ORIGINAL PROF-613

TYPHIDOT TEST AND BLOOD CULTURE FOR THE DIAGNOSIS OF TYPHOID FEVER

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ABSTRACT

Typhoid fever is endemic in Pakistan and its clinical diagnosis is difficult due to a diverse presentation of the patients. Early and accurate diagnosis is of utmost importance to save the patient from dreadful complications. This prospective study was conducted to observe the sensitivity and specificity of typhidot test for the diagnosis of typhoid fever. Adult patients presenting with acute febrile illness were interviewed in all the Medical Units of Allied Hospital, Faisalabad. Thirty patients were selected who proved to have salmonella infection on blood culture. There was a male to female ratio of 3:1 and maximum number of patients were between 21-30 years of age. Many patients presented with unusual symptoms mimicing other diseases. For comparative study another group of 30 patients was selected who did not have salmonella infection on blood culture and widal test was also negative in this group. Typhidot test was performed on all these patients of both groups. Among 30 cases of proved salmonella infection, typhidot test was positive in 26 cases giving it a sensitivity of 87 percent. In the other group who were having no typhoid illness, typhidot test was positive in only two out of thirty patients giving it a specificity of 39%. So it is concluded that typhidot test is a much sensitive and specific test. It may be helpful for the serological diagnosis of typhoid fever even in remote areas of our country.

INTRODUCTION

Typhoid fever is a common febrile communicable ailment which is a serious health problem in the under developed countries of Asia and Africa[1]. Typhoid fever is the name given to infection caused by S.Typhi, however many other serotypes of salmonella occur causing infection of intestine, hence the name "Enteric Fever" is also used. Paratyphoid fever is the fever caused by any serotypes other than S.Typhi especially by paratyphoid A,B,C and it is much less common than typhoid fever[2]. Clinical presentation of typhoid fever varies tremendously among patients and range across a wide spectrum. S.Typhi is a highly pathogenic organism. On the other hand, S. paratyphi A, B and C are less invasive and more irritant to the intestinal tract and the disease is usually milder than typhoid. Although typhoid fever is eradicated from the West, it is still a serious problem in the underdeveloped countries like Pakistan and is responsible for significant morbidity and mortality[3].

Accurate and early diagnosis of typhoid fever is very important for the proper management and prevention of complications. Blood culture is the corner stone for the diagnosis of typhoid fever but the facilities for the blood culture are very limited in our country and the indiscriminate use of antibiotics has reduced the utility of blood culture for the diagnosis of typhoid fever. Widal test is being used for the last 100 years to diagnose typhoid fever but it lacks sensitivity and specificity[4]. So it is the need of the hour that there should be a diagnostic test which should be performed easily throughout the country even in remote areas. It should be cost effective and its sensitivity and specificity should be adequate, so that it may be possible to diagnose typhoid fever easily and adequately.

PURPOSE OF STUDY

The main purpose of the study is;

To evaluate the sensitivity and specificity of typhidot test in patients of blood culture positive salmonella infection. Though it is a small study but done with the hope that it would be beneficial to our physicians for the early and accurate diagnosis of typhoid fever.

MATERIAL & METHODS

This prospective study was conducted in all the Medical Units of Allied Hospital Faisalabad and includes the patients who were admitted in these Medical units from March 2000 till 30th Nov 2000. All suspected febrile patients were examined and when a provisional diagnosis of typhoid fever was made, following investigations were carried out before starting the specific therapy.

Complete blood examination (Hb, TLC, DLC, ESR), Urine C/E , Widal test, Blood culture, Urea and creatinine, Serum electrolytes, LFTs (in required cases) X-Ray chest (PA view) and ECG etc.

SELECTION CRITERIA

The basic idea of this study was to check the sensitivity and specificity of typhidot test in patients proved to have typhoid fever by blood culture. So before starting the chemotherapy blood culture was carried out by consultant bacteriologist.

