Global Journal of Medical Research: C
Microbiology and Pathology
Volume 15 Issue 5 Version 1.0 Year 2015
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Spectrum of Disorders Diagnosed by Bone Marrow Aspiration

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Abstract- *Aims and Objectives:* To identify and analyse the most common hematological disorders diagnosed by doing bone marrow aspiration in a particular group of patients.

Material and Method: Bone marrow aspiration was done from Manubrium of the Sternum after injecting 2% xylocaine to the part. Bone marrow smears were prepared and stained with Leishman stain along with the simultaneous staining of the peripheral smears. A complete hemogram including Hb%, PCV, Red cell indices, platelet count, total leucocyte count and differential leucocyte count was also done by Automated cell counter. Finally, the bone marrow and peripheral smears were examined manually under oil immersion.

Conclusion: In this study it was found that the most frequently diagnosed hematological disorders on bone marrow aspiration are Megaloblastic and Dimorphic anemias followed by Acute Myeloid and Acute Lymphoblastic Leukemias. Hematological disorders are more common in early adulthood. commonest leukemia in adults and children is Acute Myeloid Leukemia, AML and Acute Lymphoblastic Leukemia, ALL respectively with overall prevalence of leukemias being more in adults.

Keywords: *bone marrow aspiration, anemia, leukemia.*

GJMR-C Classification : *NLMC Code: WH 380, WH 175*

Strictly as per the compliance and regulations of:

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I. Material and Method

Study area and design: The present study was done in the Department of pathology, Gandhi Medical College and associated Hamidia hospital, Bhopal M.P. A total of 135 consecutive prospective cases were studied during a span of one year.

Ethical consideration: Bone marrow aspiration was done under all aseptic precautions and samples were processed according to the established laboratory protocol before generating final report to the patient. Informed consent regarding the procedure was taken prior to the aspiration. It was told to the patients that the information shared by them and the results thereafter will be used for medical research.

Patient's Selection criteria: Our study included all the patients admitted in Hamidia hospital with a clinical suspicion of hematological disorder and demonstrating some abnormality in the peripheral blood smears. OPD patients on clinical suspicion of a hematological disorder by the consultant incharge were also included in the study group after obtaining the detailed history, clinical examination and all relevant investigations. Patients with highly increased bleeding time and clotting time were deterred.

II. Procedure

a) Bone Marrow Aspiration

Patient and his attendants were told about the entire procedure and a written consent was taken. Complete patient preparation (xylocaine sensitivity testing, cleaning and draping) was done prior to the bone marrow aspiration. The skin over the sternum was cleaned with 70% ethyl alcohol. The skin, subcutaneous tissue and the periosteum overlying the manubrium was infiltrated with 1-1.5 ml of 2% xylocaine. Two minutes were given to achieve the effect of anaesthesia. In case of small children and uncooperative patients, sedation with diazepam was used. The site of puncture of the manubrium was opposite to the second intercostal space and slightly to one side of the midline.

The guard on the aspiration needle was adjusted and with the boring movement, needle (salah needle) was passed perpendicularly into the cavity. After piercing the skin and the subcutaneous tissue when the needle point reached the periosteum, the needle was pushed with a boring motion into the cavity and the termination point was achieved when there was loss of resistance. Stilette was removed and a 10 ml dispovan syringe was attached to the needle to suck the marrow contents. Not more than 0.3 ml of marrow fluid was sucked in a single aspiration. Immediately, 6-8 good marrow smears were made and dried quickly with the help of a hair drier. Simultaneously, 2-3 peripheral blood smears were also made. The slides were numbered with a diamond pencil. Two marrow smears and one peripheral blood smear were taken for leishman staining while the rest of the unstained smears, after being fixed in methanol were wrapped in an aluminium foil and kept in a dry place for future use.

b) Leishman Staining of Slides

Bone marrow smears and the peripheral blood smear were placed on a staining rack and leishman stain was put drop by drop on the film so as to cover it completely. After 2 minutes, double the volume of

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buffered water was added and the two were mixed together with the help of a dropper. After 20 minutes, slides of peripheral smear were washed under the running tap water and the scum was drained off while bone marrow smears were washed after 30 minutes. Back side of the slides was wiped off with a clean and dry filter paper. The slides were kept in a vertical position to drain and dry. The slides were now ready for the microscopic examination.

c) Reporting of Bone Marrow Smears

Bone marrow as well as peripheral smears were first scanned with scanner (4X lens) followed by the examination under low power(10X), high power(40X) and oil immersion lenses(100X) respectively. The final reports were dispatched in the prescribed format only.

