ORIGINAL ARTICLE

BONE MARROW STUDY IN A TERTIARY CARE HOSPITAL, ELURU- ASRAM

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ABSTRACT:

Introduction: Examination of bone marrow aspirate (BMA) and bone marrow biopsy (BMB) are essential for the diagnosis of bone marrow pathology. Bone marrow examination will give information about hemopoietic tissue in various conditions in addition to findings of blood sample as the bone marrow can be affected by both hematological and non-hematological disorders.

Aim and objectives: To analyze the cause of hematological, non-hematological disorders and to interpret the bone marrow findings with various conditions.

Methods: A retrospective and prospective study of 112 patients over a period of two years (June 2015 to July 2017). Clinical details and ethical clearance from institute were obtained. Three modalities peripheral smear(PS), BMA, and BMB were used for diagnosing hematological and non-hematological disorders were included in the study.

Results: Out of 112 cases studied 68(60.7%) were male and 44(39.3%) were female with age group ranging from 3 to 82 years. In both aspiration and biopsy most common findings were Reactive marrow (25.0%), Megaloblastic anemia (20.5%) 2 (1.7%) biopsy samples were found to have Metastasis and 1 (0.8%) case was of SLE.

Conclusion: Bone marrow study is highly informative diagnostic test procedure in evaluating hematological, non-hematological disorder. The final interpretation requires the integration of PS, BMA, and trephine biopsy findings together with the results of supplementary tests such as immunophenotyping, and molecular genetic studies as appropriate, in context of clinical and diagnostic findings.

Keywords: Peripheral smear, Bone marrow aspirate, Bone marrow biopsy.

Introduction:

Bone marrow examination by aspiration & biopsy is simple, cost effective, outpatient procedure & complimentary to each other. Evaluation of hematological &non-haematological disorders, even after detailed clinical history, physical examination & peripheral blood analysis the diagnosis is cryptic & crucial. This study was conducted to evaluate bone marrow samples received at a tertiary care center in our hospital over a period of two years.

Methods:

A two year (June 2015 to July 2017) retrospective and prospective study of 112 patients. Clinical details and Institutional ethical clearance obtained. As per International council for standardization in hematology guidelines, all three modalities :Peripheral smear (PS), Bone Marrow Aspiration (BMA), Bone Marrow Biopsy (BMB), performed to diagnose hematological and non haematological disorders. The bone marrow examination done under local anesthesia by the conventional technique using Jamshidi needle from the posterior superior iliac crest. BMA was done for majority of the cases. BMB was done for all cases, including the cases where aspiration failed.

Exclusion criteria:

Patients with severe thrombocytopenia or functional platelet defects, Prolonged PT INR, Severe bleeding, Children below 3 years of age.

Results:

From June 2015 to May 2017, 112 patients enrolled for the study.

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Age distribution	N(112)	%
<15 years	12	10.7
15-30 years	23	20.5
31-45 years	26	23.2
46-60 years	37	33.0
61& above	14	12.5
	112	100%

Table.1 Age distribution

Presenting complaints	N(112)	%
Fever of unknown origin	32	28.5
Generalised weakness	24	21.4
Weight loss	19	17.0
Organomegaly	19	17.0
Others	18	16.0

Table 2. Presenting complaints

PERIPHERAL SMEAR	N(112)	%
Pancytopenia	52	46.4
Anemia	31	27.7
Leukemia	16	14.2
Bicytopenia	7	6.2
Sub leukemic leukemia	6	5.3

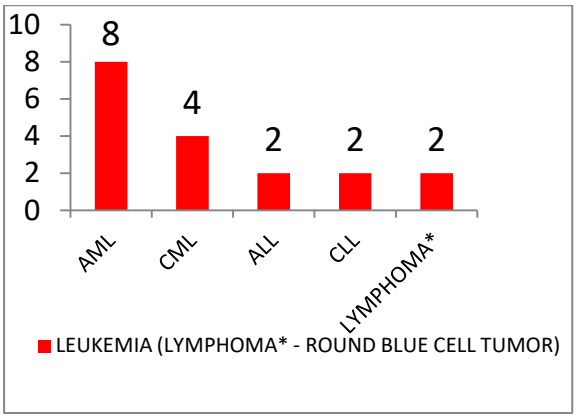
Table3. Peripheral smear

	BONE MARROW ASPITATION		BONE MARROW BIOPSY	
DISORDERS	N	%	N	%
Reactive Marrow	23	26.7	28	25.0
Megaloblastic anaemia	19	22.0	23	20.5
Leukemia	16	18.6	18	16.0
Normal Marrow study	8	9.3	12	10.7
Hypo/ Hyperplastic marrow	11	12.7	18	16.0
Metastatic deposit	2	2.3	2	1.7
Aplastic anemia	2	2.3	4	3.4
Myeloma	2	2.3	4	3.4
Myelofibrosis	2	2.3	2	1.7
SLE	1	1.1	1	0.8
Total	86	100	112	100

