

Haematological profile in typhoid fever

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Abstract

Objective:

1. To determine haematological changes in typhoid fever.
2. To establish early diagnosis using haematological parameters for prompt treatment of the disease.

Materials and Method: This study was conducted at Khaja Banda Nawaz Institute of Medical Sciences and Teaching Hospital Kalaburgi from March 2015 to May 2015. 130 patients with suspected typhoid fever were included in this study and were confirmed by Widal test. Complete blood count was carried out in all these patients.

Results: A total of 130 cases of suspected typhoid fever were taken, out of which 58 (44.61%) were positive for typhoid fever and 72(55.38%) were negative. In majority of the positive cases, neutrophilia was seen in 23 cases (39.65%), anaemia in 20 cases (34.48%), leucocytosis in 13 cases (22.41%) and thrombocytopenia in 10 cases (17.24%).

Conclusion: To conclude, usually anemia, neutropenia and thrombocytopenia are observed in typhoid fever but the present study demonstrated neutrophilia in patients who had complications like perforation, bronchopneumonia and urinary tract infection. Hence in patients with typhoid fever, neutrophilia indicates an evidence of complications.

Keywords: Typhoid Fever, Haematological Parameters.

Introduction

Of the food borne infections, salmonella infections are more common and remains an important public health problem in the world today particularly in developing countries.⁽¹⁾

According to WHO 2000 census typhoid fever caused an estimated 21.7 million illnesses and 2,17,000 deaths approximately per year. With availability of better diagnostic modalities and treatment, management of typhoid fever still requires more efforts. (Ryder & Blake, 1989).⁽²⁾

Typhoid fever is a systemic bacterial infection caused by gram negative rods i.e. Salmonella typhi, and the disease is acquired through the ingestion of water or food contaminated by the urine or faeces of infected carriers. Typhoid fever predominantly affects children and young adults and is recognized as a major cause of morbidity globally with over 12.6 cases worldwide with an estimated 6,00,000 deaths annually.⁽³⁾

Poor sanitation and improper water filtration process are responsible for high incidence of enteric fever. Contaminated water, food and drinks purchased from street vendors, frozen foods, improper preservation of milk and milk products in refrigerator, use of sewage water for the cultivation of fruits and vegetables, lack of hand washing and toilet access are the common risk factors. In endemic regions, enteric fever is more common in urban than rural areas and among young children and adolescents.⁽⁴⁾

Investigations for this infection is by isolation of bacilli from blood, stool, urine and serologically, by widal test by the rising titre of antibodies in both ill persons and asymptomatic carriers.⁽⁵⁾

Although culture remains the gold standard for the definitive diagnosis of salmonella, but because of lack of availability of resources and longer time in isolating the organism, Widal test has been preferred and still is widely used.^(6,7)

Rising titers of "O" and "H" antigens of Widal test are of diagnostic value.⁽⁸⁾ Anemia, elevated ESR, thrombocytopenia, reactive lymphocytosis, increased PT, APTT, and decreased fibrinogen levels observed, are usually non-specific parameters. Leukopenia is considered a key feature of Enteric fever, but studies have shown it to be present in only 20-25% of cases.⁽⁹⁾

Aims and Objectives

1. To determine specific hematological changes in Typhoid fever.
2. To establish early diagnosis using haematological parameters for prompt treatment of the disease.

Materials and Method

Blood samples of suspected cases of typhoid fever were collected from 130 patients attending KBN Hospital for the period of 3 months i.e. from March 2015 to May 2015.

Inclusion Criteria: Clinically suspected cases of Typhoid fever with clinical features like prolonged fever for 1-2 weeks, abdominal pain, rose spots and hepatosplenomegaly.

Exclusion Criteria: Patients with other common causes of fever like malaria, dengue etc.

Sample Collection

In clinically suspected 130 patients of Typhoid fever, blood samples were collected and analyzed for various haematological parameters along with Widal test, in KBN Medical Hospital.

Whole blood samples drawn with minimum stasis into 5 ml EDTA and plain containers via antecubital vein using a disposable plastic syringe and needle were collected. Each sample was then mixed gently and thoroughly to ensure anticoagulation and prevent cell lysis.

EDTA anticoagulated samples were used for complete blood count, while serum samples were used for widal tests. Suspected patients were confirmed to have typhoid fever on the basis of Widal test.

To check the significance of association, chi-square test was used.

