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Original Research Article

CLINICAL AND LABORATORY SPECTRUM OF MULTIPLE MYELOMA: A TERTIARY CARE EXPERIENCE FROM CENTRAL KERALA

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ABSTRACT

Background: Multiple myeloma (MM) is a malignant plasma cell disorder with varied clinical presentations and significant morbidity. While global data on MM are well-documented, regional insights—especially from government tertiary care centres in India—remain limited. This study aimed to evaluate the trend of M-band detection through serum protein electrophoresis (SPEP) and describe the clinical and laboratory profile of MM patients in central Kerala.

Materials and Methods: A retrospective, hospital-based cross-sectional study was conducted at Government Medical College, Thrissur, including 82 MM patients diagnosed between January 2022 and March 2024. Data on clinical presentation, laboratory parameters, radiological findings, and treatment details were extracted from medical records. Additionally, 7451 SPEP reports from January 2018 to March 2024 were reviewed to determine the prevalence of M-band positivity.

Results: The mean age at diagnosis was 61.5 years, with equal male and female representation. Among those screened via SPEP, 4.8% were M-band positive, and 98.78% of confirmed MM cases exhibited M-band positivity. Lower back pain (43.90%) and fractures (17.07%) were the most common presenting complaints. Anaemia was present in 65.85% of patients, while hypercalcemia and renal dysfunction were seen in only 4.87% and 24.39%, respectively. Vertebral lytic lesions were most frequent (43.90%), though 39.02% showed no skeletal abnormalities. IgGκ was the predominant paraprotein subtype. ISS Stage 1 was most common, with a third of patients undergoing diagnostic workup. Bortezomib-based regimens were the most frequently used treatments.

Conclusion: This study reveals a shifting clinical landscape of MM in Kerala, marked by earlier detection, diverse presentations, and reduced frequency of advanced disease features. SPEP remains a highly sensitive diagnostic tool. These findings underscore the importance of routine screening, early diagnosis, and improved access to diagnostic and treatment facilities to optimize MM outcomes in regional healthcare settings.

Keywords: Multiple Myeloma, Serum Protein Electrophoresis, M-band, Clinical Profile, Kerala.

INTRODUCTION

Multiple myeloma (MM) is a malignant clonal disorder of plasma cells characterized by the presence of a monoclonal (M) protein in serum and/or urine, bone marrow plasmacytosis, and evidence of end-organ damage such as anaemia, hypercalcemia, renal dysfunction, or lytic bone lesions. Globally, MM accounts for approximately 1% of all cancers and over 10% of hematologic malignancies.[1-3] The disease predominantly affects individuals over the age of 60, and its incidence

continues to rise with increasing life expectancy and improved diagnostic capabilities.[3] While comprehensive national registries are still developing in India, smaller regional studies suggest rising detection rates, likely due to heightened clinical suspicion and better access to laboratory diagnostics, including serum protein electrophoresis (SPEP).[4]

The clinical presentation of MM has been undergoing a shift over recent decades. Earlier studies reported classic symptoms like bone pain and renal failure at the time of diagnosis in the majority of patients.[5] However, more recent findings reveal a growing number of asymptomatic or minimally symptomatic cases, often diagnosed incidentally through routine blood tests or evaluations for unrelated complaints.[5] In the Indian context, this trend is compounded by the heterogeneity of healthcare access and health-seeking behaviour. Despite a growing number of MM cases being diagnosed in Kerala, published data is scarce describing the clinical and laboratory profile of affected patients, especially from government-run tertiary centres where a diverse patient demographic is served.

Given the central role of M-band detection in SPEP as a diagnostic and screening tool for monoclonal gammopathies and the evolving clinical profile of MM, it is imperative to understand regional patterns in both laboratory and clinical parameters.[1,2] This is especially relevant for Kerala, where robust public health systems coexist with significant non-communicable disease burden. This study was therefore undertaken with two objectives: (1) to determine the pattern and prevalence of M bands in serum protein electrophoresis specimens at a tertiary care centre from January 2018 to March 15, 2024, and (2) to describe the clinical profile of patients diagnosed and treated for multiple myeloma at Government Medical College, Thrissur, from January 2022 to March 15, 2024.

