

Frequency of HBV, HCV and Malaria Infections in Cytopenic Patients Coming for Bone Marrow Aspiration to Bacha Khan Medical College Mardan

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ABSTRACT

Objective: To know the frequency of HCV, HBV, and Malaria infections in cytopenic patients coming for Bone Marrow Aspiration.

Study Duration: Observational study

Place and Duration of Study: This study was conducted in Pathology and Medicine Departments of Bacha Khan Medical College Mardan from January 2012 to December 2014.

Materials and Methods: 100 patients with cytopenia were referred for Bone Marrow Aspiration and were screened for HBV, HCV and malaria infections. Complete blood counts were performed on 50 healthy individual as a control group.

Both Thick and Thin Blood smears were examined for Malaria, while Anti HCV and HBs Ag Screening was done by kit method (Immunochromatographic Method SD company). Complete blood count was performed by Hematology analyser. (Sysmex Hematology Analyzer).

Results: 4 out of 100 cytopenic patients were Anti HCV positive, who were referred for Bone Marrow Aspiration. These patients had a Hemoglobin level 10.5 ± 0.978 G/dl, Platelets counts $120 \pm 24.768 \times 103/\mu\text{L}$. 2 out of 100 Cytopenic patients were HBs Ag Positive. They had anemia and thrombocytopenia, Hb level was 10.4 ± 0.879 g/dl and platelets count was $119 \pm 24.965 \times 103/\mu\text{L}$ respectively. while 7 (7%) out of 100 cytopenic patients had malaria microscopy. They presented with Hb of 9.5 ± 0.978 g/dl, platelet count $120 \pm 24.768 \times 103/\mu\text{L}$ and TLC $3.8 \pm 1.365 \times 103/\mu\text{L}$ respectively. Counts in HCV, HBV and malaria are significantly lower than the control groups value < 0.0024 .

Conclusion: Cytopenia is a significant finding in HCV, HBV and Malaria infections and patients presenting with any cytopenia patients referred for Bone marrow Aspiration presenting with cytopenia should be properly screened for HCV, HBV, and Malaria as these can be the cause of cytopenia thus unnecessary use of Bone Marrow Aspiration can be presented.

Key Words: HBV, HCV and Malaria Infection Anemia, Thrombocytopenia, Cytopenia.

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INTRODUCTION

According to world Health organization about 3% of the world population has been infected with HCV, there are about 170 million patients with HCV infection in the world and about 3 to 4 millions are diagnosed annually. In Pakistan about 10 Millions patients are infected with HCV.¹ Patients with hepatitis C virus (HCV) infection develop a number of Hematological disorder, with benign and malignant B-Cell-proliferations being the most common HCV infected patients develop peripheral cytopenias, the etiology of which is multifactorial and include hypersplenism and

autoimmune process, Bone Marrow suppression and dysfunction also occur in HCV patients.² Extra hepatic Hematological manifestations are also commonly observed in cases of Hepatitis B infection, with portal Hypertension and splenomegally. Which can cause Thrombocytopenia, leucopenia, and anemia due to peripheral destruction of blood cells. Viral hepatitis B and C may be associated with bone marrow suppression and can cause pancytopenia.³ Malaria is a major public health problem in developing world owing to its high rates of morbidity and mortality.⁴ malaria is an important cause of death and illness specially in tropical in developing countries, the most severe form from which death results is plasmodium falciparum⁵ More than 40% of the world population reside in Malaria endemic area and it is predicted that 300 to 500 Millions cases and 1.5 to 2.7 million deaths

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occur each year.⁶ Hematological changes are some of most common complication in Malaria, these changes involve major cell lines such as red blood cells, leucocytes and thrombocytes, children infected with plasmodium falciparum malaria causes important changes in hematological parameters with low platelet counts and haemoglobin level.⁷ plasmodium malaria is one of the most common cause of anemia due to haemolysis of infected and non infected red blood cells.⁸

The aim of these studies is to properly screen the patients who present with Anemia, Thrombocytopenia, Bicytopenia or pancytopenia for HBV, HCV, and Malaria infection to avoid accessory use of Bone Marrow procedure and treat their root causes initially.

MATERIALS AND METHODS

This study was conducted in the Pathology Department of Bacha Khan Medical College Mardan and Medical Department of MMC Teaching Hospital from January 2012 –December 2014.

All patients who had anemia, leucopenia, Thrombocytopenia alone or Bicytopenia or pancytopenia were included in the study that had been referred from MMC Teaching Hospital Mardan for Bone Marrow Aspiration.

Before Bone Marrow Aspiration to perform all these patient had been advised peripheral smear Examination, Blood complete and screening test for Hepatitis B and Hepatitis C virus, Peripheral blood smear properly examined to detect Malaria Parasite. Hematological investigation for completed blood count were performed by Hematology analyzer. Blood sample 5ml was collected in EDTA tube containing 1.8ml EDTA. Complete blood counts were done by Hematology analyzer for determination of HB Level, TLC and platelets counts.

Peripheral smears were properly examined under microscope for determination of Malaria parasite a gold standard method for detection of Malaria Parasite.

