



## ASSESSMENT OF QUALITY OF LIFE IN PATIENTS WITH METASTATIC BONE DISEASE BEING TREATED WITH BISPHOSPHONATES AND EXTERNAL BEAM RADIATION THERAPY

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### ABSTRACT

**Background:** Bone is the most common site of metastasis in cancer. Bone metastasis is a devastating condition that can have a negative impact on the lives of patients with advanced cancer in many ways. Although the overall incidence of bone metastasis (BM) is unknown, BMs are a frequent complication in patients with advanced cancer. Patients may experience limitations in the activities of daily living (ADL), decreases in quality of life (QOL) and threat of survival due to bone metastases. Thus in our study we focused to assess the QOL of patients suffering with metastatic bone disease. **Aim:** To study the QOL in patients with metastatic bone disease receiving Bisphosphonates and External Beam Radiation Therapy. **Methodology:** A Prospective observational study was carried out in Government General Hospital, Guntur for duration of 6 months i.e., October 2017 to March 2018 after obtaining approval from Institutional Ethics Committee. The Patients were screened based on inclusion and exclusion criteria. Patients who satisfy inclusion criteria were included in the study after obtaining informed consent. The data was collected in the specifically designed data collection form. Assessment of quality of life was performed using EORTC QLQ BM 22 questionnaire which consists of 22 questions categorized into 4 groups, representing painful sites (Q1 to Q5), pain characteristics (Q6 to Q8), functional interference (Q9 to Q16) and psychosocial aspects (Q17 to Q22) respectively. The obtained results were tabulated and interpreted using suitable statistical software (SPSS version 22.00, Paired t-test). **Results:** 36 patients who met the inclusion criteria were included in the study. On reviewing the demographic data it was found that bone metastasis was found to be more predominant in females within the age group of 51-70 years. Our study also revealed that there was no significant family history noted in patients who developed metastasis. In our current study it was found that patients suffering with breast cancer, lung cancer and prostate cancer are more likely to develop bone metastasis. We also assessed quality of life of patients suffering with bone metastasis being treated with Bisphosphonates and EBRT (upto 10#, 30Gy) and noted that, painful site, painful characteristic and psycho social status was significantly improved ( $p < 0.0001^{***}$ ) from baseline after receiving zoledronate and EBRT therapy. **Conclusion:** Based on the results obtained our study *strongly concludes* that use of Bisphosphonates and EBRT is effective in improving QOL of patients with bone metastasis.

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### INTRODUCTION

Bone is a common site for metastasis owing to high blood flow in the bone marrow. Bone metastasis or "bone mets" occurs when cancer cells from the primary tumor relocate to the bone. Bone metastasis is a devastating condition that can have a negative impact on the lives of patients with advanced cancer in many ways.

survival due to bone metastases. Although the overall incidence of bone metastasis (BM) is unknown, BMs are a frequent complication in patients with advanced cancer. The most common human cancers such as breast, prostate, kidney, thyroid and lung have a great avidity for bone, leading to painful skeletal symptoms. The distress associated with this symptom adds significantly to the overall burden for patients and their families. Pain is among the most prevalent symptoms and poses a challenge for the cancer health-care system. BMs can be associated with skeletal-related events (SREs), which include pathologic fracture, the need for surgery or radiation to bone, spinal cord compression, and hypercalcemia of malignancy (HCM)<sup>[1]</sup>. Palliative radiotherapy and

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Bisphosphonates for bone metastasis is of significant benefit to patients with painful bone metastasis and metastatic spinal cord compression. Radiotherapy plays an important role in palliative care and treatment for patients with symptomatic bone metastasis<sup>[2]</sup>. QOL is a multidimensional model that attempts to capture the physical, social, and psychological well-being of the patient. Many components influence QOL, including physical symptoms of the disease, side effects of treatment, social and family support. Treatment in the advanced cancer population is palliative rather than curative in intent, meaning that the goal is managing symptoms as opposed to prolonging life. With this goal in mind, it is important for health care providers to consider treatment in terms of not only managing symptoms, but also stabilizing or improving other factors that affect QOL<sup>[3]</sup>. Pharmaceutical Care is a patient-centered, outcomes oriented pharmacy practice that requires the pharmacist to work in concert with the patient and the patient's other healthcare providers to promote health, to prevent disease, and to assess, monitor, initiate, and modify medication use to assure that drug therapy regimens are safe and effective. The goal of Pharmaceutical Care is to optimize the patient's health-related quality of life, and achieve positive clinical outcomes, within realistic economic expenditures<sup>[4]</sup>.

