Original Research Paper

Volume-8 | Issue-11 | November-2018 | PRINT ISSN No 2249-555X

Pathology

SPECTRUM OF HAEMATOLOGICAL DISORDERS ON BONE MARROW ASPIRATION AND BIOPSY: A RETROSPECTIVE STUDY OF 498 CASES

Dr Priya Bagale Assistant Professor BJ Govt Medical College, Pune

Dr Meenal Shingade* Associate Professor BJ Govt Medical College, Pune *Corresponding Author

ABSTRACT

Introduction: The present study was conducted in the department of pathology with the aim to evaluate the frequency of involvement of bone marrow in various haematological disorders and to assess utility of bone marrow examination to reach the final diagnosis.

Material methods: This was a retrospective study and total 498 bone marrow aspiration (BMA) and biopsies were included along with those cases where patient presented to us with hematological abnormalities. Clinical and laboratory data were retrieved from case files and laboratory records.

Results: BMA from 498 patients were analyzed. Megaloblastic anemia contributed highest number of cases among the non malignant haematological group. Acute myeloid leukemia was the commonest malignant haematological disorder. Among 498 cases, 256 were male and 242 were female patients with highest number of cases in the age group of 21-30 years.

Conclusion: Bone marrow examination plays important role not only in definitive tissue diagnosis, but also determine prognosis & further line of management in haematological and nonhematological disorders.

KEYWORDS : Bone marrow aspiration, haematological disorders, megaloblastic anemia.

INTRODUCTION

Bone marrow is involved in variety of haematological and non-haematological disorders.

The haematological disorders include acute leukemia, myeloproliferative neoplasm (MPN), hemato-lymphoid neoplasm, nutritional deficiency diseases. Non-haematological disorders include infectious diseases infiltrating the bone marrow such as tuberculosis, parasitic infections and metastatic deposits[1].

The two most important techniques used for the diagnosis of haematological disorders are bone marrow aspiration and trephine biopsy. For bone marrow interpretation, the history, clinical finding, peripheral blood picture and other laboratory findings are required[2]. 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. Bone marrow trephine biopsies (BMB) provide excellent appreciation of spatial relationships between cells and of overall bone marrow structure. It is required in conditions such as inadequate or failed aspirate, assessment of cellularity and bone marrow architecture, suspected focal lesion (for example, suspected granulomatous disease, or lymphoma) and bone marrow fibrosis[3]. Commonly it is done for the evaluation of unexplained cytopenias, leukemia, for the diagnosis or staging of a neoplasm and storage disorders. Trephine biopsy is usually performed when there is hypoplasia or aplasia suspected on aspiration. The present study is undertaken to evaluate spectrum of various hematological disorders reported in bone marrow aspiration and trephine biopsy.

MATERIALS AND METHODS

This was a retrospective study done in Department of Pathology, B.J. Medical College, Pune over a period of 2 years. A total 498 cases were included in this study. Bone marrow aspiration reports of patients were retrieved from the record file in department. Peripheral blood smear along with necessary haematological and clinical parameters were also noted from record file. Aspirates of inadequate material or dry tap were excluded from the study. Then data was manually collected and subsequently analyzed.

RESULTS

A total number of 498 cases were included in this study. Age group ranged from 7 months to 75 years with highest number of cases in the age group of 21-30 years. Male to female ratio was 1.05:1 Non-malignant haematological conditions were 388/498 (77.91%) while the numbers of malignant haematological conditions were 110/498(22%). Out of the non-malignant haematological disorders 131/388 (33.76%) cases were megaloblastic anaemia while 91/388 (23.45%) cases were having dimorphic anemia. 42/388 (10.82%) were having iron deficiency anaemia. In the present study nutritional anemia contributed highest number of cases amongst the non-malignant haematological group. Out of nutritional anemia, megaloblastic anemia was the most common disorder. Acute myeloid leukemia (AML) 53/110 (53%) was the commonest malignant hematological disorder in the present study. Other malignant disorders include acute lymphoblastic leukaemia (ALL), chronic myeloid leukemia(CML), chronic lymphocytic leulemia (CLL) and multiple myeloma, non Hodgkins lymphoma (NHL). Blood counts and peripheral blood smear revealed anemia in 156(31.31%) cases. Pancytopenia was seen in 151(30.32%) cases. Fever was noted in 89(17.87%) cases.

