

***Salmonella typhi*: Causes, symptoms, treatment, and prevention of typhoid fever.**

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Abstract

Enteric fever is a common but serious disease that affects mostly children and adolescents in the developing countries. *Salmonella enterica* serovar *typhi* remains responsible for most of the disease episodes; However, *S. Paratyphi A* has also been reported as an emerging infectious agent of concern. The control measures for the disease must encompass early diagnosis, surveillance and vaccine to protect against the disease. Sanitation and hygiene play a major role in reducing the burden of enteric diseases as well. The current status of diagnostics, the surveillance practices in the recent past and the vaccine development efforts have been taken into account for suggesting effective prevention and control measures. However, the challenges in all these aspects persist and cause hindrance in the implementation of the available tools. Hence, an integrative approach and a comprehensive policy framework are required to be in place for the prevention, control and elimination of typhoid fevers.

Keywords: Complications, Diagnostics, Enteric fever, Surveillance system, Typhoid fever, Vaccines.

Introduction

Salmonella typhi is a gram-negative bacterium that causes typhoid fever, a potentially fatal illness that affects millions of people worldwide every year. This bacterium is a member of the Enterobacteriaceae family, and it is spread through the ingestion of contaminated food or water. Typhoid fever is most prevalent in developing countries, where access to clean water and proper sanitation is limited. In this article, we will explore the characteristics of *Salmonella typhi*, the symptoms and treatment of typhoid fever, and the measures that can be taken to prevent the spread of this bacterium [1].

Characteristics of Salmonella typhi

Salmonella typhi is a rod-shaped bacterium that is approximately 2-3 micrometers in length and 0.5-1.0 micrometers in width. It is a facultative anaerobe, which means that it can grow in both the presence and absence of oxygen. This bacterium is motile, and it uses its flagella to move around. *Salmonella typhi* is also capable of forming biofilms, which are communities of bacteria that adhere to surfaces and can protect the bacteria from environmental stresses such as antibiotics.

Salmonella typhi is an intracellular pathogen, which means that it can invade and survive inside human cells. It does this by using its Type III secretion system (T3SS) to inject bacterial proteins into host cells, which then manipulate the host cell machinery to create a protected niche for the bacterium to grow and replicate. *Salmonella typhi* also produces a variety of virulence factors, including lipopolysaccharides, fimbriae,

and outer membrane proteins, which contribute to its ability to cause disease [2].

Symptoms of typhoid fever

Typhoid fever is a systemic illness that can affect multiple organs in the body. The symptoms of typhoid fever typically appear 1-3 weeks after infection, and they can include fever, headache, malaise, abdominal pain, diarrhea or constipation, and a characteristic rash known as rose spots. In severe cases, typhoid fever can lead to complications such as intestinal perforation, sepsis, and death [3].

Treatment of typhoid fever

Diagnosis of typhoid fever is typically based on a combination of clinical symptoms, blood culture results, and serological tests. Antibiotic therapy is the mainstay of treatment for typhoid fever, and the choice of antibiotic depends on the severity of the illness and the local resistance patterns of *Salmonella typhi*. In general, fluoroquinolones such as ciprofloxacin or third-generation cephalosporins such as ceftriaxone are recommended as first-line therapy. In addition to antibiotics, supportive care such as fluid and electrolyte replacement may be necessary to manage complications such as dehydration and electrolyte imbalances [4].

Prevention of typhoid fever

Prevention of typhoid fever is based on two main strategies: Vaccination and sanitation. Several vaccines are available for the prevention of typhoid fever, including the live attenuated

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Ty21a vaccine, the VI capsular polysaccharide vaccine, and the conjugate VI polysaccharide vaccine. These vaccines are recommended for travelers to areas where typhoid fever is endemic, as well as for individuals at high risk of exposure, such as healthcare workers and laboratory personnel. Sanitation measures are also critical for the prevention of typhoid fever. This includes the provision of clean drinking water, proper sewage disposal, and good personal hygiene practices such as handwashing [5].

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