



Contents lists available at BioMedSciDirect Publications

International Journal of Biological & Medical Research

Journal homepage: www.biomedscidirect.com



Original Article

Spectrum of Bone Marrow aspiration test results at Prince Rashid Hospital/ Jordan; A 3 Year Experience

Asim Momani^a, Ramekhasawneh^{a*}, Ruba abed^b

^aDepartment of pathology, Princess Iman Laboratory and Research Center, King Hussein Medical Center (KHMC), Amman-Jordan

^bDepartment of pathology, Prince Hamzah Hospital, Amman-Jordan

Correspondence should be addressed to Dr. R. Khasawneh (KHMC), E-mail: dr_r_khasawneh@yahoo.com

ARTICLE INFO

Keywords:

Bone marrow
Aspirate
Biopsy

ABSTRACT

Objective: To investigate the common clinical conditions found in bone marrow aspirate test reports among patients of medical ward at Prince Rashid Hospital. **Methods:** This is a retrospective study from January 2008 to December 2010. All bone marrow aspiration results were retrieved from the lab records. **Results:** A total of 200 bone marrow aspiration results were recorded from patients aged 13 years to 80 years. There were 101 females and 99 males with an M: F ratio of almost 1:1. The more frequent indications for bone marrow aspiration were unexplained anemia or pancytopenia, found in 60% of request forms, investigation of underlying hematological malignancy, found in 30% of request forms. The main findings were variable according to the age group. Anemia of chronic disease (23.3%) was the commonest finding in the age group >65 years equal to normal bone marrow findings. Normal bone marrow was the commonest finding in the 36-65 year age group (17.5%) with anemia of chronic disease being next (12.5%). In the 13-35 year age group, normal bone marrow was the commonest finding (20%). **Conclusion:** Bone marrow aspiration and biopsy are used to collect and evaluate bone marrow specimens. Bone marrow aspiration is an important diagnostic modality. This study emphasizes the significance of bone marrow aspiration as a single test when bone marrow biopsy is not available. However, to achieve the optimum standards of patient care and management; bone marrow aspiration and biopsy should be integrated

© Copyright 2010 BioMedSciDirect Publications IJBMR -ISSN: 0976:6685. All rights reserved.

1. Introduction

The bone marrow produces the cellular elements of the blood, including platelets, red blood cells and white blood cells. While much information can be generated by testing the blood itself (withdrawn from the patient by venipuncture), it is sometimes necessary to examine the source of the blood cells in the bone marrow to obtain more information on hematopoiesis; this is the role of bone marrow study (aspiration and biopsy) [1]. The bone marrow biopsy and aspiration procedure provides information about the status of and capability for blood cell production. Bone marrow biopsy and bone marrow aspiration can show whether the bone marrow is healthy and making normal amounts of blood elements [2]. Bone marrow examination is used in the diagnosis of a number of hematologic disorders, including leukemia, multiple myeloma,

lymphoma, anemia, and pancytopenia. Bone marrow samples can be obtained by aspiration and trephine biopsy. Sometimes, a bone marrow examination will include both an aspirate and a biopsy. A bone marrow aspiration removes only the marrow [3]. The aspirate yields semi-liquid bone marrow, which can be examined by a pathologist under a light microscope as well as analyzed by other ancillary tests including flow cytometry, cytogenetic and molecular studies. Frequently, a trephine biopsy is also obtained. An aspiration, using a 20 mL syringe, yields approximately 300 µL of bone marrow. A volume greater than 300 µL is not recommended, since it may dilute the sample with peripheral blood and this can give erroneous results [4].

* Corresponding Author : Dr. Ramekhasawneh

Department of pathology,
Princess Iman Laboratory and Research Center,
King Hussein Medical Center (KHMC),
Amman-Jordan
E-mail: dr_r_khasawneh@yahoo.com

© Copyright 2010 BioMedSciDirect Publications. All rights reserved.

2. Material and Methods

A 3 year retrospective study was conducted at Prince Rashid Hospital; with a capacity of 259 beds, is a general hospital located in Irbid in the north of Jordan, to find out the most common conditions found in bone marrow aspiration samples taken from patients in the medical ward.

Records of all the bone marrow aspirates performed over a 3 year period from January 2008 till December 2010 were retrieved and reviewed. The clinical information including age, sex, pertinent clinical data and the indication for the test on the request form as well as the test result were all noted.

A total of 200 cases were reviewed; 101 females and 99 males with an M: F ratio of almost 1:1.

The cases were divided according to sex and age group as follows:

Age Group	Number; % of total	M; % of same age group	F; % of same age group
>65 Y	60 (30%)	32 (53%)	28 (47%)
36-65 Y	80 (40%)	37 (46%)	43 (54%)
13-35 Y	35 (17.5%)	21 (60%)	14 (40%)
No age	25 (12.5%)	9 (36%)	16 (64%)