MATERIALS AND METHODS

This hospital record-based cross-sectional study was conducted at Government Medical College, Thrissur, between 16th April 2024 and 30th April 2024. The study population included all patients diagnosed with multiple myeloma who sought treatment at the institution between January 1, 2022, and March 31, 2024. A total of 82 patients were included using convenience sampling. The objective was to assess clinical and laboratory profiles using a semi-structured questionnaire that captured demographic details (age, sex), department of presentation, presenting complaints, and key laboratory parameters such as ESR, serum calcium, creatinine, subtype of immunoglobulin, plasma cell percentage, beta-2 microglobulin levels, serum protein electrophoresis (SPEP) results, radiological findings, and treatment details.

Data were obtained retrospectively from hospital records, including case files and department registers. Information on serum protein electrophoresis tests and M band positive cases from January 1, 2018, to March 15, 2024, was collected from the Special Investigation Laboratory of the Department of Biochemistry. M band positive cases from January 1, 2022, to March 15, 2024, were traced using their UHID and inpatient numbers, and corresponding case files were retrieved from the Medical Records Library. The hospital-based cancer registry was also used to identify CR numbers of patients treated in the Department of Oncology and Radiotherapy, and their records were obtained from the Medical College Chest Hospital. All data were compiled using the study questionnaire.

Data were entered and analyzed using Microsoft Excel. Descriptive statistics were used to summarize demographic details, clinical presentation, and laboratory findings. The study obtained ethical approval from the Institutional Ethics Committee (IEC) and Institutional Research Committee (IRC) of Government Medical College, Thrissur.

RESULTS

The study included 82 patients diagnosed with multiple myeloma. The mean age at diagnosis was 61.5 years, ranging from 35 to 87 years. The majority (36.58%) were between 60 and 70 years old, and both sexes were equally represented (M: F = 1:1). Most patients (78%) were residents of the Thrissur district, reflecting the regional patient distribution.

Screening and Diagnosis: Out of 7451 patients screened, 358 (4.8%) tested positive for M-band on serum protein electrophoresis (SPEP), highlighting the diagnostic yield in the regional healthcare setting. Among the study population, 81 patients (98.78%) had M-band positivity, confirming the high sensitivity of SPEP in diagnosing multiple myeloma.

Clinical Presentation: The most common presenting complaint was lower back ache (43.90%), followed by fractures (17.07%), pedal oedema (17.07%), and infections (9.75%). Multiple other symptoms were reported, reflecting the heterogeneous clinical spectrum of the disease, including bone pain (7.32%), fatigue (7.32%), and fever (7.32%)—a subset presented with atypical or incidental findings such as amyloidosis-related features, ataxia, and urine abnormalities.

Laboratory Parameters: Anaemia was prevalent in 65.85% of patients, with 24.39% having mild anaemia, 40.24% moderate, and 18.28% severe to very severe. ESR values were elevated (>20 mm/hr) in 33 patients (40.23%), though nearly half the data (48.78%) was unavailable. Hypercalcemia was observed in 4.87%, while hypocalcemia occurred in 18.29%. Only 26.82% had normal serum calcium levels, with data missing for half the cohort.β2-

microglobulin levels were raised in 40.24%, suggesting significant tumour burden, though data was unavailable for 54.87% of cases. Plasma cell percentage in bone marrow ranged widely: 8.53% had <10% involvement, while 13.8% had >50%. The majority (30.5%) had 10–40% plasma cell infiltration.

Immunoglobulin Typing: Among patients with data available (n=36), the most common paraprotein subtype was IgGκ (21.95%), followed by IgGλ (17.07%). A smaller fraction had IgA variants (each 2.43%).