RESULTS

Adult patients admitted in Medical Units of Allied Hospital Faisalabad were included in this study. Among a total No of 30 patients, 22 (72.6%) were male and 8 (26.4%) were female with a male to female ratio 3:1. Regarding different age groups, 10 patients (33%) out of 30 were between 15-20 years of age.

Table-I. Symptoms of patients with enteric fever at the time of admission: n=30

Sr. #	Symptoms	No. of Pts.	%age
01	Fever	30	100
02	Headache	15	50
03	Vomiting	12	39.6
04	Generalized abdominal discomfort	17	56
05	Diarrhoea	10	33
06	Constipation	12	40
07	Malaise and lethargy	11	36.3
08	Cough	6	20
09	Rt. Iliac fossa pain	5	16
10	Malena	1	3.3
11	Backache	2	7
12	More than one symptom	20	66

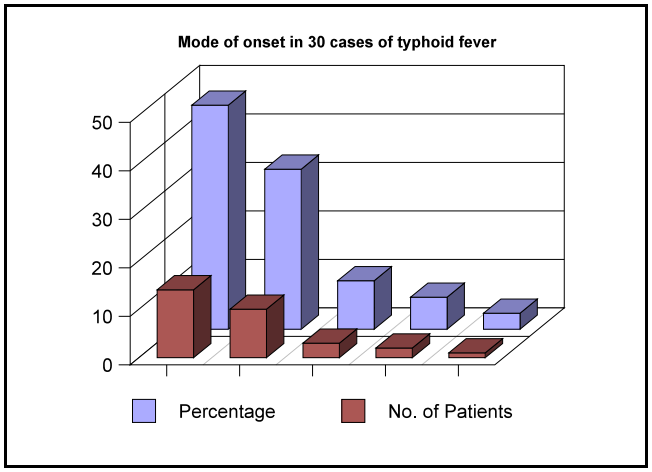
Maximum number of cases were between 21-30 years of age, 12 (39.6%) with distribution of 8 male and 4 female patients. Five cases (16.5%) were between 31-40 years and only 3 cases (9.9%) were more than 40 years of age. Most of the patients (82.5%) belonged to low socioeconomic status having a per capita income of <800 and 500 Rs. Per month respectively.

CLINICAL FEATURES

The mode of onset of typhoid fever is shown by graphic presentation in Fig 1. The most common symptom was

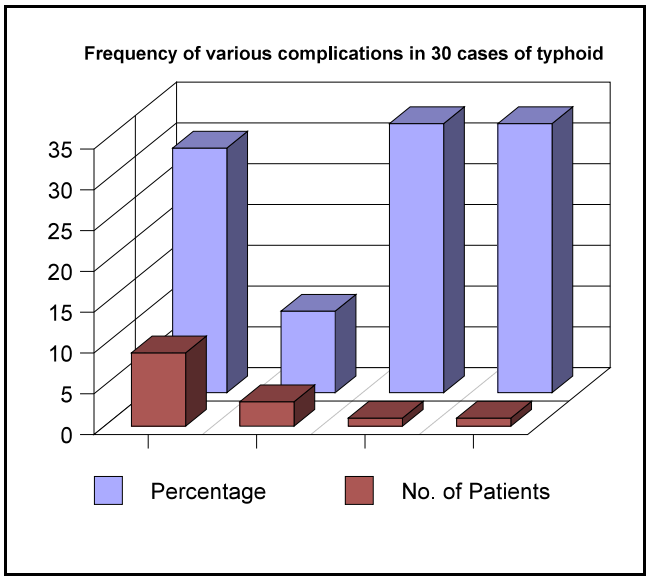
fever 100%. Other symptoms included headache 50%, vomiting 39.6%, Diarrhea 33%, constipation 40% , Malaise and lethargy 36.3%, cough 20%, pain right iliac fossa 16.5% and malena 3.3%. More than one symptom was present in 66% Table 1.

