Typhoid and paratyphoid

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Key Messages

| Typhoid and paratyphoid (also known as enteric fevers) are infections acquired by the ingestion of food or water contaminated by Salmonella Typhi and Salmonella Paratyphi A, B or C. |
| Most travel related typhoid and paratyphoid cases in the UK are in those travellers visiting friends and relatives in countries of the Indian subcontinent (Bangladesh, India and Pakistan). |
| Typhoid vaccination is recommended for travellers whose planned activities put them at higher risk for typhoid in areas where sanitation and food hygiene are likely to be poor. |
| Prevention of paratyphoid is through the use of good food and water hygiene precautions. There is no vaccine to prevent paratyphoid infection. |
| Typhoid and paratyphoid infection can be treated with appropriate antibiotics. |

Overview

Typhoid fever is a systemic disease acquired by the ingestion of food or water contaminated by the bacterium Salmonella enterica serovar Typhi. Paratyphoid is a clinically similar illness (though often less severe), caused by Salmonella enterica serovar Paratyphi A, B or C. These organisms are usually referred to as S. Typhi and S. Paratyphi A, B, C.

Risk areas

Typhoid and paratyphoid mainly affect low income areas of the world, where sanitation and clean water are lacking. The World Health Organization (WHO) conservatively estimates that 21 million cases of typhoid occur each year with a case fatality rate of 1-4 percent [1]. The majority of typhoid cases occur in Asia, but it continues to be a public health concern in many other low income countries in Africa and Central and South America [1,2]. Rarely outbreaks have also been reported in Europe [3-5].

Risk for travellers

Travellers to countries were the burden of infection is high are at the greatest risk of infection [6]. In the Indian subcontinent (ISC) – (Bangladesh, India and Pakistan), an area of high incidence, the rate of infection for travellers has been estimated at 1 to 10 per 100,000 journeys [7-9].

Further information about the epidemiology of enteric fever in England Wales and Northern Ireland is available...
from Public Health England.

Transmission

Transmission occurs following the ingestion of food or water that has been heavily contaminated (10^5 or more organisms may be required to cause illness) by the bacterium S. Typhi or S. Paratyphi. S. Typhi can be passed in the faeces of persons who are acutely ill with typhoid fever or chronic carriers. The bacteria can then enter the food chain and water supply if personal hygiene and general sanitation is inadequate. Direct faecal-oral transmission also occurs.

Ingestion of vegetables fertilised with human waste (night soil) and eaten raw, shellfish harvested from sewage-contaminated beds, and contaminated milk products can result in typhoid infection [10].

Signs and symptoms

Typhoid

The severity of typhoid disease is variable, but nearly all patients experience fever and headache. Young children may experience a mild illness, but they can also suffer from severe disease.

The incubation period for typhoid fever is usually 7-14 days, but can be shorter or longer depending upon how many bacteria are ingested. Symptoms include low-grade (mild) fever (which typically becomes higher as the illness progresses), chills, headache, myalgia (muscle ache), malaise, anorexia and nausea. There can be abdominal discomfort and constipation, and diarrhoea can occur early in the illness. In some cases, a macular rash (rose spots) consisting of pink lesions which fade on pressure under a glass, will appear on the trunk. The rash may be difficult to see in dark-skinned individuals.

Enlargement of the liver and/or spleen occurs in about 50 percent of cases.

Complications occur in 10-15 percent of all infections and are more likely in those who are not treated or are late seeking medical help. Complications include intestinal haemorrhage and perforation, toxic myocarditis, pneumonia, seizures, typhoid encephalopathy, and meningitis (usually in young children).

Less than one percent of those treated promptly with antibiotics die. If untreated, the number can rise to as high as 20 percent.

Following recovery, convalescing patients may continue to excrete S. Typhi in their faeces. Between one and three percent will become long-term carriers, excreting the organism for more than one year after the initial illness [11]. This is more common in women and those with biliary tract abnormality [10, 11]. Chronic (long-term) carriers require prolonged courses of antibiotics to clear the organism.

Paratyphoid fever

Paratyphoid is clinically similar to typhoid, but the disease may be more mild and of shorter duration [11, 12].
Diagnosis and treatment

From its introduction in 1948, chloramphenicol was the drug of choice to treat typhoid [13], but in the early 1970s, chloramphenicol-resistant strains of *S. Typhi* began to emerge. Large outbreaks of resistant *S. Typhi* occurred in Mexico and India, and resistant *S. Typhi* became endemic in many countries of South and South East Asia [14]. Other antibiotics such as ampicillin and co-trimoxazole have been used to treat typhoid, but resistance to multiple antibiotics has developed since 1987 in endemic regions such as China, South East Asia and the ISC [14]. In 1997, a large outbreak of multi-drug resistant typhoid was reported in Dushanbe, Tajikistan involving 8,901 cases and 95 deaths [7]. Drug-resistant strains have been seen in the UK in returned travellers [15].

Typhoid can be successfully treated with appropriate antibiotics. Treatment is usually with fluoroquinolones, cephalosporins [16], or azithromycin when there is resistance to fluoroquinolones [17].

Relapse will occur in less than 10 percent of patients treated with antibiotics. Relapse illness is usually milder and of shorter duration than the original illness. Those treated with fluoroquinolones are less likely to suffer relapse or become chronic carriers.

**Preventing typhoid and paratyphoid**

All travellers should practice *food and water hygiene precautions*.

**Typhoid**

Vaccination is recommended for travellers whose planned activities put them at higher risk of typhoid infection in areas where sanitation and food hygiene are likely to be poor.

**Paratyphoid**

There is currently no vaccine available against paratyphoid.

**Vaccine information**

Typhoid vaccine information is available at the electronic Medicines Compendium (eMC)

**Availability of typhoid vaccine**

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<thead>
<tr>
<th>Vaccine</th>
<th>Schedule</th>
<th>Length of protection</th>
<th>Age range</th>
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</thead>
<tbody>
<tr>
<td>Typhim Vi</td>
<td>Single dose</td>
<td>3 years</td>
<td>Adults &amp; children from 2 years of age</td>
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<td>Typherix</td>
<td>Single dose</td>
<td>3 years</td>
<td>Adults &amp; children from 2 years of age</td>
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<tr>
<td>Vivotif*</td>
<td>3 capsules</td>
<td>3 years</td>
<td>Adults and children from 6 years of age</td>
</tr>
<tr>
<td>ViATIM (combined hepatitis A and typhoid vaccine)</td>
<td>Single dose of combined vaccine</td>
<td>Typhoid 3 years</td>
<td>Adults from 16 years of age</td>
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<td></td>
<td></td>
<td>Hepatitis A 1 year</td>
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<td>Vaccine/Preventive Measure</td>
<td>Booster dose at 6-12 months after first dose</td>
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<td>Hepatyrix (combined hepatitis A and typhoid vaccine)</td>
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*Vivotif is a live vaccine*

Children between the ages of 12 months and two years should be immunised if the risk of typhoid fever is considered high. Immunisation is not recommended for children under one year of age. When children are too young to benefit fully from typhoid vaccination, scrupulous attention to personal, food and water hygiene measures should be exercised by the caregiver [6].

**Resources**


**REFERENCES**


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