

## SALMONELLA MENINGITIS IN AN INFANT: A CASE REPORT

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## ABSTRACT

**Introduction:** Salmonella infections are a public health problem, generally the bacterial agents "salmonella" are responsible for digestive infections, meningeal localization remains very rare. This localization is associated with a high mortality rate of more than 50%, relapses and abscesses of the brain are not uncommon. Reporting to us a case of salmonella meningitis, focusing on his diagnostic and therapeutic management. **Materials and Methods:** This is a 03-month-old infant, with no pathological history, admitted for management of a suspected recurrent meningitis, clinical examination objected a high fever, hypotonic infant with a bulging anterior fontanel. The cerebrospinal fluid analysis was compatible with bacterial meningitis with direct examination of BGN, the culture identified salmonella, and the patient was initially put on ceftriaxone at a meningeal dose. The evolution was marked by the persistence of fever with the onset of a convulsive state complicated by left ptosis, ciprofloxacin was added at a rate of 20 mg / kg / day for 06 weeks with a very good result. **Discussion:** Salmonella meningitis is rare, this localization particularly concerns newborns and infants whose contamination is often inter-familial. Early and adequate therapeutic management determines the patient's vital and functional prognosis. **Conclusion:** Salmonella meningitis is an infrequent but serious pathology, regardless of their location, especially gastroenteritis, must be treated early and properly to avoid complications such as meningitis.

**KEYWORDS:** Recurrent meningitis, Salmonella, Ciprofloxacin.

## INTRODUCTION

Salmonella infections are mainly responsible for the most common foodborne illnesses and are a real public health problem. This disease is caused by the bacterium 'salmonella', until 2004, 2501 different serotypes have been identified which are generally responsible for gastroenteritis which does not usually require special treatment.<sup>[1]</sup>

On the other hand, meningeal localization has been known for a long time but it remains very rare. This localization is associated with a high mortality rate of more than 50%, relapses and brain abscesses are not exceptional.

We report a case of recurrent salmonella meningitis treated in the pneumology and infectiology department of the Rabat children's hospital.

## MATERIALS AND METHODS

This is a 03-month-old infant with no notable pathological history, he was admitted 20 days previously for the management of lymphocytic meningitis, the diagnosis was made on the basis of a lumbar puncture

that revealed 920 elements/mm<sup>3</sup> white blood cells with lymphocyte predominance (70%), direct examination was negative with a sterile culture, normal biochemistry, and a negative infectious balance.

Based on the clinical symptoms and the age of the patient, he was treated with ceftriaxone meningitis for 10 days with good clinical progression.

Two weeks following discharge, the child again presented with fever, refusal of feed, irritability and convulsions. The clinical examination found a hypotonic infant, with a weak sucking reflex, a bulging anterior fontanel, without purpuric spots, the rest of the clinical examination was unremarkable. The possibility of recurrent meningitis was considered and repeat examination CSF examination was done which showed 250 cells with a mixed formula: 59% PNN and 41% lymphocytes.

The Gram stain revealed a Gram-negative bacillus, the biochemical analysis of the CSF showed a hyperproteinorachy at 2.09g/l and CSF/blood glucose ratio: 0.01. And the culture objectified the presence of a Salmonella typhimurium sensitive to ceftriaxone,



As the clinical symptoms worsened, ciprofloxacin at a rate of 20mg/kg/24h in IV was added with spectacular clinical improvement (disappearance of fever, meningeal syndrome and ptosis). The duration of treatment was 06 weeks. The infant is followed in regular consultation, Currently he is 03 years old, with good psychomotor and staturo-ponderal development and without neurological sequelae.

