

PATTERN OF HEMATOLOGICAL DISEASES DIAGNOSED BY BONE MARROW EXAMINATION IN A TERTIARY CARE HOSPITAL

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Abstract

Background: The aim is to determine the pattern of various hematological disorders that can be diagnosed on bone marrow examination and to assess the diagnostic utility of bone marrow aspiration. **Materials and Methods:** This is a retrospective study carried out in TSM medical college, Lucknow. All stained bone marrow aspirate smears were examined over a period of two years from Jan 2018 to Dec 2019. Records regarding the clinical indication for the procedure, peripheral blood smear reports, blood counts and significant findings on bone marrow aspiration examination were obtained. **Result:** Out of 72 cases, bone marrow aspiration yielded a diagnosis of hematological malignancy in a total of 31 cases. M:F ratio was 2:1. Most common age group affected was 60-70 years (20.8%) followed by 10-20 years (19.4%). Most common indication for bone marrow aspiration was anemia (52.7%) in our study. Most common non-malignant disease diagnosed in our study was megaloblastic anemia (39%). Most common malignant disease diagnosed by bone marrow aspiration was acute leukemia (58%). **Conclusion:** This study shows that bone marrow aspiration is a valuable diagnostic tool and aids in diagnosis of various hematological diseases.

INTRODUCTION

Hematological disorders are commonly seen in all ages.

Often the diagnosis can be arrived by detailed clinical examination and simple investigations.

However without bone marrow examination the diagnosis is usually not confirmed. Bone marrow aspiration is one of the most frequent and relatively safe invasive procedure.

Although bone marrow examination is an invasive procedure this is well tolerated by patients. The examination helps in many cases to come at a final diagnosis within a short period of time.^[1]

Bone marrow examination is a useful and cost-effective diagnostic procedure in hematological practice for the diagnosis of both neoplastic and non-neoplastic hematological diseases.

Both bone marrow aspiration (BMA) and bone biopsy are useful and complementary to each other. Bone marrow aspirate smears are ideal for the study of cytological details of haematopoietic cells. Trephine biopsies are helpful for the assessment of cellularity, extent and pattern of tumour infiltration and cell type.

Nutritional anemias, hematological malignancies and immune thrombocytopenias can be readily

diagnosed by bone marrow aspiration alone. On the other hand, trephine biopsy is important for diagnosing granulomatous inflammations, hypoplastic or aplastic anemias, myelofibrosis and lymphomatous infiltrations.^[2]

Aim

To determine the spectrum of various hematological disorders that can be diagnosed on bone marrow examination and to know the age and sex incidence.

MATERIALS AND METHODS

This is retrospective study done in the department of Pathology, TS Misra medical college, Lucknow over a period of two years from Jan 2018 to Dec 2019. A total of 72 cases were included in this study. The clinical details were taken from case sheets and bone marrow reports of the patients were collected from the bone marrow register of pathology department. Then the data obtained was statistically analyzed.

The procedure of Bone marrow aspiration was done after giving 2% xylocaine as local anaesthesia either from sternum or from posterior iliac spine. Leishman-stained peripheral blood and bone marrow smears were studied. The diagnosis among

various hematologic disorders was confirmed by using the standard criteria.

RESULTS

Most common indications for bone marrow aspiration (BMA) in our study is anemia(52.7%) followed by pancytopenia(19.4%) as shown in the [Table 1].

Table 1: Indications for bone marrow examination

Indications for BMA	Number of cases
Anemia	38
Pancytopenia	14
Pyrexia of unknown origin	10
Hepatosplenomegaly	10
Total	72

Out of 72 cases, 41 cases (57%) were nonmalignant and 31 cases (43%) were malignant.

Male to female ratio is 2:1 with male were 48 cases and females were 24 cases. Sex distribution is shown in the [Table 2].

Table 2: Sex distribution of cases diagnosed on BMA

Gender	Cases
Males	48
Females	24
Total	72

Age ranged in our study from 12 years to 83 years. Most common age group of involvement in our study is 60-70 years followed by 10-20 years. Age distribution of various hematological diseases diagnosed on bone marrow aspiration is shown in the [Table 3].

