Enteric fevers

Typhoid fever
Paratyphoid fever
type: A, B & C

1. Identification:

A systemic bacterial disease with insidious onset of **sustained** fever, marked headache, anorexia, relative bradycardia, splenomegaly, and rose spots on trunks in 25% of white-skinned patients in 2nd week (2-3 mm in diameter that fades on pressure, disappear in 3-4 days).

Inapparent or mild illnesses occur, especially in endemic areas and constitute about 60-90% of typhoid patients.

1. Identification:

Severe cases with complications can occur (bleeding or perforation) in 1% of cases.

In severe cases, the CFR → 10% - 20% in pre-antibiotic era, which drop below 1% with prompt antibiotic.

15%-20% of patients may experience relapses (generally milder than the initial clinical illness)

Paratyphoid fever A and B presents a similar clinical picture, but tends to be milder, and the CFR is much lower. Relapses occurs in approximately 3 – 4 %

- **Diagnosis**

1. Clinical picture → unexplained prolonged fever
2. Isolation of M.O by culture:

Blood	first 7-10 days	almost +ve
	2nd – 3rd W	50% +ve
Bone marrow		+ve even with A.B
Stool	1st W	50% +ve
	2nd – 3rd W	100% +ve
Urine	20-30 %	+ve after 1st W

3. Serology:

a) Widal test:

Infection, Vaccination } S. typhi, S. paratyphi A-B → O&H Ag. → body

invitro add Ag. → **O&H Ab**

Agglutination

The Lab. Results appear as follows:

TH	AH	BH
TO	AO	BO

Problems of Widal test:

1) Ag. sharing between Salmonella genes (false positive result FP).
2) Ag. sharing with other M.O (FP in: malaria, typhus fevers, E. coli infections as UTI, other infections and cirrhosis).
3) TAB vaccination (FP).
4) It can be negative test in up to 30% of culture proved typhoid patients (FN).
5) O –Ab → appear in 6-8 days & remain for 6-12 months.
6) H –Ab → appear in 10-12 days & remain for years.

A single Widal test are generally of little diagnostic value.

Interpretation

Non endemic

No TAB vaccination

1st test
- **1/40 O&H suggestive**
- **1/80 O&H diagnostic**

2nd test
- **higher titer → Dx certain**

Endemic

TAB vaccination

O Ab is more significant

progressive ↑ in titer is essential

Further studies on serological test is needed in our locality

(Sensitivity &specificity studies)

A four fold raised in paired sera (1st in acute stage and the 2nd in convalescent stage) is diagnostic, but this is difficult to apply practically.

b) Vi Ab present in high titer in chronic carriers and can be used as a screening test for chronic carriers.

c) New serological test:

1- **IDL Tubex® test:** Swedish company, one step test, rapid result (2 minutes). It detect IgM **09**. Sensitivity and specificity better than Widal test.

2- **Typhidot® test:** developed in Malaysia, 3 hours, EIA test, sensitivity 75%, specificity 95%, detect specific IgM & IgG.
Newer **Typhidot-M® test**: detect specific IgM.

3- **IgM dipstick test:** developed in Netherland.

2. Infectious agents:

Typhoid fever → *S. Typhi*

Paratyphoid fever → *S. Paratyphi A & B.*

3. Occurrence:

Worldwide; occur in all area where water supplies and sanitation are substandard. The annual I. of typhoid fever is about 17 million cases with approximately 600 000 deaths. Almost 80% of cases and deaths are in Asia and most of others occur in Africa and Latin America.

- **In Nineveh 2005-2011: 22500 cases, 70% of them affecting young age groups (15-45).**

4. Reservoir:

Humans — **All ages - both sexes**

cases & carriers

Cases: **mild, missed or severe**

Carriers: **temporary (convalescent)**
or chronic carrier

- **Convalescent carriers → excrete the bacilli for 6 -8 weeks, after 3 months only 4% remain excreting M.O.**

4. Reservoir:

- After 1 year only 3% → chronic carrier (either fecal or urinary carrier).
- In most chronic carriers, the microorganism persist in the gallbladder and in the biliary tract.
- M.O excreted either continously or intermittently.
- “Typhoid Mary”: an Irish cook in New York City in early 1900s.