Serological tests were also performed for these patients for the detection of Hepatitis B and Hepatitis C Virus. All the serological tests for the detection of Hepatitis B and hepatitis C were done by ICT Strip Method (Immuno Chromatographic Technique) SD Company. Statistical analysis of data done by using T Test. All these investigation done properly before Bone marrow aspiration to perform for detection of Malaria Parasite, Hepatitis B virus, and Hepatitis C virus.

RESULTS

There were total of 100 cytopenic patients referred for Bone marrow aspiration including both adults and children. They were all subjected to prescreening test for hepatitis C virus, Hepatitis B and Malaria complete blood count were performed on total 50 patients as a control. During smear examination 7 patients out of 100

cytopenic patients, Malaria Parasite were detected, who had cytopenia that had been referred from MMC Teaching hospital Mardan. These patients had anaemia, thrombocytopenia and leucopenia with Hb level 9.5 ± 0.978 g/dl, platelet count $120 \pm 24.768 \times 10^3/\text{ul}$ and TLC $3.8 \pm 1.365 \times 10^3/\text{ul}$. 4 out of 100 cytopenic patients, Hepatitis C Virus were detected before Bone Marrow aspiration to perform, these patients presented with cytopenias with Hb level 10.5 ± 0.978 g/dl and platelet counts $120 \pm 24.768 \times 10^3/\text{ul}$. 2 out of 100 cytopenic patients, Hepatitis B virus were detected who had been advised bone marrow aspiration these patients had Hb level 10.4 ± 0.879 g/dl and platelet counts $119 \pm 24.965 \times 10^3/\text{ul}$. The above results show that before performing Bone Marrow aspiration 7% of Malaria, 4% of HCV and 2% of HBV were detected during screening examination of Patients

Table No.1: Frequency of Malaria, HBV and HCV during screening Examination.

Total patients for Bone Marrow aspiration	100	Percentage %
Malaria	7	7 %
Hep. C Virus	04	04 %
Hep. B Virus	02	02 %

Table No.2: Hb Level, TLC and Platelet Counts in Malaria HBV, and HCV Patients:

Disease Name	Hb Level g/dl	TLC Level $10^3/\text{ul}$	Platelet Count $10^3/\text{ul}$
Malaria	9.5 ± 0.978 g/dl	$3.8 \pm 1.365 \times 10^3/\text{ul}$	$120 \pm 24.768 \times 10^3/\text{ul}$
Hep. C Virus	10.5 ± 0.978 g/dl	$5.6 \pm 1.567 \times 10^3/\text{ul}$	$120 \pm 24.768 \times 10^3/\text{ul}$
Hep. B Virus	10.4 ± 0.879 g/dl	$5.8 \pm 1.567 \times 10^3/\text{ul}$	$119 \pm 24.965 \times 10^3/\text{ul}$

DISCUSSION

Alteration in Hematological profile is a common finding in systemic and infectious disease HBV and HCV infected individuals can be asymptomatic for many years or many have mild symptoms which makes these infections difficult to recognize. But in addition to hepatic pathology these infections cause hematological abnormalities.

Malaria is also the most prevalent infectious disease and hematological changes are some of most common complication in these patients.

In the present study 4 patients of Hepatitis C, and 2 patients of Hepatitis B, viruses were detected during screening examination of the patients. All these 4 patients have cytopenia either Bicytopenia or Pancytopenia which had been referred for Bone Marrow Aspiration. A similar study was conducted by

CIFU et al that patients with Hepatitis B and Hepatitis C are associated with haematological disorder including Leucopenia, Thrombocytopenia and Anemia. The Mechanisms are thought to involve hypersplenism and autoimmune process.⁹

Another study conducted by Douglas T.C et al showed that Hepatitis C virus infected patients were more likely to have low neutrophils and platelet counts and autoimmune hemolytic anemia is the most common extrahepatic complications in HCV infected Patients.¹⁰ In another study showed that marked anemia is a frequent finding in patients with Hepatitis B and C virus and this is attributed to bone marrow suppression and autoimmune hemolytic Process.¹¹ Immune thrombocytopenia and leucopenia are commonly associated with Hepatitis C infection however infection with Hepatitis B virus should be kept in mind in a patient presenting with leucopenia and thrombocytopenia stated by Sanjy and Kumar. Patients with HCV infection develop abnormalities in peripheral cells counts like neutropenia, thrombocytopenia and anemia. Hypersplenism autoimmune process folate deficiency, Antiviral therapy, decreased thrombopoietin level and many unknown factors are involved in their pathogenesis.³ Hepatitis associated aplastic anaemia also occur with several Hepatitis viruses, most common are HBV, HCV, HDV, HEV and HGV¹² several abnormalities have been accountable for development of aplastic anaemia. There is decreased ratio of CD4/CD8 cells and high percentage of CD8 can be myelotoxic responsible for aplastic anaemia¹³. In the present study 7 patients out of 100 cytopenic patients referred for Bone Marrow aspiration, Malaria was detected. Their smears were strongly positive for Malaria Parasite both *Plasmodium Vivax* and *Plasmodium Falciparum*. A study has been conducted by Lyila AM, et al that Malaria is typically a Blood disease and the haematological abnormalities associated with Malaria include anemia, thrombocytopenia, splenomegaly, atypical Lymphocytosis, Leucopenia and monocytosis.¹⁴ Other studies have been performed on Malaria Patients and concluded that haematological abnormalities in these patients include Anemia, thrombocytopenia, Leucopenia and Leucocytosis¹⁵⁻¹⁶ Malaria is commonly associated with various degree of haematological complications¹⁷ In another study conducted by Abro et al *Plasmodium falciparum* and *Plasmodium Vivax* cause significant haematological changes with high frequency of thrombocytopenia and anemia¹⁸ but the pathogenesis of Anemia in Malaria is multifactorial and incompletely understood it is thought to result from hemolysis of parasitized red blood cells, depressed and ineffective erythropoiesis, dyserythropoiesis and anemia of chronic diseases¹⁹. A number of studies have confirmed the association of thrombocytopenia and anemia in malaria, but the

