

LABORATORY DIAGNOSIS OF ENTERIC FEVER**— A STUDY OF 57 CASES**

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ABSTRACT :

57 of culture positive cases were collected. The laboratory investigations done in these cases were analysed and presented. It was observed that most of the patients were anemic with high ESR, normal TLC and a positive Widal test. The antibiotic sensitivity shows that the majority of the isolated salmonella are resistant to commonly prescribed antibiotics.

INTRODUCTION :

The definitive diagnosis of enteric fever requires isolation of the causative salmonella from blood, urine or stool. Although the culture method of diagnosis is confirmatory, currently this facility is lacking in major parts of our country. Only in few specialized centre culture method of diagnosis is carried out as a routine. Therefore, other easily available investigations which provide indirect support to the diagnosis are being widely practiced. In the present study 57 cases of culture positive enteric fever were included and the results of the laboratory investigations are tabulated and analysed.

MATERIALS AND METHODS :

The cases of enteric fever of this study were collected from the patients who attended Shere Bangla medical college Hospital, Barisal, for treatment and also a few cases from the private chambers of some practitioners. All the cases were investigated as cases of pyrexia of unknown origin and those cases which yielded positive blood culture for salmonella were included in this study.

Blood culture was done in conventional glucose and bile broth followed by isolation in pure form in MacKonkey's agar medium. Antibiotic sensitivity testing were also performed.

Besides blood culture routine blood counts (TLC, DLC, HB%, ESR), Widal test and urine examinations (R/E) were done in all cases.

RESULTS AND OBSERVATIONS :

The age and sex distribution of the 57 cases are presented in the following table (Table-1). It reveals that the male patients are 5.3 times more than the females. The commonest age group was 21-30 yrs (37%) and 63% of the patients belonged to the 11-30 yrs age group.

Age group (years)	Male	Female	Total
0-10	04	01	05 (8.8%)
11-20	11	04	15 (26.3%)
21-30	17	04	21 (36.8%)
31-40	14	00	14 (24.6%)
40 +	02	00	02 (3.5%)
Total	48(84.2%)	09(15.8%)	57 (100%)

Table-1 : Showing the age and sex distribution of 57 cases of enteric fever.

Hemoglobin concentration : Majority of the patients showed moderate anemia and five patients showed sever anemia. The following table presents the distribution of hemoglobin values in our patients.

TLC : It was observed that none of the patients had leucopenia while marginal leucocytosis was seen in 5 (8.8%) cases. In the rest (91.2%) of the cases TLC were in the normal range (Table-4)

TLC Values (thousands/cumm)	No of patients
< 6	00
6 - 8	17 (29.8%)
8. - 10	25 (43.8%)
10.1 - 11	10 (17.6%)
> 11	05 (08.8%)
Total	57 (100%)

Table-4 : Showing the total leucocyte count values in the enteric fever patients

DLC : In the DLC distribution neutrophilic dominance was observed in majority of the patients (47.3%). Nonspecific DLC was seen in (38.7%) cases and relative lymphocytosis was present only in 8 (14.0%) cases. (Table-5)

DLC Pattern	No of patients
Relative lymphocytosis	08 (14.0%)
Neutrophillia	27 (47.3%)
Nonspecific	22 (38.7%)
Total	57 (100%)

Hb concentration (in gm/dl)	No of patients
< 6	02 (3.5%)
6 - 8	05 (8.8%)
9 - 10	28 (49.1%)
11 - 12	19 (33.3%)
> 12	03 (5.3%)
Total	57 (100%)

Table-2 : Showing the hemoglobin concentration in patients of enteric fever.

ESR : Moderate increase in the sedimentation rate was seen in majority of the patients. Of the 57 patients 37 (65%) had ESR values in the range of 40-80 mm. (Table-3)

ESR values (mm in 1st hr, Westergren)	No of patients
< 20	01 (1.7%)
21 - 40	13 (22.8%)
41 - 60	15 (26.3%)
61 - 80	22 (38.7%)
81 - 100	05 (8.8%)
> 100	01 (1.7%)
Total	57 (100%)

Table-3 : Showing the ESR values in the enteric fever patients.

Widal test : It was observed that in 3 (5.3%) of our 57 cases there was no significant rise of antibody titre. In the rest 54 (95.7%) cases showed significant rise in titre (rise of titre upto 1:160 or more considered significant). The following table (Table-6) shows the antibody titres in all the cases.

Titre of antibody	No of cases			
	TO	TH	AH	BH
40	00	00	00	00
80	03	02	31	37
160	05	03	16	18
320	19	11	06	02
640	26	35	04	00
1280	04	06	00	00
Total	57	57	57	57

Table-6 : Showing the antibody titres of Widal test

Sensitivity : Sensitivity of the isolated salmonella was done by disc diffusion method. The result of the sensitivity are shown in table-7. It was seen that in majority of cases the bacteria are resistant to ampicillin and chloramphenicol. More than half (53%) of the cases are resistant to amoxycillin. The organisms were found sensitive to cephradine, gentamycin, cefuroxime, nalidexic acid and brulamycin.

