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Pattern of Haematological Disorders on Bone Marrow Aspiration in Atertiary Care Centre in North India.

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Abstract: ***Background: Bone marrow aspiration is an important technique for diagnosing both neoplastic and non-neoplastic haematological diseases. The present study was done in the post graduate department of pathology to study the spectrum of haematological and non haematological disorders on bone marrow aspiration and its role in the identification of these disorders. Material and Methods: This was a one year study conducted in the department of pathology Govt Medical College Jammu from January 2018 to December 2018. Total of 350 cases were subjected to bone marrow aspiration during this period. Results: A total of 350 cases were included in the study. The age range of patients was 2 to 75 years and male to female ratio was 1.16:1. Anemias were the most common haematological disorders in our study accounting for 40% of cases followed by acute leukemias accounting for 27.14% of cases. Among anemias, megaloblastic anemias were the most common followed by dual deficiency anemia. Among leukemias, acute myeloid leukemia was the most common. Conclusions: Bone marrow aspiration cytology is a mildly invasive technique which can diagnose many neoplastic and non-neoplastic haematological disorders. It is very useful in making a correct diagnosis and determining the cause of disease.***

Keywords: Anaemia, haematological disorders, bone marrow aspiration

1. Introduction

Haematological disorders are very common ranging from anemias to advanced haematological malignancies. These disorders could be nutritional anemias like megaloblastic anemia or iron deficiency anemia or they may include hematological malignancies like leukemia or lymphoma. However, the pattern of these disorders is different in different geographical locations. This variation in frequency of these diseases also differs among developing and developed nations (1, 2). Bone marrow aspiration is a mildly invasive but relatively simple and safe procedure, whereby representative specimen of spongy bone marrow is obtained through a needle aspiration for diagnostic evaluations in hematology and stem cell harvest (3, 4). It forms the cornerstone of diagnosis and management in myriad clinical situations, both haematological and non haematological. Often the patients with suspected marrow diseases whose diagnosis remain inconclusive after examination of the peripheral blood with complete blood count, peripheral smear examination, and ancilliary tests require bone marrow aspiration. It gives a complete picture of reaction of the haematopoietic tissue to anemia that cannot be gained from the peripheral blood smear alone. The procedure may be necessary for the diagnosis and management of haematological and to some extent non haematological disorders, for staging, prognostication and evaluation of therapeutic response in some cases (5). The present study was done to know the etiological spectrum of disorders as diagnosed on bone marrow examination and to know the age incidence and male to female ratio.

2. Material and Methods

The present study was conducted in the Postgraduate Department of Pathology, Government Medical College Jammu for a period of one year from January 2018 to December 2018. BMA was performed using a standard unit protocol as adopted from ICSH guidelines and other authorities (3, 4, 6, 7, 8). Written informed consent of all the patients was obtained before performing the procedure. BMA was done from the posterior superior iliac spine in all the patients with Salah aspiration needle. The aspirate was drawn with a 20ml plastic syringe. Bone marrow smears were prepared immediately following aspiration. After being air dried, these smears were stained with Leishman stain for morphological examination. Iron stained (Perls stain) slides were examined in all the cases. For all the cases, complete blood count and peripheral blood smears were also taken.

3. Results

A total of 350 cases were included in the study. Male to female ratio in our study was 1.16:1. The age ranges of the cases were from 2 to 75 years. Table 1 and Table 2 show age and gender distribution of these patients. Table 3 shows the pattern of haematological and non haematological disorders on bone marrow examination. Anemias were the most common haematological disorders in our study accounting for 40 % of cases followed by acute leukemias accounting for 27.14 % of cases. Among anemias, megaloblastic anemias were the most common followed by dual deficiency anemia. Among leukemias, acute myeloid leukemia was the most common.