III. Observation and Discussion

Table no. 1 : Indications for Bone Marrow Examination

INDICATION	CASES	
	No.	%
Anemia Under Evaluation	62	46.0
Pancytopenia Under evaluation	28	20.7
Suspected Leukemia	14	10.4
Thrombocytopenia	12	8.9
Hepatosplenomegaly Under evaluation	04	3.0
Pyrexia Under Evaluation	02	1.5
Others	13	10.0
Total	135	100.0

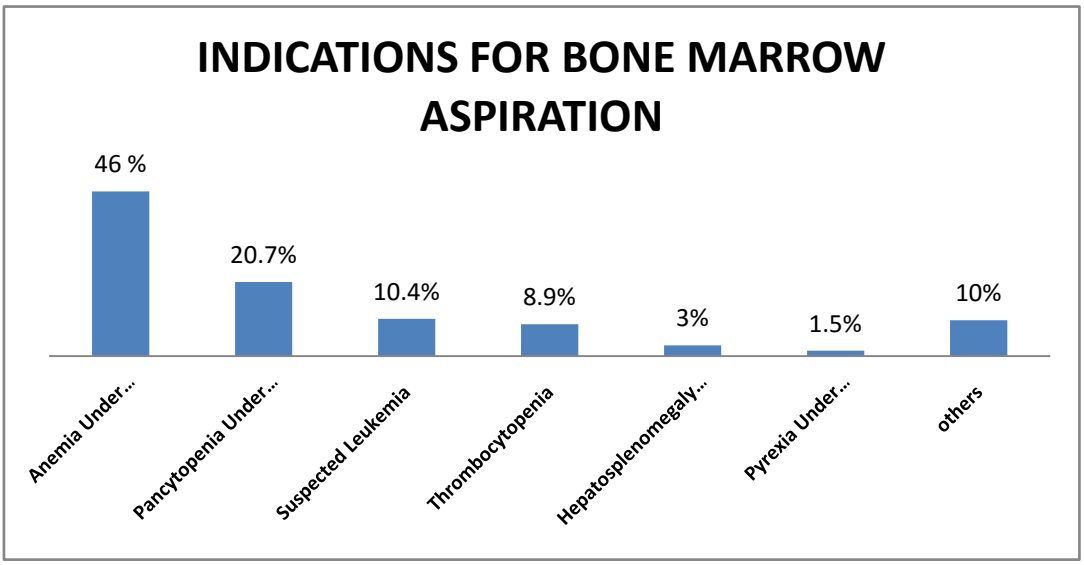


Table no. 2 : Spectrum of Disorders

S.No	Disorder	Total	Percentage (%)
1	Megaloblastic Anemia	59	43.7
2	Dimorphic Anemia	18	13.3
3	Acute Myeloid Leukemia	13	9.6
4	Idiopathic Thrombocytopenic Purpura	13	9.6
5	Hypoplastic Marrow	11	8.1
6	Acute Lymphoblastic Leukemia	09	6.6
7	Plasma Cell Disorder	03	2.2
8	Myeloproliferative Disorder	03	2.2
9	Lymphoproliferative Disorder	02	1.5
10	Chronic Lymphocytic Leukemia	01	0.74
11	Myelodysplastic Syndrome	01	0.74
12	Leishmaniasis	01	0.74
13	Hypersplenism	01	0.74
Total		135	100.0

