Commentary

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Non-Typhoidal Salmonella Meningitis: A Commentary of a Case Report

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Commentary

Salmonella is a gram negative bacilli with two main types Salmonella typhi and Salmonella Non-Typhi (NTS). Each type has further subtypes and causes various diseases. Non-typhoidal salmonella are an important cause of self-limiting diarrheal illness but it may also present with focal septic infections, bacteraemia and rarely meningitis and osteomyelitis [1,2].

A meta-analysis reviewing the global incidence of non typhoidal salmonella infections including thirty five studies estimated approximately 535,000 cases in 2017 worldwide for Non typhoidal salmonella with incidence of 7.5 per 100,000 population [3]. Most cases occur in Sub Saharan Africa approximately 79% globally. Mean all age case fatality was 14.5% with higher cases of mortality in children younger than 5 years of age (13.5%), those aged more than 70 years of age (51.2%) and people with HIV infections (41.8%) [3].

Approximately 65% of NTS infections occur in children younger than 5 years of age. Risk factors increasing risk of invasive NTS are extremes of age, immunosuppression including malignancy, HIV, use of immune-suppressants, sickle cell disease and people recently affected with malaria [4-6]. NTS risk of fatality is also linked to the serotype by which it is caused. Most common amongst them are *salmonella enteridis* and *typhimurium*, other subtypes of NTS have a greater risk of invasive disease and complications that is Dublin, Newport, Infantis, Virchow etc. Furthermore, antibiotic resistant strains of *S. tymphimurium* also result in 2-3 fold increase in risk of bacteremia [7-11].

NTS is however notorious worldwide by causing uncomplicated enterocolitis (diarrhea) spreading *via* feco-oral contamination [12]. About 94 million cases are reported each year as cases of gastroenteritis with 155,000 deaths due to NTS. It causes diarrhea in healthy individuals by invading the intestinal epithelium and triggering inflammatory response with influx of neutrophils. It resides within the phagocytes intracellularly in lamina propria. Numerous virulence genes have been identified as Salmonella Pathogenicity Islands (SPIs) [13]. This allows bacterial engulfment by building a channel across between bacterial and epithelial cell membrane; this ability of intracellular niche has different outcomes that can lead to bacteraemia (2%-47%), that can lead to extra-intestinal manifestations such as meningitis, osteomyelitis and pneumonia particularly in immune compromised children [14,15].

Salmonella meningitis is a rare complication of invasive NTS but there are few cases in children less than five years of age reported particularly in immune compromised children. In high HIV prevalent areas, it can also present in adult population. A study in Africa has showed the bimodal age distribution of NTS with age group between 6-36 months and adults in 3rd and 4th decade of their lives being affected the most [16]. This usually presents with fever, seizures, hydrocephalus, or signs of brain abscess and many children may have developmental delay [1]. This condition is difficult to manage and mortality rate associated with NTS meningitis is reported to be as high as 50%-70% [17]. The management of NTS meningitis is a slightly different from conventional gram negative meningitis treatment due to the nature of organism being intracellular and therefore having relapses [18]. NTS meningitis should be treated for at least 4 weeks [18]. For the optimal intracellular penetration and reducing the risk of relapse, combination therapy should be considered [19]. Different studies have reported that cephalosporin and fluoroquinolone should be considered in combination therapy [18,19]. Azithromycin has also been suggested by multiple recent studies for its intracellular action. Third generation cephalosporins have been recommended for a period of at least 4-6 weeks by American Academy of Paediatrics [1,19].

In the case report, they present a rare case of NTS meningitis in aimmune competent 5 year old child. He presented with low grade fever, cough and irritability. Blood cultures and cerebrospinal fluid studies were done because of high suspicion of meningitis and cultures showed pan-sensitive Salmonella typhimurium which was successfully treated with intravenous ceftriaxone for 6 weeks and two weeks of oral azithromycin. He was followed up to 1 month post discharge with no signs of developmental delay or any other complications.

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