

## CASE REPORT

### *SALMONELLA*: A RARE CAUSE OF MENINGITIS IN AN ADULT

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*Salmonella* is rarely the cause of meningitis in the adult and is an infrequent clinical consideration. *Salmonella* meningitis is predominantly a disease of infants. We report here a case of *Salmonella* meningitis in an adult patient with systemic lupus erythematosus (SLE). *Salmonella* meningitis may occur in the adult and should be considered in the differential diagnosis of purulent meningitis. Rapid identification of the causative organism and appropriate therapy are of paramount importance.

A 56-year-old Thai woman was diagnosed as having SLE 8 years earlier. Ten days prior to admission she presented with purpura while receiving prednisolone 10 mg/day. The platelet count was 50,000/mm<sup>3</sup> and she was treated with prednisolone 60 mg/day. She was admitted to hospital because of fever, headache and vomiting which had developed during the preceding 24 hours. On physical examination the patient was confused, the temperature was 39.2°C, the pulse was 100/minute, blood pressure was 160/100 mm Hg, and signs of meningeal irritation were present. Laboratory examination showed a WBC count of 41,000/mm<sup>3</sup> with 87% neutrophils. Lumbar puncture produced cloudy fluid containing 9,200 white cells/mm<sup>3</sup>, of which 98% were neutrophils. The protein content of this fluid was 463 mg/dl and the glucose was 24 mg/dl (serum glucose was 157 mg/dl). Gram stain was negative for bacteria, and a specimen was sent for culture. Initially, treatment consisted of intravenous penicillin (24 × 10<sup>6</sup> units/day) and intravenous ceftriaxone (2 g/day) after which the patient showed rapid clinical improvement. CSF culture yielded no growth. Blood culture grew *Salmonella choleraesuis*. Penicillin was withdrawn from the regimen. Antibiotic therapy was continued with intravenous ceftriaxone for two weeks. She responded well to treatment and was discharged on ciprofloxacin (400 mg twice daily) for another two weeks. She returned to normal activities and remained well at the time of follow-up visits.

Meningitis is an uncommon complication of *Salmonella* infection (Cohen *et al*, 1987). Only 74 of 9,518 (0.8%) isolates of *Salmonella* reviewed by Saphra and Winter (1957) were from CSF. Geiseler *et al* (1980) noted only two cases of *Salmonella* meningitis among 1,316 patients with purulent meningitis. Several extensive reviews of bacterial meningitis reported no cases of *Salmonella* infection (Swartz and Dodge, 1965; Jonsson and Alvin, 1971; Durand *et al*, 1993). *Salmonella* is rarely the cause of meningitis in the adult and is an infrequent clinical consideration (Kauffman and St Hilaire, 1979; Cohen *et al*, 1987). All reported cases of *Salmonella* meningitis have occurred in children, especially young infants (Black *et al*, 1960; Cohen *et al*, 1987). Cherubin *et al* (1981) found only 6 cases of *Salmonella* meningitis in adult among 156 cases of gram negative meningitis over a period of eight years. In a review of 144 cases of *Salmonella* meningitis, Cohen *et al* (1987) found only 7 cases in adult. In another review of *Salmonella* meningitis in adult, Kauffman and St Hilaire (1979) can identify only 14 cases reported in the English-language literature since 1900. In this review, only one case was due to *S. choleraesuis*.

Patients with impaired cellular and humoral immune mechanisms are at increased risk for development of salmonellosis. Impairment of host defenses caused by malnutrition, malignancy, infection with human immunodeficiency virus or therapeutic measures such as corticosteroid or immunosuppressive therapy also predispose to infection and disease (Han *et al*, 1967; Sinkovics and Smith, 1969; Wolfe *et al*, 1971; Sperber and Schlepner, 1987). The concurrence of *Salmonella* infection and SLE has been noted in several case reports. (Guthaner and Stathers, 1969; Lovy *et al*, 1981; Abramson *et al*, 1985). Abramson *et al* (1985) reviewed all cases of *Salmonella* infection documented in adults at Bellevue Hospital during the years 1975-1982. The most frequent underlying disease found among bacteremic patients in this

study was SLE. All published cases of *Salmonella* infection in SLE have been in patients who developed the infection after the diagnosis of SLE and in most cases, they were taking immunosuppressive therapy (Guthaner and Stathers, 1969; Lovy *et al*, 1981; Abramson *et al*, 1985). Although *Salmonella* infection is not uncommon in SLE, The occurrence of meningitis is rare.

*S. choleraesuis* is a highly invasive serotype that usually causes a septicemia syndrome and is most commonly isolated from blood but not from stool. *S. choleraesuis* is reported to be the most virulent *Salmonella* serotype with the highest proportion of fatal infections (Saphra and Wassermann, 1954; Allison *et al*, 1969; Hook, 1990). However, *S. choleraesuis* is a rare cause of purulent meningitis in adult. In a study by Allison *et al* (1969) at the Medical College of Virginia, nineteen cases of salmonellosis due to *S. choleraesuis* were reported from 1955 to 1968. In this study, only one case of meningitis due to *S. choleraesuis* occurred in an infant.

Although the overall incidence of *Salmonella* meningitis is low, mortality is exceedingly high. The illness is compounded by difficulty in sterilizing the CSF, complications (*eg* cerebral abscesses, subdural empyema, and ventriculitis), hydrocephalus, and frequent relapses (Bryan *et al*, 1986; Cohen *et al*, 1987). The treatment of *Salmonella* meningitis has not been well delineated. No prospective comparative trials have ever been performed, but ampicillin and chloramphenicol are generally regarded as the drugs of choice for this disease. When nontyphoidal salmonellae are responsible, the choice of antibiotics can be problematic because of multiple-drug resistance among pathogenic strains (Bryan *et al*, 1986). The clinical experience accumulated thus far indicates that two new classes of antimicrobial agents, the third-generation cephalosporins and the quinolones, offer significant potential for the treatment of specific problems in salmonellosis: bacteremia and enteric fever, meningitis, osteomyelitis, and the chronic carrier state (Bryan *et al*, 1986; Soe and Overturf, 1987). In this case, the patient responded well to intravenous ceftriaxone followed by oral ciprofloxacin. The safety and low toxicity of the cephalosporins and the convenience of the oral quinolones are attractive features.

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