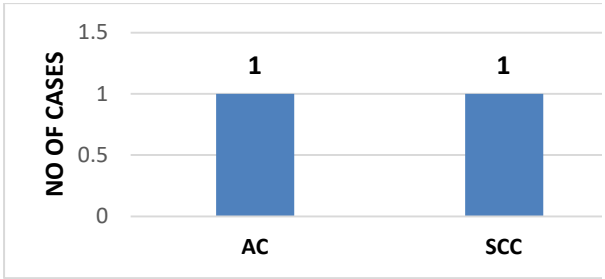
Table 4 % disorders diagnosed as aspiration vs biopsy

BMA & BMB	N(112)	%
REACTIVE MARROW	29	27.1
MEGALOBLASTIC ANEMIA	23	20.5
LEUKEMIA/ Lymphoma	18	16.8
NORMAL MARROW STUDY	18	16.8
OTHERS	11	10.2
APLASTIC ANEMIA	4	3.7
MYELOMA	4	3.7
TOTAL	107	100%

Table 5 Hematological disorders Aspiration and Biposy



Graph.1 Distribution of leukemia



Graph.2 Distribution of non-hematological disorders

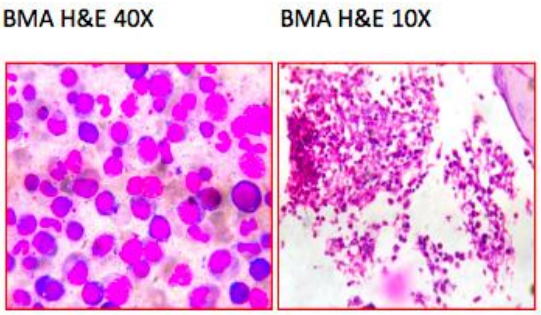
Discussion:

No	Study	Year	No of Cases	Percentage
1	Tilak Et Al	1999	77	Megaloblastic Anaemia (68%)
2	Khodke Et Al	2001	50	Megaloblastic Anaemia (44%)
3	Shilpa Patel Et Al	2014	34	Megaloblastic Anaemia (28%)
4	Present Study	2017	112	Megaloblastic Anaemia (20.5%)

Table 6 showing the previous studies.

MEGALOBLASTIC ANEMIA:

Megaloblastic anemia is 20.5 % in our study and these results are in comparison to the study by shilpa et al. However, the other studies such as Tilak et al and Khodke et al reported 68% and 44% of megaloblastic picture.

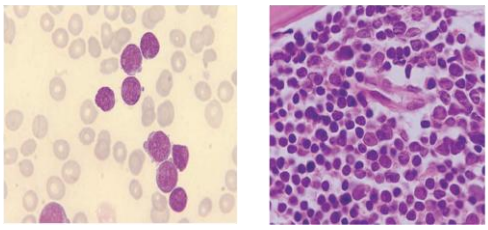


LUEKEMIAS:

As per Islam A and Frisch B et al: Bone marrow histology is often supplementary investigation in acute myeloid leukemia. However, when peripheral blood features are not diagnostic, and bone marrow aspiration is unsuccessful BMB is needed. Our study has similar outcome.

ALL

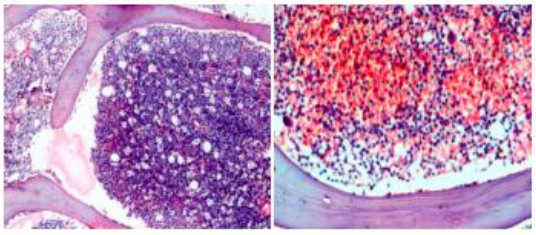
BMA-MGG 100X BMB-H&E 100X



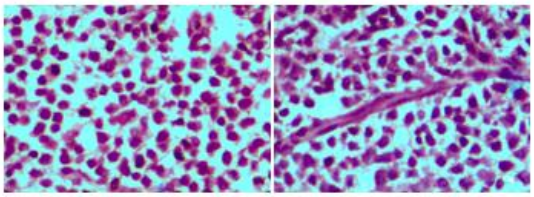
MYELOMA:

Bone marrow biopsy is recommended in multiple myeloma even if an adequate aspirate as a baseline to assess a post treatment response as per Smith Et AL. There were 4 cases (3.7%) of myelomas in our study two of them were diagnosed on biopsy where aspiration yielded a dry tap. Bone marrow biopsy was done in all four cases.