5. Mode of transmission:

Feco-oral route by ingestion of water and food contaminated by feces and urine of patients and carriers.

- Raw fruits and vegetables especially when human excreta used as fertilizer.

-Sea food (shell fish, oysters).

-Contaminated milks and milk products,

-Flies may infect foods in which the organism then multiplies to infective doses.

- **6. Incubation period:**

  8 - 14 days but it may be as short as 3 days up to 60 days.

- **7. Period of communicability: as long as the bacilli appear in the excreta. Usually from 1st week throughout the convalescence. (10% of untreated cases excrete bacilli for 3 months after onset of symptoms).**

8. Susceptibility:

is general, and increase in person with gastric achlorhydria, and possibly in those with HIV (+ve).

- Serum antibodies (O &H) are not the primary defenses against infection; *S. typhi* being an intracellular organism, cell-mediated immunity play an major role in combating the infection.
- The immunity is temporal, 2nd attacks infection may occur.

9. Method of control:

A- Preventive measures

B- Control of patients, contacts and the immediate environment

C- Epidemic measures

D- Disaster implications

E- International measures

9. Method of control:

A- Preventive measures:

1. **Educate the public …**
2. **Personal hygiene particularly food handlers.**
3. **Sanitary sewage disposal.**
4. **Provide, protect, purify and chlorinate public and private water supplies.**
5. **Control flies.**
6. **Use of sanitary practices for food preparation, handling and storage especially of salads**
7. **Pasteurization or boiling of milk and diary products.**

A- Preventive measures:

8) Exclusion of **typhoid carriers** from handling foods until 3 consecutive negative stool cultures (and urine in areas endemic for schistosomiasis) at least 1 month apart and at least 48 hours after antimicrobial therapy has stopped.

Rx of chronic carriers → 750 mg ciprofloxacine or 400 mg norfloxacine twice daily for 28 days → 80% successful.

Surgery → cholecystectomy + Ampicillin therapy

The management of carriers continues to be an unsolved problem. This is the crux of the problem, in the elimination of typhoid fever.

9. Immunization

Vaccination of high-risk populations is considered the most promising strategy for the control of typhoid fever. Immunization is not routinely recommended in non-endemic areas.

TAB vaccine:

Killed vaccine, given 2 doses at one month interval.

Side effect → redness, fever, nausea and headache

Booster every 3 years

Vaccine protection ?? 65-70 % against low to moderate infecting doses but provide little protection against very large doses.

WHO recommended → TAB should be discontinued.

Immunization

Indications

1. Food handlers
2. Workers in water, sewage plants
3. Swimming pools attendances

Obligatory in Iraq

4. Visitors to endemic areas
5. School-age children living in endemic areas.

WHO

Other vaccines

Ty 21a (typhoral) **→ oral, live attenuated, completely devoid of pathogenicity. It colonizes the gut. Enteric-coated capsule, one capsule/dose (+ antacid), 3 doses: day 1, 3 and 5, protection commences 2 weeks after taking the last capsule and last for at least 3 years. Therefore, a booster dose is needed every 3 years.**

- **Age:** adults and children > 6 years.
- **Trials in Egypt and Chile (> 500 000 school children) 3 doses and observed them over last 6-7 years → 3 years protection in 96%.**
- **Now > 60 countries adopted.**

B- Control of patients, contacts &environment:

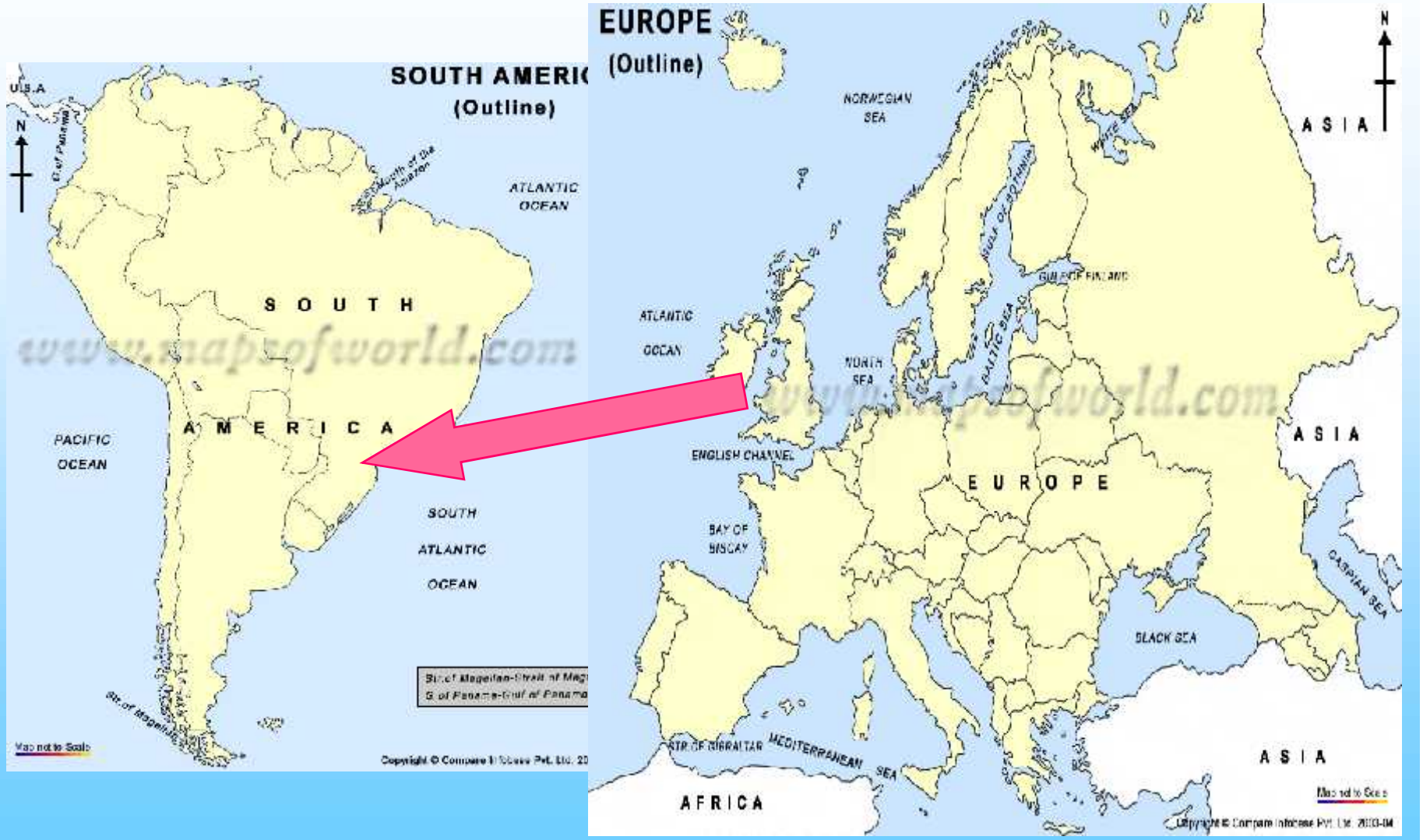
1) **Reporting:** Class II
2) **Isolation:** Enteric precaution while ill (hospital care in acute illness). Release from supervision until 3 consecutive negative cultures of stool (and urine in patients with schistosomiasis) on 3 separate days and at least 48 hours after antimicrobial therapy has stopped and not earlier than 1 month after onset.

   If any of these is positive, repeat cultures at monthly interval during 12 months.
3) **Disinfection** of feces and urine.
4) **Quarantine:** not applicable.

B- Control of patients, contacts and environment:

5) **Immunization of contacts:** is of limited value.
6) **Investigation of contacts and source of infection:** (by Vi Ag).
7) **Specific treatment:** is by ciprofloxacin for 2 weeks or ceftriaxone or azithromycine.

   - Chloramphenicol, amoxicillin, ampicillin and trimetheprine-sulfamethoxazole are equally effective.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