Results

Table 1: Showing the number of Positive and Negative cases in the Study group

	Positive		Negative		Total	
	No.	%	No.	%	No.	%
No. of Cases	58	44.61	72	55.39	130	100

Table 2: Gender wise distribution of the Study Subjects

	Positive		Negative		Total		X ² Value P value
	No.	%	No.	%	No.	%	
Male	12	25	36	75	48	36.92	X ² = 11.8492; P= 0.000577; P<0.05
Female	46	56.09	36	43.91	82	63.08	
Total	58	44.61	72	55.39	130	100	

Graph 3: Showing positive cases with respect to Age in the Study Population

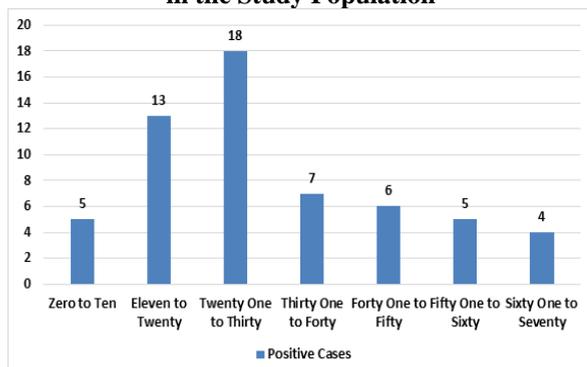


Table 4: Haematological Parameters among the Positive Cases

Parameters	Positive Cases	
	No.	%
Neutrophilia	23	39.65
Leucocytosis	13	22.41
Anaemia	20	34.48
Thrombocytopenia	10	17.24

Out of 130 patients, 58 (44.61%) cases were positive for Typhoid and 72 (55.39%) were negative for typhoid (Table 1).

Out of 48 males, 12 (25%) were positive for Typhoid and 36 (75%) were negative. Out of 82 females, 46 (56.09%) were positive and 36 (43.90%) were negative (Table 2).

Typhoid positive cases were seen commonly in the age group of 21-30 years (Table 3).

Haematological changes seen in positive cases were, neutrophilia in 23(39.65%), anaemia in 20(22.14%), leucocytosis in 13(22.41%), and thrombocytopenia in 10(17.24%) cases. (Table 4).

Discussion

Enteric fever has high incidence of mortality and morbidity in India. Diagnosis of enteric fever is based on clinical suspicion and confirmed by laboratory tests. Enteric fever is a short-term febrile illness with few complications and 0.2% risk of mortality with proper treatment.⁽¹⁰⁾ Patho-physiology of typhoid fever constitutes several stages.⁽¹¹⁾ Asymptomatic incubation period of 7-14 days- macrophages proliferation will be seen throughout the reticuloendothelial system. First week of symptomatic disease - progressive rise in temperature with bacteraemia. Second week - rose spots, pain abdomen and splenomegaly. Third week - complications, like perforation, hemorrhage, pneumonia and encephalopathy.⁽¹²⁾

In the present study, positive cases were commonly seen in children & young adults which agrees with the Wasfy et al study.⁽¹³⁾

In the present series 20(34.48%) patients had anemia, a figure higher than reported by Alam (31%)⁽¹⁴⁾ but lower than Ahmed et al(38%),⁽¹⁵⁾ Joseph et al(77.8%)⁽¹⁶⁾ and Rasoolinejad et al (79.4%).⁽¹⁷⁾

In the present study majority of patients revealed normocytic normochromic anaemia which agrees with the findings of Dangana A et al study.⁽¹⁾

Leucocyte count was normal in most of the patients which is consistent with the earlier reports.⁽¹⁷⁾ Neutropenia in typhoid fever has been attributed to

increased margination and defective granulopoiesis⁽¹⁸⁾ but, in the present study, neutrophilia in 23(39.65%) cases was observed, which agrees with the earlier statement of Hoff brand et al 1996, who stated that neutrophilia is a feature of complicated typhoid fever.⁽¹⁹⁾ In the present study, out of 23 neutrophilia cases, only inpatients were followed up. Among them intestinal perforation were seen in 2 cases, 6 cases had bronchopneumonia and 11 cases had urinary tract infection. Other 4 patients were lost to follow up.

