Streptokinase clot culture compared with whole blood culture for isolation of *Salmonella typhi* and *S. paratyphi A* from patients with enteric fever


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ADMINISTRATIVE INFORMATION

C.G. HAYES, Ph.D.
Scientific Director

F.P. PALEODLOGO
Officer in Charge
Jakarta Detachment

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Abstract

The sensitivities of whole blood and clot cultures were compared in 155 patients with typhoid or paratyphoid fever. Salmonella typhi or S. paratyphi A were isolated from 98.7% of 5 ml:10 blood/broth ratio blood cultures and 94.8% of 5 ml streptokinase clot cultures (P>0.05). There was no difference in the speed of isolation. Whole blood culture and clot culture were of nearly equal sensitivity in this group of patients.

Introduction

Confirmation of the diagnosis of typhoid and paratyphoid fever requires isolation of the causative organism from a patient. The bone marrow aspirate culture is the single most sensitive method for isolating Salmonella typhi and S. paratyphi A. However, obtaining bone marrow aspirates is not always possible. Watson (1978) reported that the streptokinase clot culture (STKCC) was 28% more sensitive than whole blood culture (BC), a finding that was not confirmed in Jakarta (Hoffman et al., 1986). This study was designed to compare the sensitivities of STKCC and whole BC for isolating S. typhi and S. paratyphi A in another location.

Methods

Patient selection

From 27 July 1984 to 8 April 1985, all patients presenting to the inpatient and outpatient departments of Pertamina Oil Company Hospital in Plaju, Sumatera, Indonesia were intended to have 5 ml STKCC and 5 ml BC. In some cases specimens for both cultures were not obtained. Only patients from whom specimens for both cultures were obtained, and who had at least one specimen positive for S. typhi or S. paratyphi A, are included in this report.

Acquisition and processing of specimens

5 ml of blood were placed in 45 ml of 10% Oxgall (Difco Laboratories, Detroit, Michigan, USA) at the bedside (5 ml:10 BC) and 5 ml of blood were placed in a sterile tube and allowed to clot at room temperature. Within 24 h (90% within 3 h) the blood was centrifuged for 15 min at 1000 g. The serum was removed and the clot was placed in 15 ml of 10% STKCC, prepared as described by Edwards & Ewing (1972). Aliquots from the Oxgall were inoculated on to MacConkey’s and salmonella-shigella agar media (Difco) daily for several days or until colonies resembling Salmonella were cultured. Cultures that did not yield an isolate after 7 d were considered negative and discarded. Colonies resembling Salmonella were tested with Salmonella group-specific antisera (Bio-Merieux, 69260 Chamboisieres les Bains, France). All isolates were sent to Jakarta for confirmation at the National Institute of Health Research and Development and US NAMRU-2 laboratories.

Results

Patient population

155 patients had at least one of the cultures positive for S. typhi (95) or S. paratyphi A (62). There were 83 males and 72 females with an age of 12.9±8.7 (1-43) years [mean±SD, (range)]. They had been ill for 5.8±3.3 (2-15) d before specimen acquisition and 7.8% had taken an antibiotic before blood was drawn.

Isolation rates

Salmonella sp. was isolated from 5 ml 1:10 BC in 98.7% of cases and from STKCC in 94.8% of cases.

<table>
<thead>
<tr>
<th>Organism</th>
<th>BC1 positive</th>
<th>STKCC1 positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. typhi</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>S. paratyphi A</td>
<td>62</td>
<td>90</td>
</tr>
<tr>
<td>S. typhi or S. paratyphi A</td>
<td>153</td>
<td>123</td>
</tr>
</tbody>
</table>

1BC = 5 ml 1:10 blood/broth ratio whole blood culture, and STKCC = 5 ml streptokinase clot culture.
Discussion

The BC became positive in 1.78±0.37 and 1.65±0.87 d after acquisition and the STKCC in 1.82±0.86 and 1.65±0.83 d for S. typhi and S. paratyphi A respectively.

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