NEONATAL MENINGITIS DUE TO SALMONELLA TYPHIMURIUM*

Report of a Case

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Salmonella meningitis is a rare entity and has been reported to be more common in the newborns and small infants as compared to the older age groups (Watson 1958). The first case reported by Ghon (1907) was due to *Salmonella paratyphi* B infection. Thereafter, about 176 cases have been reported in which the organisms involved were mostly *S. paratyphi*, *S. enteritidis*, *S. havana* and *S. panama* (Henderson 1948, Watson 1958). Other strains known to produce meningitis include cholerae-suis, newport, london, oranienburg, derby anatam, bareilly, new brunswick, johannesburg, heidelberg, dublin, manhattan, bredeney, blegdam, montevides, bovis-morbiicans, lomalinda and east bourne. Any salmonella species, many of which are primarily pathogenic to animals, may cause meningitis in the infant. So far, only 14 cases of meningitis due to *S. typhimurium* have been reported (Arora and Kumar 1964).

**Report of a Case**

B.B., a 24-day-old male child, was born at full term to a primiparous mother. The mother had remained well throughout the pregnancy. The labour was prolonged and the membranes ruptured 24 hours before delivery. The baby was healthy for the first 11 days after which he developed a moderate degree of fever and refusal to take feeds. With some medication, the temperature had come down to normal but three days later the baby started getting generalised tonic and clonic convulsions. On examination, he looked pale, weighed 3 Kg., was afebrile, conscious and had a good cry. The head circumference was 14”, the anterior fontanelle was tense and bulging. Posterior fontanelle was patent and the sutures were gaping. There was no neck rigidity and Kernig’s sign was negative. The neonatal reflexes were sluggishly elicitable. A transillumination test of the head did not suggest subdural haematoma. Other systems were normal clinically.

**Investigations.** Hemoglobin was 12.5 G.%, leucocytes 10,700/c.mm., polymorphs 33%, lymphocytes 63%.
and monocytes 4%. Urine and stools were normal. Blood culture showed growth of *Salmonella typhimurium*. C.S.F. pressure was high. It was a turbid fluid with innumerable cells, predominantly polymorphs. The proteins were 1110 mg%, sugar 16 mg %, chloride 260 mg %. C.S.F. culture showed growth of *Salmonella typhimurium*, sensitive to streptomycin, chloramphenicol and kanamycin. X-rays of the chest and skull were normal. The child was put on anticonvulsants and chloramphenicol injections 50-75 mg. 8 hourly. As the child did not show any improvement, kanamycin was added after 3 days in the dose of 50 mg 12 hourly. Lumbar puncture was repeated several times to relieve the raised intracranial tension. C.S.F. examination did not show any change in the cytological and biochemical findings. Chloramphenicol was given intrathecally also. There was no improvement in his condition. After 15 days of hospitalisation, the parents took away the child against medical advice. His condition at that time was very critical.

Comment

Meningitis is not a common complication of Salmonella infection. Out of 151 cases reviewed by Levinson et al. in 1950, 13 were due to *Salmonella typhimurium*. 80% of these cases were below the age of one year showing that this complication is more common in the newborns and small infants. However, infection by Salmonella where the clinical manifestations are confined to areas other than the meninges, is not more common in children than adults. Cooke and Bell (1922) postulated that the ability of Salmonella organisms to gain entry into the body depends upon permeability of the intestinal mucosa and host resistance to the bacterial infection. The intestinal mucosa of the newborn possibly has a high permeability for colon bacilli and a low resistance to bacterial infection including poor antibody response. Even slight trauma to the meninges as during the birth process makes the newborn more prone to such a complication. This does not explain small epidemics of Salmonella infections in the nursery, where inherent characteristics of the organism must be significant factors.

The source of infection may be contaminated milk (breast or artificial), water and food handled and prepared by carriers. In some cases, the mothers are the carriers of this organism in the stools or breast milk (Jundell 1938, Hollis and Barron 1944). In our patient, the stool culture of the mother done twice was normal. Breast milk was not tested. No other family member was screened, so we do not know the source of infection in this baby. In a majority of the cases, there is preceding gastroenteritis; our patient did not have this. It may follow other infections of the central nervous system such as meningococcal meningitis, syphilis, or of other systems, e.g. pertussis, otitis media, malaria, pyelitis, etc.

The signs and symptoms of Salmonella meningitis are not different from those in other types of pyogenic meningitis in the newborn. Prognosis is very poor. Mortality rate is about 90% in infants below one year. No case of meningitis due