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Spectrum of hematological disorders by Bone Marrow Aspiration in a tertiary care centre in Gwalior

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ABSTRACT

Background: The bone marrow examination is an essential investigation for the diagnosis and management of many disorders of the blood and bone marrow both neoplastic and non- neoplastic haematological diseases.Bone marrow aspiration usually leads to diagnosis of nutritional anemia, acute leukemia and Immune thrombocytopenic disorders. The present study was conducted in the Central Pathology Laboratory, Department of Pathology with the aim to assess the bone marrow aspiration findings amongst subjects with hematological disorders.

Material and Methods: The study was conducted in the Department of Pathology, Gajra Raja Medical College and Jayarogya Group of Hospitals over a period of 3 years. Bone marrow was aspirated from posterior superior iliac spine under local anaesthesia. Aspirates of dry tap were excluded from the study. Aspiration smears where stained with Leishman stain for morphological examination.

Study Design: The study was conducted from October 2017 to December 2020 i.e. 3 years and 2 months. It was a 2 years retrospective and one year prospective study. Total 189 cases were studied only.

Results: Out of the 189 cases, 37 cases showed diluted marrow. Total 152 cases were included in the study.

Conclusions: Bone marrow aspiration cytology is a mildly invasive technique which can diagnose many hematological and non-hematologic diseases that can be confirmed by more advanced investigations viz. serological, biochemical or molecular

Keywords: Aspiration, Bone marrow, Examination, Hematological disorders, Megaloblastic INTRODUCTION

Hematological disorders are quite frequent in population. Most of the times the diagnosis can be arrived by detail clinical examination and few simple investigations. Bone marrow examination is a formidable weapon in the clinician's diagnostic armamentarium to hit an unsuspected diagnosis when other test results turn out to be noncontributory or inconclusive during the evaluation process.[1,2] It is a useful investigative tool for the diagnosis of many hematological and nonhematological disorders.[3] Though an invasive procedure it can be easily performed even in the presence of thrombocytopenia with little or no risk of bleeding.^[1] 6

Bone marrow examination may be performed by two methods: Aspiration and trephine biopsy. Bone marrow aspiration (BMA) is simple, reliable, and rapid method of marrow evaluation. It provides information about the numerical and cytological features of marrow cells. These cells are also well suited to further examination by cytogenetics, molecular and flow cytometric methods. However, BMA has low sensitivity in detecting solid tumor metastasis and lymphoma involvement.[4,5]

Aims and Objectives:

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The aim of the present study is to analyze the common indications of performing BME and to assess the spectrum of disorders diagnosed from BM

OBJECTIVES: To study the-

- 1. Age group of patients.
- 2. M:F Ratio
- 3. Commonest hematological disorders

Duration of Study: Study conducted for 3 years and 2 months.2 year and 2 months Retrospective and 1 year prospective study.

Material And Methods: We mostly recieve BMA slides from Paediatric and Medicine Departments.For Retrospective cases the Bone marrow aspiration data was retrieved, reviewed and analysed.

Observation and Results:

Total 189 cases were reported in the study duration.37 cases(19.57%) presented with diluted

marrow hence excluded from the study. Total cases analysed were 152. Male to Female ratio was 1.01:1.Maximum cases were reported in Age groups 0-10 years followed by 11 to 20 years (Table 1). Youngest case was a 02 month old male and oldest was a 75 year old female.

Commonest Peripheral Smear finding reported was Macrocytic Anemia(Megaloblastic) confirmed on BMA as Erythroid Hyperplasia with Megaloblastic maturation (42 cases, 27.63%) followed by Erythroid Hyperplasia with Normoblastic maturation(29 Dimorphic cases, 19.07%), Anaemia/Nutritional Deficiency Anaemia (23 cases, 15.13%),13 cases Micronormoblastic each of Marrow and ALL(8.55%), 12 cases(7.89%) of Hypoplastic marrow, 9 cases of ITP constituting 5.92%, 05 cases (3.28%) of AML,01 case each of CLL,NHL and Idiopathic Hypereosinophilic Syndrome(0.65% of total cases each)shown in Table 2.

Age group	Number of patients(n=189)	Percentage
0-10	78	41.2%
11-20	77	40.74%
21-30	10	5.29%
31-40	09	4.16%
41-50	04	2.1%
51-60	06	3.17%
>60	05	2.64%

Table1: Showing Age group distribution

	Diagnosis	Number of	Percentage
S.No.		cases	(%)
		(n=152)	
1.	Erythroid Hyperplasia with Megaloblastic Maturation	42	27.63
2.	Erythroid Hyperplasia with Normoblastic Maturation	29	19.07
3.	Dimorphic Anemia/Nutritional Deficiency Anaemia	23	15.13
4.	Acute Lymphoblastic Leukaemia(ALL)	13	08.55
5.	Micronormoblastic Maturation	13	08.55
6.	Hypoplastic Marrow	12	07.89
7.	Idiopathic Thrombocytopenic Purpura(ITP)	09	05.92
8.	Acute Myeloid Leukemia(AML)	05	03.28
9.	Chronic Myeloid Leukemia(CML)	03	01.97
10.	Chronic Lymphocytic Leukemia(CLL)	01	00.65
11.	Non Hodgkins Lymphoma	01	00.65
12.	Idiopathic Hypereosinophilic Syndrome	01	00.65

