

## Salmonella Typhimurium Meningitis: A Diagnostic Challenge

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### ABSTRACT

We report a case of atypical meningitis which turned out to be culture positive for Salmonella typhimurium. Though a rare entity, radiological findings can aid in the early diagnosis of salmonella meningitis thereby enabling prompt treatment for a rapidly deteriorating fatal illness.

**Key Words:** Salmonella Typhimurium, Atypical Meningitis, Imaging Findings.

### Article History:

Received: 23-01-2017, Revised: 08-02-2017, Accepted: 24-02-2017

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### Access this article online

Website:

[www.ijmrp.com](http://www.ijmrp.com)

DOI:

10.21276/ijmrp.2017.3.2.059

Quick Response code



### INTRODUCTION

An 8 month old previously asymptomatic child presented with high grade fever, poor sucking and lethargy of 2 weeks duration. Also presented with an episode of abnormal posturing with upward rolling of eyes lasting for 10 minutes at the time of hospital admission. On physical examination, the child was irritable with a temperature of 103 degree F and tense, bulging fontanelles.

On account of the neurological symptoms, patient was subjected to plain and contrast sections of CT brain. CT (Figure 1,2) revealed multiple small ill-defined lesions in head and body of bilateral caudate nuclei and left lentiform nucleus, which were showing evidence of peripheral rim enhancement on post contrast images. Based on the clinical history and imaging findings, a diagnosis of pyogenic cerebral abscesses was made.

During the course of illness, the child developed paucity of movements of left upper and lower limbs and the examination revealed grade 3 power in left upper and lower limbs. Lumbar puncture was done, which showed turbid cerebrospinal fluid (CSF) with a total white cell count of 80cells/cu mm and neutrophilic predominance. Protein was 123mg/dl. Gram staining and AFB did not show any organism. CSF and blood culture yielded growth of Salmonella typhimurium.

On the 10<sup>th</sup> day of hospital admission, the child was referred for MR imaging of brain which showed multiple small ring enhancing lesions of average size 5-6mm in bilateral basal ganglia, few of which revealed central diffusion restriction. There was also evidence of subdural effusion (which was not present in CT done 9 days back) involving left fronto temporo parietal convexity and ependymal enhancement along the lateral margin of right lateral ventricle.

Meanwhile her repeat CSF culture also yielded the same organism. Patient was started on ceftriaxone for 12 days, followed by Ampicillin and Chloramphenicol for 21 days. The child improved dramatically. She was almost in near normal state of health with completion of antibiotics.

Repeat CSF and blood cultures turned out to be negative.

### DISCUSSION

Salmonella meningitis accounts for a small proportion of bacterial meningitis<sup>1</sup>, with very few cases being reported in Indian literature till date.<sup>2</sup> Among infants younger than 1 year of age with salmonellosis, the incidence is between 1.8 percent and 4 percent. Salmonella are motile, non-encapsulated Gram negative bacilli of the Enterobacteriaceae family. Among them Salmonella typhimurium belongs to

sero group B.<sup>1</sup> Salmonella infection in humans can cause enteric as well as non-enteric focal infections. The infection is said to have feco oral route of transmission<sup>3</sup>, then the organism invades the blood stream, later on causing suppurative foci anywhere in the body, most commonly bone and meninges.<sup>1</sup> Salmonella meningitis is most often reported in infants, particularly during the second half of infancy, as a complication of salmonella sepsis.

Radiological findings, though not well established, include multiple micro abscesses, acute hydrocephalus, ventriculitis and subdural effusions/empyema.<sup>4</sup> Long term neurological sequelae are reported in most of the cases.<sup>5</sup> Medical management with third generation cephalosporins and fluoroquinolones is said to be effective.<sup>6</sup> Rarely surgical intervention may be needed to evacuate subdural effusions/ empyema.<sup>6</sup>

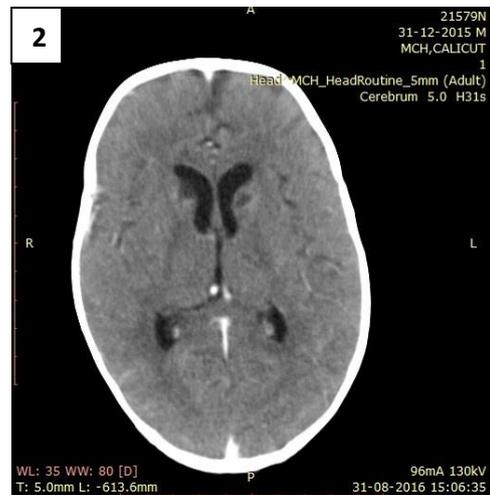
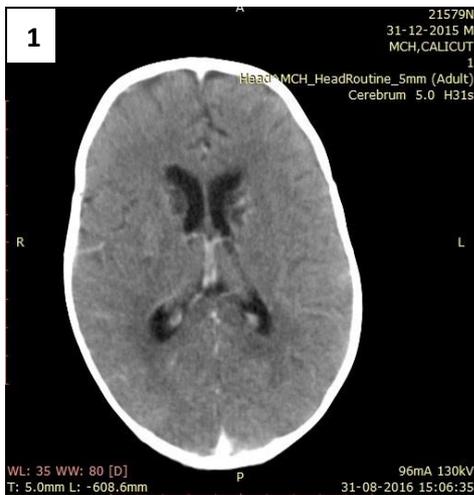


Figure 1 & 2: CECT sections showing peripherally enhancing hypodense lesions in bilateral caudate nuclei with a central non enhancing hypodense area.

