ORIGINAL ARTICLE

Clinical and Radiological Features of Multiple Myeloma Patients at the University Teaching Hospital, Lusaka, Zambia

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ABSTRACT

Background: Multiple myeloma (MM) is the second most common blood cancer after lymphomas, thereby accounting for 10% of all haematological malignancies.

Objectives: To evaluate the clinical and radiological features of Multiple Myeloma at presentation in patients presenting at the University Teaching Hospital (UTH), Lusaka, Zambia.

Design: Descriptive study

Methods and Results: Record files of patients diagnosed with MM from 2008-2015 April were reviewed. Data was analysed using SPSS Version 22. The median age at diagnosis was 53.0 (range 32-81 years). From 46 patients, 25 (54%) were men and 21(46%) were females. The most frequent and common clinical and radiological features in order of occurrence were osteolytic lesions (65%), back pain (59%), bone pain (46%), anaemia (30%), pathological fractures (26%), chest pain (26%) and fatigue (15%). Females had a higher proportion of fatigue than men with (P= 0.036). It was also observed that pathological fractures in individuals with osteolytic lesions were statistically significant with (P=0.001).

Conclusion: It was observed that osteolytic lesions which are a radiological feature of MM were the most frequent feature of patients presenting with MM at UTH, Lusaka Zambia.

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INTRODUCTION

Multiple myeloma (MM) is the second most common blood cancer after lymphomas, thereby accounting for 10% of all haematological malignancies [1].

There have been published descriptive studies of MM incidence and survival by race. It has been shown that there is consistently higher incidence and mortality rate among blacks [2]. This is also supported by studies from the USA that have shown that the incidence of myeloma in African Americans is two to three times more frequently compared with European Americans and that of other ethnic groups [3].

The incidence of MM is related to age with the condition being more common in the elderly. The age of onset of the disease is different in developed and developing countries. In developed countries, the median age at diagnosis is 62-65 years and about a decade less in developing countries [2]. Recent statistics show an increase in incidence in individuals below 55 years of age, most of them being under the age of 40 years old at the time of diagnosis [4].

It has been observed that there are gender differences in the incidence of MM and recent statistics and several studies indicate that MM is more common in males than females [5].

There are various clinical features of MM, and these include bone disease, hypercalcemia, renal failure, haematological abnormalities and increased susceptibility to infections.

Keywords: *Multiple myeloma, Clinical and Radiological features.*

Myeloma cells cause damage to the bones and cause bone loss that interferes with the normal process of bone repair and growth. Bone disease occurs in 80 to 90% of MM patients. The development of bone disease can result in pain, pathological fractures, spinal cord compression and hypercalcemia [6].

Hypercalcemia results when there is an increase in bone resorption and calcium leakage out of the bones [6]. Up to 30% of MM patients present with hypercalcemia, this can present with central nervous system dysfunction (confusion and coma), muscle weakness, pancreatitis, constipation, thirst, polyuria and renal failure.

Renal failure is seen in 20% to 30% of MM patients at the time of diagnosis and investigations [7]. Recent statistics show that this damage is as a result of damage caused to renal tubules by free light chain accumulations (Bence jones protein). When light chain accumulates in the distal tubules, tubular casts are formed and obstructive nephropathy occurs. This phenomenon is called myeloma kidney [8]. Other factors known to cause renal damage in MM is the hyperviscosity from excessive amounts of M protein in the blood, dehydration, hypercalcemia, nephrotoxic drugs and infections [9].

The growing number of myeloma cells can also interfere with the production of all types of blood cells (WBC, RBC and platelets) leading to anaemia, leukopenia and thrombocytopenia. Anemia is seen in 70% of patients at time of diagnosis and it is usually normocytic normochromic type of anaemia [10]. This predisposes patients to infections and bleeding tendencies.

Myeloma is associated with an increased incidence of early infection especially bacterial infections mostly pneumococcal. This is related to the deficits in the body's humoral and cellular immunity. It has been reported that 10% of patients die of infective causes within 60 days of diagnosis [11].