 Table 2: Showing the total cases of all Diagnosis with percentage

DISCUSSION:

Pancytopenia (>50%) was commonest indication for BMA followed by Bicytopenia.^(7,8) In our study, Nutritional anemia contributed highest number of cases among the nonhematological group(67.76%). Out of nutritional anemia megaloblastic anemia was disorder ^(9,10). common Cases the most of Micronormoblastic marrow were less only 5.92%.⁽⁷⁾ Erythroid hyperplasia was seen in 105 cases of Nutritional Anaemia.Acute leukemia is the commonest hematological malignancy and AML is more common than ALL.^(11,12)ALL was reported the highest owing to our predominantly paediatric population followed by AML.

Rarely infection, excessive bleeding or embolism has been reported after bone marrow biopsy.^[13]

BMA is an uncomfortable procedure for the patient ,it should be performed only when there is a clear clinical indication, ^[2] it is a useful,economical and quick technique not only in the diagnosis of different blood disorders but also for various systemic illnesses including pyrexia of unknown origin.BM Biopsy has an added advantage over aspiration especially in cases of focal lesions ,failed or diluted aspirate,hence should be practiced. BMA cytology and trephine biopsy histopathology complement each other .Furthermore, application of ancillary techniques such as flow cytometery and IHC prove to be an additional advantage in further typing of various diseases.

We receive BMA from mainly Paediatric and Medicine wards hence the commonest age group was 0-20 years.(>80% cases)

Diluted Marrow cases were too high and should be avoided by proper training and practice.

to COVID Pandemic.the Due cases were comparatively less from Dec.2019 till Dec.2020.The differences noticed in our study can be attributed to group small sample size,age under study ,geographical distribution and variation in cases.Long term studies and More data is required to reach conclusion and plan accordingly.



Fig.1: Bone marrow aspirate smear replaced by blasts in a case of ALL

CONCLUSION:

Bone marrow examination is an invasive yet safe procedure and it is well tolerated by patients. The examination helps in many cases to arrive at a final diagnosis within a short span of time, guides management too. Many studies have concluded that BMA will yield diagnostic result in majority of cases.^[13,14] In our study also we could diagnose many cases on BMA alone. Long term continuous studies are required for further analysis and evaluation.

REFERENCES:

- Bain BJ. Bone marrow aspiration. J Clin Pathol. 2001;54:657–63. [PMC free article] [PubMed] [Google Scholar]
- Bain BJ. Bone marrow trephine biopsy. J Clin Pathol. 2001;54:737–42. [PMC free article] [PubMed] [Google Scholar]
- Riley RS, Hogan TF, Pavot DR, Forysthe R, Massey D, Smith E, et al. A pathologist's perspective on bone marrow aspiration and biopsy: I. Performing a bone marrow examination. J Clin Lab Anal. 2004;18:70– [PMC free article] [PubMed] [Google Scholar]
- Bates I, Burthem J. Bone marrow biopsy. In: Bain BJ, Bates I, Laffan MA, Lewis SM, editors. Dacie and Lewis Practical Hematology. 11th ed. China: Elsevier, Churchill Livingstone; 2012. pp. 123–37. [Google Scholar]
- Atla BL, Anem V, Dasari A. Prospective study of bone marrow in haematological disorders. Int J Res Med Sci. 2015;3:1917–21. [Google Scholar]
- 6. 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.

- Pudasaini S , Prasad KBR et al.Interpretation of bone marrow aspiration in hematological disorder. Journal of Pathology of Nepal (2012) Vol. 2, 309-312
- 8. Ahmad SQ, Khan OU, Zafar N. Utility of Bone Marrow Examination in a Secondary Care Hospital JRMC 2011;15:40-1.
- 9. Shastry SM, Kolte SS. Spectrum of hematological disorders observed in onehundred and ten consecutive bone marrow aspirations and biopsies. Med J DY Patil Univ [serial online] 2012 [cited 2021 Apr 26];5:118-21
- Fahim Manzoor et al .Diagnostic Outcome of Bone Marrow Aspiration– An Experience from Tertiary Care Hospital.JMSCR Volume 06 Issue 08 August 2018
- Egesie OJ, Joseph DE, Egesie UG, Ewuga OJ. Epidemiology of anemia necessitating bone marrow aspiration cytology in Jos. Niger Med J. 2009;50:61-1.
- Kibria SG, Islam MDU, Chowdhury ASMJ et al. Prevalence Of Hematological Disorder: A Bone Marrow Study of 177 Cases In A Private Hospital At Faridpur. Faridpur Med. Coll. J. 2010;5:11-3.
- 13. Onal IK, Sümer H, Tufan A, ShorbagiA.Bone marrow embolismafter marrow aspiration and biopsy. Am J Hematol 2005;78:158
- 14. Mussarat N, Raziq F. The incidence of underlying pathology in pancytopenia. An experience of 89 cases. J Postgr Med Inst 2004;18:76-9