LETTER TO EDITOR

Comparison of Whole Blood Culture and Blood Clot Culture for the Diagnosis of Enteric Fever

Peerapur B V[1], Smitha S[2]*

[1]Department of Microbiology, Raichur Institute of Medical Sciences, Raichur-584101, (Karnataka), India; [2]Consultant Microbiologist, Fortis Hospital, Cunningham Road, Bangalore - 560052, (Karnataka), India

Enteric fever is a systemic illness which includes typhoid and paratyphoid fever [1]. The mortality of untreated cases can be as high as 30%, whereas in treated cases it is less than 1% [1]. Specific antibacterial therapy is available. But resistance and treatment failure are increasingly being reported. Rapid accurate diagnosis and appropriate treatment are necessary to decrease mortality and morbidity. Definitive diagnosis on clinical grounds alone is difficult as the clinical pattern of enteric fever has changed from its classical presentation. Several serological tests have been developed. The role of classic Widal test is controversial, as it lacks in sensitivity and specificity [2]. Other serological tests have promised greater sensitivity and specificity but remain to be assessed critically in field conditions. Isolation of microorganisms remains the gold standard in diagnosis. There are practical and technical limitations in obtaining bone marrow aspirates and intestinal secretions. Cultures from faeces and urine have low sensitivity in the first week of illness. The sensitivity of blood culture is low, attributed to the low concentration of bacteria circulating in blood (<15 organisms/ml) and antibacterial activity of serum. Blood clot culture after removal of serum which contains antibacterial activity is highly recommended [3]. But there is paucity of data in support of this recommendation. The present study was aimed to evaluate the performance of blood clot culture over whole blood culture.

The study was carried out in the department of microbiology, B.L.D.E.A's Shri. B. M. Patil Medical College, Hospital and Research Center, Bijapur, Karnataka, India. A total of 200 clinically suspected cases of enteric fever were included in the study. 10ml venous blood was collected aseptically from each of these cases, and was subjected for both whole blood culture and blood clot cultures simultaneously. For whole blood culture, 5 ml of venous blood was directly inoculated into 50ml of bile broth containing 0.05% sodium polyanethol sulphonate. For blood clot culture, a modification of method described by Escamilla et al [4] was used. Serum was separated, clot was defibrinated with sterile glass beads with the help of a shaker for 15 minutes and the clot was then made to semi fluid with the help of a sterile glass rod. The resultant produce (1-2ml) was added to 15ml of bile broth containing 0.05% sodium polyanethol sulphonate.

The media were incubated at 37^0C under aerobic conditions overnight and were subcultured onto MacConkey agar and Blood agar daily for 7 days. The date of appearance of growth in both culture systems was recorded for comparison of growth rates. Following isolation of Salmonella organisms, they were identified by customary methods. Antibiotic susceptibility test-

ing was carried out for all the strains using modified Kirby-Bauer disc diffusion method following CLSI guidelines. The total number of isolates were 11. Whole blood culture was positive in 9 cases (4.5%) and blood clot culture was positive in all 11 cases (5.5%). There was not a single case wherein whole blood culture was positive and blood clot culture was negative. And two cultures were positive only in blood clot culture and negative in whole blood culture even after 1 week of sub culturing. Mean day of detection for both the culture system was 1.1 day for whole blood culture and 1 day for blood clot culture which is almost same. There was only one case where whole blood recovered an isolate after 2 days of incubation. The results of our study show that blood clot culture was effective in recovering 10% more cases in first week of illness. Also it was effective in recovering an isolate even after one month of illness.

Strains (both *S. typhi* and *S. paratyphi A*) were sensitive to drugs like Ampicillin, Chloramphenicol, Co-trimoxazole, Gentamicin, Ceftriaxone and 17% of *S. Typhi* and 40% of *S. paratyphi A* were intermediately sensitive to ciprofloxacin. The strains were 100% resistant to nalidixic acid. Nalidixic acid resistance is considered a marker of low level resistance to ciprofloxacin among Salmonella and also an indicator of treatment failure with ciprofloxacin. Hence any isolate that shows resistance to nalidixic acid should be reported as intermediately susceptible to ciprofloxacin even though the routine disc diffusion method shows sensitive zone for ciprofloxacin [5].

From our study, we are of opinion that blood clot culture is worth practicing in developing countries where the facilities for advanced technologies for diagnosis are lacking as it is simple and practical for routine laboratory use. In addition, an important attribute of clot culture is that it utilises what is usually considered the left over material, giving it the potential of increasing Salmonella species isolation without requiring additional blood from patients and also the sera after removal can be used for different serological assay.

References:

1. Editorial. Multi-drug resistant typhoid: a global problem. *Journal of Medical Microbiology* 1996; 44:317-19.
2. Pang T, Puthucheary S. Significance and value of Widal test in diagnosis of typhoid. *Journal of Clinical Pathology* 1983; 36:471-75.
3. Watson KC. Isolation of *Salmonella typhi* from blood stream. *Journal of Laboratory and Clinical Medicine* 1955; 46(1): 128-34.
4. Escamilla J, Ugrate HF, Kilpatrick ME. Evaluation of blood clot cultures for isolation of *S. typhi, S. paratyphi A* and *Brucella melitensis*. *Journal of Clinical Microbiology* 1986; 24(3):388-90.
5. Lakshmi V, Ashok R, Susmita VV. Changing trends in antibiograms of salmonella isolates at a tertiary care hospital in Hyderabad. *Indian Journal of Medical Microbiology* 2006; 24(1): 45-48.

**** Author for Correspondence:*** *Dr. B.V Peerapur, Professor & HOD, Microbiology, Raichur Institute of Medical Sciences, Raichur-584102, (Karnataka), India Cell No: 9448139438, Email Id: peerapur_2003@yahoo.co.in*