MATERIALS AND METHODS

Clinical and Demographic data collection – All individuals who were previously diagnosed with MM and were being managed at the haemato-oncology clinic, Cancer Diseases Hospital and those who were being investigated for MM who had a confirmed diagnosis record files were reviewed. Ethical clearance and permission was sought from the University of Zambia Biomedical Research Ethics Committee (UNZA-BREC), Cancer Disease Hospital Senior Medical Superintendent and University Teaching Hospital Senior Medical Superintendent.

RESULTS

In total 46 record files were reviewed.

The median age at diagnosis was 53.0 (range 32-81 years). From 46 patients, 25 (54%) were men and 21(46%) were females. The study showed that the patients presented with 8 clinical features and 2 radiological features (Table.1). When grouped for sex, males had the highest frequencies of these features except for fatigue, anaemia, chest pains and osteolytic lesions.

A total of 15% participants had fatigue. (13.0%) 6 females and (2.2%) 1 male had fatigue. Females had a significantly higher proportion of fatigue than males with p-value = 0.036 (Figure 1). 6.5% (3) had both pathological fractures and osteolytic lesions, (58.7%) 27 had osteolytic lesions but without pathological fractures and (19.6%) 9 had pathological fractures without osteolytic lesions. Pathological fractures in individuals with osteolytic lesions were statistically significant with a p-value of 0.001 (Figure 2).

Table 1: Clinical and Radiological features of MM at presentation

Clinical and Radiological features	Absolute count	Percentages
Osteolytic lesions	30/46	65%
Back pain	27/46	59%
Bone pain	21/46	46%
Anaemia	14/46	30%
Pathological fractures	12/46	26%
Chest pain	12/46	26%
Fatigue	7/46	15%
Hypercalcemia	5/46	11%
Renal dysfunction	3/46	7%
Epistaxis	2/46	4%

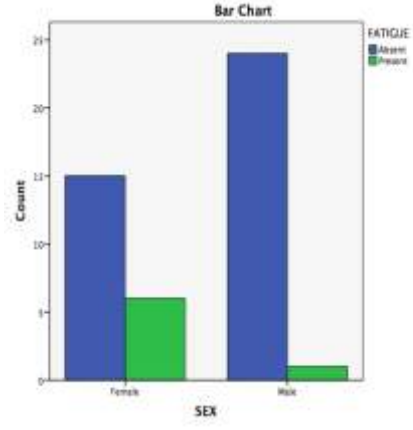

Figure 1: Distribution of fatigue between males and females: Females had more fatigue.

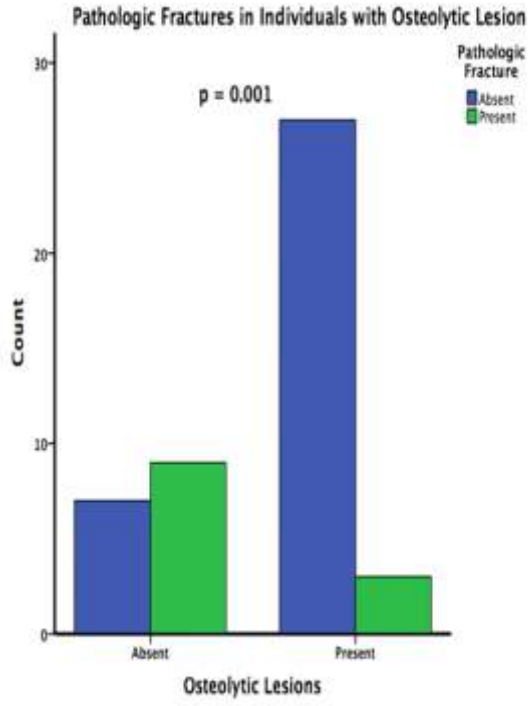

Figure 2: Distribution of pathological fractures in individuals with osteolytic lesions: there were more individuals with osteolytic lesions but without pathological fractures.

DISCUSSION.

Multiple myeloma is plasma cell dyscrasia with a high degree of heterogeneity in its clinical manifestation and survival. The reason for this is the difference in its biological characteristics among patients.

