

OSTEOPOROSIS IN BREAST CANCER SURVIVORSArvind Kumar^{1*} and Usha Singh²¹Vardhman Institute of Medical Sciences, Pawapuri, Nalanda (Bihar).²Department of Radiotherapy, Mahavir Cancer Sansthan, Patna (Bihar).***Corresponding Author: Dr. Arvind Kumar**

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ABSTRACT

Breast cancer is the most common cancer in women. Risk of developing breast cancer increases with age. The risk is particularly high in women aged 60 years and above. Because of their age, these women are already at increased risk for osteoporosis. Due to rising incidence of breast cancer and the improvement in long-term survival rates, bone health and fracture prevention have become important health issues among breast cancer survivors. To know about prevalence and risk factors of osteoporosis in breast cancer survivor. A total no. of 34 patients was included in this study, which were treated by multimodality approach including surgery, chemotherapy, radiotherapy and hormonal therapy depending upon receptor status. All patients were followed up for a significant period of time. These patients were evaluated with questionnaire based survey, lab investigations, radiographs and DEXA test keeping in mind all possible etiology of osteoporosis. Out of 34 patients, 22 (64.7%) patients were diagnosed as having osteoporosis. 04 (11.7%) patients had osteopenia and 08(23.5%) patients were normal in DEXA test. Breast cancer and osteoporosis are common diseases especially in post-menopausal women. Three fourth of breast cancer patients has developed osteoporosis. Postmenopausal breast cancer patients are at higher risk of developing osteoporosis when received chemotherapy for breast cancer. Breast cancer patients are at higher risk of developing osteoporosis due to decreased estrogen either due to menopause or due to chemotherapeutic drug regime.

KEYWORDS: Breast cancer, DEXA test, Osteoporosis, Osteopenia.**INTRODUCTION**

Breast cancer is the most common cancer in women worldwide (Parkin DM et al 2002). It can occur in both men and women, but it is very rare in men. Although the exact cause is not known, the risk of developing breast cancer increases with age. The risk is particularly high in women aged 60 years and above. Because of their age, these women are already at increased risk for osteoporosis. Every one in three women after 50 years are affected by osteoporosis (Hannan et al, 2000).

One in eight women will have breast cancer in their lifetime. Most women are diagnosed when they are postmenopausal. Osteoporosis is a systemic disease affecting bone mineral density (BMD) and structure, leading to increased bone fragility. Osteoporosis and osteoporotic fractures affect one in three women over the age of 50 worldwide [Kanis et al, 2000].

Estrogen has long been thought to be the key link between BMD and breast cancer because of its role in regulation of bone turnover and its effect on breast cancer cells [Toniolo et al, 1995 and Fox et al, 1993].

The hormone oestrogen protects against bone loss and helps to maintain bone density and strength. Women who

have gone through the menopause are at increased risk of osteoporosis and fractures as their ovaries no longer produce oestrogen 1-4% (Demir B et al 2008).

Chemotherapy can affect the function of the ovaries, causing an early menopause in some women. This means less oestrogen production which can reduce bone density. Women aged 45 years or less whose menstruation have stopped for at least a year as a result of treatment may also be at risk of osteoporosis, even if their periods restart (Shapiro CL et al 2001).

The present study is designed to evaluate common risk factors associated with breast cancer and osteoporosis.

MATERIALS AND METHODS

This is a non randomized, retrospective study conducted at department of Radiation Oncology, Mahavir Cancer Sansthan, Patna. Total number of 34 patients with breast cancer, who had completed treatment were evaluated for osteoporosis during a period from 2014 to 2015. All female patients were in age group ranging from 30 years to 69 years, had non metastatic breast cancer, who accepted to get bone mineral density done and were included in this study.

Patients with inflammatory diseases, gastrointestinal and respiratory diseases were excluded from this study.

All patients underwent laboratory tests like alkaline phosphatase, serum calcium, radiograph of affected parts and DEXA test. Proposal of study was approved by ethics committee of Mahavir Cancer Sansthan. The main aim of the present study was to determine prevalence and etiology of osteoporosis in breast cancer patients by DEXA test. Information regarding age, parity, menopausal status, body mass index, addictions, food habits, comorbidity like Diabetes Mellitus, thyroid disease and physical activity were collected.

BMD at lumbar spine and femoral neck were measured by Dual Energy X-ray absorptiometry method. Result of BMD was expressed as BMD gram/cm², BMD T score and BMD Z score.

RESULT

A total of 34 patients were studied. Age ranges from 30 to 69 years, with mean age 52.23 years. Majority of the patients belongs to range of 50-59 years group (Graph: 1). Out of all Patients 91% had children up to five in numbers, only 8.8% patients had children more than five in number. 79.4 % patients belongs to postmenopausal group and 20.5% patients belongs to premenopausal group (Table: 1,2&3; Graph: 2).