Table 3: Age distribution of cases diagnosed on BMA

Age in years	Frequency
10-20	14
21-30	04
31-40	10
41-50	10
51-60	10
61-70	15
>70	09

Table 5: Age distribution of various non-neoplastic hematological diseases diagnosed on bone marrow aspiration

Disease	11-20yr	21-30yr	31-40yr	41-50yr	51-60yr	61-70yr	>70yrs
Normoblastic erythroid hyperplasia	2	2		6		2	
Megaloblastic erythroid hyperplasia	3		5	4		2	2
Micronormoblastic erythroid hyperplasia						4	
Dimorphic			2				
Hypoplastic marrow					2		4
Infective pathology						1	

Table 6: Age distribution of various neoplastic diseases diagnosed on bone marrow aspiration

Disease	11-20	21-30	31-40	41-50	51-60	61-70	>70yrs
Acute leukemia	8	-	2		2	4	2
Chronic leukemia		2	2		6		
Multiple myeloma						2	
Metastasis							1

Table 4: Frequency of hematological diseases diagnosed on bone marrow aspiration.

Diseases	Number of cases	Percentage
Megaloblastic anemia	16	22%
Normoblastic erythroid hyperplasia(EH)	12	16.6%
Micronormoblastic EH	04	5.5%
Dimorphic anemia	02	2.7%
Hypopasticanemia	06	8.33%
Infective pathology	01	1.38%
Acute leukemia	18	25%
Chronic leukemia	10	13.8%
Multiple myeloma	02	2.7%
Metastasis	01	1.38%
Total	72	100

Most common non-malignant hematological disease diagnosed in our study is megaloblastic anemia (39%) shown in figure 1 followed by normoblastic erythroid hyperplasia (29%).

Most common malignancy diagnosed by bone marrow examination is acute leukemia (58%) shown in [Figure 2].

Various hematological diseases diagnosed on bone marrow aspiration shown in [Table 4].

Megaloblastic erythroid hyperplasia was the commonest finding in non-neoplastic hematological diseases and most common age involved was 30-50yr. Most common age for micronormoblastic erythroid hyperplasia is 60-70 yrs and for hypoplastic bone marrow is >70 yrs as shown in [Table 5 and Figure 3].

Most common age for acute leukemia in our study is 11-20yrs while for chronic leukemia is 51-60yrs.

Two cases diagnosed as multiple myeloma shown in figure 4 in our study were in age range 61-70 yrs while metastasis was seen in 75 yr male patient as shown in [Table 6 and Figure 5]

