - Fever – High Grade
  - Relative Bradycardia,
  - Hepatomegaly
  - Splenomegaly
  - Abdominal symptoms like Pain in abdomen, Nausea, Vomiting
  - ‘Rose spots' which are clusters of pink patches on the skin.

❑ **Complications**

❑ **intestinal hemorrhage or perforation..... can develop in untreated patients or when treatment is delayed.**

Events in a Typical typhoid Fever

CHART 23.—Course of typhoid fever of a previously immunized American patient in Vietnam



Source: Records of patients treated by Lt. Col. Kenneth W. Hedlund, MC, 85th Evacuation Hospital, Vietnam.

Rashes in Typhoid

- Rash
- Rose spots 2 - 4 mm in diameter
- Raised discrete irregular
- Found in front of chest
- Fade after 3 – 4 days

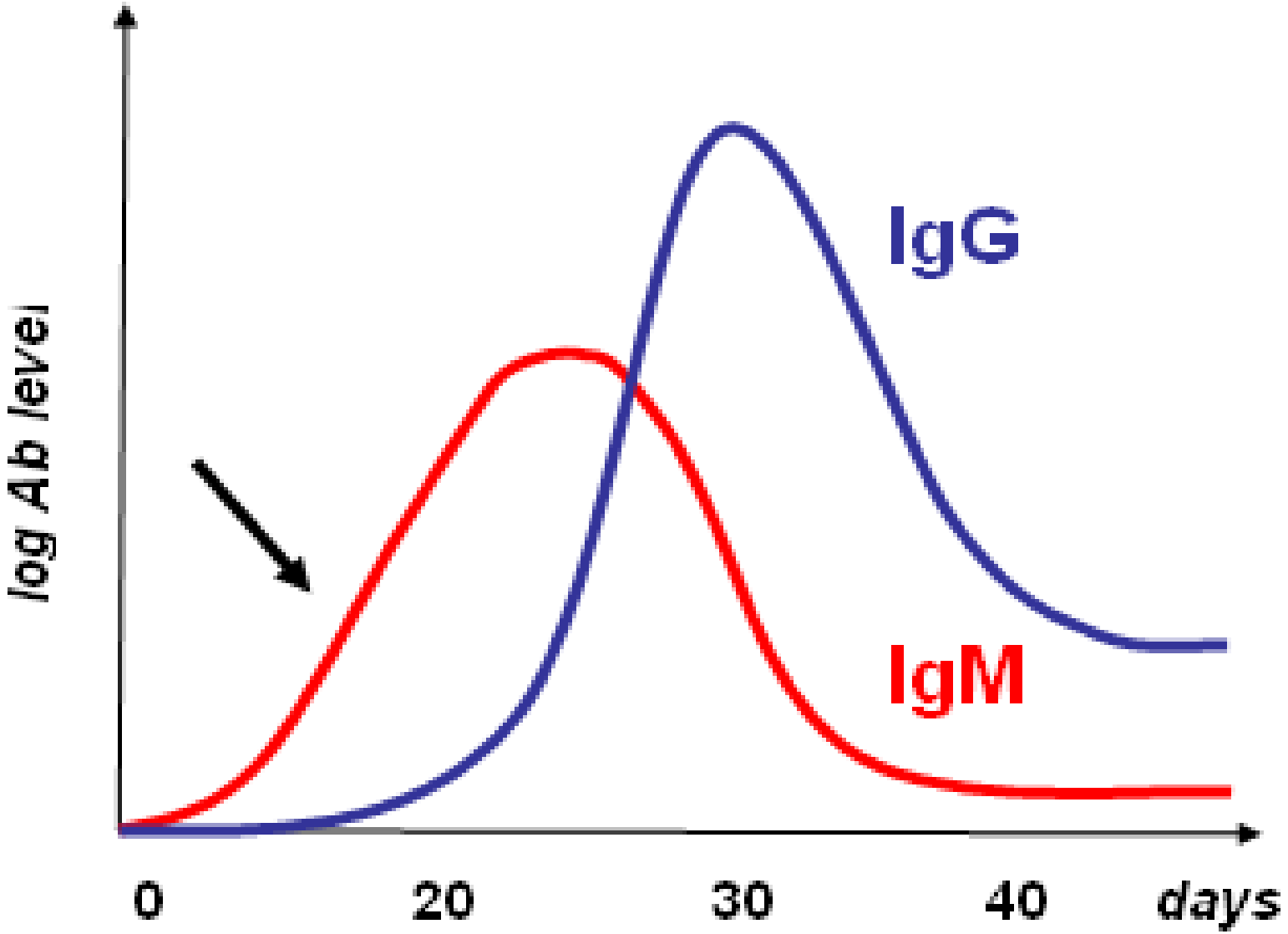
Complication in Typhoid

- Intestinal perforation
- Severe intestinal hemorrhage
- Severe bacteremia

Relapse

- 5 – 10 % of untreated patients
- On few occasions relapses can be severe and may be fatal.

Immune Response in Typhoid



Typhoid carriers

- 1 per 30 of the survivors become carriers.
- In carriers the bacteria remain
  - Inside the gall bladder
  - Spread bacteria to environment through stool
  - causing new infections to healthy through contaminated water & food.

Diagnosis of Enteric Fever

Blood Cultures in Typhoid Fevers

- Blood culture in Bile broth
- Bacteremia occurs early in the disease
- Blood Cultures are positive in

  1st week in 90%

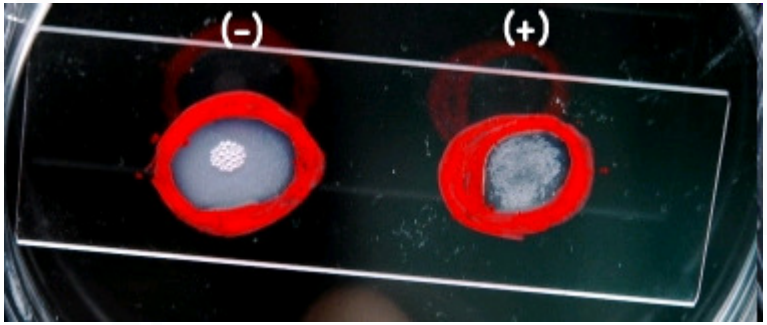
  2nd week in 75%

  3rd week in 60%

  4th week and later in 25%

Slide agglutination tests

- In slide agglutination tests,
  - known serum and unknown Serum is mixed
