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Research Article

Clinico-Pathological Profile of Multiple Myeloma: A Single-Center Study from Nepal

Ajaya Kumar Jha[1, *], Garima Subedi[2], Arvind Kumar Sinha[2]

[1]Department of Hematology and Medical Oncology, Vayodha Hospital, Kathmandu, Nepal
[2]Department of Pathology, Vayodha Hospital, Kathmandu, Nepal

Abstract

Multiple myeloma (MM) is a malignant plasma cell disorder characterized by monoclonal protein production and multisystem involvement, including bone destruction, anemia, renal impairment, and hypercalcemia. Despite advances in therapy, relapse is common. Disease characteristics varies from monoclonal gammopathy of undetermined significance to smoldering form, active multiple myeloma to aggressive plasma cell leukemia. Retrospective observational study of patients diagnosed with MM between January 2023 and February 2025 at a tertiary care center was done. Clinical features, laboratory parameters, radiological findings, immunofixation profiles, and treatment modalities were analyzed. Out of 21 patients were diagnosed as plasma cell neoplasm. Three had solitary plasmacytoma of bone and were excluded. Among the remaining eighteen patients, males predominated (66.6%). Mean age of presentation was 56.2 years (range 36-72 years). Median age was 56 years. Bone pain was the most common symptom (90%), followed by fatigue (39%), neurological symptoms (22%), and renal failure (5.5%). Laboratory evaluation revealed anemia in 61%, elevated beta-2 microglobulin in 78%, lytic bone lesions in 78%, and M-protein in 61%. IgG kappa was the predominant subtype (55.5%). VRD was the most commonly used treatment modality (67%). Multiple myeloma in Nepal shows heterogeneous clinical and pathological features with prominent multisystem involvement. Bone pain, anemia, and lytic lesions are common. Limited access to advanced therapies may influence outcomes. Improvements in diagnostics and treatment accessibility are required.

Keywords

Multiple Myeloma, Plasma Cell Neoplasm, Bone Pain, Lytic Lesions, Nepal

1. Introduction

Multiple myeloma (MM) is a clonal plasma cell malignancy characterized by the production of monoclonal immunoglobulin and associated end-organ damage, including osteolytic bone lesions, anemia, renal dysfunction, and hypercalcemia. It accounts for approximately 10% of all hematological malignancies worldwide and predominantly affects older adults. Advances in treatment strategies, including proteasome inhibitors, immunomodulatory drugs, and autologous stem cell transplantation, have significantly improved patient survival over the past two decades [1].

Despite therapeutic advances, MM remains largely incurable, with most patients experiencing disease relapse during the

*Correspondence: Ajaya Kumar Jha (drajha75@yahoo.com)

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course of their illness [2]. The clinical presentation and management of relapsed MM vary widely depending on disease biology, prior treatment exposure, and availability of diagnostic and therapeutic resources [3]. In low- and middle-income countries, including Nepal, limited access to advanced diagnostics, novel agents, and transplant facilities may influence disease presentation and outcomes [4].

Data describing the clinic-pathological profile of MM patients from Nepal are limited. Understanding disease patterns, laboratory characteristics, and treatment practices is essential for clinical decision-making and resource allocation. This study aimed to describe the clinical features, laboratory parameters, radiological findings, immunofixation profiles, and treatment modalities among newly diagnosed patients with multiple myeloma treated at a tertiary care center in Nepal.

2. Materials and Methods

2.1. Study Design and Setting

This retrospective observational study was conducted at Vayodha Hospital, a tertiary care center in Nepal. Medical records of patients diagnosed with multiple myeloma between January 2023 and February 2025 were reviewed.

2.2. Study Population

Patients were included with confirmed diagnosis of multiple myeloma based on standard diagnostic criteria and received treatment. Patients with solitary plasmacytoma at initial diagnosis were excluded from analysis.

2.3. Data Collection

Demographic data, clinical presentation, laboratory investigations, radiological findings, serum immunofixation results, and treatment regimens were extracted from hospital records. Clinical features assessed included bone pain, fatigue, neurological symptoms, and renal impairment. Laboratory parameters included complete blood count, serum calcium, renal function tests, lactate dehydrogenase, beta-2 microglobulin, serum protein electrophoresis, serum immunofixation electrophoresis and light chain assay. Radiological evidence of lytic bone lesions was recorded.