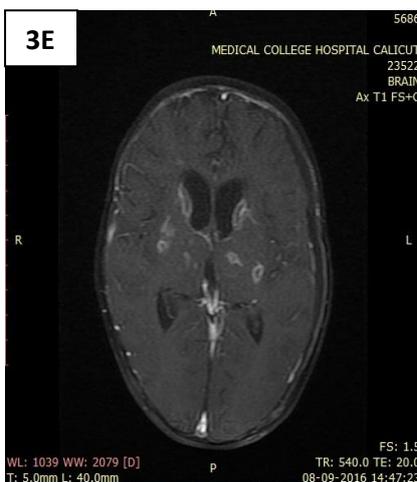
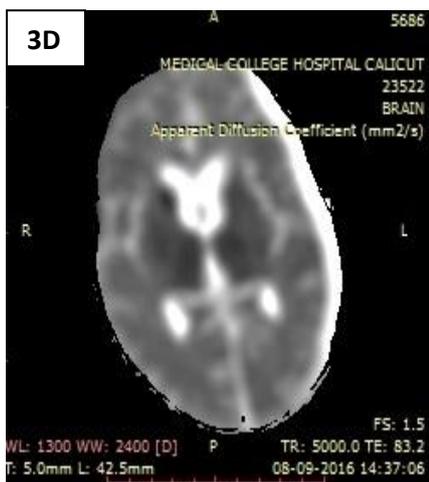
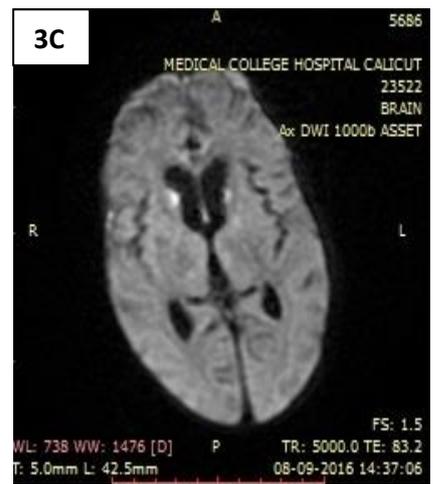
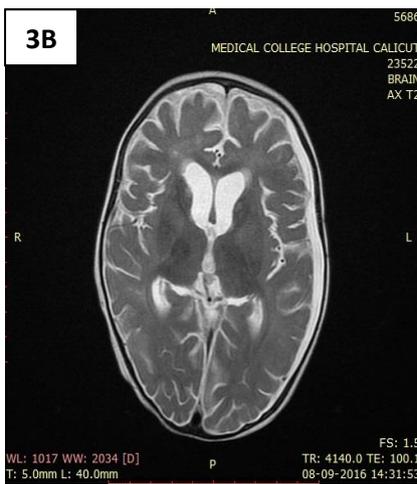
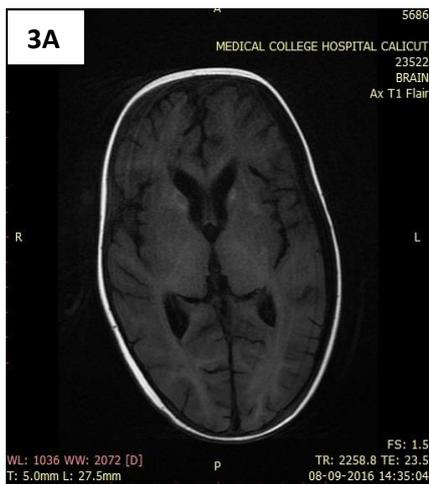


Figure 3 A-E: A & B: Axial T1 and T2 weighted images showing small altered signal intensity lesions, appearing hypointense with a hyperintense rim in T1, hyperintense with a hypointense rim in T2WI. C&D: Central diffusion restriction with corresponding low signal in ADC. E: Peripheral ring enhancement of the lesions and left subdural effusion.

## CONCLUSION

Salmonella meningitis remains a threat to infants<sup>6</sup>, however prompt diagnosis and targeted treatment reduces the greater morbidity and mortality significantly. So, knowledge of radiological manifestations is important for the same. Therefore, Salmonella typhi/ typhimurium should be included in the differential diagnosis of gram negative bacillary meningitis.<sup>3</sup>

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**Source of Support:** Nil.

**Conflict of Interest:** None Declared.

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**Cite this article as:** V.R Rajendran, Saanida MP, C. Krithika Mahalakshmi, Sherinas Rehiman, Ipsit Menon. Salmonella Typhimurium Meningitis: A Diagnostic Challenge. *Int J Med Res Prof*. 2017; 3(2):279-81. DOI:10.21276/ijmrp.2017.3.2.059