41% patients were Estrogen/Progesterone positive, 14.7% patients were only Her2neu score 3 positive, 14.7% patients were both Estrogen/Progesterone and Her2neu score positive. 29.4% patients had triple negative. Out of 20.5% premenopausal women 5.8% were Her2neu score 3+ve, 5.8% were both ER/PR +ve and Her2neu score 3+ve, 8.8% patients were triple negative (Graph: 3 & 4). Out of 79.4% postmenopausal women 41% were ER/PR+ve alone, 8.8% patients were Her2neu score 3+ve, 8.8% patients were +ve for both receptors, 20.5% patients were triple negative (Table: 4, 5, 6 & 7).

Table: 6 Receptor status among Pre/post menopause women

	ER/PR+ve N=14	%	Her2neu+ve N=5	%	Both+ve N=5	%	Triple -ve N=10	In%
Premenopausal (N=7)	0	0	2	5.8	2	5.8	3	8.8
Postmenopausal (27)	14	41	3	8.8	3	8.8	7	20.5

Table: 7 Status of chemotherapy

Types of chemotherapy	Numbers of patients	% of patients
Paclitaxel	13	38.2
CAF	21	61.7

64.7% patients were diagnosed as having osteoporosis, 11.7% patients had osteopenia and only 23.5% patients were normal according to WHO classification of DEXA test (Table: 8 & Graph: 5).

Table: 1 Age of patient

Age range (years)	Number of patients	% of patients
30-39	5	14.7
40-49	7	20.5
50-59	12	35.2
60-69	9	26.4

Table: 2 Parity of patients

parity	Numbers of patients	% of patients
0-5	31	91
6-10	3	8.8

Table-3 Menopausal status

Menopausal status	Numbers of patients	% of patients
Pre menopause	7	20.5
Post menopause	27	79.4

Table: 4 Receptor status

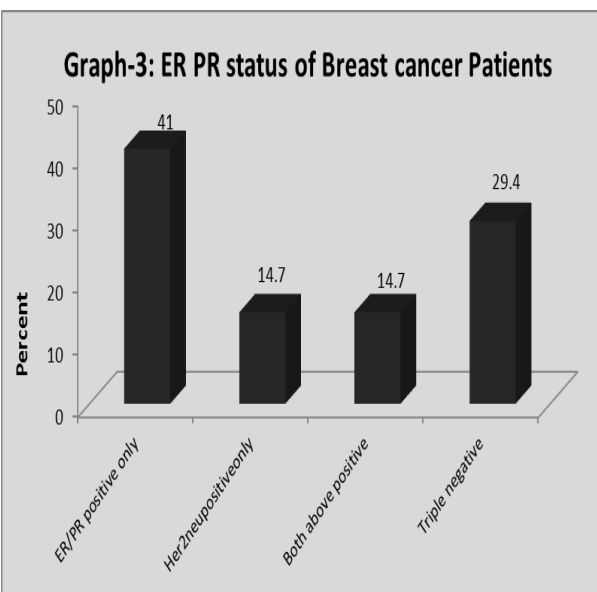
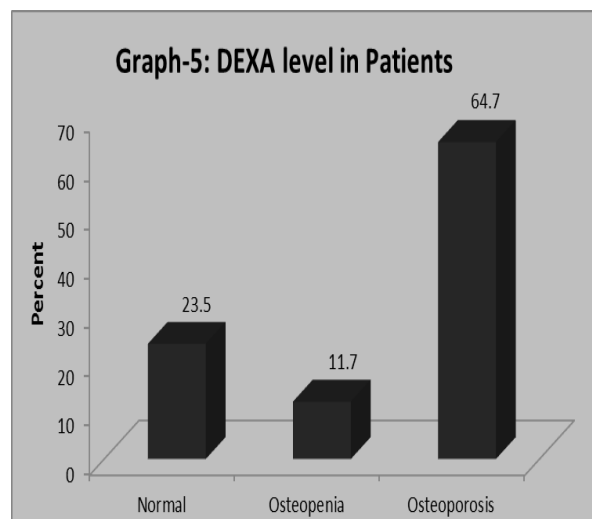
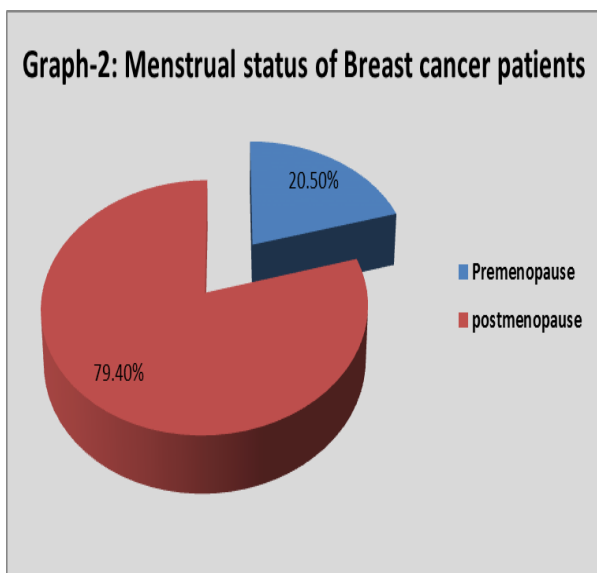
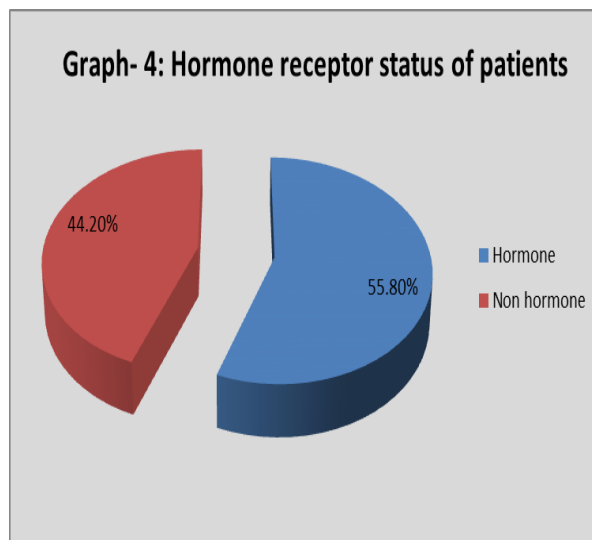
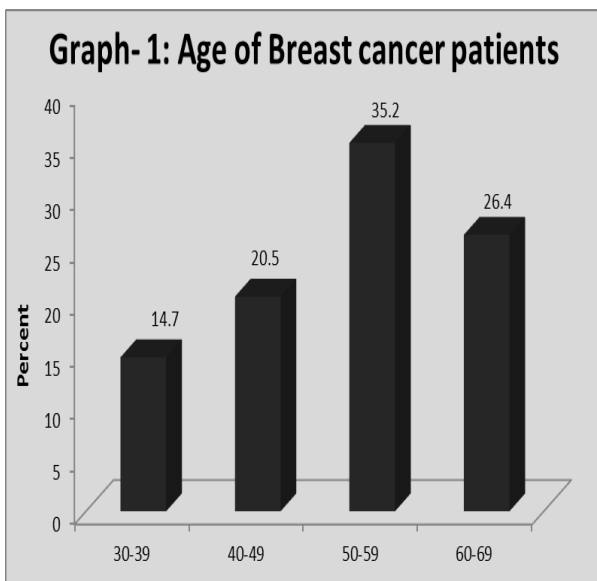
Receptor status	Numbers of patients	% of patients
ER/PR positive only	14	41
Her2neu positive only	5	14.7
Both above positive	5	14.7
Triple negative	10	29.4

