Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

Multiple Myeloma (MM) Morphological Investigation

Natasha Parkes
Research Scholar,
Cluj Napoca Medical University, Romania.

Abstract

Existing as a disorder of the clonal plasma cell, multiple myeloma (MM) exhibits variations in the clinical course with which it is associated, with frankly aggressive neoplasia reported in some cases and relatively indolent forms in others. Through the neoplastic cells' accumulation and proliferation, the disorder's clinical manifestations are reported. In this study, the main aim was to analyze MM's occurrence in the selected aspirate smears of the bone marrow. Other objectives included analyzing MM cell percentage in the marrow and using Bartl's histological grading model towards reviewing bone marrow trephine biopsies. The motivation of the study was to examine tumor cell burden and growth pattern in bone marrow biopsies. Methodologically, the study focused on individuals clinically diagnosed with MM in PSG OPD. From the findings, based on 1663 bone marrow aspirates under examination, cases of MM were 54. A specific observation concerning the informative nature of the selected materials and methods was that when there is a combined evaluation pitying trephine biopsy and bone marrow aspirate, the approach exhibits superiority and promises more informative and accurate data, as each is independently diagnostic.

Introduction

In cases of MM, pathological manifestations arise from the overproduction of some proteins, as well as the associated constituent polypeptide chains [1]. Hence, establishing MM diagnoses mostly relies on the examination of the bone marrow, combined with other laboratory and clinical parameters [2]. Through morphological, laboratory, and clinical parameters, therefore, it is possible to establish the disease's prognosis [3]. Some of the histological parameters that pose prognostic significance in MM include the mitotic index, marrow fibrosis, plasma cell atypia, pattern of infiltration, and myeloma cell percentage in the marrow [3, 4]. For MM histological staging, a crucial role is played by plasma cell burden quantity in the biopsy, which supplements the role of other clinical staging systems [5]. Hence, through the stage and the grade parameters, there is the provision of the needed data concerning decision-making about modalities of MM treatment, allowing further for the use of sequential biopsies to monitor the effects of therapy [5].

In situations involving classical myeloma cases, they entail plasma cells that are easily recognizable and the diagnosis could be achieved with ease [1]. However, in other situations, there are significant diagnostic problems because they are associated with unusual cytological features. Should the cytological aberration go unrecognized, the resultant diagnosis could be

Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

erroneous [3]. In this study, the central purpose lies in the analysis of MM plasma cells' morphological variants.

Methods

The study targeted individuals clinically diagnosed as MM, having conducted the trephine biopsy and bone marrow aspirate. Following a clinical evaluation, given all patients, there was the collection of trephine biopsy and bone marrow aspirate. Indeed, it was in B5 solution that there was there fixing of the trephine biopsy specimen. This process allowed for routine histopathological investigation, ensuring the smearing of the aspirate without delay. This precision sought to avoid the fast clotting of the bone marrow – when compared to the case of the peripheral blood. For specimen collection, some of the materials that were needed included methanol, clean glass slides, local anesthetic agents, spirit swab or 70% alcohol to clean the skin, and B5 solution. Regarding the procedure for bone marrow aspiration, it was from the posterior or anterior iliac spines, iliac crest, or the sternum that there was the aspiration of the satisfactory bone marrow sample. Indeed, it was under local anesthesia's single sitting that both the bone marrow trephine biopsy and aspirate were obtained. Other procedures included GIESMA staining, bone marrow aspirate smears' evaluation, the bone marrow trephine biopsy process, and hematoxylin and eosin staining. Additional steps entailed bone marrow sections' evaluation, Gomori's methods of reticulum staining, and fibrosis grading.

Results and Discussion

In this investigation, 25,085 biopsies were received. From the bone marrow, there were 976 biopsies. On the other hand, 1663 bone marrow aspirate samples were collected. Indeed, MM diagnosed cases were 54. Out of 54 cases, both the biopsy procedure and bone marrow aspiration were conducted on 34 patients. For the remainder of the 20 cases, either trephine biopsy or aspirate sample was not done. Hence, they were excluded. From a demographic perspective, 60.6 years was the mean age, with the individuals ranging between 34 and 80 years. Hence, the study concentrated on adult individuals. Also, most patients were male (22 out of 34), yielding a female to male ratio or 1:1.8.

