



Research Article

ROLE OF BONE MARROW ASPIRATION IN VARIOUS HAEMATOLOGICAL STUDIES- A THREE YEAR STUDY

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ABSTRACT

Background:- Bone marrow aspiration is simple, minimally invasive technique. The bone marrow examination may either confirm the clinically suspected disease or may provide the previously unsuspected diagnosis. Bone marrow aspiration alone is usually sufficient to diagnose nutritional anaemias, most of the acute leukaemias, Immune Thrombocytopenias, pyrexia of unknown origin and infective diseases. **Aims & Objectives:-** To determine and evaluate the diagnostic role of bone marrow aspiration in hematological malignancies.

Methodology:- Bone marrow samples were aspirated from 104 patients suspected for hematological malignancies under aseptic precautions. Slides were stained by Giemsa Stain and examined under microscope. **Results:-** Out of 104 cases, 60 (57.69%) were male and 44 (42.31 %) were female. Male to female ratio was 1.36:1. Maximum number of cases found was in the age group of 0-10 years. The maximum cases were CML with frequency of 44(42.31%). 58.65% Bone marrow were hypercellular followed by normocellular 34.62% and lastly hypocellular 6.73%. Maximum mean age of patient with CLL (64.87) and minimum mean age of patient with ALL (5.91). **Conclusion:-** Bone marrow examination is a useful and cost effective diagnostic procedure in haematological practice for the diagnosis of both neoplastic and non-neoplastic haematological diseases. Rapid and early diagnosis of malignancies are critical for proper initiation of treatment and to control the disease.

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INTRODUCTION

Bone marrow aspiration is simple, minimally invasive technique. Bone marrow aspiration alone is usually sufficient to diagnose nutritional anaemias, most of the acute leukaemias and Immune Thrombocytopenias and pyrexia of unknown origin and infective diseases. It is also valuable for follow up of patients undergoing chemotherapy and bone marrow transplantation. The bone marrow examination may either confirm the clinically suspected disease or may provide the previously unsuspected diagnosis. The bone marrow examination is a commonly employed tool for staging and prognosis of various solid tumors. The presence of metastasis in the bone marrow is usually incurable but not necessarily fatal. Bone marrow aspirate smears are more useful to study morphology and applying pearl iron stain.⁵⁵ The adult haematopoietic system includes tissues and organs involved in the proliferation, maturation and destruction of haematopoietic cells. These organs and tissues include the bone marrow, thymus, spleen and lymph nodes. Bone marrow is the site of myeloid, erythroid, and megakaryocytic as well as lymphoid cell development.

Aims & Objectives

To determine and evaluate the diagnostic role of bone marrow aspiration in hematological malignancies.

MATERIAL AND METHOD

The study was conducted in Pathology Department, RNT Medical College, Udaipur, Rajasthan from 2014 to 2017. After obtaining the informed written consent, bone marrow aspiration (by Klima or Salah needle) was taken from posterior superior iliac spine. 0.2 to 0.5 ml of fluid was aspirated, smears prepared, dried and stained with Giemsa stain.

RESULTS

There were a total of 104 Bone marrow aspirations were collected from the people attending the Radiotherapy Department of Maharana Bhupal Hospital during a period of three years from 2014 to 2017.

Table 1 Distribution of study population according to Gender

Gender	Frequency	Percentage (%)
Male	60	57.69 %
Female	44	42.31 %
Total	104	100 %

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The table 1 shows the distribution of study population according to Gender. Out of 104 selected patients, 60 (57.69%) were male and 44 (42.31 %) were female in a ratio of 1.36:1.

Table 2 Distribution of study population according to age

Age group (years)	Frequency	Percentage (%)
0-10	30	28.84%
11-20	7	6.73%
21-30	4	3.84%
31-40	6	5.76%
41-50	13	12.5%
51-60	21	20.19%
61-70	16	15.38%
Above 70	7	6.73%
Total	104	100%

The table 2 shows the distribution of study population according to Age. Among the 104 patients maximum cases 30 (28.84%) were in 0-10 years (first decade) age group and lowest 4 (3.84%) in 21-30 years (third decade) age group. The age ranged from 1 year to maximum 82 years with a mean age 37.30 years.

