https://doi.org/10.29309/TPMJ/2023.30.04.6781

The Professional Medical Journal
www.theprofesional.com
2023, Volume, 30 Issue, 04

ORIGINAL ARTICLE

Pattern of bone metastasis; Central versus Peripheral skeleton in metastatic breast carcinoma.

Fariha Ahmed[1], Aamir Shahzad[2], Waseem Abbas[3], Sidrah Mahmood[4], Khadim Hussain[5], Muhammad Sabir[6]

Article Citation: Ahmed F, Shahzad A, Abbas W, Mahmood S, Hussain K, Sabir M. Pattern of bone metastasis; Central versus Peripheral skeleton in metastatic breast carcinoma. Professional Med J 2023; 30(04):442-445. https://doi.org/10.29309/TPMJ/2023.30.04.6781

ABSTRACT… Objective: To see the pattern of bone involvement in metastatic breast carcinoma. To study the distribution of bone metastasis, central skeleton vs. peripheral skeleton, in metastatic breast carcinoma. **Study Design:** Retrospective study. **Setting:** Department of Surgery, Nishtar Medical University, Multan, in accordance with Breast Clinic MINAR. **Period:** March, 2021 to August, 2022. **Material & Methods:** The study was done in breast clinic MINAR, Multan. It was retrospective, non-randomized and single institution based study. The female patients who presented with breast carcinoma from March 2021 to August 2022, aged 25 to 70 years were scrutinized. Among these, the patients with metastatic breast carcinoma having metastasis in bones, confirmed on bone scan, were included in the study. 90 cases were collected in this research. The tumours which primarily arise from bone, lymphoid tumours, soft tissue tumours and bone marrow tumours and bone metastasis due to malignancies arising from other visceral organs were excluded. All the data was entered and analyzed using computer programme SPSS version 25.0. **Results:** The highest range of patients were between ages of 46-65 years. 87.8% were married, 2.2% were unmarried and 10% were divorced or widow. 43.3% were from rural area and 56.7% were from urban area. 93.3% previously had not any history of breast carcinoma. Only 6.7% had family history of breast carcinoma. 64.4% had menarche during the age of 12 to 14 years. And 42.2% had menopause between 50 to 55 years. While in all these cases 46.7% were those who had no menopause at all when they presented with metastatic breast carcinoma. Among these 13.3% had solitary bone metastasis and 86.7% had metastasis to multiple bones. 46.7 % had central or axial skeletal involvement, 13.3% had peripheral skeletal involvement and 40% had both, including central and peripheral skeleton. **Conclusion:** This study has shown that among all the patients there were 46.7% patients had central skeletal involvement and 13.3% had peripheral skeleton involvement and 40% had both.

Key words: Breast Carcinoma, Bone Metastasis.

INTRODUCTION

One of the most common cancers among females is breast carcinoma and it is also the main reason of cancer related death in them.[1,2] It is prevailing worldwide as 22% and in it 42% is found in developing countries. And 90% deaths are caused by breast cancer metastasis.[3] A study in Jinnah Postgraduate Medical Centre, Karachi, in 2005 showed 30% of malignancies in females were breast carcinoma.[4] Breast carcinoma most frequently metastasizes to Lungs, Liver, Bone, Brain and Skull.[5,6,7] Metastasis to bones, when becomes symptomatic, not only greatly affects the functional quality of life but also affects the patient emotionally, psychologically and economically and may make the patient more dependent on others. The metastasis of tumour cells from breast neoplasm to the bones of spinefollow a unique pattern. The veins draining the breast are connected with the Batson's plexus of veins. These are thin walled, valve less veins that are present over the spine. These veins connect the veins of the spinal canal to the veins around the vertebral column. Once the tuomur cells reach the bone substance through these veins, they cause lytic lesions in bone leading to long bone fractures or vertebral collapse, depending on the site of involvement. That's why for staging and therapeutic purposes, it is very important to know the metastasis in bones.

1. MBBS, FCPS, Senior Registrar Surgery, Nishtar Hospital, Multan.
2. MBBS, FCPS, Senior Registrar Surgery, Nishtar Hospital, Multan.
3. MBBS, FCPS, Medical Officer Surgery, Nishtar Hospital, Multan.
4. MBBS, FCPS, Consultant Radiology, Multan Institute of Nuclear Medicine and Radio Therapy, Multan.
5. MBBS, FCPS, Senior Registrar Surgery, Nishtar Hospital, Multan.
6. MBBS, FCPS, Assistant Professor Surgery, Nishtar Hospital, Multan.

