

## ISOLATION OF *SALMONELLA TYPHI* FROM A CASE OF MENINGITIS

BADRUR RAHMAN KHAN DIP BACT, D PATH\* and MD ZAHIR KHAN MBBS\*\*

### Summary

This is a case report of *Salmonella typhi* meningitis in a 16 year old boy. The organism was isolated from the CSF and stool. The patient recovered with no sequelae after treatment with chloramphenicol.

Meningitis is a rare, sometimes fatal and sometimes sole, manifestation of *Salmonella typhi* infection.<sup>1,2,3,4</sup> However, the relative infrequency of reports in the medical literature may reflect failure of recognition of meningeal involvement in this infection.

We report here a case of *Salmonella typhi* meningitis which occurred during a recent outbreak of typhoid fever in a small village near Tangkak.

### CLINICAL HISTORY

KD, a 16 year old Malay boy, was admitted on 24.6.77 to the Tangkak District Hospital, with a history of high fever not accompanied by chills or rigors, for two days, during which he had become progressively drowsy and confused. There was no significant past or family history.

On examination, he was dehydrated and delirious. His temperature was 102.4°F, pulse rate 120 per minute, respiratory rate 24 per minute, and his blood pressure was 100/70 mmHg. There were no rose spots on the skin, and there was no evidence of lymphadenopathy.

The abdomen was soft and there was no tenderness. The liver was enlarged, 3 cm below the costal margin in the mid-clavicular line, and was soft, smooth, and not tender. The spleen was not palpable. Heart sounds were normal. Both lungs were clear clinically. There was marked neck rigidity and a positive Kernig's sign. There was no papilloedema, and no evidence of otitis media. A provisional diagnosis of meningitis was made, and a lumbar puncture was performed.

### INVESTIGATIONS

Haemoglobin 7.2 gm/dl., total white blood

count  $8 \times 10^9/L$  (8000/mm<sup>3</sup>), with normal differential proportions. Blood film showed no malarial parasites. Urine examination showed some protein (not quantitated), and 2-3 RBC per high power field were seen on microscopy; there was no glucose. The following measurements were made: blood urea 13.5 mmol/l (81 mg/100ml); serum electrolytes: sodium 127 mmol/l, potassium 4.6 mmol/l, and chloride 91 mmol/l.

Cerebrospinal fluid (CSF) was obtained by lumbar puncture on the day of admission and examination showed the fluid to be clear, there were no cells, protein was 78 mg/dl and sugar 36 mg/dl. Culture for bacteria yielded a growth of non-lactose fermenting organisms confirmed by biochemical and serological tests to be *Salmonella typhi*. This organism was also confirmed by the Institute for Medical Research (IMR) Kuala Lumpur, as *Salmonella typhi*. CSF obtained 2 days later was clear, no cells were seen, protein was 45 mg/dl, and sugar 40 mg/dl. No organisms were grown this time.

Blood cultures performed on 25.6.77 and 6.7.77 were negative. Stool and rectal swabs, obtained on 29.6.77, yielded *Salmonella typhi* on culture. This *S. typhi* isolated from the CSF, rectal swab and stool was phage-typed by the I.M.R. Kuala Lumpur and was reported as degraded A. Strains of the same phage type were isolated from other patients during this outbreak. Antibiotic sensitivity tests were carried out and the organisms were found to be highly sensitive to chloramphenicol.

Results of Widal tests, performed on sera collected on 25.6.77 and on two later dates, are shown in the table. Antibody titres to flagellar (H) antigen and somatic (O) antigen of only *Salmonella typhi* are reported.

\* Pathologist, District Hospital, Muar, Johore, Malaysia (Address for reprint requests).

\*\* Medical Officer, District Hospital, Tangkak, Johore, Malaysia.

TABLE Antibody Titres to Flagellar (H) and Somatic (O) Antigens of *Salmonella Typhi*.

25.6.77	(2nd day in Hospital)	(H) 1/2000	(O) 1/1000
6.7.77	(13th day in Hospital)	(H) 1/2000	(O) 1/2000
12.7.77	(19th day in Hospital)	(H) 1/2000	(O) 1/2000

CLINICAL COURSE AND TREATMENT

This is summarized in the figure. This patient was treated with intravenous fluids, ampicillin (500 mg, six hourly) and hydrocortisone (100 mg six hourly) on the first day in hospital. The temperature fell to normal on the same day, but two days later (26.6.77) he had a transient spike of 99.5°F. Since C.S.F. culture yielded a growth of *S. typhi*, sensitive to chloramphenicol, the ampicillin was changed to intra-