The commonest signs were temperature 100%, tachycardia (increase 100/min) (46%), relative bradycardia (53%), splenomegaly (33%), respiratory rate less than 20/min (66%), more than 20/min (16.5%). Sixteen cases (53.3%) showed abdominal tenderness, (36%) coated tongue, (66%) anaemia, (13%) hepaomegaly, (30%) dehydration, (10%) were mentally confused and (12%) had rose spots.



COMPLICATIONS

Fig-2 shows frequency of various complications seen in these 30 cases. Major complications were dehydration due to diarrhoea or vomiting (30%). State of delerium (10%), intestinal haemorrhage /malena (3.3%), intestinal perforation/peritonitis (3.3%). No patient had jaundice. Two patients were shifted to the surgical floor.



LABORATORY

Out of 30 cases, 20 patients (66%) had total leukocyte count between 4000 to 11000 per microlitre (within normal range), in 6 cases (19.8%) total leukocyte count was above 11000 per microlitre, while 4 cases (13.2%) total leucocyte count was less than 4000 per microlitre.

The only abnormal finding on urine C/E was the presence of albuminuria which was present in 8 cases (26.4%). Chest x-ray and ECG were normal in all cases except presence of u-wave in some cases due to hypokalemia.

BLOOD CULTURE

As the inclusion criteria of this study was culture positivity, so blood culture was positive for all the cases (100%) in group A. Out of 30 cases , 26 cases (86%) were positive to salmonella typhi and 4 (14%) gave growth of paratyphi A on blood culture. No positive growth for paratyphi B or C was seen in the present study.

WIDAL TEST

Out of 30 culture positive patients (Group A) 14 cases (47%) showed agglutinin titre for typhoid “O” and typhoid “H” antigen in dilution of 1: 160. Six cases (19.9%) exhibited agglutinin titre for typhoid “O” and

typhoid "H" antigen more than 1:320. In these cases widal test was repeated after 7-10 days and a four fold rise in titre was observed in 10 cases (33%).

TYPHIDOT TEST

Typhidot test was performed on all the patients who were blood culture positive for S.typhi or paratyphi A (Group A) to check its negative predictive value, typhidot test was also performed on group B which had patients who were blood culture negative and widal test was also negative in this group i.e. they were not suffering from typhoid fever.

Out of 30 culture positive patients (Group A), 26 cases (87%) gave positive results to typhidot test. Among these 26 cases, 15 were 1gM positive and 11 were positive to both 1 gM and 1gG. Remaining 4 cases were negative to both 1 gM and 1gG.

In the group B (which comprises of patients who were not suffering from typhoid fever), typhidot test was positive in only two cases (6.6%).

DISCUSSION

In this study, 30 typhoid fever blood culture proved cases were selected and a control group of 30 patients was employed for comparative study. The infection was more common in males as compared to females[3]. This is because more males go out more frequently than females for eating food from restaurants and street vendors.

Most of the patients (74%) were between 21-30 years of age, similar reports were seen in previous studies[5]. In the present study, all patients had pyrexia, though its type and severity varied a great deal. High grade continuous fever with headache and vomiting was observed in 46.2% of cases which coincides with reports that intermittent fever was incompatible with diagnosis of typhoid fever[6]. The common clinical features like fever, abdominal pain, vomiting and diarrhea reported by others like Durrani correlate with present study[7].

Classical step ladder pattern of typhoid fever associated with relative bradycardia was observed in 54% of patient. Durrani and Rub (1996) in their study of 276 cases in Karachi described that the step ladder fever with relative bradycardia was seen in 60% of cases as compared to 54% cases in present study.