**Aim:** To study the QOL in patients with metastatic bone disease receiving bisphosphonates and external beam radiation therapy

**Objective**

To assess the QOL in patients receiving Bisphosphonates & EBRT and to emphasize the pharmaceutical care in improving QOL.

**METHODOLOGY**

A non experimental prospective observational study was carried out on “Assessment of Quality of life in patients with Metastatic bone disease being treated with Bisphosphonates and EBRT” for a period of 6 months from October 2017 to March 2018 in Government General Hospital, Guntur in the Department of Radiotherapy after obtaining approval from Institutional Ethics Committee. The Patients were screened based on inclusion and exclusion criteria. Inclusion criteria includes patients who are diagnosed malignancy with bone metastasis, those receiving zoledronic acid and EBRT, Patients of either gender and age >21 yrs, those who are with performance status (ECOG) more than grade II, Patients who concerned to participate in the study, who are able to understand local language, who are willing for regular follow up. Exclusion criteria includes patients whose origin of cancer (primary lesion) involved is bone, Those who are receiving bisphosphonates alone, receiving EBRT alone, who are not willing to participate in the study, who were renally impaired, those not willing for regular follow up, who are < 21 yrs of age, Patients who are pregnant and lactating. Patients who satisfy inclusion criteria were included in the study after obtaining informed consent. The data was collected in the designed data collection form. After the necessary data was collected Assessment of quality of life was performed using European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Bone Metastasis 22 ( EORTC QLQ BM 22) questionnaire which consists of 22 questions categorized into 4 groups, representing painful sites (Q1 to

Q5), pain characteristics (Q6 to Q8), functional interference (Q9 to Q16) and psychosocial aspects (Q17 to Q22) respectively. The obtained results were tabulated and interpreted using Paired t-test in SPSS version 22.00.

**RESULTS**

Based on the results obtained our study revealed that patients with bone metastasis was found to be more predominant in females (58.34%) as shown in fig 1. within the age group of 51-70 years (63.89%) as depicted in fig 2.

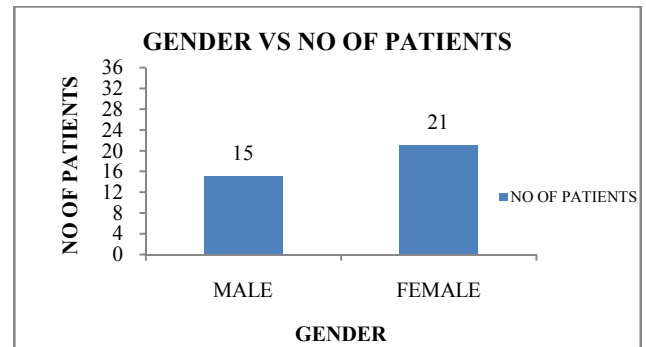


Figure 1 Gender vs no. of patients

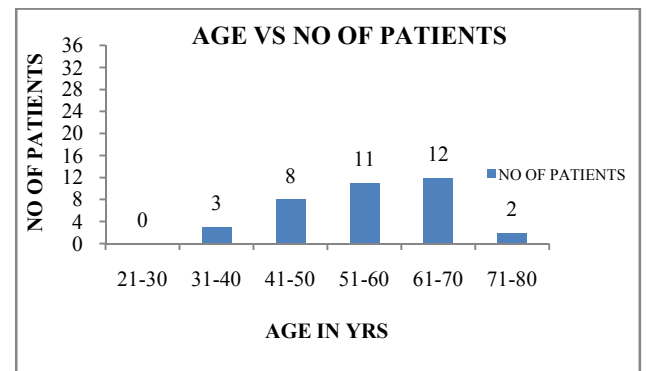


Figure 2 Age vs no. of patients

Our study also found that there is no significant association (94.45%) with family history for the development of bone metastasis as shown in fig 3.