## DISCUSSION

Salmonella meningitis is rare, outside the neonatal period,<sup>[2]</sup> it represents 1 to 10% of bacterial meningitis in Africa and Asia,<sup>[3]</sup> whereas in France its prevalence does not exceed 0.2%, the most frequent stereotype being *S. typhi murium*. This localization particularly concerns newborns and infants whose contamination is often inter-familial,<sup>[4]</sup> since the frequency of diarrhoea in the family environment of infants with salmonella infection has already been described, hence the interest of searching for salmonella in the family in search of a source of contamination, in our patient a coproculture was made in the family returned negative. Other routes of contamination have been described recently, in 2005 a case of salmonella meningitis was reported in which the contamination was through infected breast milk.<sup>[5]</sup> Katherine Blackshaw has shown in her recent publications on bacterial and viral diseases transmitted through breast milk, donor milk and powdered infant formula that intrinsic and extrinsic microbial contamination by Cronobacter and Salmonella remain identifiable causes of infant morbidity and mortality.<sup>[6]</sup> For our observation, no Salmonella testing was performed in breast milk since the infant was exclusively breastfed artificially. Another case was described in 2013 and the route of contamination was a domestic turtle.<sup>[7]</sup> The clinical and biological signs are similar to those of other bacterial meningitis, digestive signs.

Including diarrhea may precede or be associated with the clinical symptoms. In recent literature reviews, mortality rates were high and may exceed 50%.<sup>[8-13]</sup> As well as neurological complications such as subdural effusion, empyema, abscess, ventriculitis, cerebritis, hydrocephalus, and venous thrombosis, however, the relapse rate varied between 10 and 20%.<sup>[14]</sup> The role of neuroimaging in salmonella meningitis is not clear, but it is recommended for every patient even if the clinical course is satisfactory because of the risk of relapse.<sup>[14]</sup> Our patient presented as a complication a convulsive state with ptosis secondary to ischemic cerebral lesions, a recent study in an adult population confirmed the increased risk of developing ischemic stroke in patients with non-typhoid salmonellosis infection.<sup>[15]</sup> It should be noted that the progression of invasive non-typhoid salmonella infections is less good than expected, despite well-conducted antibiotic therapy, due to multiple risk factors that may increase infectious complications, namely HIV infection, parasitosis and sickle cell anemia<sup>[16]</sup> In addition, delayed initiation of targeted antibiotic therapy and inadequate duration may play an

important role in prognosis. Early and adequate therapeutic management determines the patient's vital and functional prognosis. In 2003, Owasu-Ofori et al. showed that conventional antibiotic therapy (ampicillin, cloramphenicol and cotrimoxazole) had not shown the expected efficacy with a relapse rate of 11.8% and a mortality rate of 44.7%.<sup>[17]</sup> The American Academy of Pediatrics has recommended treating these meningitis with third-generation cephalosporins for a minimum of 3 to 4 weeks.<sup>[14]</sup> The results were not as satisfactory as hoped, but this poor prognosis of salmonella meningitis was transformed after the use of another class of antibiotic therapy: ciprofloxacin.

Fluoroquinolones are characterised by high bioavailability (close to 100%), oral availability, excellent penetration into many tissues (including CSF and brain) and good intracellular diffusion.<sup>[14]</sup> The use of this molecule was initially reserved for the treatment of brain abscesses and relapses, before being indicated as first-line therapy.<sup>[18]</sup> In our case, an initial antibiotic therapy based on 3rd generation cephalosporin was started, as the germ was sensitive, but in view of the lack of improvement and the onset of complications, ciprofloxacin was rapidly added, which allowed a rapid, complete cure without sequelae. Currently, the latest studies recommend starting treatment with C3G and ciprofloxacin as a first-line treatment; the recommended dosage is 20 mg/kg/24h in two IV doses.<sup>[19]</sup> For the duration of treatment, no consensus has been validated so far, Price et al have proposed the combination of the 2 antibiotics for a minimum duration of 3 weeks from the date of CSF sterilization with an extension of the duration in case of brain abscess.<sup>[20]</sup> In our case, the duration of treatment was 06 weeks given the neurological complications he presented.

## CONCLUSION

All salmonella infections, regardless of their location, especially gastroenteritis, must be treated early and properly to avoid complications such as meningitis. For our patient, dual antibiotic therapy from day one would probably have avoided neurological complications.

What is already known on this topic: include a maximum of 03 bullet points on what is already known on this topic.

## Competing interests

The authors declare no competing interest.

## Authors' contributions

Study design: I. Amassas, S.Benchekroun F.Benbrahim, C.MAHRAOUI and N.El Hafidi Data collection: Inssaf Amassas Data analysis: I. Amassas and N. El Hafidi Manuscript writing: I. Amassas and N.El Hafidi

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