Correspondence Address:
Dr. Fariha Ahmed
House No. 93, Sultan Abad,
Gulgash Road, Multan.
natureloving1984@gmail.com

Article received on: 06/09/2021
Accepted for publication: 10/01/2022

So that prompt treatment or early intervention should be done for stabilizing the skeleton.

MATERIAL & METHODS

The study was done in breast clinic MINAR, Multan. It was retrospective, non-randomized and single institution based study. The female patients who presented with breast carcinoma from March 2021 to August 2022 aged 25 to 70 years were scrutinized. Among these, the patients with metastatic breast carcinoma having metastasis in bones, confirmed on bone scan, were included in the study. 90 cases were collected in this research. The tumours which primarily arise from bone, lymphoid tumours, soft tissue tumours and bone marrow tumours and bone metastasis due to malignancies arising from other visceral organs were excluded. All the data was entered and analyzed using computer programme SPSS version 25.0. This was approved by ethical committee (23483/NMU&H).

RESULTS

The analysis of the disease was performed from the data collected among the 90 patients. The patients were grouped among age categories between 25-45 years, 46-65 years and 66-75 years. Among these age groups there were 48.9% of patients that reported the disease within the age group of 46-65 years. There were 45.5% patients that were reported with the disease in their ages from 66-75 years. The least range of patients were reported in the age of 25-45 years with the least percentage of 5.6%. 87.8% were married, 2.2% were unmarried and 10% were divorced or widow. 43.3% were from rural area and 56.7% were from urban area. 93.3% previously had not any history of breast carcinoma. Only 6.7% had family history of breast carcinoma. 64.4% had menarche during the age of 12 to 14 years. And 42.2% had menopause between 50 to 55 years. While in all these cases 46.7% were those who had no menopause at all when they presented with metastatic breast carcinoma. Among these 13.3% had solitary bone metastasis and 86.7% had metastasis to multiple bones. 46.7 % had central or axial skeletal involvement, 13.3% had peripheral skeletal involvement and 40% had both, including central and peripheral skeleton.

DISCUSSION

Breast carcinoma is one of the commonest malignancies among females, being the leading cause of morbidity and mortality in this population.[1,2] Breast cancer cells grow and have local, regional and distant spread. Among distant spread, skeleton is one of the most common site.[8,9] 70% of the breast cancer metastasizes to bones.[10,11]

Metastasis to bones occur in different pattern as central or axial skeleton (involving skull, hyoid bone, ear ossicles, the thoracic cage and the whole vertebral column), peripheral or appendicular skeleton (involving the bones of upper limbs, lower limbs and the bones that attach the limbs to the central skeleton) or both.[12] The metastasis to bones is easily detected by Bone Scan.[12] The presentation of metastasis to bones is by the complaints of bony aches, pathological fractures or by nerve root compression symptoms (in case of vertebrae involvement).[13,14,15] Its treatment is palliative, reducing symptoms, improving the quality of life and prolonging symptom free survival.[16,17,18,19,20,21,22] It was also found that the prognosis of the patients with earlier metastasis to bone was much better than the patients having first metastasis to liver, lung or brain.[23] S.A Adewuyi et al found in his study that there was involvement of lumber spine in 51.4%, thoracic spine in 21.6%, sacrum and pelvic bones in 10.8%, and skull and ribs in 2.7%.Zhenchong Xiong et al showed that 60% of the tumours with bone metastasis were hormone receptor positive. Delpech et al showed that the risk of n=bone metastasis in patients with hormone receptor positive breast cancer was 1.66 times higher than the risk of patients with hormone receptor negative breast cancer.

CONCLUSION

This study showed that the 46.7% patients had central skeletal involvement (including skull, hyoid bone, ear ossicles, the thoracic cage and the whole vertebral column) and 13.3% had peripheral skeleton involvement (including the bones of limbs and the bones that attach the limbs to the central skeleton) and 40% had both. So, there were a greater percentage of patients who had central skeleton involvement. This shows that

breast carcinoma cells have greater tendency to involve vertebral column as compared to limbs. One possibility could be that Braxton plexus of veins of vertebrae are directly connected through valve less veins to the chest wall veins that drain the breast tissue as well. That's why spread to the vertebrae is rapid as compared to limb bones.

REFERENCES

1. DeSantis C, Siegel R, Bandi P, Jemal A. **Breast Cancer Statistics, 2011: American Cancer Society.** CA Cancer J Clin. 2011; 61(6):408-18.

2. Sohail S, Alam SN. **Breast Cancer in Pakistan-Awareness and Early detection.** J Coll of Physicians Surg Pak. 2007; 17(12):711-2.

3. Parkin DM, Bray F, Ferlay J, Pisani P. **Estimating the world cancer burden: Globocan 2000.** Int J Cancer. 2001; 94:153-6.