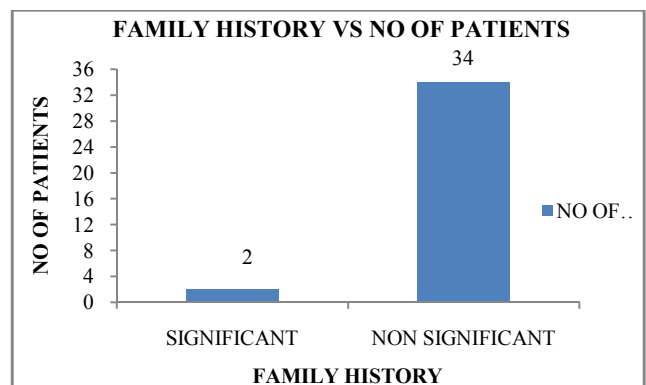


Figure 3 Family history vs no. of Patients

Our study also revealed that patients suffering with breast cancer (30.56%), Lung (19.44%), Prostate (16.67%) & multiple myeloma (3.89%) are more likely to develop bone metastasis followed by cervical (8.33%), endometrium (2.78%), Hepatocellular carcinoma (2.78%) and unknown origin (2.78%) as depicted in fig 4. Based on fig 5 we also

noted that multiple site metastasis (80.56%) were found to be more common compared to single site (19.44%).

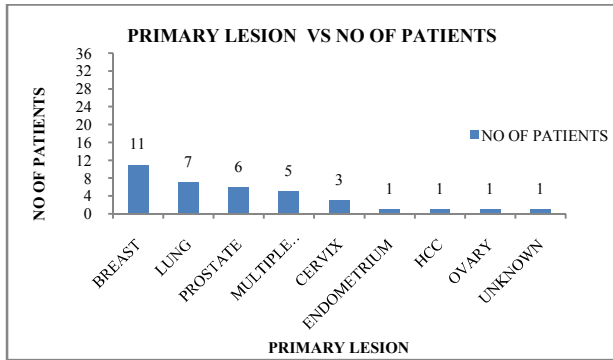


Figure 4 Primary Lesion VS no. of patients

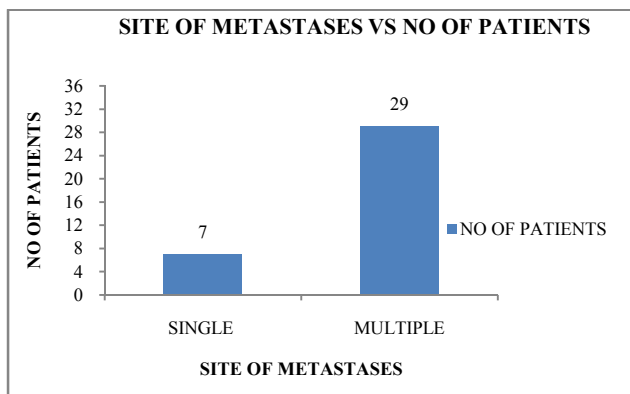


Figure 5 Type of Skeletal Metastasis Vs No.of Patients

We also tried to analyze the most affected sites of metastasis and found that axial skeleton (44.45%) was mostly affected when compared to appendicular skeleton (16.67%) according to fig 6. Fig 7 depicts that in axial skeleton we also noted that Ribs(44.45%), Lumbar and Dorsal vertebrae(38.89%), Iliac bones(30.55%), Femur & Acetabulum (25%) & Sacrum(22.22%) are mainly affected followed by Pelvic Bones, Disc Regeneration, Clavicle, Sacroiliac & Tibia(5.55%), Radius, Thoracic Cage, Shoulder Joints & Wrist Joints(2.78%).

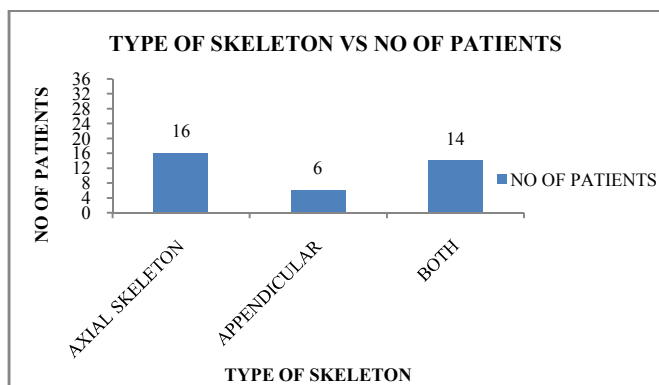


Figure 6 Type of Skeleton vs no. of patients

The results of part 1 (Painful site-Q1to Q5) of the EORTC QLQ BM22 questionnaire (table 1) revealed that most of patients were experiencing severe back pain, followed by legs/hip pain, arms/shoulder pain, chest/ribs pain and finally buttock pain before the treatment which was gradually reduced after the treatment. The results of part 2 (painful Characteristic-Q6 to Q8) of the EORTC QLQ BM22 questionnaire (table 2) revealed that most of patients were experiencing constant pain, followed by intermittent pain and pain not relieved by pain medications before the treatment which was gradually reduced after the treatment.

