

Determine the Prevalence of Biochemical and Haematological Changes in Patients Presented with Typhoid Fever

MUHAMMAD YASEEN BAZAI¹, GHAZANFAR ALI SIRHINDI², MUHAMMAD IMRAN³

¹Department of Biochemistry, Bolan University of Medical & Health Sciences Quetta,

²Department of Haematology, Shaikh Zayed Hospital Lahore, \

³Department of Physiology, Continental Medical College, Lahore

Correspondence TO Dr. Muhammad Yaseen Bazai email: mykbazai@hotmail.com

ABSTRACT

Aim: To examine the haematological and biochemical changes in patients diagnosed with typhoid fever.

Study design: Descriptive/ Observational study.

Place and duration: This study was conducted at Department of Biochemistry, Bolan University of Medical & Health Sciences, Quetta from 1st January 2018 to 30th June 2018.

Methods: One hundred and fifty patients of both genders who were clinically diagnosed with typhoid fever were included. Patient's ages were ranging from 15 to 65 years. Patient's detailed history was examined including age, sex, socio-economic status after taking informed consent from all the patients. All patients were referred to laboratory for observation of hematological and biochemical changes.

Results: Out of all 150 patients, 120 (80%) patients were males and 20% patients were females. 65 (43.34%) patients were ages between 15 to 35 years, 50 (33.33%) patients were ages between 36 to 55 years and 35 (23.33%) patients had an ages >55 years. 80 (53.33%) patients had rural residency while 46.67% patients had urban residency. Haematological changes were noted as, anaemia, thrombocytopenia, leucocytosis and leucopenia in 95, 40, 10 and 5 patients respectively.

Conclusion: It is concluded that, typhoid fever causes many hematological and biochemical changes as well as hepatic dysfunction. Proper diagnoses and lab findings may help to reduce the mortality and morbidity.

Keywords: Biochemical, Haematological, Typhoid Fever

INTRODUCTION

Typhoid fever is a systemic bacterial infection caused by salmonella typhi. Typhoid infection is commonly caused by the ingestion of water and food adulterated by the urine or feces of infected carriers.¹ Typhoid fever is one of the most common diseases found in developed and more increasingly found in developing countries². Worldwide, typhoid fever is commonly found in children and young adults and reported as a major cause of morbidity, 22 million people found typhoid infected and 0.2 million deaths happen per year due to this malignant disease³. In Asia, approximately 80% of incidences and deaths are reported due to typhoid infection, and in developing countries the infection rate is very high as eleven hundred cases/100000 population have been reported⁴.

A research conducted by Ann Peitragelo demonstrated that, about 26 million people affected with typhoid fever and in USA about 300 cases reported annually and this rate is very low as compared to developing countries it may be due to better environmental sanitary condition in USA.⁵ In typhoid fever, many organs involved and may lead to uncomplicated fever into the severe complicated. Hematological changes are commonly found in this infectious disease⁶. Moreover, hepatic dysfunction has been resulted and rated 1% to 26% respectively.⁷ Clinically significant renal disease in Typhoid fever is an unusual incidence and reported 0 to 6% of all patients infected with typhoid fever⁸.

Diagnosing for this infectious disease is through isolation of bacilli from blood, stool, urine and by widal test.⁹ Anemia, elevated ESR, thrombocytopenia, lymphocytosis, raises PT, APTT and decreased albumins observed as hematological changes. Some of studies demonstrated that leucopenia is a key feature of typhoid fever and resulted in 20 to 25% of patients¹⁰.

MATERIALS AND METHODS

This descriptive/observational study was conducted at Department of Biochemistry, Bolan University of Medical & Health Sciences, Quetta from 1st January 2018 to 30th June 2018. One hundred and fifty patients of both genders who were clinically diagnosed with typhoid fever were included. Patient's ages were ranging from 15 to 65 years. Patient's detailed history was examined including age, sex, socio-economic status, clinical examination, hematological and biochemical changes examined in all patients. Previous history regarding liver failure, blood disorder, renal disease were taken from all the patients through a questionnaire after taking informed consent from all the patients.

Patients having liver diseases history, renal diseases, blood disorders, +ve viral hepatitis infection or any alcohol and drugs user patients that affects the hematological and biochemical changes in patients were excluded from this study. All patients were referred to laboratory and blood samples were collected for observation of hematological and biochemical changes. All the statistical data was analyzed by SPSS 19.

