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Spectrum of hematological disorders in Bone Marrow Aspirations at M. Y. Hospital, Indore – One Year Study

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Abstract
Aim: *The study was done to know the spectrum of hematological disorders at M.Y.H. Hospital, Indore.*
Materials and Methods: *The present study was done on the patients who were adviced bone marrow aspiration examination during the period of 2017 to 2018, in the Department of Pathology, M. Y. Hospital, Indore. During this period, a total of 109 bone marrow smears were examined. Bone marrow examination was done for various indications and in patients of all age groups. Complete clinical history and all relevant investigations such as complete blood count, peripheral blood smear, reticulocyte count, coagulation profiles and radiological investigations were reviewed.*
Results: *In the present study, megaloblastic anemia 27 (24.77%), aplastic /hypoplastic anemia 14 (12.85%), AML 12 (11.01%), ALL 5 (4.58%), CML/myeloproliferative disorder 10 (9.17%), multiple myeloma 1 (0.92%), metastatic deposits1 (0.92%), MDS 10 (9.17%), plasmacytosis 2 (1.84%), ITP 1 (0.92%), normal study 10 (9.17%) and diluted marrow 16 (14.68%) were seen. Among the non-malignant hematological disorder, megaloblastic anemia is the most common entity found in our study while among the malignant hematological disorders, AML is the most common disorder found.*
Conclusion: *Bone marrow aspiration is an easy, rapid, cost-effective and almost of equal value in various hematological and non-hematological disorders of bone marrow.*
Keywords: *Bone marrow, malignant hematological disorders, non malignant hematological disorders.*

Introduction

Bone marrow examination is quite a valuable test, which has become very important these days for the diagnosis of hematological disorders.[1,2] Bone marrow aspiration is a very important diagnostic tool in many haematological disorders originating from or infiltrating the marrow, as well as many non-haematological disorders that involve bone marrow such as diagnosis or staging of a neoplasm and storage disorders. It helps in the diagnosis and staging of hematological malignancies, especially leukemias. It is a significant prognostic modality and an essential component of the follow up of patients

undergoing chemotherapy or bone marrow transplantation It also provides detailed information regarding the presence hemoparasites within the bone marrow, the presence of infiltrates and storage diseases.[3] Bone marrow aspiration (BMA) provides reliable information regarding bone marrow cellularity, its architecture and the stage of maturation of different blood cells.[4] Although it is an invasive procedure, it can be easily performed even in the presence of severe thrombocytopenia with little or no risk of bleeding.[3] The spectrum of hematological disorders is relatively different in the developing world than the developed countries.[5]

Materials and Methods

The present study was done on the patients who were adviced bone marrow aspiration examination during the period of 2017 to 2018, in the Department of Pathology, M. Y. Hospital, Indore. During this period, a total of 109 bone marrow smears were examined. Bone marrow examination was done for various indications and in patients of all age groups. Complete clinical history and all relevant investigations such as complete blood count, peripheral blood smear, reticulocyte count, coagulation profiles and radiological investigations were reviewed.

The bone marrow aspirate is evaluated for: 1) cellularity of the fragments, 2) erythropoiesis - cellularity, maturation pattern and any cytological abnormalities, 3) myelopoiesis - cellularity, maturation pattern and any abnormalities, 4) M:E ratio, 5) megakaryopoiesis - number, morphology, presence of immature forms, 6) lymphocytes, 7) plasma cells, 8) parasites/ abnormal cells/Granulomas/storage cells. The cellularity was assessed by estimating the percentage of hematopoietic cells compared to fat spaces in the bone marrow. The categories were identified in the following way: 1) hypercellular: > 75% cells, 2) normocellular: 25-75% cells, 3) hypocellular: < 25% cells, depending upon the age of the patient.

Inclusion criteria - Patient with all age groups.

Exclusion criteria- Patients with known coagulopathies or platelet counts less than 20,000/ul were excluded from the study. Patients on anti-platelet medications were deferred for a few days.

Result

Table 1 Findings of bone marrow examination –

Diagnosis	No. of patient	Percentage
Megaloblastic anemia	27	24.77
Hypoplastic/Aplastic marrow	14	12.85
AML	12	11.01
ALL	5	4.58
Myeloproliferative disorder/CML	10	9.17
Multiple myeloma	1	0.92
Metastatic deposits	1	0.92
MDS	10	9.17
Plasmacytosis	2	1.84
ITP	1	0.92
Normal study	10	9.17
Diluted marrow	16	14.68
Total	109	100

In the present study, megaloblastic anemia 27 (24.77%), aplastic /hypoplastic anemia 14 (12.85%), AML 12 (11.01%), ALL 5 (4.58%), CML/myeloproliferative disorder 10 (9.17%), multiple myeloma 1 (0.92%), metastatic deposits1 (0.92%), MDS 10 (9.17%), plasmacytosis 2 (1.84%), ITP 1 (0.92%), normal study 10 (9.17%) and diluted marrow 16 (14.68%) were seen. Among the non-hematological disorder, megaloblastic anemia is the most common entity found in our study while among the hematological disorders, AML is the most common disorder found.