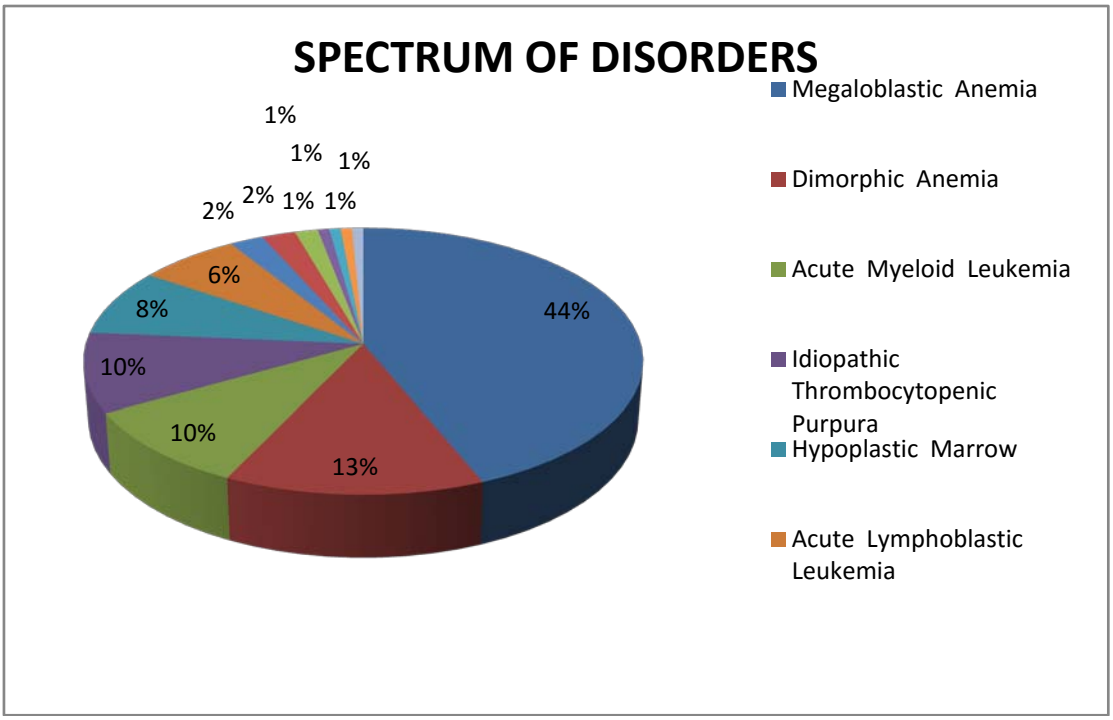


Table no. 3 : Percentage of Cases in Each Age Group

Age (Yrs)	Percentage
0-20	41.5
21-40	33.3
41-60	22.2
>60	3.0

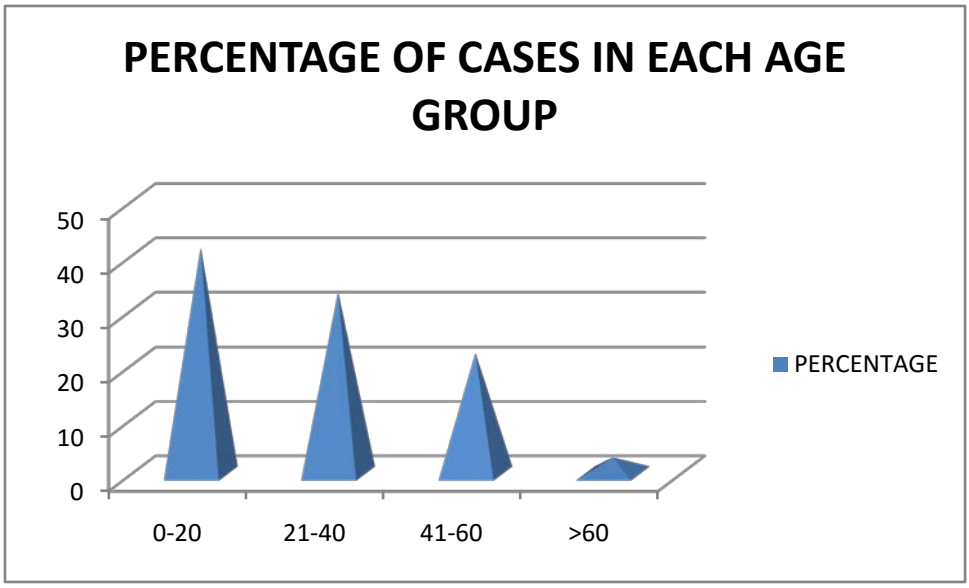
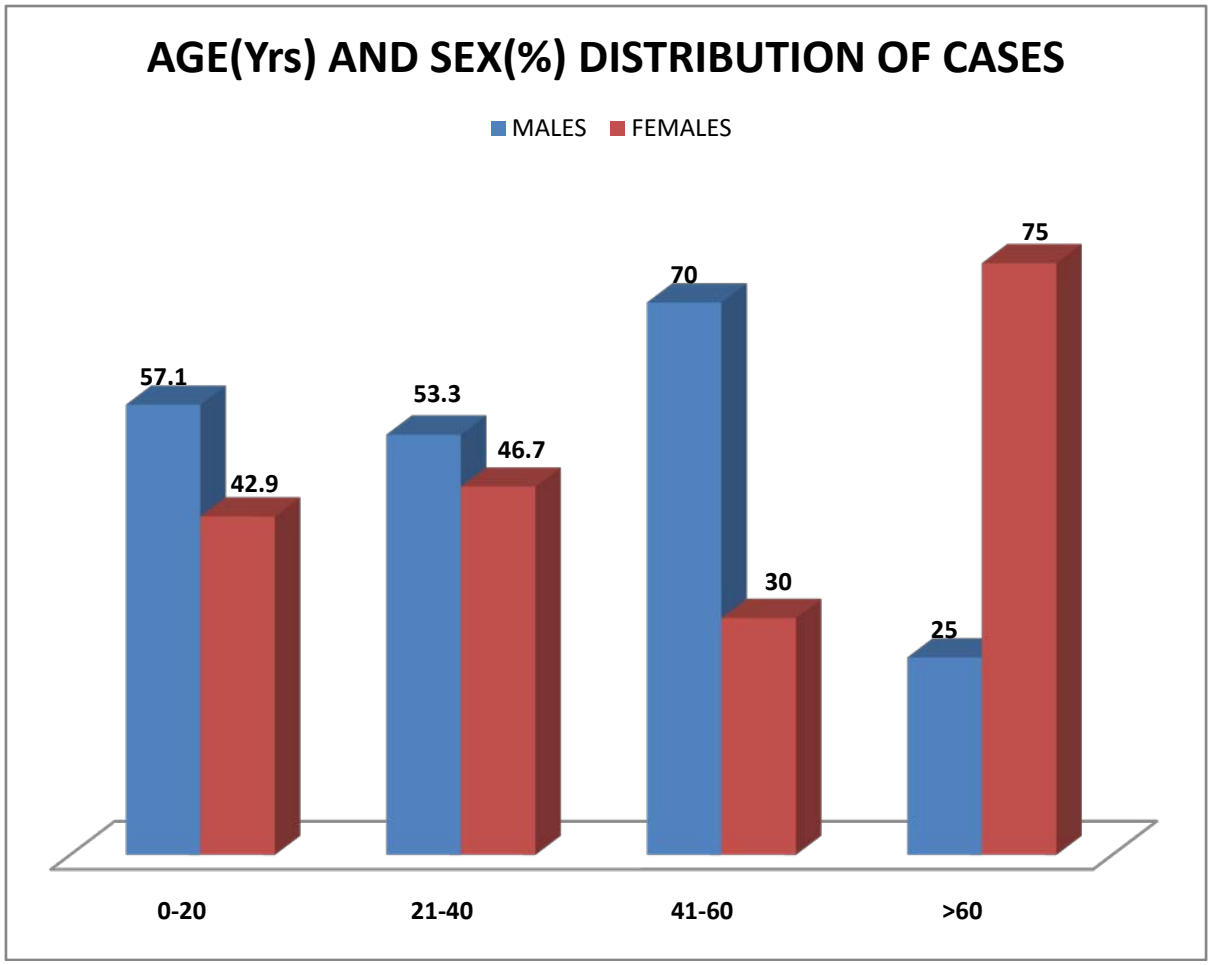


Table no. 4 : Age and Sex Distribution of Cases

Age (Yrs)	Males (%)	Females (%)
0-20	57.1	42.9
21-40	53.3	46.7
41-60	70	30
>60	25	75



IV. Conclusion

In this study, we found that on bone marrow aspiration the most frequently diagnosed haematological disorders[1] are Anemias[9]. Amongst the anemias, the commonest one are the Megaloblastic anemias[4,6,10] and those showing Dimorphic blood picture. Acute Leukemias[2,3,5,7,8] occupy the second position in the list including the Acute Myeloid Leukemias and Acute Lymphoblastic Leukemias with overall prevalence of leukemias being more in adults as compared to children. Hematological disorders are more common during childhood period and in the early adulthood. Commonest Leukemia in adults is Acute Myeloid Leukemia. The most common clinical presentation of Acute Leukemias is Pallor and Fever while Anemias present clinically with Pallor and Fatigue.

V. Acknowledgement

Smt. Annapurna Tomar, Dr. R.K Nigam and the entire staff of the department of pathology, Gandhi Medical College, Bhopal, M.P.

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