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RESULTS

Table 1: Demographic information of the patients

Variable	No.	%
Gender		
Male	120	80.0
Female	30	20.0
Age (years)		
15 -35	65	43.34
36 to 55	50	33.33
>55	35	23.33
Residency		
Urban	70	46.67
Rural	80	53.33

Table 2: Hematological changes observed in patients

Variable	No.	%
WBC count (x10³/UL)		
Normal white blood cells count	125	83.33
Leucocytosis	18	12.0
Leucopenia	7	4.67
HB Count (gm/dl)		
Normal Hemoglobin Level	55	36.67
Anemia	95	63.33
PT Count (x10³/ul)		
Normal PT	85	56.67
Thrombocytopenia	65	43.33
DLC		
Normal Neutrophils	122	81.34
Neutrophilia	20	13.33
Neutropenia	8	5.33

Table 3: Prevalence of biochemical changes observed in patients

Variable	No.	%
Serum alanine aminotranferase (0-41U/L]		
Normal ALT	34	22.67
Increased ALT	116	77.33
Asparate aminotransfrase (0-38U/L)		
Normal asparate aminotransferase (AST)	53	35.33
Increase asparate aminotransferase(AST)	97	64.67
Serum Albumin (3.4-4.8gm/dl)		
Normal Alb	88	58.67
Decreased Alb	62	41.33
Alkaline phosphatase (40-129U/L)		
Normal	82	54.67
Increased	68	45.33
Bilirubin (0-1mg/dl]		
Normal	102	68
Increased	48	32
Blood urea (12-40 mg/dl)		
Normal	130	86.67
Increased	20	13.33

Out of all 150 patients, 120(80%) patients were males and 20% patients were females. 65(43.33%) patients were ages between 15 to 35 years, 50(33.33%) patients were ages between 36 to 55 years and 35 (23.33%) patients had an ages >55 years. 80(53.33%) patients had rural residency while 46.67% patients had urban residency (Table 1). Haematological changes were noted as, anaemia in 95 (63.33%) patients,, thrombocytopenia found in 65 (43.33%) patients, leucocytosis observed in 18 (12%) patients, leucopenia in 7(4.67%) patients, neutrophilia found in 20 (13.33%) patients and 8 (5.33%)

patients had found neutropenia (Table 2). Biochemical changes were observed as raised ALT (alanine aminotransferase) in 116 (77.33%), raised AST in 97 (64.67%) patients, raised bilirubin in 48 (32%) patients , decreased albumin, alkaline-phosphate and blood urea was noted as 62 (41.33%), 68 (45.33%) and 20 (13.33%) [Table 3].

DISCUSSION

Typhoid fever observation by pathology including hematological and biochemical changes is a very complex procedure and inattentiveness may lead to many severe complications.¹¹ Typhoid fever begins from 7 to 14 days after bacteria infect the macrophages and spread throughout the reticuloendothelial system.¹² The first 7 days of the infectious disease is characterized by the high temperature associated by bacteria. 7 to 14 days of disease characterized by abdominal pain and splenomegaly after 14 days many severe complications occurred and fall to perforation and hemorrhage.¹¹ Parry et al¹² reported 10-15% of incidences have severe complication like GI bleeding and perforation followed by typhoid fever.¹² A study conducted regarding typhoid fever, reported complications such as viral hepatitis, bone marrow suppression, paralytic ileus and cholecystitis were observed in patients whom were infected typhoid fever more than 14 days¹³.

In our study 120 (80%) patients were males and 20% patients were females and these results shows the similarity to some other studies in which male patients population was high as compared to women.¹⁴ We observed hematological changes were noted as, anaemia in 95 (63.33%) patients and these results shows difference to some other studies conducted by Amad et al¹⁵ and Alam et al¹⁶ in which anemia rate to 38% and 31%. Another study conducted by Joseph et al regarding hematological changes in typhoid fever resulted anemia in 77.8%¹⁷ and these results was high as compared to our findings. Another research shows difference to our findings in which anemia was resulted 79.4%.¹⁸ We observed 125 (83.33%) patients had normal white blood cells count and these results shows similarity to many of other studies.¹⁸ In this study leucocytosis in 18 (12%) patients, leucopenia in 7 (4.67%) patients and these observation showed no major difference to other studies.¹⁹ Ahmad et al¹⁵ studied leucopenia in 18% and these results was high to our study. We observed thrombocytopenia found in 65 (43.33%) patients and these results was higher than the some other studies conducted regarding typhoid fever^{15,18}.

Liver is usually involved in patients with typhoid fever, However, severe hepatic infection simulating acute viral hepatitis is rare.¹⁹ The prevalence of liver enzymes in typhoid fever has been resulted as 22%, 26% and 52% in different researches.¹⁸⁻²¹ In this study we observed Biochemical changes were observed as raised ALT (alanine aminotransferase) in 116(77.33%), raised AST in 97(64.67%) patients, raised bilirubin in 48(32%) patients , decreased albumin, alkaline-phosphate and blood urea was noted as 62(41.33%), 68(45.33%) and 20 (13.33%) and these results showed a difference to some other studies¹⁵.

CONCLUSION

Typhoid fever is most common infectious disease in all over the world. In this study, we concluded, typhoid fever causes many hematological and biochemical changes as well as hepatic dysfunction. The involvement of liver was followed by high prevalence of extrahepatic complications. Proper and accurate diagnoses and lab findings may help to reduce the mortality and morbidity.

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