Table 2 Age distribution of patients for bone marrow aspiration

Age	No. of patients	Percentage
0-10	1	0.92
11-20	23	21.10
21-30	15	13.76
31-40	23	21.10
41-50	16	14.68
51-60	18	16.51
61-70	11	10.09
71-80	1	00.92
81-90	1	00.92
Total	109	100

In this study, 109 bone marrow aspirates were studied. Patient with age ranged from 01 year to 90 years were included. Maximum number of cases were seen in age group of 11 to 40 years i.e. 61 (55.96%) while least number of cases i.e. 13 (11.93%) cases were beyond the age of 60 years.

Table 3 Sex distribution of patients for bone marrow aspiration –

Sex	No. of patients	Percentage
Male	64	58.72
Female	45	41.28
Total	109	100

Out of 109 cases, 64 were male and 45 cases were female, male to female ratio is 1.4:1.

Table 4 Bone Marrow Cellularity

Cellularity	No. of cases	Percentage
Hypercellular	67	61.47
Normocellular	26	23.85
Hypocellular	16	14.68
Total	109	100

Out of the 109 cases, hypercellular marrow are 67 (61.47%), hypocellular marrow are 16 (14.68%) had and normocellular marrow are 26 (23.85%).

Discussion

BMA is one of the most common and safe procedure done routinely in medical practice. Among the non-malignant hematological disorder, megaloblastic anemia is the most common entity found in our study. Similar results were also found in the study done by Damulak et al[6], who reported the most frequent marrow diagnosis as nutritional deficiency anaemias in one-third of marrow aspirates, followed by leukaemias. Rahim et al.[3] also found the same result in their study. In other similar studies its frequency ranges from as low as 24% to as high as 68%.[7,8] Folate defi ciency is more common in children, while B12 deficiency is more common in adults.[8] The second common entity in this study was aplastic/ hypoplastic anemia. Tilak et al and khodke et al also found the same results.[9,10]. Aplastic anemia has a pattern of geographic variation opposite to that of leukemias, with higher frequency in the developing world than in the industrialized West.[11] The most common hematological malignancy found in our study is acute myeloid leukemia. Rahim et al.[3] also concluded the same results for AML. Many studies have concluded that bone marrow aspiration will yield diagnostic result in majority of cases.[7,12] In present study also, many cases were diagnosed on bone marrow aspiration alone.

Conclusion

Bone marrow aspiration should not be a first line investigation. It is often indicated after initial evaluation of the peripheral blood and other ancillary tests, in patients with blood or blood related diseases.

Bone marrow aspiration is an uncomfortable procedure for the patient and should be performed only when there is a clear clinical indication,[4] but it is a useful technique for the diagnosis of different blood disorders.

Reference

1. Dacie JV, Lewis SM, editors. Dacie and Lewis Practical Hematology. 8th ed. Edinburgh: Churchill Livingstone; 1994.
2. Sitalakshmi S, Srikrishna A, Devi S, Damodar P, Alexander B. The diagnostic utility of bone marrow trephine biopsies. Indian J Pathol Microbiol 2005;48:173-6.
3. Rahim F, Ahmad I, Islam S, Hussain M, Khattak TA, Bano Q. Spectrum of hematological disorders in children observed in 424 consecutive bone marrow aspirations/biopsies. Pak J Med Sci 2005;21:433-6.
4. Bain BJ. Bone marrow biopsy morbidity: Review of 2003. J Clin Pathol 2005;58:406-8.
5. Young NS, Abkowitz JL, Luzzatto L. New Insights into the Pathophysiology of Acquired Cytopenias. Hematology Am Soc Hematol Educ Program 2000:18-38.
6. Damulak OD, Damen JG. Diagnostic outcome of bone marrow aspiration in a

new centre in Nigeria. Global Advanced Research Journal of Medicine and Medical Sciences 2012; 1(7): 166 – 171.

7. Mussarat N, Raziq F. The incidence of underlying pathology in pancytopenia. An experience of 89 cases. J Postgr Med Inst 2004;18:76-9.
8. Ng SC, Kuperan P, Chan KS, Bosco J, Chan GL. Megaloblasticanaemia--a review from University Hospital, Kuala Lumpur. Ann Acad Med Singapore 1988;17:261-6.
9. Tilak N, Jain R. Pancytopenia – A clinico-haematological analysis of 77 cases. Indian J Pathol Microbiol. 1999;42(4):399-404.
10. Khodke K, Bone marrow examination in cases of pancytopenia. J Ind acad clini Med. 2001;2.
11. Issaragrisil S, Leaverton PE, Chansung K, Thamprasit T, Porapakham Y, Young NS. The aplastic anemia study group: The incidence of aplastic anaemia in Thailand. Am J Hematol 1999;61:164-8.
12. Onal IK, Sümer H, Tufan A, ShorbagiA. Bone marrow embolismafter marrow aspiration and biopsy. Am J Hematol 2005;78:158.