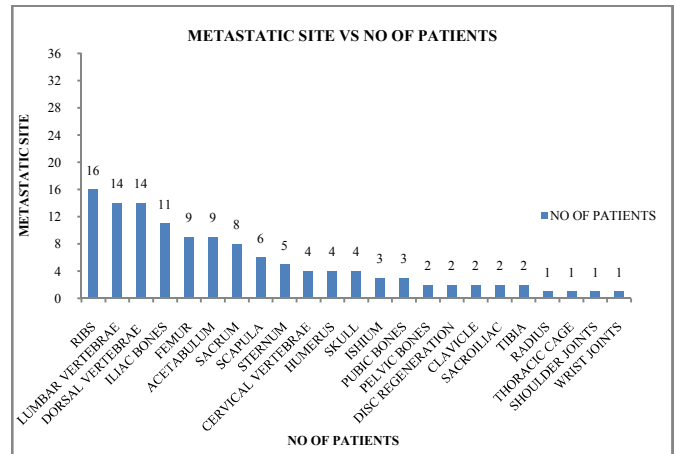


Figure 7 Metastatic site VS no. of patients

The results of part 3(Functional Interference-Q9 to Q16)of the EORTC QLQ BM22 questionnaire (table 3&4) revealed that most of patients were experiencing pain while walking, followed by pain interfering sleep, pain which modified activities of daily living, pain while sitting and pain while trying to stand up and finally pain with strenuous activity followed by pain while lying down & pain during bending / climbing stairs before the treatment which was gradually reduced after the treatment. The results of part 4 (Psychosocial aspects-Q17 to Q22) of the EORTC QLQ BM22 questionnaire (table 5&6) revealed that the psychosocial aspects have also showed a significant improvement after the treatment with bisphosphonates and EBRT.

Table No 1 Assessment of Painful Site

Painful Site	BACK		LEGS/HIP		ARM/Shoulders		CHEST/Ribs		Buttocks	
	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment
Not At All(1)	5	17	11	26	17	26	23	24	25	26
A Little(2)	5	16	2	9	3	8	2	10	3	8
Quite A Bit(3)	5	3	11	1	3	2	5	2	6	2
Very Much(4)	21	0	12	0	13	0	6	0	2	0

**Table No 2** Assessment of Painful Characteristic

Painful Characteristic	Constant Pain		Intermittent Pain		Pain Not Relieved by Pain Medications	
	Before	After	Before	After	Before	After
	Treatment		Treatment		Treatment	
Not At All(1)	4	21	8	24	9	21
A Little(2)	7	14	12	12	11	13
Quite A Bit(3)	7	1	10	0	12	2
Very Much(4)	18	0	6	0	4	0

**Table No 3** Assessment of Functional Status

Functional status	Pain while lying down		Pain while sitting		Pain when trying to stand up		Pain while walking	
	Before	After	Before	After	Before	After	Before	After
	Not At All(1)	9	25	7	20	6	20	4
A little(2)	9	10	8	15	6	14	5	13
Quite A Bit(3)	8	1	7	1	10	2	12	0
Very Much(4)	10	0	14	0	14	0	15	0

**Table No 4** Assessment of Functional Status (CONTD)

Functional Status	Pain During Bending /Climbing Stairs		Pain With Strenous Activity		Pain Interfering Sleep		Modifying Adl Due To Illness	
	Before	After	Before	After	Before	After	Before	After
	Not at all(1)	5	21	4	18	5	17	6
A little(2)	3	12	9	16	9	17	9	11
Quite a bit(3)	23	3	12	2	8	2	7	1
Very much(4)	6	0	11	0	14	0	14	0