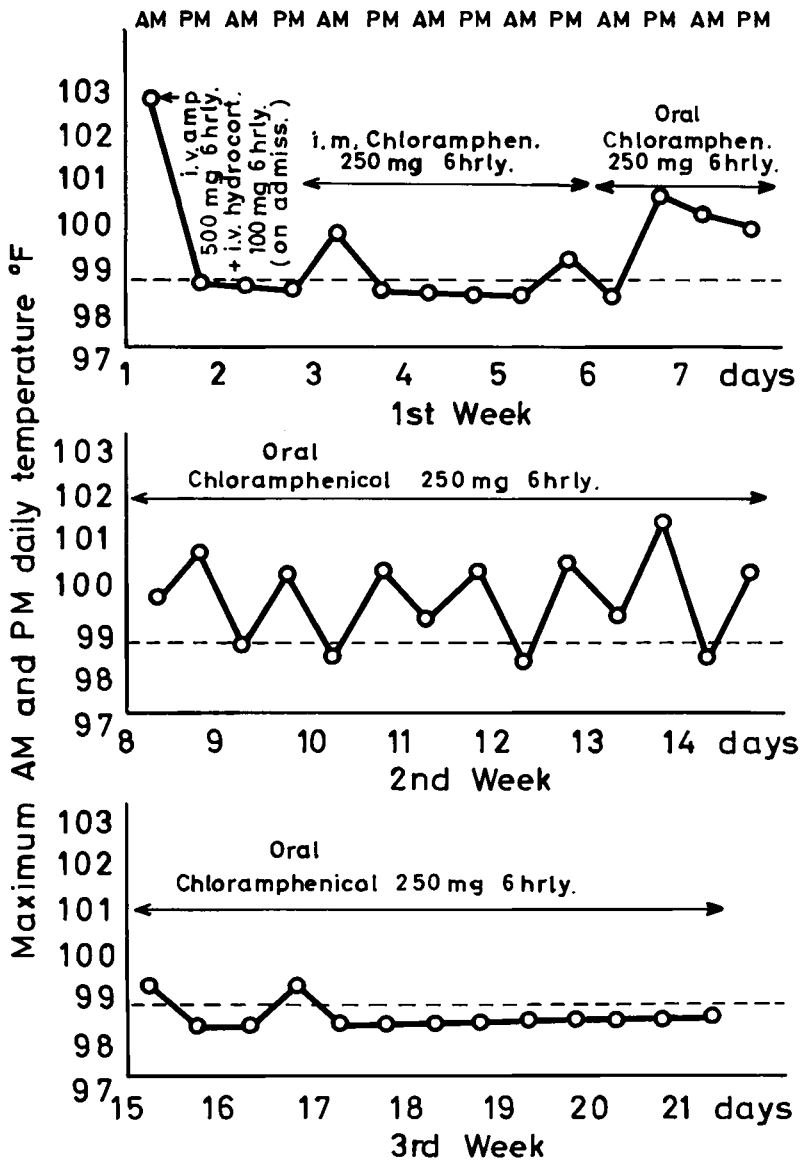


FIGURE. Treatment and Course

muscular chloramphenicol. This was given in a dose of 250 mg six hourly on the third day (26.6.77) for two days, followed later by oral chloramphenicol six hourly from the sixth day (29.6.77). His temperature remained normal till the fifth day (28.6.77), when he developed an intermittent fever, which lasted until the fifteenth day (8.7.77). During this time, the patient improved clinically, with disappearance of meningeal signs. Lumbar puncture was repeated on the 13th day of admission (6.7.77), while still on chloramphenicol, and this time culture of the C.S.F. was negative.

Delirium ceased on the day following admission. No neck rigidity was noted on the seventh day onwards and he became afebrile without recurrence, on the sixteenth day.

The dose of chloramphenicol was reduced to 250 mg eight hourly on the twentieth day (13.7.77) and was discontinued after a week.

The patient was fit for discharge, with no symptoms, on the 24th day in hospital (17.7.77) and at that time his stool culture was negative, blood urea was normal and no abnormal urinary findings were present.

#### DISCUSSION

This sixteen year old previously well boy gave a history of fever only two days prior to admission. Blood cultures were negative, but the Widal test showed significantly raised titres, and the stool culture was positive on 29.6.77. While it is conceivable that the negative blood cultures could have resulted from unsuitable culture media, or antibiotic therapy, these findings suggest that he had the infection much earlier than was reported. The Widal test done on the 19th day (12.7.77) showed no further rise in the titres (suggesting arrest of the infective process) and although the titres remained high, this is well recognized and does not imply continuing infection.

The clinical presentation was that of meningitis but the physical signs were unusual. Thus he did not have a "stepladder" type of

temperature pattern. Instead, the temperature fell after the hydrocortisone, only to rise again a couple of days later. There was no bradycardia, and there was clinical hepatomegaly rather than splenomegaly. Although no cells were seen on CSF examination, *S. typhi* was cultured by two separate laboratories.

Dehydration was perhaps the cause for his high blood urea. The response to chloramphenicol in this single patient was dramatic, despite rather lower doses than those recommended in previous reports.<sup>3,5,6</sup>

#### ACKNOWLEDGEMENT

We are grateful to the laboratory staff, in particular Mr. Ho Hon Choy and Mr. Chan Kin Mun; Dr. Chan Fook Cheong, Physician, of Muar Hospital; and Miss Raghdzah bt. Ali for typing the manuscript. Thanks are also due to Dr. M. Jegathesan, Head of the Bacteriology Division, the Institute of Medical Research, Kuala Lumpur and Dr. Raja Ahmad Noordin, Director General of Health, Malaysia for permission to publish this report.

#### REFERENCES

- 1 Gooi HC and Sia TH: *Salmonella typhi* meningitis, a case report and family investigations. *Med J Malaysia*, 30: 219–222, 1975.
- 2 Gordon Smith SE and Marsden ATH: Fatal meningitis in typhoid fever treated with chloramphenicol. *Lancet* 2: 430–431, 1951.
- 3 Huckstep RL: Typhoid fever and other *Salmonella*, infections, 1st ed., Livingstone, Edinburgh, 1962, pp. 181, 182, 187.
- 4 Chanmugam D, Machado V and Mihindukulasuriya JCL: Primary *Salmonella typhi* meningitis in an adult, *Br Med J*, 1: 152, 1978.
- 5 Rabinowitz SG and MacLeod NR: *Salmonella* meningitis. A report of 3 cases and review of the literature. *Am J Dis Child* 123: 259–262, 1972.
- 6 Wagenhals CO and Tanneberg J: *JAMA*, 173: 355–359, 1960.