Table 3 Cellularity of Bone Marrow Aspirate smears among the cases

Cellularity of Bone Marrow	Number of patients	Percentage (%)
Hypercellular	61	58.65%
Normocellular	36	34.62%
Hypocellular	7	6.73%
Total	100	100%

The table 3 shows maximum number of BMA came out to be hypercellular 58.65% followed by normocellular which was noted in 34.62% and lastly hypocellular reported in 6.73%.

Table 4 Clinical findings of the patient

Clinical Finding	Number of patients	Percentage (%)
Fever	38	36.53%
Anaemia	62	59.61%
Organomegaly	38	36.53 %
Bleeding manifestation	22	21.15 %

The table 4 shows the clinical findings of the patient. Anaemia was present maximum (59.61%),36.53% cases presented with fever, 36.53% cases were presented with organomegaly and 21.15% cases presented with bleeding manifestations mainly petechial, mucosal and gum bleeding.

Table 5 Distribution of cases according to Bone Marrow examination finding

BM finding	Number of cases	Percentage (%)
AML	11	10.57%
ALL	36	34.61%
CML	44	42.31%
CLL	8	7.7%
NHL	3	2.89%
MM	2	1.92%
Total	104	100%

In our study of 104 cases, the maximum cases were Chronic Myeloid Leukemia (CML) 44/104 (42.31%) which was commonest malignancy in our patients followed by Acute Lymphoblastic Leukemia 36/104 (34.61%), Acute Myeloid Leukemia 11/104 (10.57%), Chronic Lymphoblastic Leukemia 8/104 (7.7%), Non Hodgkin Lymphoma 3/104 (2.89%) and Multiple Myeloma 02/104 (1.92%).

Table 6 Distribution of study population according to mean age

Diagnosis	Age range (years)	Mean Age (years)	Mean Age of Males (years)	Mean Age of Females (years)
AML	10-75	61.85	61.16	62.6
ALL	1-14	5.91	6.31	5.51
CML	22-72	51.18	52.74	49.62
CLL	42-82	64.87	67.6	62.14
NHL	11-55	33.66	23	55
MM	50-65	57.5	0	57.5

The Mean age for AML and CLL was 61.85 and 64.87 (7th decade) respectively while for ALL, it was in the first decade of life that is 5.91. In CML, MM it was in the sixth decade of life and NHL it was in third decade of life.

DISCUSSION

In our study, only those cases were included that were diagnosed on bone marrow aspiration. If a malignancy was not evident on bone marrow aspiration or if bone marrow aspirate was not performed it was not included in the study. The study was conducted to understand the common indications and diagnosis of hematological disorders, with the advent of Bone marrow aspiration examination. Bone marrow examination plays vital role in knowing the root cause of hematological disorders up to a certain level.