2.4. Treatment Modalities

Treatment regimens were documented based on medical records and included bortezomib-based combinations, immunomodulatory drug–based regimens, conventional chemotherapy, radiotherapy, and supportive care. Autologous stem cell transplantation status was also reviewed.

2.5. Statistical Analysis

Data were analyzed using descriptive statistics. Categorical variables were expressed as frequencies and percentages. Continuous variables were summarized using ranges or proportions where applicable. Due to the small sample size, no inferential statistical analysis was performed.

2.6. Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki. Patient confidentiality was maintained by anonymizing all data. As this was a retrospective review of existing records, informed consent was waived according to institutional policy.

3. Results

3.1. Patient Demographics

A total of 21 patients were diagnosed with plasma cell neoplasm during the study period. Of these, three patients had solitary plasmacytoma of bone were excluded from the analysis. Among the remaining eighteen patients, males predominated (66.6%), with a male-to-female ratio of 2:1 (Table 1).

3.2. Clinical Presentation

Bone pain was the most common presenting symptom, reported by 90% of patients. Easy fatigability was observed in 39%. Neurological symptoms such as limb weakness, significant numbness, paresthesia, bladder and bowel involvement were present in 22%. Renal failure requiring dialysis was documented in one patient (5.5%). The distribution of clinical symptoms is summarized in Table 2.

3.3. Laboratory and Radiological Findings

Anemia was present in 61% of patients at presentation, while pancytopenia was observed in 11%. Elevated beta-2 microglobulin levels were detected in 78% of patients, and lactate dehydrogenase was raised in 67%. Hypercalcemia was noted in 11% of cases, and deranged renal function tests were observed in 22%. Radiological evidence of osteolytic bone lesions was present in 78% of patients. Monoclonal protein (M-band) was detected in 61% of cases on serum protein electrophoresis, summarized in Table 3.

3.4. Serum Immunofixation Profile

Serum immunofixation electrophoresis revealed IgG kappa as the most frequent monoclonal immunoglobulin subtype (55.5%), followed by IgG lambda (39%) and IgA kappa (5.5%). The distribution of monoclonal immunoglobulin subtypes is shown in Table 4.

3.5. Radiological Features

Radiology of the skeletal system revealed Lytic lesion in 78%, Compression fracture of the spine in 39% and Paraspinal mass in 17% which is summarized in Table 5.

3.6. Bone Marrow Study

Bone marrow aspiration and biopsy was done in all cases and increased plasma cells in the range of 30 to 60% was reported in 44%.

3.7. Treatment Modalities

The most commonly administered treatment regimen was Bortezomib, Lenalidomide, and Dexamethasone (VRD), used in 50% of patients. Lenalidomide plus dexamethasone was administered in 30% of cases. A smaller proportion received melphalan-based chemotherapy (6%). Two patients (11%) underwent autologous stem cell transplantation during the study period. Treatment patterns are summarized in Table 6.

Table 1. *Gender distribution of patients with multiple myeloma included in the study.*

Gender	Number of patients	Percentage (%)
Male	12	66.6
Female	6	33.3
Total	18	100

Table 2. *Clinical symptoms at presentation among patients with relapsed multiple myeloma.*

Clinical symptom	Percentage (%)
Bone pain	90.0
Easy fatigability	39.0
Neurological symptoms	22.0
Renal failure requiring dialysis	5.5

Table 3. *Laboratory and radiological findings at presentation or relapse in patients with multiple myeloma.*

Investigation	Percentage (%)
Anemia	61.0
Pancytopenia	11.0
Hypercalcemia	11.0
Deranged renal function tests	22.0
Raised lactate dehydrogenase	67.0
Raised beta-2 microglobulin	78.0
Lytic bone lesions	78.0
Presence of M-protein (M-band)	61.0

Table 4. *Serum immunofixation electrophoresis profile showing distribution of monoclonal immunoglobulin subtypes.*

Immunoglobulin subtype	Percentage (%)
IgG kappa	55.5
IgG lambda	39.0
IgA kappa	5.5

Table 5. *Radiological Features.*

Findings	Percentage (%)
Lytic lesion	78
Compression fracture	39
Paraspinal mass	17

Table 6. *Treatment modalities administered to patients with relapsed multiple myeloma.*

Treatment regimen	Percentage (%)
Bortezomib + Lenalidomide + Dexamethasone (VRD)	67.0
Lenalidomide + Dexamethasone	28.0
Melphalan + Prednisolone + Thalidomide	5.0
Autologous stem cell transplantation	11

4. Discussion

This study provides an overview of the clinico-pathological characteristics and treatment patterns of patients with multiple myeloma treated at a tertiary care center in Nepal. Consistent with existing literature, MM predominantly affected males and commonly presented with bone pain and anemia, reflecting extensive skeletal and marrow involvement [5].

