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Clinicopathological Characteristics and Immunophenotype of 67 Patients with Multiple Myeloma

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Abstract

Objective: Multiple myeloma (MM) is a neoplastic disorder characterized by proliferation of a single clone of plasma cells derived from B cells. Our aim is to study demographic and clinicopathological features of adult Turkish MM patients at presentation.

Materials and Methods: This single center retrospective study extended from January 2010 to December 2017. Patient data were obtained from hospital database.

Results: Twenty-nine (43.3%) female, and 38 (56.7%) male patients with an overall mean age of 65.4 ± 10 years (range, 35 - 87 years) were included in the study. The most common complaints in patients were bone , body pain, and fatigue. In 64.2% of the patients had symptoms related to acute kidney injury. Thirty-nine (58.2%) patients had lytic lesions in one and more than one bones. Bone lesions were frequently localized in the vertebra (n = 23, 59%). Immunohistochemical evaluation of bone marrow biopsy specimens revealed kappa light chain globulin, and IgG heavy chain globulin positivities in 50.7% and 72.4%, of the patients, respectively. The mortality rate was 65.7% in all cases.

Conclusion: Demographic, and clinopathological characteristics of the patients with MM complied with those of the literature. Median survival time of the patients was 7.6 months.

Keywords: Multiple myeloma , demographic data, histopathology, immunohistochemistry.

Introduction

The presence of monoclonal immunoglobulins in serum and urine in multiple myeloma, is characterized by monoclonal plasma cell proliferation in the bone marrow. It accounts for about 10% of all hematological malignancies. [1-3]. The average age at the time of diagnosis is 60-70 years and it is more common in men than in women [4]. The invasion of the adjacent atypical plasma cells in the bone marrow to the adjacent bone leads to skeletal destruction which results in bone pain and symptoms associated with fracture. Rarely, multiple organ involvement and other symptoms occur [2]. Conventional histomorphological examination and multiparametric flow cytometry play important roles in the evaluation of MM diagnosis and response to treatment [5]. Histomorphologically, abnormal monoclonal immature plasma cell infiltration is observed in bone marrow biopsy and aspiration. Immunohistochemical analysis of plasma cells reveal expressions of CD138, CD38, CD117, CD56 and MUM1. In addition, in flow cytometry and immunohistochemical staining the

presence of kappa or lambda light chain globulin, and one or more than one of IgG, A, D or M positivity of heavy chain immunoglobulins (Ig) are rarely observed [5,6]. Clinically, M-protein is detected in serum and urine. Some patients have osteolytic bone lesions based on radiologic findings. Over-production of M protein Bence - Jones and proteinuria in patients result in hyperviscosity with development of renal failure (2).

Our aim is to study demographic and clinicopathological features of adult Turkish MM patients at presentation.

Materials and Methods

Between 2010 and 2017, 67 patients who were diagnosed as MM according to bone marrow biopsy and aspiration smears were analyzed retrospectively. Demographic characteristics and clinical findings of the patients were obtained from hospital data. Reports from the pathology archives and hematoxylin eosin, histo-, and immunohistochemically stained preparations were reexamined.

Statistical analysis: Statistical analysis was carried out using SPSS version 22. Qualitative data were presented in terms of frequencies and percentages. Mean and standard deviation were reported for quantitative variables.

Results

Demographic characteristics and clinicopathological findings of the patients are summarized in the table.

Twenty-nine (43.3%) female, and 38 (56.7%) male patients with an overall mean age of 65.4 ± 10 years. (range, 35 - 87 years) were included in the study. In the majority of the patients frequently complaints of bone, body pains, and weaknees were observed.

In 64.2% (43 patients) of the patients symptoms due to acute kidney injury were detected. Extramedullary bone involvement was seen mostly in vertebrae (58.9%), followed by multiple bones (15.4%), skull (12.8%), ribs (10.3%), pelvis and femur (2.6%).

In hematoxylin eosin stained bone marrow biopsy specimens, atypical plasma cell infiltration was observed in more than 10% of the cases [Figure 1]. Immunohistochemically, membranes of tumor cells were stained positively with CD138 [Figure 2]. Kappa and lambda expression rates were close to each other (n = 34, 50.7%, and n = 33, 49.3%, respectively) [Figure 3]. Immunohistochemical analyses of heavy chain immunoglobulins (Ig) (IgG, IgA, IgD, IgM) were performed in 58 of 67 patients, IgG was the most commonly expressed immunoglobulin at a rate of 72.4% (n = 42).

The 65.7% of the patients exited due to complications secondary to acute renal failure. The average life expectancy of the patients was calculated as 7.6 months.

Discussion

MM usually develops insidiously and is mostly seen in people over 60 years of age , more predominantly in men. In the Western and developed countries, the average age is higher compared to the South Asian countries. The reason has been explained by genetic diversity [7]. The ages of the patients included in this study group ranged from 35-87 years and most of patients presented in the 6th decade of life, with the mean age of 65,4 years.

The frequency of extramedullary bone involvement in MM was reported to be above 50% [8, 9]. In our series, lytic lesions were detected in one and more than one bone in 39 (58.2%) patients.

Permanent renal dysfunction in MM is caused by monoclonal immunoglobulins secreted by plasma cells leading to tubular nephropathy. Renal failure findings are seen in 45-62% of the patients [10, 11]. There was also a similar rate of acute renal failure in our patients (64.2%).

MM is an incurable disease and the mean survival time has been reported as 3-4 years [12]. Most of our patients

died 65.7% due to renal failure. The average life span of our patients was 7.6 months.