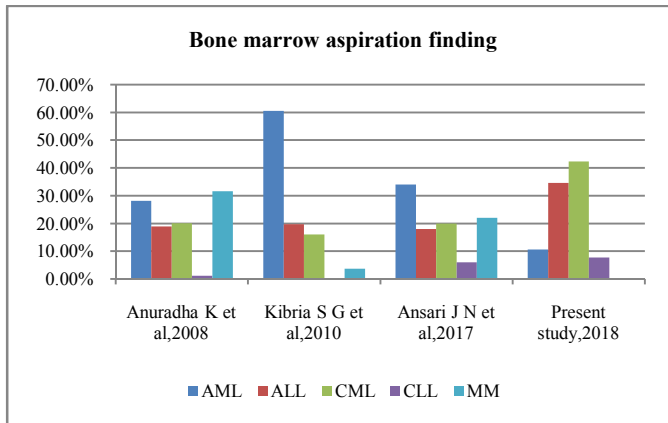
The age range of our patients was 1-82 years similar to that reported by Dapus *et al* (2012) and showing male predilection. The study of Sreedevi P *et al* (2016) showed maximum cases in age group 0-10 years (first decade) with percentage of 27.9% which was almost similar to present study. Pandya A *et al*, Ansari J N *et al* and Present study concluded that maximum cases of study population belonged to Hypercellular with percentage of 63.16%, 37.05% and 58.65% respectively followed by Normocellular with percentage of 26.31%, 35.70% and 34.62%. The minimum cases belonged to Hypocellular with percentage of 10.53%, 27.25% and 6.73%. The Present study showed Anemia was found to be the most common clinical finding with percentage of 59.61% which correlate with Dapus DO *et al* 77.1% and Sreedevi P *et al* 41.8%. Dapus DO *et al* and Present study showed the Bleeding manifestation was the lowest clinical finding with percentage of 5.2% and 21.15% respectively. In case of maximum percentage of clinical finding, Our finding correlate with both Dapus DO *et al* and Sreedevi P *et al* but in case of minimum percentage of clinical finding, Our finding correlate with Dapus DO *et al*. The mean age in Present study with CLL and MM was approximately similar study of Dapus D O *et al*. Mean age of our patients with AML was almost similar that reported by the American Cancer Society (55-60 years). Dapus D O *et al* showed the Mean age of ALL (10.5%) which is higher than the Present study.

Table 7 Bone marrow aspiration finding

Diagnosis	AML (%)	ALL (%)	CML (%)	CLL (%)	MM (%)
Anuradha K <i>et al</i> , 2008	49(28.16%)	33(18.96%)	35(20.11%)	2(1.14%)	55(31.60%)
Kibria SG <i>et al</i> , 2010	49(60.49%)	16(19.75%)	13(16.04%)	0(0%)	3(3.70%)
Ansari JN <i>et al</i> , 2017	17(34%)	9(18%)	10(20%)	3(6%)	11(22%)
Present study, 2018	11(10.57%)	36(34.61%)	44(42.31%)	8(7.7%)	2(1.92%)

In our study among the 104 cases, Chronic Myeloid Leukemia (CML) was the most common malignancy (42.31%) followed

by Acute Lymphoblastic Leukemia (34.61%), Acute Myeloid Leukemia (10.57%), Chronic Lymphoblastic Leukemia CLL (7.7%) and Multiple Myeloma (1.92%). AML was the most common malignancy according to Kibria S G *et al* and Ansari J N *et al*. Anuradha K *et al* reported Multiple Myeloma to be the commonest (31.60%) among all hematological malignancies.



CONCLUSIONS

Bone marrow examination is a useful and cost effective diagnostic procedure in haematological practice for the diagnosis of both neoplastic and non-neoplastic haematological diseases. Rapid and early diagnosis of malignancies are critical for proper initiation of treatment and to control the disease. In the Present study out of 104 cases; males constituted 60 cases (57.69%), while females were 44(42.31%). The male female ratio was 1.36:1. Majority of cases occurring in 0 to 10 years (28.84%) age group and minimum cases reported in 21-30 years (3.84%) age group. The age ranged from 1 years to maximum 82 years with a mean age 37.30 years. Among the 104 cases, 58.65% Bone marrow were hypercellular followed by normocellular 34.62% and lastly hypocellular 6.73%. The majority of cases in the study group were presented with Anaemia (59.61%) followed by Fever 36.53%, Organomegaly 36.53% and Bleeding Manifestations 21.15%. The maximum cases were Chronic Myeloid Leukemia (CML) with frequency of 44(42.31%). Acute Lymphoblastic Leukemia 36/104 (34.61%), was the second most common. Multiple Myeloma 02/104 (1.92%) was the least common malignancy in Present study. The Present study shows the maximum mean age of patient with CLL (64.87) and minimum mean age of patient with ALL (5.91). Rapid and early diagnosis of malignancies are critical for proper initiation of treatment and to control the disease.

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