Splenomegaly was found in 33% of cases in present study but according to Shakil Rizvi (1996) it was found in 11.1% cases only and other authors have reported splenomegaly in 20-70% of cases[8,9]. Arora et al in their study of an outbreak in Calcutta described that fever was present in 100% cases while they coated a very high incidence of splenomegaly in 90.2% cases[10]. Confusion was reported in 13% of our cases where as a very high incidence of neuropsychiatric symptoms (51%) was reported by Khosla et al but the observation in recent studies do not correlate with Khosla and this high figure coated by Khosla was most probably due to non availability of effective antibiotics at that time. Neuropsychiatric complications are seen mostly in multi drug resistant patients[11].

Among 30 bacteriologically proved cases of typhoid fever, 26 cases (86%) yield S. typhi while 4 cases (14%) yields paratyphi a. Paratyphi B and C were not cultured even in a single case. Karamaat et al[3] in their study reported S. typhi 80% and paratyphi A in 20% of their culture proved cases. No case of paratyphi B & C was reported by them. Farooqi et al[12] isolated S. typhi in 83%. S.Paratyphi A in 12.8% and S.paratyphi B in 4.1% of cases. This is in contrast to findings found in developed countries. Oboeghulan and co-workers 1995 recorded a higher proportion of paratyphoid infection over typhoid infection and the major culprit was paratyphoid C[13]. Possible cause of high infection with paratyphoid organisms in Europe is that they use prepared food products more than under developed countries and paratyphoid is mostly by meat, fish and other prepared food. On the other hand S.typhi which spread by contaminated water and food is the problem of underdeveloped countries where hygienic conditions are not good. Widal test was positive upto a dilution of 1:160 or more in 20 cases (66%). Among these 20 cases a repeated widal test after 7-10 days gave a four fold rise in 10 cases. Hanif et al[14] in their study conducted at Bangladesh concluded that widal test was positive in 72% cases of their 150 bacteriologically proven cases, while Srivastava[15] reported a figure of 40.9% positive widal test in blood culture proved cases[15]. Positive widal

test was recorded in 61.2% of patients with bacteriologically confirmed typhoid fever but it was also positive in 58.8% of culture negative cases in a study[16].

Among 30 bacteriologically proved cases (Group A) typhidot test was positive in 26 cases (87%). In group B which comprised of 30 blood culture negative widal test, typhidot test was positive in two cases (16.6%). This gives a sensitivity of 87% and specificity of 93%.

Karamat et al[3] at Armed Forces Institute of Pathology, Rawalpindi observed in their study that typhidot test was positive in 100% of their blood culture proved cases. They concluded that the sensitivity and specificity of the typhoidot test was 92% and 96% respectively.

While Quiroga et al described the sensitivity of typhidot test as 93.6% and specificity 94.9% in their study while a sensitivity and specificity of 94% and 92% respectively was coated[17] .

Sridgharan and co-workers described that typhidot test was positive in 28 out of 30 typhoid patients giving a sensitivity of 93% while in asymptomatic and non typhoidal cases its specificity was 100% i.e. no false positive result was observed. These findings correlated with the present study[18].

A important observation during the present study is that usual clinical presentation of typhoid patients are just as common as the classical textbook picture. So there should be a high index of suspicion for the clinical diagnosis of typhoid fever especially where this disease is endemic.

CONCLUSIONS

This study of typhoid patients is generally comparable to those reported in recent years. Following conclusions are made from this study;

1. Typhoid is more common in male with a male to female ratio being 3:1.
2. It is more common in low socio economic group of people.
3. It is more common in a younger age group between 15-30 years of age.
4. Step-ladder fever with relative bradycardia was observed in 54% of cases.
5. Splenomegaly was seen in 33% cases.
6. S.typhi was the major organism involved (86%) with a small contribution made by S.paratyphi.
7. Widal test was positive in 66% cases and a rising titre was observed in 33% cases.
8. Typhidot test was positive in 87% of blood culture proved cases with a sensitivity and specificity of 87% and 93% respectively.
9. The culture isolation remains the gold standard, however typhidot test may be used for the serological diagnosis of typhoid fever.

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Speech is of time, silence is of eternity.

Carlyle