Clinical and Radiological features

Multiple myeloma is characterized by one or more of the following features which are denoted by the acronym CRAB (Hypercalcemia, renal disease, anaemia and bone abnormalities including osteolytic lesions, pathological fractures, backache and osteopenia) [12].The results of this study showed anaemia, back pain, bone pain, hypercalcemia, epistaxis, renal impairment, fatigue and chest pain as the clinical features, pathological fractures and osteolytic lesions as radiological features of MM at presentation.

The most frequent and common features in order of occurrence were osteolytic lesions, back ache, bone pain, anaemia, pathological fractures, chest pain and fatigue.

Females had a higher proportion of fatigue than men with (P= 0.036). This finding is similar to the findings of the study done in the USA in which patients diagnosed with MM had fatigue and it was more in females than males [13]. This finding could be attributed to anaemia that is caused by the myeloma cells infiltrating the bone marrow and thus not making enough red blood cells. Fatigue is a problem in the MM population as many of the patients are usually older individuals who have issues that are straining their physical, mental and functional capacity.

The Osteolytic lesions in this study were seen in 65% of patients at presentation and this is similar to the findings of a study done in the USA that found that out of 1027 patients diagnosed with MM, osteolytic lesions were found in 66% of patients [14]. Osteolytic lesions usually occur in late diagnosis when the disease has progressed. The presence of osteolytic lesions is a hall mark of MM. These lesions are as a result of increased bone resorption due to increased levels of IL-6 which activates osteoclasts. These lesions represent uncoupling between osteolytic and osteoblastic activities [15].

Another study done also found that almost all MM patients develop osteolytic lesions [16]. These lesions result in associated abnormalities such as pathological fractures, bone pain, backache and hypercalcemia.

Bone and back pain are common presenting features in MM. Majority of patients in this study had bone and back pains and this is similar to the findings of a study done in Nigeria [17]. Two thirds of patients complain of bone pain frequently located in the back, long bones, skull and pelvis [18]. This could be due to osteolytic lesions, bone metastases and associated pathological fractures.

Pathological fractures are also in about 30% of patients at diagnosis. In this study, pathological fractures were seen in 26% of patients which is slightly lower than the ones seen in other studies that observed pathological fractures in 44% of MM [19]. This study also found that pathological fractures in individuals with osteolytic lesions were statistically significant with (P=0.001). This should be a red signal for clinicians to quickly investigate for MM in patients presenting with both pathological and osteolytic lesions.

Anaemia was seen in 30% of patients in this study. This is similar to the findings of a study in Nigeria [20]. Anaemia is caused by ineffective erythropoiesis as a result of myeloma cells infiltrating the bone marrow. Anaemia could also be due to associated renal damage which leads to reduced erythropoietin production by the kidney. These findings are also at variance with the findings in the USA who recorded anaemia in 70% of patients [10]. This variance could be because of a small sample size in our study. Anaemia may promote tumor hypoxia which is

thought to impart resistance to irradiation and some chemotherapeutic agents and to give rise to malignant progression [21]. Therefore, adequate iron supplies are necessary to support increased erythropoiesis.

Chest pain was seen in 26% of patients. Many patients with MM develop chest infections caused by bacteria. This increased susceptibility of infections is as a result of hypogammaglobulinemia, granulocytopenia and low cell mediated immunity. The common pathogens implicated in these infections are the gram positive organisms e.g. *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Haemophilus influenzae* [11].

The findings of this study are at variance with the findings of a study done in Taiwan that found plasmacytoma and extra medullary myeloma as the clinical features of MM [22]. This variance could be attributed to the late diagnosis of MM in our study.

CONCLUSION

Osteolytic lesions which are a radiological feature of MM were the most frequent feature of patients presenting with MM at UTH, Lusaka Zambia. Findings of this study suggest that patients who are in their fifth decade complaining of chronic backache and bone pain should quickly be investigated for MM.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHORS CONTRIBUTIONS

Florence Mwaba, Trevor Kaile and Hamakwa Mantina were involved in designing the study, participated in data analysis, interpretation, drafted and finalized the manuscript. Sumbukeni Kowa, Chintu Chifumbe, Lydia Korolova, Panji Nkhoma, and Geoffrey Kwenda were involved in the acquisition of data, analysis and interpretation. All authors agree to be accountable for all aspects of the work.

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