  - clumping occurs within few minutes



Bactek and Radiometric based methods are in recent use

- Bactek methods
- Isolation of Salmonella
- Rapid and Sensitive method
- In early diagnosis of Enteric fever.

Other methods in Isolation of Enteric Pathogens

- Feces Culture
- Urine Culture
- Bone marrow cultures (Highly Sensitive)

Widal test

- The widal test detects
  —antibodies against **O and H antigens**
- Serial dilutions
- **Two serum** specimens obtained at intervals of 7 – 10 days to read the raise of antibodies.
- Following Titers of antibodies against the antigens are significant

  O > 1 in 160

  H > 1 in 320

Management
Antimicrobial Therapy in Typhoid

- With antibiotic therapy, more than 99% are cured.

1. **Chloramphenicol =** Drug of choice and effective
2. **Tromethoprim Sulfamethozole**
3. Flouroquinolones like **Ciprofloxacin ,Levofloxacin.**
4. 3rd generation cephalosporins, **Ceftriaxone, Cefixime**

Vaccines for Typhoid Prevention

Oral – A live oral vaccine (Typhoral)

1, 3, 5 days (three doses)

No antibiotics should be taken during the period of administration of vaccine

The injectable vaccine, (Typhim –vi)

- Given Subcutaneous or Intramuscular injection
- Single dose is adequate.

Vaccines for Typhoid

Both vaccines are given to only > 5 years of age.

Immunity lasts for 3 years

Need a booster

Vaccines are not effective in prevention of Paratyphoid fevers

Simple hand hygiene and washing can reduce several cases of Typhoid

It is nice to have money
and
the things that money can buy.

But it's important to make sure
you haven't lost the things
which money can't buy.”