**Table No 5** Assessment of Psychosocial Status

Psychosocial Status	Felt isolated		Worried about loss of mobility		Worried about being dependant	
	Before	After	Before	After	Before	After
	Not at all(1)	20	29	10	21	14
A little(2)	9	6	9	9	4	11
Quite a bit(3)	5	1	6	6	9	1
Very much(4)	2	0	11	0	9	0

**Table No 6** Assessment of Psychosocial Status (Contd)

Psychosocial status	Worried about health in future		Felt hopeful your health gets better		Felt positive about your health	
	Before	After	Before	After	Before	After
	Not at all(1)	14	26	4	0	5
A little(2)	7	9	4	0	6	0
Quite a bit(3)	12	1	15	2	16	4
Very much(4)	3	0	13	34	9	32

## CONCLUSION

Based on the results obtained our study *Strongly concludes* that use of Bisphosphonates and EBRT is effective in improving QOL and reducing pain in patients with bone metastasis. Our study also concludes that Bisphosphonates possess co-analgesic activity in reducing bone pain. Our study concludes that Pharmaceutical care and Psychosocial support plays a vital role in improving adherence to the therapy there by enhancing the QOL of patients with metastatic bone disease being treated with Bisphosphonates and EBRT.

## DISCUSSION

Based on the results obtained our study revealed that patients with bone metastasis was found to be more predominant in females (58.34%) within the age group of 51-70 years (63.89%). These findings were in concordance with study done by vivek ajit singh et al., (2014) on “Incidence and outcome of bone metastatic disease at University Malaya Medical Centre”

which showed that the highest incidence of metastatic bone disease was observed in patients aged 50–59 years, followed by patients aged 60–79 years. Our study also found that there is no significant association (94.45%) with family history for the development of bone metastasis. Our study also revealed that patients suffering with breast cancer (30.56%), Lung (19.44%), Prostate (16.67%) & multiple myeloma (3.89%) are more likely to develop bone metastasis followed by cervix (8.33%), endometrium (2.78%), Hepatocellular carcinoma (2.78%) and unknown origin (2.78%) This findings were similar to the study done by vivek ajit singh et al., on “Incidence and outcome of bone metastatic disease at University Malaya Medical Centre” which showed that Breast cancer (23.2%) was the most common primary cancer, followed by lung (21.2%), prostate (9.3%) and thyroid (7.3%) cancers, and renal cell carcinoma (5.3%). The incidence of primary tumours of unknown origin was an infinitesimal 6.6%. We also noted that multiple site metastases (80.56%) were found to be more common compared to single site (19.44%). We also tried to analyze the most affected sites of metastasis and found that axial skeleton (44.45%) was mostly affected when compared to appendicular skeleton (16.67%). In axial skeleton we also noted that Ribs(44.45%), Lumbar and Dorsal vertebrae(38.89%), Iliac bones(30.55%), Femur & Acetabulum (25%) & Sacrum(22.22%) are mainly affected followed by Pelvic Bones, Disc Regeneration, Clavicle, Sacroiliac & Tibia(5.55%), Radius, Thoracic Cage, Shoulder Joints & Wrist Joints(2.78%). These results were similar with study done by vivek ajit singh et al., on “Incidence and outcome of bone metastatic disease at University Malaya Medical Centre” which showed that Metastasis is more prevalent in the axial skeleton compared to the appendicular skeleton, due to a higher percentage of red bone marrow. We also assessed quality of life of patients suffering with bone metastasis being treated with bisphosphonates and EBRT and noted that, painful site, painful characteristic and psychosocial status was significantly improved ( $p < 0.0001$ \*\*\*\*) from baseline after receiving zoledronate + EBRT therapy. These results are concordance to the study done by Dah-cherng Yeh et al. (2014) on “EORTC QLQ-BM22 Quality of Evaluation and Pain Outcome in Patients with Bone Metastases from Breast Cancer Treated with Zoledronic acid” and concluded that there was significant reduction of the symptom scale after treatment compared with the baseline. We found that the functional status was also significantly improved ( $p < 0.0001$ \*\*\*\*) after receiving zoledronic acid + EBRT therapy compared to baseline where as the study done by Dah-cherng Yeh et al. (2014) on “EORTC QLQ-BM22 Quality of Evaluation and Pain Outcome in Patients with Bone Metastases from Breast Cancer Treated with Zoledronic acid” has stated that there is no significant improvement.

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