Table 1: Indications for bone marrow examination

Clinical Condition	Number	Percentages (%)
Anemia	156	31.31
Pancytopenia	151	30.32
Fever of unknown origin	89	17.87
Hepatospleenomegaly	35	7.02
Bleeding	36	7.22
Fatigue	10	2.00
Lytic lesion	06	1.20
Weight loss	15	3.01
Total cases	498	100

Table 2 : Bone marrow examination findings (Total cases 498)

Non Malignant Haematological Disorders	Numbers	Percentage
Megaloblastic anemia	131	33.76
Iron deficiency anaemia	42	10.52
Dimorphic anemia	91	23.45
Haemolytic Anaemia	3	0.77
Sideroblastic anaemia	2	0.51
Anaemia of chronic disorders	8	2.06
Aplastic anaemia	5	1.28
Idiopathic thrombocytopenia purpura	20	5.15
Myeloid hyperplasia	8	2.06
Myelofibrosis	4	1.03
Hypersplenism	3	0.77
Hypoplastic marrow	23	5.92
Normal reactive marrow	45	11.59
Non Haematological disorders		
Visceral leishmaniasis	1	0.25
Storage disorder	2	0.40
Total	388/498	77.91

B: Malignant haematological disorders		
Acute myelogenous leukaemia	52	47.27
Acute lymphoblastic leukaemia	12	10.90
Chronic lymphocytic leukaemia	5	4.54
Chronic myelogenous leukaemia	11	10
Non-Hodgkin's lymphoma	15	13.6
Multiple myeloma/plasmacytosis	11	10
Myelodysplastic syndrome	3	2.7
BM secondaries	1	0.90
Total	110/498	22.08

DISCUSSION

The spectrum of haematological disorders is very wide. Bone marrow examination is safe and a useful test in reaching the final diagnosis. This study was conducted to know the spectrum of haematological disorders on bone marrow examination in a tertiary care hospital.

In our study, 77.91% were non-malignant haematological conditions while 22.08% cases were haematological malignancies. Our findings are almost similar to study done by Gandapur AS et al[4] who observed 73.2% cases were non-malignant haematological conditions while 27.8% cases were different haematological malignancies. In our study the most common age group undergoing BMA was 21 -30 years. In a study done by Shastri et al,[5] the majority of patients were from the age group of 21 -30years. In the present study commonest indication of BMA was anemia (31.31%) followed by pancytopenia(30.30%). Similar to our finding, anaemia was the commonest indication in a study done by Kishore et al[6] and the second common indication in a study done by Manjit kaur et al[7]. In the present study nutritional anemia contributed highest number of cases amongst the non malignant hematological group. Out of nutritional anemia megaloblastic anemia 131/388 (33.76%)was the most common disorder. Similar findings were reported by Gandapur AS et al 131/417 (31.4%), Shaheen et al[8] 12/37 (32%), Manan et al[9] 128/412 (30.7%). Possible reasons for higher incidence of megaloblastic anaemia in our setup is dietary factor (lack of Vitamin B12) due to poverty as majority patients coming to government hospital belong to poor socioeconomic strata. In present study hypoplastic marrow seen in 23(5.92%) cases comparable to Pudasaini et al[10](5.3%) and 7.2% and 6.4% of hypoplastic marrow were seen in other studies.[4,6] We encountered 5(1%)cases of aplastic anemia comparable to Gandapur et al (1.75%) and 28(5.62%) cases of ITP comparable to findings of other series who observed 7.8% and 8.9% of ITP cases.[4,6] Acute leukemia was seen in 65(13.5%) cases. Out of this 12 cases were ALL and 52 cases were AML. Other series also showed that acute leukemia is the commonest haematological malignancy [4-6, 8, 9]. In our study CML was seen in 11(2.2%) cases. CLL was seen in 5 (1%) cases. Gandapur et al reported 3.33% of CML cases and 2.6% of CLL cases . Parikh et al[11] observed 6% of CML and 6% of CLL cases.