speculated mechanism coagulation disturbances, splenomegaly, bone marrow suppression, anti body mediated platelet destruction and oxidative stress²⁰

CONCLUSION

Cytopenia is a significant finding in HCV, HBV and Malaria infections and patients presenting with any cytopenia patients referred for Bone marrow Aspiration presenting with cytopenia should be properly screened for HCV, HBV, and Malaria as these can be the cause of cytopenia thus unnecessary use of Bone Marrow Aspiration can be presented.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Anwar B, Hassan K, Asif N. Diagnostic utility of Bone marrow examination of chronic liver disease patients referred for evaluation of hematological derangements. *IJP* 2012;10:13-16.
2. Klco JM, Gieng B, Burrent EM, Hassan A, Nguyn TD, Kreise FH, et al. Bone Marrow biopsy in patients with Hepatitis C virus infection: Spectrum of finding and diagnostic utility. *Am J Hemotol* 2010; 85: 106 – 110.
3. Kumar S, Hepatitis B presenting as primary thrombocytopenia and leucopenia without evidence of cirrhosis. *JIACM* 2013;14: 169 -70
4. Mishra Sk, Newton Crj. Diagnosis and management of neurological complications of falciparum. *Nat Rev Neurol* 2009;4:189-198.
5. Trampuz A, Jereb b, Muzlovic I, Prabhu RM. Clinical review severe anemia, *Crit Care* 2003; 7:315-323.
6. Akhtar S, Gumashta R, Mahore G, Maimoon. Hematological changes in Malaria; Comparative Study. *JPBS*: 2014;4:15-19.
7. Witumbi JN, Opllo MO, Muga RO, Misorp Ao, Stuoute JA, Red cell surface changes and erythrocytopenia in children with severe *Plasmodium falciparum* malaria. *Blood* 95:1481-1486.
8. Bakhubaira S, Haematological parameters in severe complicated *Plasmodium falciparum* malaria among adults in Yemen Aden, Turk J Haematol 2013;30:394-399
9. Ciuluc, Arama V, Bombea H, Dobreo C, Vladareanu AM. Correlation of hematological parameters with bone marrow findings in chronic lymphoproliferative disorders associated with hepatitis virus. *J Med life* 2013;4:464-71.
10. Dieterich DT, SpirakJ. Hematological disorders associated with hepatitis C virus infection and their management. *Clinical Infectious Disease*. 2003; 37:533-41.

11. Fasola. FA, Otegbayo JA, Abjah UMA, Olaso. Hematological parameters in Nigerians with Acute Viral Hepatitis. NJGH 2009;1:27-31.
12. Bisma R, Idrees M, Shahida AM, Butt S, Butt M, Ali M. Hepatitis associated aplastic anaemia. Virology. Journal 2011;8:80-87.
13. Cengiz C, Turhan X, Yalku OF, Yalmaz S. Hepatitis associated with aplastic anaemia, CD8 cells have a role in pathogenesis. Dig Dis Sci 2007; 52:2438-43.
14. Bashwari AM, Mandil AA, Bahnassy AA, Ahmad AM. Malaria hematological aspects. Annual of Saudi Med 2002;22: 372-77.
15. Imoru M, Shehu UA, Ihesuilor UG, Kwaru AH, Haematological changes in Malaria infected Children in west Nigeria. Turk J Med Sci 2013; 43: 838-842.
16. Igbenegghu C, Odiabo AB. Impact of acute Malaria on some hematological parameters in a semi urban community in south western Nigeria. Acta Parasitologia Globalis 2013; 4:2018-2079
17. Gosh K, Pathogenesis of anemia in malaria, a concise review Parasitology research, 2007; 101: 1463-1469
18. Ahbro AH, Ustadi AM, Unas MJ, Abdu AS, Hameed DJ. Malaria and hematological changes. Pak Med Sci 2008;2:287-291.
19. Mean RT, The anemia of infection. Bayers Best Pract Clin Haematol 2005;13:151-152.
20. Khan SJ, Usman M, Zahid S, Malaria can lead to thrombocytopenia Rawal Med J 2008;33:183-185.