Section: Clinical Haematology

Original Research Article

A STUDY ON CLINICO-DEMOGRAPHIC PROFILE AND DIAGNOSTIC PARAMETERS IN MYELOMA

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Abstract

Background: Multiple myeloma is a malignancy involving terminally differentiated plasma cells. It accounts for 1.8% of all malignancies and is the second most common hematologic malignancy. **Aim:** The study aims to identify and categorise the presenting symptoms in newly diagnosed cases of myeloma, to identify and categorise the demographic profile, to identify and tabulate the blood and biochemical parameters at diagnosis, and to identify the symptoms and organ involvement at presentation. **Materials and Methods:** This retrospective descriptive study was conducted in the Department of Clinical Haematology, Rajiv Gandhi Government General Hospital and Madras Medical College, Chennai, Tamilnadu, from January 2019 to November 2022. Newly diagnosed cases of multiple myeloma as per the International Myeloma Working Group (IMWG) diagnostic criteria were included. **Result:** A total of 69 cases were included in the study. Most patients belonged to the sixth decade of life, with a significant male predominance of 59.42%. The most common occupation was farming (18, 26.09%). Bone pain was the most common symptom at presentation (34, 49.28%) 36 cases had hypoalbuminemia (52.17%). M band was demonstrated in 63 cases (91.3%), and the most common monoclonal protein was immunoglobulin G. Light chain myeloma was diagnosed in 6 cases. In patients with a cytogenetic test performed (34), only 1 case was positive for t (11;14), while others showed a normal karyotype. **Conclusion:** Most patients had male preponderance in the sixth decade of life. Bone pain and fatigue were the most common symptoms at presentation.

INTRODUCTION

Multiple myeloma is a malignancy arising from terminally differentiated plasma cells. This disease is characterised by monoclonal plasmacytosis with the production of a monoclonal immunoglobulin or its fragment, resulting in organ involvement. It accounts for 1.8% of all malignancies and is the second most common hematologic malignancy.[1] The average number of new cases in India as per ICMR is 6800/year.[2]

The International Myeloma Working Group (IMWG) diagnostic criteria for multiple myeloma (MM) need 10% or more clonal plasma cells in the bone marrow (or a biopsy-proven plasmacytoma). Also, any one or more myeloma defining events (MDE): end-organ damage (hypercalcemia, renal failure, anaemia, lytic lesions in the bone -CRAB) attributable to the underlying plasma-cell disorder, bone marrow clonal plasmacytosis ≥60%, serum free light chain (FLC) ratio ≥100 (provided involved FLC level is ≥100 mg/L), or more than one focal lesion (5 mm or more in size) on magnetic resonance imaging (MRI).[3]

Multiple myeloma (MM) overall survival (OS) has dramatically increased during the past 15 years. These improvements in OS are mainly attributable to several novel therapies, early and accurate MM diagnosis and advances in supportive care.[4] Multiple Myeloma (MM) incidence is rising in Asian nations.[5] Treatment of MM is a problem for the medical community in India due to significant economic inequities, a lack of proper healthcare infrastructure, and limited access to innovative medications in our nation. Our study aims to shed light on the clinico demographic profile and

laboratory parameters of newly diagnosed myeloma at a tertiary care Government Hospital in South India.

Aim

The study aims to identify and categorise the presenting symptoms in newly diagnosed cases of myeloma, to identify and categorise the demographic profile, to identify and tabulate the blood and biochemical parameters at diagnosis, and to identify the symptoms and organ involvement at presentation.

MATERIALS AND METHODS

This retrospective descriptive study was conducted in the Department of Clinical Haematology, Rajiv Gandhi Government General Hospital and Madras Medical College, Chennai, Tamilnadu, from January 2019 to November 2022.

Informed consent was obtained from all patients before the study started. Newly diagnosed cases of multiple myeloma from January 2019 to November 2022, as per the International Myeloma Working Group (IMWG) diagnostic criteria, were included.

Relapsed myeloma cases and other plasma cell neoplasms not satisfying the criteria were excluded.

All the data were collected from the patient's medical records, and no additional investigations or interventions were carried out for the study. The patient's demographic profile, including age, gender, occupation, symptoms at the presentation, and laboratory parameters, were collected from medical records and tabulated.

Data were entered into MS excel and calculated. All demographic data were presented in frequency and percentage.

RESULTS

The details of 69 patients with newly diagnosed myeloma from January 2019 to November 2022 who satisfied the IMWG criteria were included.