Thrombocytopenia was found in 10 (17.24%) cases, a figure lower than Ali Hassan Abro et al (40%) study⁽³⁾ and higher than Ahmet Y et al (10%).⁽¹⁵⁾

Conclusion

Typhoid fever has significant effect on some haematological parameters, but these changes can aid in diagnosis. Hence complete blood count should be ordered early by the clinicians for proper diagnosis and treatment.

To conclude, usually anemia, neutropenia and thrombocytopenia are observed in typhoid fever but the present study demonstrated neutrophilia in patients who had complications like perforation, bronchopneumonia and urinary tract infection. Hence in patients with typhoid fever, neutrophilia indicates an evidence of complications.

References

1. Dangana A, Ajobiwe J, Nuhu A. Haematological changes associated with Salmonella typhi and Salmonella paratyphi in humans. *International Journal of Biomedical and Health sciences* 2010;Vol6(4):219-222.
2. Crump JA, Luby SP, Mintz ED. The global burden of typhoid fever. *Bull World Health Organ* 2004;82:346-53.
3. Ali Hassan Abro, Ahmed MS Abdou, Jawahar L, Gangwani, Abdulla M Ustadi, Nadeem J Younis, Hina Seyada Hussaini. Hematological and Biochemical changes in typhoid fever. *Pakistan Journal of Medical Sciences* 2009;Vol25(2):166-171.
4. Fauci AS, Loscalzo J, Kasper DL, Hauser SL, Longo DL, Jameson JL. *Harrison's principles of internal medicine* 18th ed. New York: McGraw Hill; 2012. P. 1275.
5. Okafor, A.I. Haematological alterations due to typhoid fever. Enugu Urban-Nigeria. *Malaysian Journal of Microbiology* 2007;Vol3(2):19-22.
6. Aliasgar Lokhandwala, Syed Athar, Nicolas P Turrin. Role of absolute Eosinopenia as marker of enteric fever: experience from a tertiary care hospital in the United Arab Emirates. *Ibnusina Journal of medicine and Biomedical sciences* 2012;Vol4(6):249-253.
7. Levine MM, Grados O, Gilman RH, Woodward We, Solis-Plaza R, Waldman W. Widal Test in areas endemic for typhoid fever. *AMJ Trop Med Hyg* 1978;Vol(27):795-800.
8. Mohanty SK, Ramana Kv. Single and unpaired sera tube Widal agglutination test in enteric fever. *Saudi J Gastroenterol* 2007:13-213.
9. Khosla SN, Anand A, Singh U, Kosla A. Haematological profile in typhoid fever. *Trop Doct* 1995;(25):156-158.
10. Lynch MF, Blanton EM, Bulens S, Polyak C, Vojdani J, Stevenson J, et al. Typhoid fever in United States, 1999-2006. *JAMA* 2009;(302):859-865.
11. Wain J, House D, Parkhil J, Parry C. Unlocking the genome of the human typhoid bacillus. *The Lancet Infectious Diseases* 2002;2(3):163-170.
12. House D, Bishop A, Parry C, Dougan G, Wain J. Typhoid fever pathogenesis and disease. *Current opinion in infectious disease* 2001;14(5):573-8.
13. Wasfy MO, Oyoyo BA, David JC. Isolation and antibiotic susceptibility of salmonella, shigella and campylobacter from acute enteric infection in Egypt. *J Health Popul Nutr* 2000;18:33-38.
14. Malik AS. Complication of bacteriologically confirmed Typhoid fever in children. *J Trop Ped* 2002;48:102-8.
15. Ahmet Y, Idris Y, Selahattin K. Clinical and laboratory presentation of typhoid fever. *International pediatric* 2001;4:227-31.
16. Joseph J, Tarun KD, Jynthi S. Correlation of clinical and hematological profile with bone marrow responses in typhoid fever. *Am J Trop Med Hyg* 1997;5(3):313-16.
17. Rasoolinejd M, Esmailpoor NB, Mogbel BA. Salmonella hepatitis (Analysis of hepatic involvement in 107 patients with typhoid fever). *Acta Medica Iranica* 2003;4:161-3.
18. Unaiza Q, and Javeria A. Hematological changes associated with typhoid fever. *Rawal medical J* 2013;38(1).
19. Obeagu Emmanuel Efeanyi. Changes in some hematological parameters in typhoid patients attending university health services department of Michael Okpara University of Agriculture, Nigeria. *Int J. Curr. Microbiol. App. Sci* 2014;3(1):670-674.