Typhoid Fever

Traveler Summary

Key Points

- Typhoid fever and paratyphoid fever are bacterial infections acquired through the consumption of fecally contaminated foods or liquids, mainly in settings with a very poor standard of hygiene.
- Risk is intermediate but highest for travelers visiting friends and relatives and those with travel outside prearranged, fixed itineraries going to remote areas of Asia (especially India, Pakistan, and Bangladesh).
- Symptoms include prolonged, gradually increasing fever, fatigue, headache, muscle ache, and loss of appetite, which may be preceded by diarrhea.
- Consequences of untreated infection include mental confusion, intestinal bleeding, or intestinal perforation.
- Prevention includes observing standard food and beverage precautions and frequent, thorough handwashing.
- Injectable typhoid vaccine requires a single dose. Oral typhoid vaccine is given in 4 doses (1 dose every other day).
- Injectable vaccine side effects are redness and tenderness at injection site. Oral vaccine side effects are nausea, abdominal pain and cramps, vomiting, fever, headache, and rash or hives.
- Duration of vaccine protection following a completed series is 2 to 3 years for the injectable vaccine and 5 years for the oral vaccine. Revaccination is recommended for conditions of continued exposure after 2 to 3 years and 5 years, respectively.

Introduction

Typhoid fever and paratyphoid fever are bacterial infections known as enteric (intestinal) fevers occurring worldwide, mainly in countries with a poor standard of hygiene. Symptoms of paratyphoid fever are difficult to differentiate from typhoid fever. Paratyphoid fever is responsible for about half of enteric fever cases in travelers. Untreated typhoid fever is fatal in up to 20% of cases; with early and appropriate antibiotic treatment, the death rate falls to less than 1%.

Risk Areas

Typhoid fever and paratyphoid fever are common in countries with warm climates and less developed sanitary facilities for sewage disposal and water treatment. Risk is highest for travelers going to South Asia (India, Pakistan, and Bangladesh), especially for those visiting friends and relatives and those going to remote areas of these countries. Other risk areas include East and Southeast Asia, sub-Saharan Africa, the Caribbean, Central and South America, and the Middle East.

Typhoid and paratyphoid fevers are uncommon in the U.S., with an average of about 300 typhoid fever cases and 100 cases of paratyphoid fever reported annually. Most U.S. cases occur among international travelers; of these, more than 75% had traveled to South Asia.

Transmission

Typhoid and paratyphoid fevers are predominantly transmitted through the consumption of fecally contaminated food (e.g., raw, undercooked, or inadequately cooked shellfish, frozen fruits, vegetables, milk or milk products) and water (or ice).

Risk Factors

Risk is intermediate for travelers (1-10 per 100,000 travelers per month of travel) and is related to overall food hygiene anywhere in the developing world. Consumption of contaminated food or water is the main risk factor for infection, especially for those visiting friends and relatives and/or going to remote areas of endemic countries. In any endemic country, even the most hygienic restaurant could be risky because of a food handler who is a healthy, asymptomatic typhoid carrier.

The risk of becoming ill following infection varies with the number of bacterial organisms ingested and the level of gastric (stomach) acid secretion. Stomach acid is the body's first line of defense against the bacteria, and reduced acid from taking medicines (such as antacids) increases the risk of infection.
Symptoms
Symptoms most commonly appear about 14-21 days following exposure and include prolonged, steady high fever, fatigue, headache, muscle aches, loss of appetite, and a rash appearing on the trunk, which may be preceded by diarrhea. Typhoid fever and paratyphoid fever have the same symptoms, but typhoid fever may be more dangerous. Symptoms of typhoid fever can be confused with malaria.

Consequences of Infection
Untreated typhoid or paratyphoid fever can lead to gastrointestinal bleeding, intestinal perforation, or death.

Need for Medical Assistance
Gradual onset of prolonged fever with malaise and abdominal symptoms is suggestive of enteric fever. Travelers who develop symptoms of typhoid or paratyphoid fever during travel or upon return from endemic areas should seek medical assistance.

Prevention
Nonvaccine
Observe food and beverage precautions and hand-hygiene measures (regardless of vaccination status). See Food and Beverage Precautions.

Vaccine
Two moderately effective (60%-70%) vaccines (injectable or oral) are available for typhoid fever but not for paratyphoid fever, although the oral typhoid vaccine might offer some protection against 1 strain of paratyphoid bacteria. Protection may last longer with the oral vaccine. A large oral intake of bacteria can overwhelm even an optimal response to the vaccine.

For travel to risk countries, vaccination is recommended for travelers:
- With long-stays
- With adventurous eating habits
- Who travel outside prearranged, fixed itineraries (including common tourist packages), especially in rural areas
- Who visit relatives or friends (who may be less likely to eat safe foods)
- Going to smaller cities, villages, and rural areas that are off the usual tourist itineraries, where food and beverage choices may be more limited
- Who have already had typhoid disease (typhoid is a bacterial infection and does not confer long-term protection)

Side Effects
The most common side effects of the injectable vaccine are redness and tenderness at the injection site. Occasionally, fever, headache, influenza-like episodes, abdominal pain, vomiting, and diarrhea occur. Side effects of the oral vaccine include nausea, abdominal pain and cramps, vomiting, fever, headache, and rash or hives.

Persons with underlying medical conditions or who have concerns about the vaccine should speak to their health care provider before vaccine administration.

Timing
Oral vaccine is given as follows:
Travelers 6 years and older: 4 oral doses; 1 capsule taken every other day (days 0, 2, 4, and 6), 1 hour before or 2 hours after a meal, with cool or lukewarm water.
- Capsules must be kept refrigerated.
- Vaccination should be completed at least 1 week before arriving in a high-risk area.
- Revaccination is recommended in 5 years if exposure is repeated or continuous.

Oral typhoid vaccine can be given at the same time as chloroquine, mefloquine, Malarone (atovaquone-proguanil), or pyrimethamine/sulfadoxine. A 24-hour interval between receiving oral typhoid vaccine and beginning doxycycline is advised. To avoid a possible reduction in vaccine effectiveness, antibiotic drugs should not be started until 1 week after the last dose of
oral typhoid vaccine. If antibiotics are unavoidable, a new dose of typhoid vaccine may need to be given.

Injectable vaccine is given as follows:

- Travelers 2 years and older: A single dose
- Vaccination should be completed at least 2 weeks before arriving in a high-risk area.
- Revaccination is recommended in 2 to 3 years if exposure is repeated or continuous.

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