Table 1: Age Distribution

Age (in years)	Number of patients	Percentage (%)
0-10	14	4
11-20	75	21.43
21-30	87	24.86
31-40	33	9.42
41-50	45	12.86
51-60	40	11.43
61-70	22	6.3
71-80	34	9.72
Total	350	100

Table 2: Sex Distribution

Sex	Number of patients	Percentage
Male	188	53.71
Female	162	46.28
Total	350	100

Table 3: Showing diseases diagnosed by Bone Marrow Aspiration Cytology

Haematological disorders	*Cases (n)*	*Percentage %*
Anemias	140	40
Megaloblastic anemia	60	17.14
Iron deficiency anemia	35	10
Dual deficiency anemia	45	12.85
Aplastic anemia	10	2.86
Acute leukemia	95	27.14
Acute myeloid leukemia	58	16.57
Acute lymphoblastic leukemia	37	10.57
Multiple Myeloma	40	11.43
Chronic Lymphocytic leukemia	13	3.71
Myeloproliferative Neoplasm	10	2.86
Lymphoma infiltration	13	3.71
Metastasis	09	2.57
Myelodysplastic changes	07	2.0
Leishmaniasis	05	1.43
Normal Marrow	15	4.30
Storage Disorders	3	0.86
Gaucher's disease	2	0.57
Neimann Pick disease	1	0.29

4. Discussion

Bone marrow aspiration is one of the most important tool in the diagnosis of many haematological and non haematological benign as well as malignant disorders of bone marrow. In our study, the age range of the patients was from 2 to 75 years with male to female ratio of 1.16 : 1. Similar results were also obtained in the studies done by Niazi et al (9) and Jha et al (10) ; in their studies, patients age range from 1-75 years and 1-79 years with a male preponderance in both the studies 1.7:1 and 1.5: 1 respectively. Table 4 shows comparison of our study with different other studies regarding age and sex distribution.

Table 4: Comparison of age and sex distribution in different studies

Study	Age (in years)	M:F
Niazi et al[9]	1-75	1.7:1
Jha et al [10]	1-79	1.5:1
Kibria et al [11]	3.5-80	1:0.59
Egesie et al [12]	3-80	1.5:1
Gayathri et al [13]	2-80	1.2:1
Pudasaini S et al [14]	9m-75	1:1.1
Present study	2-75	1.16:1

In all the above studies, there was a male preponderance except the study done by Pudasaini S et al (14) in which there is slight female predominance with a male to female ratio being 1:1.1

In our study, anemia was the most common haematological disorder (40%) with megaloblastic anemia being predominant, accounting for 17.14% of the cases. In a similar study done by Khan SP et al (15), megaloblastic anemia was the most common finding (14.5% cases). Similarly, studies done by Ranabhat et al (16) and Atla BL et al (17) also reported megaloblastic anemia as the most common finding.

Acute leukemias were the second most common finding accounting for 27.14% cases with acute myeloid leukemia constituting 16.57% cases. In other studies done by Pudasaini S et al (14), Khan SP et al (15), Ghartimagar D et al (18) ; acute leukemias were the second most common disorder and in all those studies they found acute myeloid leukemia more common than acute lymphoid leukemia. Atla BL et al (17) also reported acute myeloid leukemias the more common haematological malignancies than acute lymphoblastic leukemias. The other common malignancies seen in our study were multiple myeloma (11.43%) and chronic lymphocytic leukemia (3.71%). Lymphoma infiltration was seen in 3.71% of cases which was similar to study done by Khan SP et al (15) who found lymphoma infiltration in 4% cases.

There were three cases of storage disorders (0.86%) diagnosed in our study, out of which 2 were of Gaucher's disease and 1 case of Neimann Pick disease. Thus, bone marrow aspiration smears are very useful in the diagnosis of these childhood disorders. Myelodysplastic syndromes were diagnosed in our study on BMA who were previously treated with megaloblastic anemia and not responding to therapy. In our study, metastatic deposits were seen in 2.57% of the cases. Khan SP et al (15) in their study have seen metastatic deposits in 4.4% cases. Normal marrow study was reported in 4.30% cases. Atla BL et al (17) reported normal marrow study in 3.8% cases and Khan SP et al (15) reported normal bone marrow in6.8% cases.

5. Conclusion

Bone marrow aspiration is a paramount tool in the diagnosis of many haematological and non haematological disorders. It doesnot require much sophisticated equipments. Thus in a resource –poor country like India it becomes an important investigation in the diagnosis of many disorders and provides a valuable insight to the cause of anemia which is very common in our country.

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