4. Issac U, Memon F, Zohra N. **Frequency of breast diseases at a Tertiary Hospital of Karachi.** J Liaqat Uni Med Health Sci. 2005; 4(1):6-9.

5. Palma MA1, Body JJ. **Usefulness of bone formation markers in Breast Cancer.** Int J Biol Markers. 2005 Jul-Sep; 20(3):146-55.

6. Sarvari BK1, Sankara Mahadev D2, Rupa S3, Mastan SA4. **Detection of Bone Metastasis in Breast Cancer Patients by Serum Tartarate-Resistant Acid Phosphatase 5b (TRACP 5b), a Bone Resorption Marker and Serum Alkaline Phosphatase (ALP), a Bone Formation Marker, in Lieu of Whole Body Skeletal Scintigraphy with Technetium99m MDP.** Indian J Clin Biochem. 2015 Jan; 30(1):66-71.

7. Baker RR. **Preoperative assessment of the patient with breast cancer.** Sug Clin North Am. 1978 Aug; 58(4):681-91.

8. Yin JJ, Pollock CB, Kelly K. **Mechanisms of cancer metastasis to the bone.** Cell Res. 2005; 15(1):57-62.

9. Mundy GR. **Metastasis to bone: causes, consequences and therapeutic opportunities.** NatRevCancer 2002; 2:584-93.

10. Coleman RE. **Clinical features of metastatic bone disease and risk of skeletal morbidity.** Clin Cancer Res 2006; 12(20):6243-9.

11. Weiss L, Gilbert AH. **The anatomy and pathways of skeletal metastases.** In: editors. Bone metastases. Boston: Boston: GK Hall. 1981; 63:49.

12. S.A Adewuyi, N.D Chom, MHumera and M.O.A Samaila. **Pattern of skeletal metastases from breast cancer in an Asian population.** Nigerian journal of Surgical Research 2006; 8(3,4):128 -131.

13. Rubens RD: **Bone metastases–the clinical problem.** Eur J Cancer 1998; 34:210-213.

14. Hortobagyi GN, Theriault RL, Lipton A, et al: **Long-term prevention of skeletal complications of metastatic breast cancer with pamidronate: Protocol 19 Aredia Breast Cancer Study Group.** J Clin Oncol 1998; 16:2038-2044.

15. **Roodman GD: Biology of osteoclast activation in cancer.** J Clin Oncol 2001; 19:3562-3571.

16. Coleman RE, Rubens RD: **The clinical course of bone metastases from breast cancer.** Br J Cancer 1987; 55:61-66.

17. Hortobagyi GN, Theriault RL, Lipton A, et al: **Long-term prevention of skeletal complications of metastatic breast cancer with pamidronate: Protocol 19 Aredia Breast Cancer Study Group.** J Clin Oncol 1998; 16:2038-2044.

18. Theriault RL, Lipton A, Hortobagyi GN, et al: **Pamidronate reduces skeletal morbidity in women with advanced breast cancer and lytic bone lesions: A randomized, placebo- controlled trial: Protocol 18 Aredia Breast Cancer Study Group.** J Clin Oncol 1999; 17:846-854.

19. Janjan N: **Bone metastases: Approaches to management.** Semin Oncol 2001; 28:28-34.

20. **Radiotherapy in patients with metastatic breast cancer.** EurJ Cancer 2011; 47(3):23-27.

21. Fujino M, Suzuki K, Nishio M, Nishiyama N, Osaka Y. **Strategy of radiation therapy for bone metastases and MSCC in breast cancer patients.** Breast Cancer 2011; 18:238-43.

22. Souchon R, Wenz F, Sedlmayer F, Budach W, Dunst J, Feyer P, etal. **DEGRO practice guidelines for palliative radiotherapy of metastatic breast cancer: bone metastases and metastatic spinal cord compression (MSCC).** Strahlenther Onkol 2009; 185:417-24.

23. Zhenchong Xiong, Guangzheng Deng, Xinjian Huang, Xing Li, Xinhua Xie, Jin Wang, Zeyu Shuang and Xi Wang. **Bone metastasis pattern in initial metastatic breast cancer: A population- based study.** Cancer management and research 2018; 10:287-289.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Fariha Ahmed	Study planning, designing, paper writing and editing.	
2	Aamir Shahzad	Study planning, designing manuscript writing and editing.	
3	Waseem Abbas	Proof reading and editing.	
4	Sidrah Mahmood	Data collection, paper writing and literature searching.	
5	Khadim Hussain	Data collection, paper writing and literature searching.	
6	Muhammad Sabir	Data entry and data analysis.	