Salmonellae

Salmonellae are motile gram-negative bacilli that infect or colonize humans, causing a number of clinical infections with different clinical features like gastroenteritis, enteric fever, bacteremia, and a chronic carrier state. Enteric fever is caused by *Salmonella typhi* and *Salmonella paratyphi*, while other strains of *Salmonella* are known as nontyphoidal strains.[1]

Non-typhoidal Salmonella (NTS) primarily leads to gastroenteritis, whereas Salmonella Typhi is responsible for systemic diseases due to its virulence factors. A notable virulence factor unique to S. Typhi is the Vi antigen, a polysaccharide capsule that inhibits phagocytosis and protects the bacterium from immune cell destruction. Additionally, S. Typhi produces the typhoid toxin, which is generated when the bacterium resides intracellularly and is subsequently secreted via vesicles into the extracellular environment. This process results in a decrease in circulating neutrophils, as well as symptoms such as lethargy and various neurological issues. Other important virulence factors include flagella, which enhance the bacterium's motility, and the type III secretion system, which facilitates the attachment and entry into human non-phagocytic cells. Utilizing these virulence factors, Salmonella penetrates the intestinal epithelium through M cells, subsequently reaching the lymphoid cells within Peyer patches. Following this, Salmonella invades macrophages and spreads throughout the reticuloendothelial system, ultimately leading to systemic infection.[2]

The definitive method for diagnosing Salmonella infection is through culture at the site of infection. Culture specimens may include stool, blood, urine, bile, cerebrospinal fluid, and bone marrow. Stool culture is particularly relevant for diagnosing Salmonella gastroenteritis and should be considered in cases of severe, persistent, or bloody diarrhea. This method is primarily utilized for non-typhoidal Salmonella (NTS) due to the high incidence of gastroenteritis associated with it. In contrast, for enteric fever, cultures from blood, bone marrow, and bile are more effective than stool cultures, as the presence of Salmonella in stool samples is typically low. The collection of cerebrospinal fluid via lumbar puncture is essential for diagnosing Salmonella meningitis.

Further identification of Salmonella can be achieved through growth on selective agar plates, such as the formation of black colonies on Hektoen Agar, which indicates hydrogen sulfide production. For patients with enteric fever, bone marrow cultures demonstrate greater sensitivity than blood cultures, as they contain higher concentrations of Salmonella bacteria. Additionally, newer diagnostic techniques, such as polymerase chain reaction (PCR) tests, are increasingly utilized in clinical settings, having gained prominence in research laboratories.[3,4]

References

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