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Pathology

BONE MARROW STUDIES IN ANEMIC PATIENTS IN KOLHAN-JAMSHEDPUR

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ABSTRACT Bone marrow study of patients suffering from moderate to severe anemia seeking repeated blood transfusions in MGM medical college and hospital in 'Jamshedpur'. The major aim is to find the cause and frequency of this disease occurrence in patients at Kolhan (Jamshedpur). This study concluded that most common cause of pancytopenia is hypoplasia and megalablastic, followed by acute leukemia and granuloma. Bone marrow examination is proven once again the most practicable investigation which reveals the underlying cause and prognosis in patients with pancytopenia.

KEYWORDS : Pancytopenia, Hypoplasia, Megalablastic Anemia, Granuloma, Bone Marrow Biopsy.

INTRODUCTION

The scenario where there is reduction or decrease in three blood cell types: white blood cells, Red blood cells and platelets are termed as Pancytopenia in medical science; whereas bicytopenia term is utilized if out of complete blood count only two parameters are decreases. The Pancytopenia occurrence is due to many possible reasons like infections, medicine side effects, and disease condition like cancer, disorder of bone marrow, or lupus, environmental toxins including exposure of arsenic or benzene, radiation, autoimmune disorders or any past family history of blood disorders in the bone marrow, which is the site of blood cells formation. This condition is concurrent of anemia, leucopenia and thrombocytopenia and its existence when Hemoglobin (Hb) is found to be lesser in females below 11.5g/dl and in males lesser than 13.5g/dl along with lesser count of leucocytes $4x10^3/l$ and the platelets count is less than $150x10^3/l$ [Khunger et al., 2002; Kumar et al., 2001]. The manifestation of several condition of hematopoietic and non-hematopoietic occurs with features of pancytopenia. There are many fundamental mechanism of this condition like hematopoietic cell formation lowering, abnormal cells replaces marrow, marrow growth and differentiation suppression, antibody mediated sequestration arresting of cells in a hypertrophied and over active reticuloendothelial system [Shimamura , 2008; Jha et al., 2008].

Pancytopenia usual clinical manifestations are: Fever, fatigue, dizziness, weight loss, anorexia, night sweats, pallor, bleeding, splenomegaly, hepatomegaly, and lymphadenopathy [Imbert et al., 1989]. Pancytopenia original cause is frequently diverging based on the following condition like geographical region, age, and gender. They include megaloblastic anemia, other nutritional anemia, aplastic anemia (AA), splenomegaly, sepsis, leukemia, lymphoma, multiple myeloma, myelodysplastic syndromes (MDSs), alcoholic diseases, HIV and hepatitis viruses, autoimmune diseases, endocrine diseases and bone marrow infiltrating diseases (such as Gaucher's disease) [Rangaswamy et al., 2012] .

In course of Pancytopenia accurate evaluation, bone marrow investigation is highly accepted and recommended [Varma and Dash, 1992] which permits complete evaluation of bone marrow architect and the pattern of distribution of any abnormal infiltrate and for the detection of focal bone marrow lesions [Bone marrow examination: indication, technique In: Anesoft, Foucar K, editors, 2001; Nanda, Basu and Marwaha, 2002]. The most common causes leading to Pancytopenia on Bone Marrow examination are Hypoplastic bone marrow (29.05%), Megaloblastic anemia (MA) (23.64%), Hematological malignancies i.e. Acute Myeloid Leukemia (21.62%), and Erythroid hyperplasia (EH) (19.6%) [Jha et al., 2008].The larger range of the reported results in local studies ranges from 38% to 72% of pancytopenia falls due to cause of the megaloblastic anemia [Ishtiaq et al., 2004 ; Khunger et al., 2002; Bone marrow examination: indication, technique In: Anesoft, Foucar K, editors, 2001]. Still the bone marrow evaluation method is mostly utilized in the diagnosis of different blood disorders and also for various systemic unwellnesses including pyrexia of unknown origin (PUO). The following findings would be useful to make strategies to defeat these common causes.

METHODOLOGY

All patients who were admitted to the MGM medical college and hospital due to pancytopenia between May 2016-November 2018 were retrospectively evaluated regarding etiological causes. We retrospectively evaluated all the patients who were admitted to the hematology ward due to pancytopenia between 2016 and 2018. Pancytopenia was defined as a hemoglobin <9 g/dL; a total leukocyte count <4000/μL; or a platelet count <100,000/μL [Kumar et al., 2001]. We examined and utilized the patients' medical record data, including anamnesis, physical examination, medical history, complete blood count, peripheral blood smear, biochemical and, blood vitamin levels, thyroid hormones, brucellosis tests, and bone marrow biopsy. We omitted patients who developed pancytopenia due to cancer chemotherapy and radiotherapy from this study. After explaining the purpose and procedure to the patients, a written consent was obtained from the patient for further studies. Every patient were undertaken a detailed medical history and full physiological examination followed by blood sampling for the examination. Keeping all the safety measures and standard methods the diagnostic bone marrow aspiration and trephine biopsy were performed from sternum under adequate local anaesthesia by using Salah and Jamshidi needles, Bone marrow aspiration needle and biopsy needle respectively. Bone marrow aspirate smears were prepared directly on the slides at the time of procedure and air dried. Leishman stain were utilized to study the complete blood count and the data were collected and analyzed well to reach to the conclusion and find the real cause and frequency of pancytopenia. Frequency and percentage were computed for categorical variables like age groups, gender, duration of illness, common causes leading to pancytopenia.

RESULT AND INTERPRETATIONS

In course of the study of pancytopenia in the patients there were 18 patients were considered. Frequencies of common causes leading to pancytopenia are shown in table-1. Hypoplasia (33.33%) in six cases and megaloblastic anemia is (28.45%) in 5 cases, followed by acute leukemia is (25.22%) in three case, Granuloma is (12%) in two cases, non- spefic inflammation is (5.5%), parasitic anemia is (5.5%) in one case, were obtained and well documented. In this study we included the vitamin B12 and serum folic acid performance and observation

Table-1: Age group wise frequency of common cause leading to pancytopenia (M:Males; F: Females)

Age wise incidence:						
Age/Number of the male & Female Patients	5-15	16-25	26-40	41-50	51-60	61-70
	M:3; F:2	M:0; F:2	M:3; F:1	M:3; F:1	M:1; F:0	M:2; F:0

Stratification of age group and gender of illness are presented in table-1 the most common cause of pancytopenia is observed in age group

between 15-45 years. Hypoplastic bone marrow is most common in adulthood 16-46 years of age male:females and ratio is 2:1 and anemia is more common in adulthood (15-45 years age group). BM examination is done for pancytopenia more frequently on age group 15-45years.

CONCLUSION

In the course of pancytopenia diagnosis the following like Patient's age, gender, anamnesis, physical examination, history, laboratory test results findings provide important. The accurate etiological cause of this illness is yet not very clear and their rates may vary in each study from same and different countries. However, most of the etiological causes of pancytopenia were associated with non-hematological diseases and were diagnosed with laboratory tests with help of the bone marrow examination. Most common cause of pancytopenia is Megaloblastic anemia but from the above studies and investigation we can conclude that hypoplasia and Megalablastic the commonest cause of the pancytopenia in the patients admitted in the kolhan (Jamshedpur). While other common causes are Acute Leukemia, Granuloma, and non-specific inflammation and parasitic anemia. Bone marrow examination is proven once again the most practicable investigation which reveals the underlying cause and prognosis in patients with pancytopenia.

Conflicts of Interest

The authors declare no conflict of interest.

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