Radiological Findings: Radiographic evidence of lytic lesions was most frequently found in the vertebrae (43.90%), followed by the skull (14.63%), pelvis (8.53%), and ribs (6.09%). Notably, 32 patients (39.02%) had no detectable skeletal lesions at presentation.

Renal Function and Staging: Renal dysfunction was identified in 24.39% of patients with serum creatinine >2 mg/dL. Using the International Staging System (ISS), Stage 1 was most common (17.07%), with Stage 2 and 3 equally represented (15.85% each).

Treatment: At the time of data collection, 36.58% were still under diagnostic workup. The most common treatment regimen was bortezomib-lenalidomide-dexamethasone (BLD), administered to 23.17%. Other regimens included bortezomib + dexamethasone (B+D) in 14.63% and CY-BD in 3.65%. A total of 7.32% were referred out for further management.

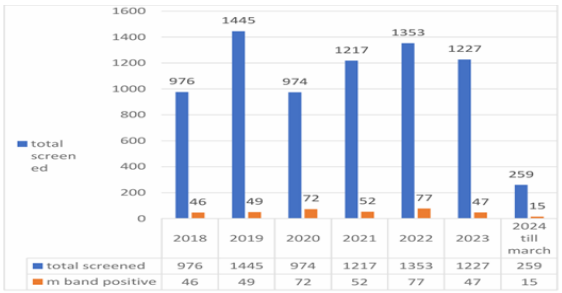

Figure 1: Screening and Diagnosis for M-band on serum protein electrophoresis

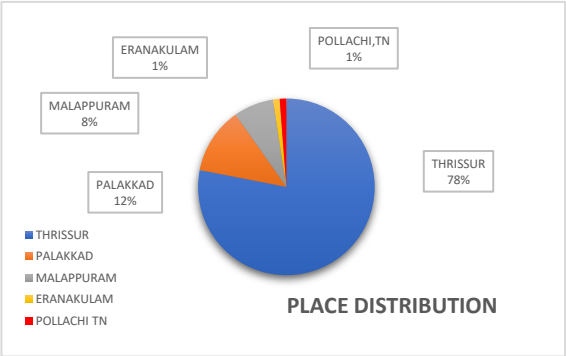

Figure 2: Distribution of patients according to their place

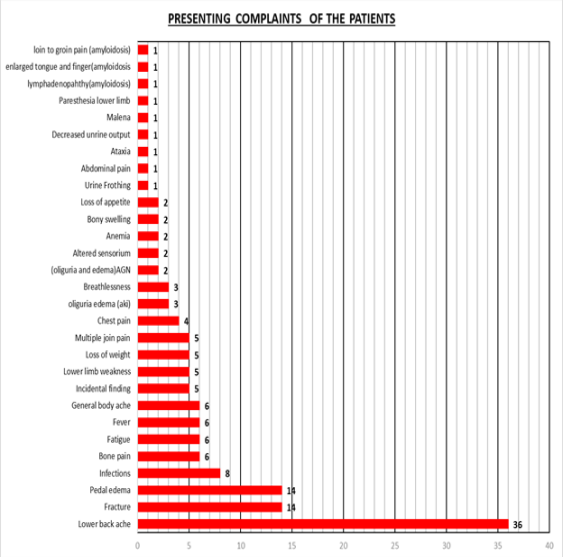

Figure 3: Presenting complaints of patients

Table 1: The Demographic and Clinical Characteristics

Variables:	N	%
Age in Years		
35-40	3	3.65
41-45	7	8.53
46-50	5	6.09
51-55	7	8.53
56-60	9	10.97
61-65	14	17.07
66-70	16	19.51
71-75	10	12.19
76-80	7	8.53
81-85	3	3.65
86-90	1	1.21
Sex		
Males	41	50
Females	41	50
District		
Thrissur	64	78.05