LYMPHOMA: BMB H&E Scanner view

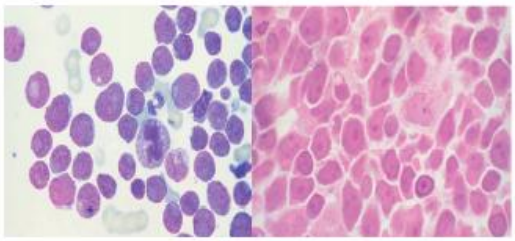


BMB -H&E 40X



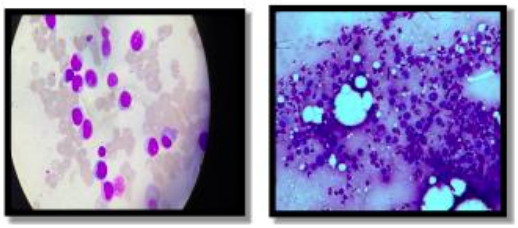
ACUTE MYELOID LEUKEMIA:

BMA MGG 100X



ACUTE MYELOID LEUKEMIA:

PERIPHERAL SMEAR BMA10X



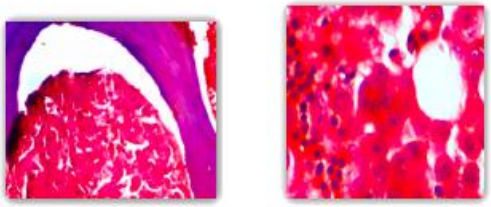
METASTASIS:

In 2 known cases of multiple metastasis marrow examination was advised to evaluate refractory anemia, marrow biopsy revealed deposits.

In our study out of 1.7 % cases of metastatic tumors, One case was SCC, another case was diagnosed to be Adenocarcinoma on biopsy. When compared with Nandu et al 2.8% and Toi et al 2.6% metastatic deposits respectively.

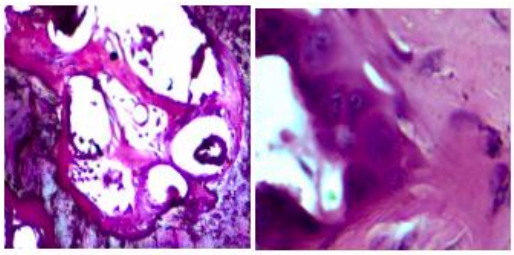
SQUAMOUS CELL CARCINOMA:

BMB- H&E 10X BMB- H&E 40X



ADENOCARCINOMA:

BMB- H&E 10X BMB- H&E 40X



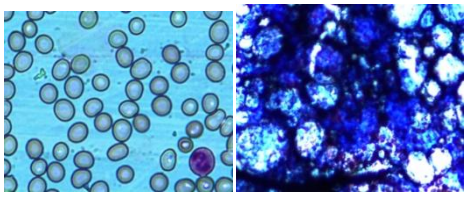
APLASTIC ANAEMIA:

Sr No	STUDY	%	BMA/BMB
1	International Agranulocytosis and Aplastic Anaemia Study7	52.7	Aplastic Anaemia
2	Verma Et Al	40.0	Aplastic Anaemia
3	Present study	3.5	Aplastic Anaemia

APLASTIC ANEMIA:

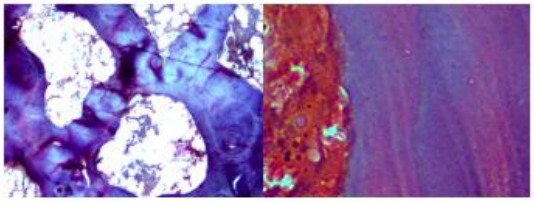
Our study reported only 3.5% of aplastic anemia picture, whereas the other studies have reported more than 40% as shown in above table.

PERIPHERAL SMEAR BMA10X



APLASTIC ANEMIA:

BMB- H&E 10X BMB- H&E 40X



Conclusion:

Peripheral Smear findings provide valuable information in planning for further investigations. BMA & BMB are valuable and usually complement each other. BMA smears are ideal for cytomorphology of hematopoietic cells. Nutritional anemias and hematological malignancies are readily diagnosed by BMA. BMB helpful to assess cell type, cellularity, extent and pattern of tumor infiltration. BMB can diagnose SLE, hypoplastic or aplastic anemias, myelofibrosis, lymphomatous infiltrations, myeloma and metastatic deposits.

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