In immunohistochemical examination of bone marrow biopsy specimens kappa and lambda positivities were reported in 50 % of tumor cells. In our study, expressions of kappa and lambda were detected in 50.7% and 49.3% of the specimens similar to those reported in the literature [12,13]. IgG was the most frequently expressed heavy chain immunoglobulin which was found in over 50% of serum and tissue samples. Rarely seen biclonality was present in our five patients (8.6%) [14,15].

Table 1. Clinico-pathological characteristics of patient with multiple myeloma

Characteristics	Median number (%)
Age (year)	
<40	2 (3)
40-49	5 (7)
50-59	8 (12)
60-69	31 (46)
70-79	14 (21)
80-89	7 (11)
Total	67 (100)
Sex	
Male	38 (56.7)
Female	29 (43.3)
Immunohistochemistry	
IgG	42 (72.4)
IgA	6 (10.3)
IgD	2 (3.4)
IgM	3 (5.2)
IgM+IgD	2 (3.5)
IgA+IgG	3 (5.2)
Total	58 (100)
Immunohistochemistry	
Kappa	34 (50.7)
Lambda	33 (49.3)
Skeletal lytic lesions	39 (58.2)
Acute renal failure	43 (64.2)

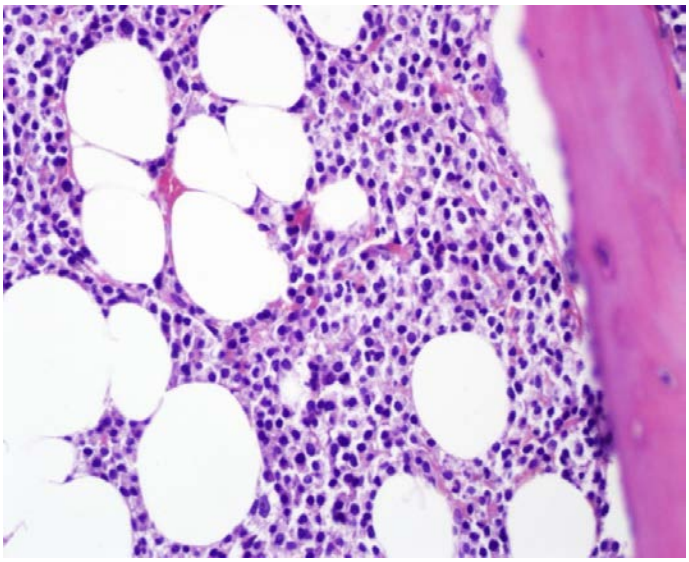

Figure 1: Multiple myeloma: Atypical plasma cell infiltration in bone marrow biopsy (H&E, x200).

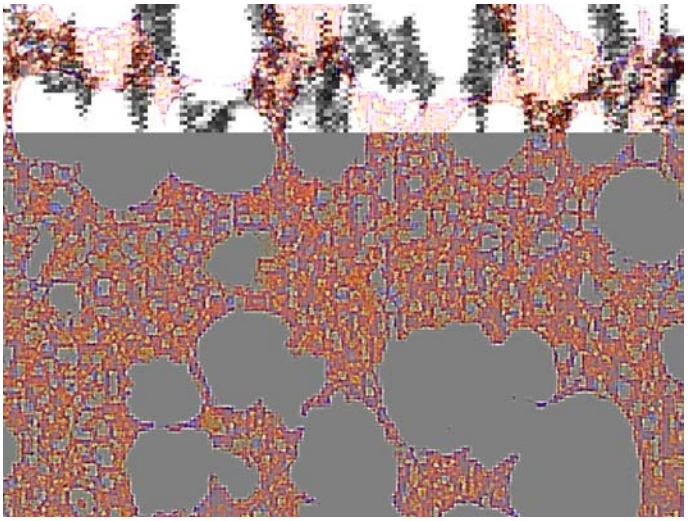

Figure 2 : Immunohistochemical staining using anti-CD138 antibody highlight the plasma cells (DAB; x200).

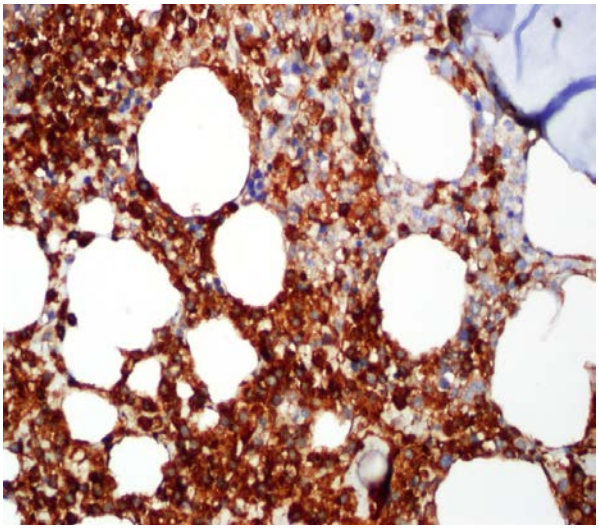

Figure 3: Immunohistochemical stain: Positive Kappa (DAB; x200).

Conclusion

In conclusion, multiple myeloma is a disease with varying clinical presentations and involves many systems. Diagnosis of multiple myeloma should be kept in mind especially in patients over 60 years of age with bone pain, anemia and renal failure. Histopathological and immunohistochemical evaluation of bone marrow biopsy and aspiration specimens is important in the diagnosis and follow-up of MM patients. The aim of this study is to contribute to the literature by sharing our 7-year single center MM case series.

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