Palakkad	10	12.2
Malappuram	6	7.31
Ernakulam	1	1.22
Pollachi	1	1.22
Presenting Symptoms		
Lower back ache	36	43.90
Fracture	14	17.07
Pedal oedema	14	17.07
Infections	8	9.75
Bone pain	6	7.32
Fatigue	6	7.32
Fever	6	7.32
General body ache	6	7.32
Incidental finding	5	6.09
Lower limb weakness	5	6.09
Loss of weight	5	6.09
Multiple join pain	5	6.09
Chest pain	4	4.87
oliguria oedema (Aki)	3	3.65
Breathlessness	3	3.65
(oliguria and oedema) AGN	2	2.43
Altered sensorium	2	2.43
Anaemia	2	2.43
Bony swelling	2	2.43
Loss of appetite	2	2.43
Urine Frothing	1	1.21
Abdominal pain	1	1.21
Ataxia	1	1.21
Decreased urine output	1	1.21
Melena	1	1.21
Paraesthesia of lower limb	1	1.21
lymphadenopathy (amyloidosis)	1	1.21
enlarged tongue and finger (amyloidosis)	1	1.21
loin to groin pain (amyloidosis)	1	1.21
Anemia		
Mild <10	20	24.39
Moderate (8 – 10)	33	40.24
Severe (6.5 – 7.9)	8	9.75
Very severe (<6.5)	7	8.53
Normal	14	17.07
ESR		
Normal	5	6.09
20–100 mm at the end of 1 hour	11	13.41
100–200 mm at the end of 1 hour	22	26.82
Data Not Available	40	48.78
Serum Calcium		
Hypercalcemia	4	4.87
7–8.8 mg/dl (Hypocalcemia)	15	18.29
8.8–10.5 mg/dl (Normal)	22	26.82
Data Not Available	41	50
Type of Immunoglobulin		
IgGκ	18	21.95
IgGλ	14	17.07
IgAλ	2	2.43
IgAκ	2	2.43
Data Not Available	46	56.09
Plasma Cell Percentage		
<10	7	8.53
10–20	13	15.85
20–30	3	3.65
30–40	5	6.09
40–50	1	1.21
50–60	7	8.53
60–70	3	3.65
70–80	0	0
80–90	2	2.43
90–100	1	1.21
β2 Microglobulin Level		
Raised more than 2454 ng/ml	33	40.24
Normal	4	4.87
Data not available	45	54.87
Serum Protein Electrophoresis (SPEP)		
M BAND Positive	81	98.78

No Abnormal BANDS	1	1.22
Radiological Lesions		
Skull	12	14.63
Vertebrae	36	43.90
Pelvis	7	8.53
Rib	5	6.09
Sternum	3	3.65
Clavicle	3	3.65
Humerus	4	4.87
Femur	4	4.87
Sacrum	2	2.43
Mandible	1	1.22
No lesions	32	39.02
ISS Staging		
STAGE 3	13	15.85
STAGE 2	13	15.85
STAGE 1	14	17.07
Serum Creatinine		
> 2 mg/dl	20	24.39
< 2 mg/dl	62	75.60
Drug Therapy		
BLD	19	23.17
UNDER WORKUP	30	36.58
B+D	12	14.63
CY BD	3	3.65
CY B	1	1.22
REFERRED	6	7.32
B TH	3	3.65
C L D	1	1.22
C T D	2	2.43
B	2	2.43

DISCUSSION

The present study offers a comprehensive overview of the clinical and laboratory profile of multiple myeloma (MM) in a cohort of 82 patients from central Kerala. The mean age at diagnosis was 61.5 years, consistent with findings from large-scale studies such as the Mayo Clinic series, which reported a median age of 62.[5] Our cohort showed an equal sex distribution (M: F = 1:1), differing from the mild male predominance noted in earlier studies (e.g., M: F ratio of 1.56 in the 1960–1971 Mayo series and 1.27 in the 1972–1986 Italian series).[6] This variation may reflect regional demographic patterns or improved health-seeking behaviour among women in Kerala.