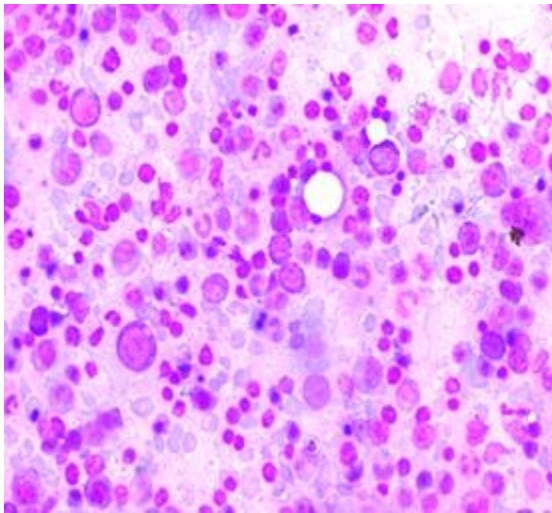


Figure 1: Megaloblastic anemia(40x) BMA

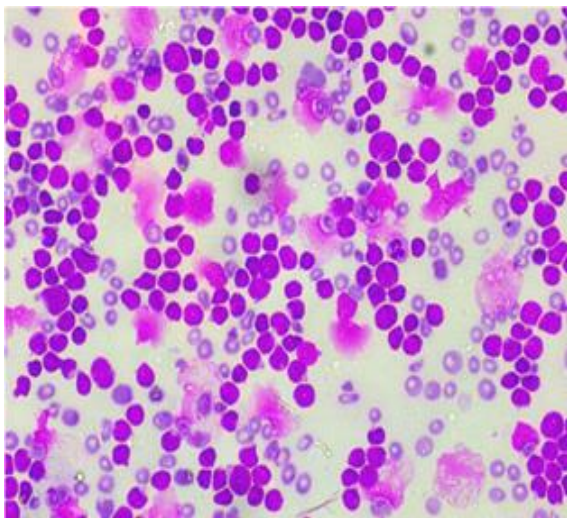


Figure 2: Acute Leukemia(10x)BMA



Figure 3: Hypoplastic marrow(10x) Biopsy

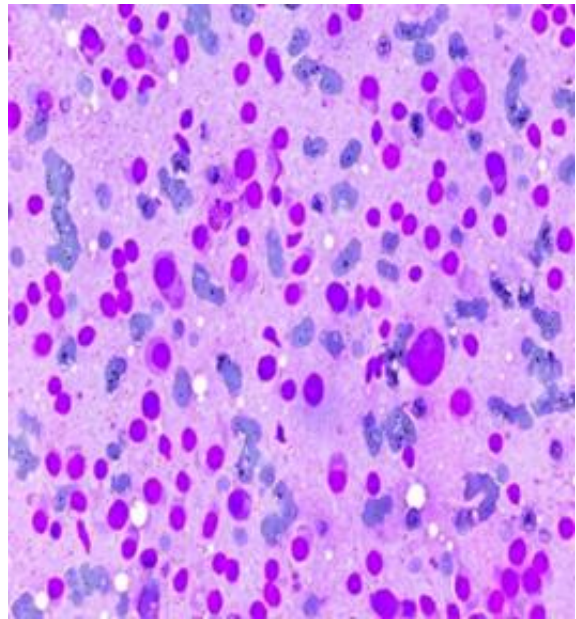


Figure 4: Multiple myeloma (10x) BMA

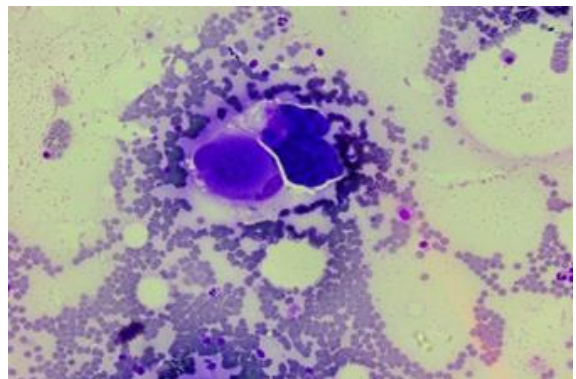


Figure 5: Metastasis (10X) BMA

DISCUSSION

In our study the most common indication for bone marrow examination was anemia, similar to the study by Srikanth M et al in 2012, nutritional anemia was the highest in number.^[1]

Most common cause for anemia in our study was megaloblastic anemia similar to study done by Shilpa patel.^[2]

In our study, anemia was the most common hematological disorder with most predominant being megaloblastic anemia. Similarly in a study done by Ranabhat S et al megaloblastic anemia is the commonest.^[3]

Male to female ratio in our study 2:1 while it was 1.3:1 in a study done by Shefali verma et al,^[4] Male :female ratio was 1.9:1 in a study by Subuh Parez,^[5] Age ranged in our study from 12yrs to 73 ys. While in a study done by Rajan et al in 2015 age ranged from 8 to 90 yrs.^[6] In their study M .Atchutya found that nonmalignant diseases are more commoner than hematological malignancies.^[7] Similar results were obtained in our study.

In our study the most common cause for pancytopenia was megaloblastic anemia followed by aplastic anemia.

In study conducted by Gayathri & Rao et al in 2011 they also found megaloblastic anemia as the commonest cause for pancytopenia.^[8]

Raphael et al observed in their study done in 2012 that megaloblastic anemia is the commonest cause of pancytopenia followed by aplastic anemia as shown in their study by Biradar MP et al.^[9,10]

Jha A et al showed hypoplastic anaemia as the commonest cause of pancytopenia.^[11]

Singh et al found aplastic anemia as the commonest cause of pancytopenia.^[12]

Acute leukemia was the commonest of all hematological malignancies in a study conducted by Atla BL et al.^[13] Similarly in our study acute leukemia were the commonest among all hematological malignancies. Similar results are seen in separate studies by Eesie OJ et al in 2009 & Kibria SG et al in 2010.^[14,15]

CONCLUSION

This study shows that bone marrow aspiration is a valuable diagnostic tool and aids in diagnosis of various hematological diseases.

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