Name of the antibiotic disc used	No of cases the antibiotic was tested	No of cases sensitive	No of cases resistant
Ampicillin	52	03 (5.8%)	49 (94.2%)
Amoxycillin	38	18 (47.3%)	20 (52.7%)
Chloramphenicol	47	02 (4.2%)	45 (95.8%)
Cephalexin	15	10 (66.6%)	05 (33.4%)
Cephradine	49	44 (90.0%)	05 (10.0%)
Cefuroxime	17	17 (100.0%)	00 (00%)
Gentamycin	37	35 (94.5%)	02 (05.5%)
Nalidexic acid	27	24 (88.8%)	03 (11.2%)
Brulamycin	27	27 (100%)	00 (00%)

Table-7 : Showing the sensitive pattern of the isolated bacteria.

DISCUSSION :

Enteric fever continues to be a major health problem in tropical and subtropical countries with high morbidity and mortality. Experienced physicians can probably diagnose the condition on clinical grounds with about 4 in 5 chances of being correct (1). Yet laboratory confirmation is essential in most of the cases by isolation of the causative salmonella. Blood culture is the most useful procedure for the isolation of the organism particularly in first 10 days of illness and by third week the chances of obtaining a positive blood culture is reduced to half (2). Bone marrow culture for salmonella gives a higher positive figure than blood culture. Bone marrow culture is specially valuable in those cases where the patient had ingested antibiotics indiscriminately before the diagnosis of enteric fever is made (1). In our series blood culture was performed as soon as the patient reported to us irrespective of the duration of the fever. In two third of our cases we obtained positive blood culture between 4th to 6th week of fever. It is very difficult to explain this positive yield of blood culture in the course of fever. It is not impossible that indiscriminate and inadequate use of antibiotics led to prolonged bacteremia of low magnitude and responsible for such observations.

The widal test is based on the principle that during the course of enteric fever there is an increase in the titre of antibody against the somatic (O) and flagellar (H) antigens and may be detected by agglutination reaction. In nonendemic areas a rise of titre to 1:80 is considered significant for diagnosis (3). In Bangladesh one study suggested 1:160 as the lowest titre to suggest the diagnosis (4). It should be mentioned that a negative widal test does not exclude the diagnosis of enteric fever. One study reveals 26% negative widal test in a series of enteric fever diagnosed by positive blood culture (5). In our series only in 3 patients (5.3%) showed negative widal test. However, in our cases the rise of titres were not as high as expected from the length of the fever. It may be because of the fact that antibiotic treatment prior to the test leads to lowering of the titres of somatic (o) antigen (6).

In enteric fever considerable variation in total counts is seen with values ranging from 1.9 thousand to 25 thousand/cumm. But in one study of 189 cases of enteric fever neutropenia is seen in 47% cases while a TLC more than 10 thousand/cumm was seen in 9% of cases (7). In the cases of our series none of the cases showed leucopenia rather majority of cases (47%) showed neutrophilia dominance in the DLC. This may be because of the fact that in majority of our cases blood count was done during 4th to 6th week of fever (as the patient reported) while leucopenia is usual during early weeks of the illness. In the past too much attention was attached to leucopenia as a diagnostic aid. In fact leucopenia occur only in a small minority of patients with enteric fever. The main value of TLC lies in the fact that a marked leucocytosis makes the diagnosis of enteric fever unlikely (1)

For many years after its introduction in 1948 chloramphenicol gave excellent results in the treatment of enteric fever and became the drug of choice. It is now apparent that resistant strains are emerging where enteric fever is endemic and where indiscriminate use of antibiotics are prevailing. Chloramphenicol resistant strains are reported from many parts of the world (8). In India salmonella strains resistant to multiple drugs had been reported by many investigators (9,10,11). In our series a high proportion of cases shows resistance to the commonly used antibiotics (Table-7). It was found that 32% of the isolated salmonella are simultaneously resistant to chloramphenicol, amoxycillin and ampicillin. This is really alarming. However, it is also possible that in our study the resistant cases are more represented than the real incidence of the resistant salmonella in the community. Because most of the cases of our series were collected from hospitalised patients. And it is quite likely

that enteric fever due to resistant salmonella frequently leads to hospitalization of the patient. Because in that case repeated bouts of commonly used antibiotic therapy fails to induce the remission of the fever.

In our series we find that the incidence of enteric fever in males is five times more than in the females. It is unlikely that males have actually such a higher rate of incidence than the females. Rather this may be partly due to less hospital admissions of our underprivileged women folk for socio cultural reasons.

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