Table 1: Demographic characteristics of the participants

AGE (YEARS)	NO. OF MALES (%)	NO. OF FEMALES (%)
31 - 40	2 (5.8)	0(0)
41 - 50	2 (5.8)	2 (5.8)
51 - 60	2 (5.8)	6 (17.6)
61 - 70	11 (32.3)	2 (5.8)
71 - 80	7 (20.5)	2 (5.8)
TOTAL	22	12

Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

Table 2: The peripheral smear's morphological pattern

BLOOD PICTURE	NO. OF PATIENTS
NN (normocytic normochromic)	29
MN (macrocytic normochromic)	5
Total	34

From Table 2 above, it can be seen that for the peripheral smear pattern, the most commonly observed was NN picture. Specifically, 22 cases demonstrated rouleaux formation relative to the peripheral smear while 9 patients exhibited a bluish hue of the background.

Another area of investigation entailed the case of hemoglobin levels. When the study group was considered, it was only in three patients that normal hemoglobin levels were evident. For the remaining 31 cases, this study found them to be anemic, accounting for 91.1%. Also, it was in the peripheral smear that a NN blood picture was observed in cases with normal hemoglobin levels. It is also notable that four patients exhibited hemoglobin levels found to be below 5 gm/dl (see the table below).

Table 3: On hemoglobin levels

HB LEVEL	NO. OF PATIENTS
< 5 gm/dl	4
5- 10 gm/dl	21
10 – 12gm/dl	6
>12 gm/dl	3
Total	34

It was also in all patients that there was the elevation of erythrocyte sedimentation rate and that 17 cases had values exceeding 100 mm/hr. when platelets and leukocytes' morphological profiles were examined, the study did not establish significant changes. However, eight patients were found to have leucopenia, with three individuals experiencing leukocytosis. It is also notable that 50 percent of the cases (17) were observed to have thrombocytopenia. In one of the patients, it is also worth noting that occasional plasma cells were present. In another

Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

patient, there was 57% plasma cell count, upon which a plasma cell leukemia diagnosis was made.

Table 4: Plasma cell percentage distribution

Percentage of plasma cells in peripheral smear	No. of patients
0%	32
1%	1
57%	1

Out of five patients in whom there was pancytopenia, two of them had NN anemia and MN anemia each. It is also notable that the case exhibiting plasma cell leukemia was found to experience pancytopenia.

For the case of bone marrow aspirate, pathological findings suggested that in all cases, there was hypercellular bone marrow. Also, the megakaryocytes, myeloid series, and erythroid would be seen to be relatively suppressed. It was also in 20 cases that the plasma cell count exceeding 50% was observed.

Table 5: Aspirate smears' plasma cell infiltrate

% OF PLASMA CELLS	NO. OF PATIENTS	FREQUENCY (%)
30 - 40	10	29.4
41 - 50	4	11.7
51 - 60	4	11.7
61 - 70	1	2.9
71 - 80	5	14.7
81 - 90	6	17.6
91 - 100	4	11.7
TOTAL	34	

In 20 patients, there was mature plasma cell morphology. Here, the cells were ellipsoidal or spheroidal and had their nuclei placed eccentrically. In the bone marrow aspirates, it is also notable that a characteristic appearance was observed in few plasma cells. It is further notable that in one case, there were Mott cells. Other two patients had ditcher bodies (pale intra-

Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

nuclear inclusions) in one and flame cells in the other. In 76.4% of the cases, an equivalent of 26 patients, there were trinucleate and binucleate plasma cells.