The diagnostic yield of serum protein electrophoresis (SPEP) in this study was notable, with 4.8% of 7,451 screened patients testing positive for M-band. Among confirmed MM cases, 98.78% exhibited M-band positivity, reaffirming SPEP's high sensitivity in diagnosing MM. This aligns with Kyle et al.'s findings, where a monoclonal spike was seen in over 76% of patients on serum electrophoresis and 75% on urine electrophoresis.[5] Our findings also emphasize the importance of routine screening, as many M-band-positive cases were likely identified during evaluations for non-specific symptoms or unrelated conditions.[3]

Musculoskeletal complaints dominated the clinical presentation in our cohort, with lower back pain (43.90%) and fractures (17.07%) being the most common. These findings are comparable to historical data, where bone pain was reported in 68% of cases in Kyle's series.[5] However, some patients presented with atypical or systemic symptoms such as pedal oedema, fatigue, and features suggestive of amyloidosis or ataxia. These observations are consistent with trends noted by Riccardi et al., who reported a shift toward more varied and less classic presentations of MM in recent decades.[6]

Laboratory analysis revealed that anaemia remains a prevalent feature (65.85%), similar to global data indicating anaemia in 60–70% of patients at diagnosis.[5,7] Elevated ESR was observed in 40.23% of patients, likely influenced by missing data (48.78%) or earlier disease detection. Interestingly, hypercalcemia—a hallmark of MM—was present in only 4.87% of our cohort, significantly lower than the ~30% reported in earlier studies.[5,6] This may again reflect earlier diagnosis before the onset of end-organ damage.

Renal impairment was noted in 24.39% of patients, considerably lower than the 55% reported in Kyle's cohort, possibly due to increased awareness and earlier referral.[5,8] Lytic lesions were found in 60.98% of patients, primarily affecting the vertebrae—consistent with prior studies where vertebral involvement predominated. However, nearly 40% of patients had no radiographic evidence of skeletal disease at diagnosis, which may indicate early-stage disease or the limited sensitivity of plain radiographs. Advanced imaging modalities such as PET-CT or MRI, which were not uniformly available during the study period, could have improved lesion detection.[1,9,10]

The distribution of immunoglobulin subtypes in our study, with IgGκ being the most common, aligns with global trends. IgG accounts for approximately 60% of cases, followed by IgA and light chain-only variants.[2,5] Regarding disease staging, ISS Stage 1 was the most common (17.07%), with Stages 2 and 3 each accounting for 15.85%. This contrasts with historical cohorts, in which most patients presented with advanced disease, further highlighting the benefits of earlier detection.[11] Treatment regimens in our cohort were heterogeneous, reflecting ongoing diagnostic evaluations and evolving therapeutic approaches. Bortezomib-based combinations such as BLD and B+D were the most frequently administered, consistent with current practice favouring proteasome inhibitor-based induction therapies.[1-3] The fact that over a third of patients were still under evaluation or had been referred out underscores systemic delays and referral practices typical of tertiary care settings.

Overall, this study reflects an evolving clinical landscape of multiple myeloma in central Kerala, characterized by earlier diagnosis, a reduced incidence of severe biochemical abnormalities at presentation, and a more diverse clinical profile. These findings highlight the need for heightened clinical vigilance, the routine use of SPEP in evaluating unexplained anaemia or bone pain, and better access to diagnostic tools. Future studies incorporating long-term outcomes and advanced imaging are warranted to characterize MM in this regional context further.

CONCLUSION

This study demonstrates how the clinical picture of multiple myeloma in central Kerala is changing, with early detection, a variety of presentations, and a lower prevalence of severe disease characteristics such as renal failure and hypercalcemia. Serum protein electrophoresis showed high diagnostic sensitivity, confirming its use in regular screening. The results highlight the need for early diagnosis, heightened clinical vigilance, and prompt management to enhance patient outcomes in regional healthcare settings.

Limitations and Future Perspectives

The study's retrospective, single-centre design and incomplete records limited data accuracy for some parameters. Advanced imaging was not uniformly used, potentially underestimating disease extent. Future multicentric, prospective studies with standardized diagnostics and long-term follow-up are needed to better understand disease patterns and outcomes.

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