Most patients belonged to the 6th decade of life (n=31, 45%), followed by 41-50 years (n=21, 30%). The mean age of presentation was 54.28 years. Male predominance was seen, with males contributing 59.42% of the study population (n=41) with a male-to-female ratio of 1.46: 1. 18 out of 69 (26.09%) patients were farmers followed by housewives (17 out of 69, i.e., 24.64%). Fifty-nine patients consumed a non-vegetarian diet (85.51%), and only ten patients were pure vegetarians (14.49%) [Table 1].

Table 1: Demographic data of the study

		Number	Percentage
Gender	Male	41	59%
	Female	28	41%
Age group	31-40	2	2.89%
	41-50	21	30.43%
	51-60	31	44.92%
	61-70	9	13.04%
	71-80	6	8.69%
Occupation	Daily wage labourers	13	18.84%
	Driver	4	5.80%
	Farmer	18	26.09%
	Housewife	17	24.64%
	Office worker	6	8.70%
	Painter	1	1.45%
	Priest	1	1.45%
	Retired	4	5.80%
Symptoms	Bone pain	34	49.28%
	Tiredness	19	27.54%
	Renal failure	11	15.94%
	Infection	2	2.90%
	Hyperviscosity	1	1.45%
	Asymptomatic	2	2.90%
Albumin level	>3.5g/dl	33	47.82%
	3.0-3.5g/dl:	18	26.08%
	2.5-3.0g/dl	12	33.33%
	<2.5g/dl	6	8.69%
Plasma cell	10-30%	20	28.99%
	30-60%	24	34.78%
	More than 60%	25	36.23%

Bone pain was the most prominent symptom among our study population. 34 out of 69 patients complained of bone pain (49.28%). The second most common complaint at presentation was fatigue due to anaemia which was seen in 19 patients (27.54%). 11 patients were admitted with acute renal failure and later diagnosed with myeloma. Two patients were asymptomatic and were found to have lytic lesions and anaemia during a regular health checkup. One patient presented with hyperviscosity symptoms like drowsiness and hematemesis [Table 1].

Haemoglobin of less than 10 g /dl was seen in 50 out of 69 cases (72.46%). Renal failure, as per the

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definition, was seen in 39 patients (56.5%). Hypercalcemia was seen in 29 patients (42.02%). Lytic lesions were observed in the radiological imaging in 35 patients out of 69 (50.72%). All cases showed more than 10% plasma cell percentage in bone marrow aspiration, with 25 cases showing more than 60% plasmacytosis (36.23%). Thirty-five cases (50.72%) were associated with elevated lactate dehydrogenase (LDH).

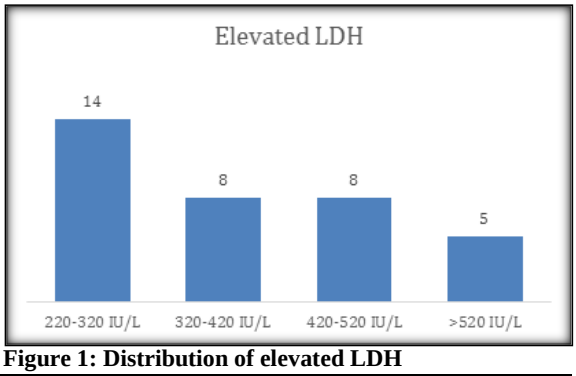

Figure 1: Distribution of elevated LDH

Elevated total protein was seen in 28 cases (40.57%). 36 out of 69 cases (52.17%) were noted to have hypoalbuminemia, and six cases (8.69%) had an albumin level of less than 2.5g/dl. Sixty-three patients (91.3%) had Monoclonal band (M Band) in serum protein electrophoresis. Serum immune fixation assay and free light chain were available only for 28 cases. Immunoglobulin G with Kappa light chain contributed to most cases (18 out of 28 cases), followed by Immunoglobulin G Lambda and immunoglobulin A with Kappa (two cases each). Light chain myeloma was found in six cases, where kappa light chain was seen in four cases and lambda chain in two cases [Table 2].

Urine Bence Jones Protein was positive in only nine cases (13.04%). Karyotyping was available for 34 cases in which 33 patients had normal karyotypes, and only one case of translocation (11;14) was observed.