The findings according to age group were as follows

Age Group / Diagnosis	>65 Y; Number & % of age group	36-65 Y; Number & % of age Group	13-35 Y; Number & % of age group	No Age; Number & % of same group
Normal bone marrow	14 (23.3%)	14 (17.5%)	6 (17.1%)	2 (8%)
Anemia of chronic disease	14 (23.3%)	10 (12.5%)	0 (0%)	2 (8%)
Iron deficiency anemia	2 (3.3%)	5 (6.25%)	2 (5.7%)	5 (20%)
Combined anemia	2 (3.3%)	7 (8.75%)	3 (8.6%)	2 (8%)
Megaloblastic anemia	4 (6.6%)	2 (2.5%)	3 (8.6%)	3 (12%)
Hemolytic anemia	2 (3.3%)	2 (2.5%)	3 (8.6%)	0 (0%)
Metastatic tumor	2 (3.3%)	0 (0%)	0 (0%)	0 (0%)
Acute leukemia	1 (1.6%)	1 (1.25%)	0 (0%)	2 (8%)
Lymphoma	1 (1.6%)	7 (8.75%)	0 (0%)	0 (0%)
Plasma cell myeloma	4 (6.6%)	4 (5%)	0 (0%)	1 (4%)
MPD	1 (1.6%)	2 (2.5%)	3 (8.6%)	2 (8%)
MDS	5 (8.3%)	5 (6.25%)	0 (0%)	1 (4%)
Aplastic anemia	0 (0%)	0 (0%)	1 (2.85%)	0 (0%)
Peripheral consumption of Plt.	3 (5%)	6 (7.5%)	7 (20%)	3 (12%)
Peripheral consumption of blood elements	0 (0%)	1 (1.25%)	0 (0%)	0 (0%)
Reactive Bone marrow	0 (0%)	6 (7.5%)	0 (0%)	2 (8%)
Inadequate material for Dx.	5 (8.3%)	8 (10%)	7 (20%)	0 (0%)

3. Discussion

There are a variety of bone marrow disorders, malignancies such as leukemia and lymphoma, vitamin and mineral deficiencies, congenital conditions and diseases such as aplastic anemia, congenital dyserythropoietic anemia and hemoglobinopathies that can affect the marrow's ability to produce an adequate number of each of the different blood cell types and release them into the circulation [6].

The main findings in our study were variable according to the age group. Anemia of chronic disease (23.3%) was the commonest finding in the age group >65 years equal to normal bone marrow findings., Normal bone marrow was the commonest finding in the 36-65 year age group (17.5%) with anemia of chronic disease being next (12.5). In the 13-35 year age group, normal bone marrow was the commonest finding (20%). The results where no age was listed showed iron deficiency anemia to be the commonest diagnosis (20%).

Reviewing the literature revealed no comparable studies with the same scope and study population, yet, other studies using bone marrow study; aspirate alone or with biopsy with different scopes and study populations were reviewed.

A study conducted by SG Kibria¹, et al "Prevalence Of Hematological Disorder: "A Bone Marrow Study Of 177 Cases In A Private Hospital At Faridpur" [7], the population of the study included adults and children, the study revealed acute myeloid leukemia to be the commonest malignancy in adults and acute lymphoblastic leukemia to be the commonest malignancy in children. Other malignancies were CML & MDS.

Among the non malignant hematological disorders, combined deficiency was the commonest followed by aplastic anemia.

A study conducted by J.N. GITHANGAA & P.DAVE "Bone marrow examination at a pediatric hospital in Kenya" [8], revealed malignancy to be the commonest finding; ALL & AML followed by hematinic deficiency.

A study done by Sharmila Laishram, et al "Neoplastic Lesions in the Bone Marrow; a 10-year Study in a Teaching Hospital", neoplastic lesions constituted 32.6 % of cases. Leukemias – both acute and chronic –

accounted for 67.9 % of the total neoplastic lesions, followed by MDS making 20.5% and metastatic lesions, 6.5% of cases. Multiple myeloma accounted for 4.1 % of cases.

Non neoplastic lesions constituted the rest of the total cases and were not detailed in the study [9,10].

4. Conclusion

Bone marrow aspiration as a single test is a valuable test in medical practice and can yield much information pertinent to various hematological disorders. However, it should be combined with biopsy as a complete study.

5. References

- [1] Bone marrow examination From Wikipedia, the free encyclopedia.
- [2] www.mayoclinic.com/ (Updated Aug. 2, 2011)
- [3] www.webmed.com, 12 Nov, 2010
- [4] a b medicine Specialties > Hematology > Diagnostic Procedures > Bone Marrow Aspiration and Biopsy Article Last Updated: Apr 7, 2008\
- [5] Omal IK, Sumer H, Tufan A, Shorbagi A. Bone marrow embolism after marrow aspiration and biopsy. Am J Haematol. 2005; 78(2):158.
- [6] Lab Tests on Line ©2001 - 2012 by American Association for Clinical Chemistry
- [7] Prevalence of Hematological Disorder: A Bone Marrow Study Of 177 Cases In A Private Hospital at Faridpur
- [8] SG Kibria¹, MDU Islam², ASMJ Chowdhury³, MY Ali⁴, MR Haque⁵, SM Mustanzid⁶, SY Ali⁷, Faridpur Med. Coll. J. 2010; 5(1):11-13

- [9] East Africa Medical Journal Vol.78 No7 (Supplement) July 2001. Bone Marrow Examination At A Pediatric Hospital In Kenya. J.N. GITHANGAA, Lecturer, Department of Hematology, College of Health sciences, University of Nairobi & P. Dave Medical Specialist, laboratory medicine/ Hematology, Kenyatta National Hospital Neoplastic Lesions in the Bone Marrow: a 10-year Study in a Teaching Hospital
- [10] Sharmila Laishram, Rachel Shimray, A Barindra Sharma, Gayatri Pukhrambam, A Meina Singh, L Durlav Chandra Sharma JIACM 2008; 9(3):175-178.