Other malignancies seen in present study were non-Hodgkins lymphoma 15(3.01%)cases, multiple myeloma 11(2.2%) cases and MDS 3(0.60%) cases. We observed 3.01% non-Hodgkins lymphoma cases comparable to Gandapur et al who observed 4.5% of NHL cases. We encountered 2.2% cases of multiple myeloma compared to other series who reported an incidence varying from 1.7%to 3.5%.[4,6,10] Other series showed incidence of MDS ranging from 0.87% to 3.5%.[4,5,6,10]

Among the non-haematological disorders, two cases of storage disorders (0.40%) and one case of Leishmaniasis (0.25%) were seen . Kishore et al and shastri et al observed (0.58%) and (0.9%) of storage disorder. Pudasaini et al showed 1.8% cases of Leishmaniasis.

CONCLUSION

Bone marrow examination is an important investigative tool for definitive diagnosis of wide varieties of haematological and nonhaematological disorders. Bone marrow aspiration and biopsy complement to each other. Better results are obtained when both are performed simultaneously. Careful evaluation of bone marrow is necessary to arrive at confirmative tissue diagnosis and it plays important role in prognosis and further line of management of wide varieties of haaematological disorders.

REFERENCES

1. S Neal, Young . Harrison's Principles of Internal medicine. 16th Edition. Vol. 15. New Delhi: McGraw Hill; 2005. Aplastic anaemia, myelodysplasia and related bone marrow syndromes. In: Kasper, Braunwald, Fauci, Hauser, Longo, Jameson, editors. p. 617.
2. Brown DC, Gatter KC. The bone marrow trephine biopsy: a review of normal histology. Histopath. 1993;22:411-22.
3. M. Gilotra, M. Gupta, S. Singh, R. Sen. Comparison of bone marrow aspiration cytology with bone marrow trephine biopsy histopathology: An observational study. J Lab Physicians 2017 Jul-Sep; 9(3): 182–189
4. Gandapur AS, Nadeem S,Riaz M, Mannan M. Diagnostic Importance Of Bone Marrow Examination In Haematological Malignant And Non-Malignant Disorders. J Ayub Med Coll Abbottabad 2015; 27(3)
5. Shastri SM, Kolte SS. Spectrum of hematological disorders observed in one hundred and ten consecutive bone marrow aspirations and biopsies. Med. J. Dr. D.Y. Patil Univ. 2012; 5(2):118-121.
6. Kishore Kumar CH, Rao S, Shreedhar T, Vijaya Bhaskar R. Diagnostic Role of Bone Marrow Aspiration In Evaluation of Hematological Disorders – A Study of 344 Cases. IOSR Journal of Dental and Medical Sciences (Volume 16, Issue 10 Ver. XI (Oct. 2017), PP 46-49
7. Kaur M,Rana, AS,Kapoor, S,Puri Diagnostic value of bone marrow aspiration and biopsy in routine hematology practice. Journal of clinical and diagnostic research. 2014 Aug, Vol-8(8): FC13-FC16
8. Shaheen N, Qaiser M. Bone marrow aspiration: The diagnostic tool in haematological and non-haematological disorders. Pak J Pathol 2010; 21:1–4
9. Manan M, Khaliq MA, Ahmed S, Qayyum I and Idrees M. Diagnostic significance of BM examination. J Ayub Med Coll Abbottabad 2000;12:43–45
10 Pudasaini S, Prasad KB, Rauniyar SK, Shrestha R, Gautaam K, Pathak R, et al. Interpretation of bone marrow aspiration in haematological disorders. J PatholNapal 2012; 2:3099-312
11 Parikh R, Vaswani L. A study of bone marrow aspiration in haematological and non haematological disorders,in an urban, tertiary care hospital in Mumbai . Asian Journal of medical ,dental and preventive research 2015; 2:10-20