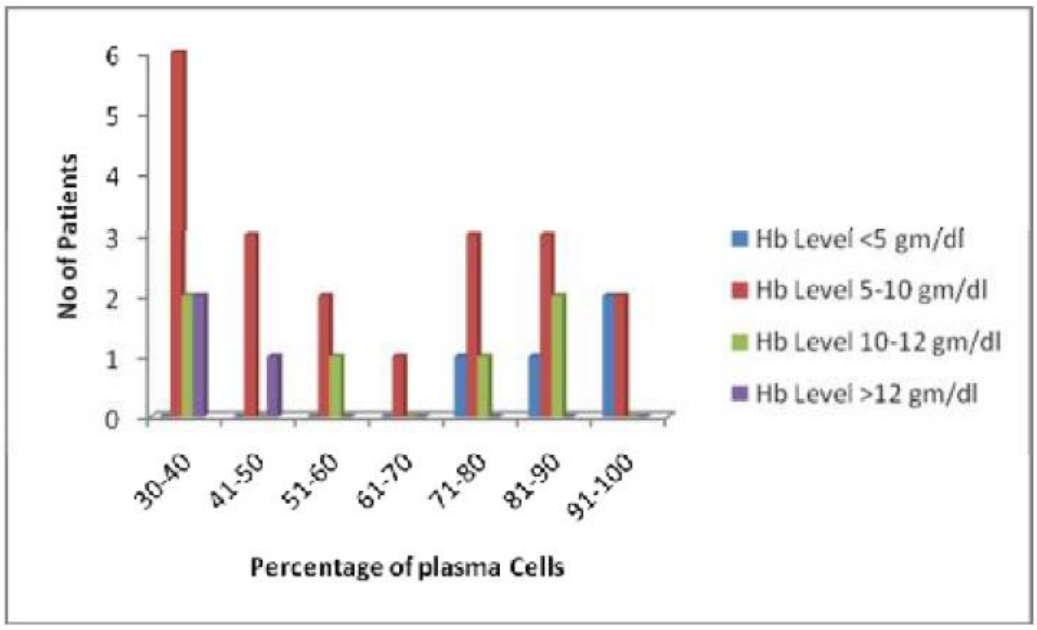

Figure 1: Findings for hemoglobin values

Conclusion

In this study, bone marrow aspirates that were received were 1663. However, 54 MM cases were found and considered for further investigation. Indeed, male participants dominated and the bone marrow aspirates' plasma cell percentage ranged between 30% and 95%. Also, 58.8% of the individuals who were considered were found to be exhibiting mature plasma cell morphology. The diffuse pattern (76.4%) was also found to dominate as a pattern of infiltration in the trephine biopsy. For the histological type, 64.7% was associated with Marschalko's plasma cell type, found to be predominant. Thus, this study established that bone marrow examination plays a crucial role during MM diagnosis. At the time of diagnosis, the morphology of plasma cells forms an important predictor that informs the nature of patient survival in MM. as such, it is critical that plasma cells' variants are recognized, a step that would aid in avoiding potential erroneous diagnoses. Also, in situations where there are atypical forms, it is important that they are reported in pathological diagnoses because they reflect poor prognosis. Overall, a specific observation concerning the informative nature of the selected materials and methods was that when there is a combined evaluation pitying trephine biopsy and bone marrow aspirate, the approach exhibits superiority and promises more informative and accurate data, as each is independently diagnostic.

References

[1] Subramanian R, Basu D and Dutta TK. Prognostic significance of bonemarrow histology in multiple myeloma. *Indian J Cancer*, 2009.46; 40-45
[2] SS Banerjee, S Verma, JH Shanks. Morphological variants of plasmacell tumours. *Histopathology*, 2004. 44; 2-8

Annals of R.S.C.B., Vol. 23, Issue 1, 2019, pp. 1 - 6
Received 20 April 2019; accepted 18 June 2019.

[3] Wicramasinghe SN, McCollough J. Blood and bone marrow pathology.*Elsevier science*, 2003;
[4] Kyle R A, Gertz M A, Witzig T E, Lust J A, Lacy M Q, DispenzieriAet al. Review of 1027 patients with newly diagnosed multiplemyeloma.*Mayo Clin Proc*. 2003.78; 21-33
[5] Blade J, Cibeira M T, Fernandez De Larrea C and Rosinol L. *Annals ofOncology*,2010.21(7); 313-19