

Typhoid Fever Illness Script

Hey Clinical Problem Solvers! My name is Mekala Neelakantan, and I am a fourth-year medical student at the Western Michigan University Homer Stryker M.D. School of Medicine! In this video, we'll be discussing the illness script for Typhoid Fever. Let's get started!

Typhoid Fever can be a life-threatening systemic illness, most frequently caused by the *Salmonella typhi* and – to a lesser extent - *Salmonella paratyphi* A, B, and C bacteria, identified as gram-negative bacilli. I'll take a second here to remind us all that *Salmonella typhi* and *paratyphi* are distinct from the non-typhoidal *Salmonella* serotypes, such as *Salmonella enteritidis*, which most often causes an acute foodborne diarrheal illness with a much smaller incubation window of 8 to 72 hours. Non-typhoidal salmonellosis is also particular in that it resides within animal reservoirs.

Typhoid fever, on the other hand, is most often spread person-to-person through drinking water or food contaminated with human feces. The incubation period following introduction of the bacteria into the human body is between 5-21 days. It is apparent that the disease occurs more frequently in regions where sanitation measures are difficult to access. Common endemic regions include South-East and South-Central Asia, India, and southern Africa. According to the WHO, there are 11-20 million cases of typhoid fever globally each year, causing between 120,000 to 161,000 deaths annually.

Now, let's talk about pathophysiology! As discussed before, the bacteria are first ingested through contaminated food or water, next penetrating the epithelium of the small intestine and proliferating within masses of lymphatic tissue known as Peyer's Patches. Dissemination throughout the body occurs either hematogenously or lymphatically, affecting the reticuloendothelial system, liver, bone marrow, and of course, the blood. The liver is especially important to discuss as it is the route through which the *Salmonella typhi* bacteria reach the gallbladder, further utilizing it as a reservoir for chronic infection. These chronic hosts are very contagious and may continue to spread the disease by shedding of the bacteria through feces or urine.

Clinically, typhoid fever presents in a variety of different ways, with Typhoid Mary being a good reminder to us that some hosts of the infection may be asymptomatic – up to 25%, to be precise.

Otherwise, infected persons commonly present with headaches, fevers and chills, along with a frequently seen pulse-temperature dissociation. Skin findings may show the faint salmon-colored “rose spots” throughout the chest and abdomen. Interestingly and unlike non-typhoidal salmonellosis, patients with *salmonella typhi* infections will commonly have constipation or have no GI symptoms at all.

Focusing on the pathophysiology can help us remember the clinical manifestations, as the organism travels through the blood and places its signature on the reticuloendothelial system (the liver, spleen, bone and lungs). As the infection continues, hepatosplenomegaly may occur, as well as abscess formation, osteomyelitis, empyema, and aortitis. Less commonly, severe ramifications including encephalopathy, meningitis, gastrointestinal bleeding, and bowel perforation may be seen.

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On laboratory testing, a complete blood count will commonly show a pancytopenia with leukopenic predominance. Liver chemistry tests may reveal hepatocellular injury with elevated AST and ALT.

The diagnosis of typhoid fever requires clinical suspicion based on the exposure history and presenting symptoms, confirmed by the detection of the bacteria on culture or PCR testing. Culture is often taken from the blood at week 1 or from the stool at week 3. Of note, culture from the bone marrow is most sensitive, but much more invasive.

It is important to discuss differentials; be sure to check out the schema on “Fever in a Returning Traveler” for more information! Here, I will mention that other illnesses to rule out may include malaria, dengue fever, chikungunya, Zika virus, leptospirosis, and of course many more depending on the associated exposures and geographic regions.

Treatment for typhoid fever requires a long and obligatory antibiotic course. The CDC recommends use of ceftriaxone or ciprofloxacin, although there have been increasing rates of fluoroquinolone resistance. Thus, ceftriaxone is favored. Lastly, for chronic gallbladder infection, a cholecystectomy may be necessary in order to remove the reservoir of infection.

Let's do a quick recap: Typhoid fever is a life-threatening systemic illness most commonly caused by *Salmonella typhi* bacteria. It is transmitted through person-to-person contact, frequently through contaminated water or food. Infection occurs after bacteria penetrate through the small intestine, diffusely infecting the reticuloendothelial system and chronically residing in the gallbladder. Signs and symptoms can include fevers, chills, gastrointestinal symptoms, pulse-temperature dissociation, and salmon-colored skin spots. Ceftriaxone is the preferred antibiotic of treatment. Lastly, don't forget to rule out those differentials!

Well, that about wraps up this illness script! Thank you for listening!