Table: 5 Hormonal treatment

Hormonal treatment	Numbers of patients	% of patients
Hormone	19	55.8
Non hormone	15	44.1

Table-8: DEXA result

DEXA result	Numbers of patients	% of patients
Normal	8	23.5
Osteopenia	4	11.7
Osteoporosis	22	64.7



DISCUSSION

Both breast cancer and osteoporosis are more common in women. One in eight women suffers from breast cancer. Most of them are diagnosed when they are postmenopausal. Every one in three women after 50 years are affected by osteoporosis (Melton 1992). In our study 64.7% patients were above 50 years of age.

Higher parity is also associated with increased risk of osteoporosis in the elderly postmenopausal women (Sadat-Ali et al 2005, Heidari et al 2013). In our study parity was also high in patients it was 3.47.

In premenopausal patients, chemotherapy-induced ovarian failure and adjuvant ovarian suppression can lead to rapid and profound loss of bone mineral density. Tamoxifen is associated with decreases in bone mineral density in premenopausal women (Powles et al, 1996, Vehmanen et al, 2006). In our study 20.5% patients belongs to premenopausal group.

In postmenopausal women, due to aging and natural ovarian failure there is progressive loss of bone density. Bone mass is decreased by 03% yearly in first five years

after menopause (Riggs *et al*, 1998). Common use of adjuvant aromatase inhibition exacerbates the estrogen deprivation state leading to osteoporosis and fracture. In our study 79.4% patients belongs to postmenopausal group.

The common use of anthracyclines and taxanes into adjuvant chemotherapy regimens had led to higher rates of chemotherapy-induced amenorrhea (Martin *et al* 2005, Parulekar *et al*). Both drugs are also responsible for vitamin D deficiency leading to low BMD in locally advanced breast cancer used as neoadjuvant chemotherapy (Jacot Wet *al* 2012). In this study 61.7% patients were treated by cyclophosphamide, anthracyclines, 5-fluorouracil regime and 38.2% patients were treated by paclitaxel regime. For adjuvant endocrine therapy, in which an aromatase inhibitor was substituted for some duration of tamoxifen, excess fractures have been reported in postmenopausal women receiving the aromatase inhibitor (Baum *et al* 2002, Howell *et al* 2005 and Thurlimann *et al* 2005). In our study majority of patients were suffering from osteoporosis.

CONCLUSION

Breast cancer and osteoporosis are common diseases especially in post-menopausal women. Three fourth of breast cancer patients has developed osteoporosis. Postmenopausal breast cancer patients are at higher risk of developing osteoporosis when received chemotherapy for breast cancer. Hormone treatment also increases osteoporosis incidence in breast cancer patients. Breast cancer patients are at higher risk of developing osteoporosis due to decreased estrogen either due to menopause or due to chemotherapeutic drug regime.

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