Table 1: Distribution of monoclonal protein

Monoclonal protein	Number
Immunoglobulin G with Kappa light chain	18
Immunoglobulin G with lambda light chain	2
Immunoglobulin A with Kappa light chain	2
Immunoglobulin G with Lambda light chain	1
Kappa light chain	4
Lambda light chain	2

DISCUSSION

From the 69 cases studied, the sixth decade was found to be the most common age group, which was similar to the Asian myeloma network study by Kim et al.[5]

A high male-to-female ratio (1.46:1) which was observed in our study, is similar to another similar study from South India by Fousad et al., in which the ratio was 1.3:1.[7]

Even though male predominance is widely described in myeloma1, a recent ongoing study from Latin America found a similar incidence among both genders.8 Occupation-wise, farmers predominated, and housewives contributed the majority of females, similar to other studies by Gupta et al. and Jamal et al. from India.[9,10]

The most common symptom at presentation was bone pain (49.28%). Bone pain was listed as the most common complaint (68%), according to Kyle et al.[6] Two Indian studies by Fousad et al. and Gupta et al. showed the percentage of presentation with bone pain were 96.9% and 63%, respectively.[7,9]

The International Myeloma Working Group described anaemia in 72.46 % of the study population, whereas the other South Indian Study showed 50%.[7]

Jamal et al. reported the myeloma demographic study from Bihar showed anaemia in 92%.10 Renal failure (Creatinine of more than two mg/dl) was seen in 56.50%, significantly higher than in other Indian studies. The percentage of renal failure in studies by Fousad et al., Gupta et al., and Jamal et al., were 21.9%, 18%, and 47%, respectively.[7,9,10]

In 90.69% of the study population, Lytic lesions were seen by Fousad et al., whereas Gupta et al. described the same in 70%.[7,9] In comparison, routine X-ray screening demonstrated lytic lesions in only 50.72% of the patients. The uncoupling of the bone remodelling process results in the myeloma bone involvement with aggressive osteoclastic resorption of bone and suppression of osteoblastic activity.[11]

Hypercalcemia was seen in 34 % of the study by Gupta et al., whereas Fousad et al. showed the same in only 18.8%.[7,9] We have found more than 11mg/dl serum calcium level in 42%, again higher than the other Indian studies.

Hyperproteinemia was seen in 40.57% of cases, with hypoalbuminemia in 52.17%. The studies by Fousad et al. and Jamal et al. showed hypoalbuminemia in 62.4% and 83%, respectively.[7,10] Monoclonal band was seen in 91.3% of our study population, similar to Fousad et al., where the M band was positive in 94% of cases.[7]

When monoclonal light chains are excreted through the urinary tract, it is called Bence-Jones proteinuria (BJP). It happens when only one light chain is

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produced or when heavy and light chains are synthesised unevenly, with the latter being produced in excess.[12] The discovery of Bence Jones Proteins lead to the first description of multiple myeloma.[13] All patients in our study population were tested for urine BJP but found positive only in 13.04%, similar to other Indian studies.[7,10]

Serum immunofixation and free light chain assays were done in only 28 cases. Immunoglobulin G was the predominant monoclonal protein in our study (20 out of 28 cases). This is similar to the already described pattern in literature. 70% of myeloma patients show immunoglobulin Gas their monoclonal protein, and immunoglobulin A in 20% of cases.[1]

In our study, light chain myeloma was seen in six cases. Light chain myeloma (LCM) has a reported global incidence of 15%–20%.[14] In an observational study by Singh et al. from India, light chain myeloma was seen in 23.01% of cases.[14]

Plasma cell percentage was more than 10% in all cases, with 36.23% showing more than 60% plasma cells, a myeloma-defining event. Kyle et al. reported that more than 60% of plasmacytosis was described in 34%, which is almost similar to our study.[6]

Karyotyping study was available only for 34 cases out of 69 patients. Thirty-three cases with a normal karyotype and one translocation (11;14) were seen. The translocation (11;14) is present in 20% of myeloma cases, and this is associated with the cyclin D1 gene and has a low proliferative index.[1]

CONCLUSION

To conclude, myeloma was common in the sixth decade of life with male predominance. The most common symptom at presentation was bone pain; the most common finding was anaemia. The predominant monoclonal protein was immunoglobulin G.

In the era of advanced laboratory diagnosis and newer treatment modalities, the high index of suspicion and awareness of varying presentation will ensure the early detection of myeloma and initiation of appropriate chemotherapy and thus will give a better survival and quality of life for myeloma patients.

Limitation

The study was retrospective in a single centre with a small study population. Due to a lack of data, the Revised International Staging System prognostication could not be done.

Financial Interest

None

Conflict of Interest

None

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