Diwan et al., documented that sixth decade is the common

age of presentation with a mean of 62 years [6]. Rajkumar and Kyle et al et al. documented that the mean age of presentation was 66 years with 2% younger than 40 and 38% older than 70 years [7, 8]. Kumar et al., from India reported that the median age of 55 years and male: female ratio 1.5:1 [9]. Median age of 62 years with 55.6% of male predominance was reported from Asian study by Kim et al. [13]. Our study showed M: F ratio 2:1 and median age of 56 years.

Barlogie et al. showed mean hemoglobin level >8.5 g/dL [3]. Diwan AG et al found anemia in 100%, and Zafar et al. found anemia in 80% of patients [6,10]. In our study anemia was documented in 61%. Ramani et al. showed serum creatinine level >2 mg/dL in 30% and hypercalcemia in 5% of cases [11]. Zafar et al reported renal failure in 44% in their series. In our study renal impairment and hypercalcemia was found in 22% and 11% respectively.

The high prevalence of elevated beta-2 microglobulin and lytic bone lesions suggests advanced disease at presentation or relapse. In the present study "M" band was detected in 61% while study by Ramani et al reported 78% in their series. Study from India by Zafar et al. found IgG-λ type MM in 32% followed by IgG-k in 20% [10]. In present study, IgG kappa was the predominant immunoglobulin sub type in 55.5% followed by IgG-λ in 39%.

In our study, osteolytic lesion was found in 78% and compression fracture in 39% cases. In study from India by Ramani et al reported lytic lesion in 85% and pathological fracture in 35% of cases. In the study by Diwan et al reported osteolytic lesion in 91%.

Bortezomib-based regimens formed the backbone of treatment, however, was adopted by 67% of patients only because of financial constraint. All Patients received Zoledronic acid as parenteral Bisphosphonate for bone disease as drug is easily available, cost effective and recommended by IMWG [12]. Lenalidomide based doublet was opted by 28% and Melphalan based (MPT regimen) was offered to one patient in the present series. In the study by Cheong et al from Malaysia reported triplet regimen used in 59% and doublet in 41% as induction therapy in their study [14]. Two patients underwent autologous bone marrow transplant after achieving complete remission by Bortezomib based triplet regimen. Most common first line therapy used was Bortezomib, Cyclophosphamide and Dexamethasone in 77% of patients reported by Mishra et al in their study from India [15]. After four months of induction, disease re-assessment was done by hematological, biochemical parameters including bone marrow examination and based on response two more cycles of consolidation were given and followed by continuation of maintenance. Modalities of treatment are basically dependent on financial resources and adherence to close follow up. However, access to autologous stem cell transplantation and newer therapeutic agents remained limited, which may influence long-term disease control and survival outcomes.

The study is limited by its retrospective design, small sample size, and single-center setting which may restrict generalizability. Additionally, survival outcomes and cytogenetic risk stratification could not be evaluated due to incomplete data and financial constraint. Despite these limitations, the findings highlight the heterogeneity of MM presentation and underscore the challenges of managing disease in resource-constrained settings.

5. Conclusion

Multiple myeloma in this Nepalese cohort demonstrated heterogeneous clinical and pathological features with prominent multisystem involvement. Bone pain, anemia, elevated beta-2 microglobulin levels, and lytic bone lesions were the most frequent findings at presentation or relapse. IgG kappa was the predominant immunoglobulin subtype, consistent with global patterns.

Bortezomib-based regimens constituted the mainstay of treatment; however, access to autologous stem cell transplantation and newer therapeutic agents was limited. These constraints may influence disease control and long-term outcomes. The findings highlight the need for improved diagnostic capacity, wider availability of advanced therapies, and development of context-specific treatment strategies to optimize multiple myeloma care in resource-limited settings such as Nepal.

Abbreviations

MM	Multiple Myeloma
VRD	Bortezomib, Lenalidomide, and Dexamethasone

Author Contributions

Ajaya Kumar Jha: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing

Garima Subedi: Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology

Arvind Kumar Sinha: Supervision, Validation, Visualization, Writing – review & editing

Conflicts of Interest

The authors declare no conflict of interest.

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