

DRUG PRESCRIPTION PATTERN OF BREAST CANCER PATIENTS IN A TERTIARY CARE HOSPITAL IN WEST BENGAL: A CROSS-SECTIONAL AND QUESTIONNAIRE-BASED STUDY

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ABSTRACT

Objective: Cancer is a disease of uncontrolled division of cells in any part of the body. Breast cancer most common in women accounts for 13% of the death worldwide. The objective of the present study was to evaluate the drug prescription pattern of breast carcinoma patients in a tertiary care hospital of West Bengal.

Methods: This was a cross-sectional observational questionnaire-based study done for a period of 6 months at the Department of Pharmacology in Collaboration with the Department of Surgery and Department of Radiotherapy of a Tertiary Care Hospital at Kolkata, West Bengal, India. Female patients with breast cancer (originated from epithelial tissues) of different types and grade attending surgery outdoor patient department were taken as subjects for the study, after signing informed consent.

Results: The present study evaluated 28 patients (n=28) diagnosed as breast cancer by the physicians of the department of surgery and radiotherapy. It was observed that breast cancer was mostly found in the middle age group. Breast carcinoma in postmenopausal women accounted to 75%. The most prevalent breast cancer was invasive ductal carcinoma, accounting to 75% of the study population. 5-Fluorouracil, epirubicin, doxorubicin, cyclophosphamide, docetaxel/paclitaxel, and carboplatin were mostly used as chemotherapeutic agent.

Conclusion: Breast carcinoma being a prevalent type of cancer in females, the present study tried to evaluate the pattern of prescribing chemotherapeutic agents for breast cancer patients in a tertiary care hospital. Such study is essential to evaluate and refine the therapeutic regimen of the cancer patients to reduce their sufferings.

Keywords: Allred score, Breast carcinoma, Nottingham factor, Prescription.

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INTRODUCTION

Cancer is a life-threatening disease which causes to lose cohesiveness and orderliness of normal tissue [1]. Apoptosis or programmed cell death in normal tissues is replaced by uncontrolled cell growth in cancer cells [2]. The cells which grow uncontrollably are called malignant cells and the phenomenon of converting a normal cell to malignant cell is called "malignancy." These malignant cells can spread to any other organ through blood flow or lymphatic flow and develop malignancy over there, this phenomenon is called metastasis [3]. Malignant cells can also invade the surrounding tissue. Lung cancers, skin cancer, colorectal cancer, bladder cancer, and breast cancer are the most common cancers, globally. Statistics till 2016 estimated that about 16.8 lakh people are suffering from cancer in the United States [4]. In India, around 2.5 million people are affected with this disease [5].

Breast cancer is the leading cause of cancer-related mortality in women causing 13% death around the globe [6]. Breast cancer initiates when cells in the breast begin to grow uncontrollably. Risk factors of developing the breast cancer include early menarche, late menopause, genetic and epigenetic reasons, family history of breast cancer, race and ethnicity, having dense breast tissue, drinking alcohol, and being overweight or obese. [7]. In India, breast cancer accounts for 27% of all types of cancer among woman [5].

The prognosis and stage of cancer cells can be detected by staining process, known as immunohistochemistry. A scoring system, the Nottingham

prognostic index (NPI) is allotted based on these histopathological factors such as tumor size, lymph node stage, and tumor grade. NPI can identify the disease progression and how aggressive the cancer is. The scoring system is based on the differentiation of the cancer cells, i.e., how much it resembles the normal tissue. Well-differentiated cancer cells look more like the normal cells and grow slowly, whereas poorly differentiated cancer cells are more aggressive and metastasize more quickly. The scoring system is as follows:

- 3–5 points: Grade I – Well differentiated
- 6–7 points: Grade II - Moderately differentiated
- –9 points: Grade III - Poorly differentiated [8].

Hormones such as estrogen and progesterone play a major role in the prognosis of this disease. Disturbances in the homeostasis of hormones in the body are responsible for the advancement of this disease. Most of the breast cancer cells show predominant expression of receptors for these hormones. Human epidermal growth factor receptor 2 (HER2) receptors are also seen in few cancer cells. The success of hormone-targeted therapy depends on the nature of these receptors. However, few breast cancer cells fail to express any types of receptors are termed as triple negative cancers. Another scoring system, Allred score is allotted based on the staining of these hormone receptors. The proportion of stained cells for hormone receptor (scored on a scale of 0–5) and staining intensity (scored on a scale of 0–3) was considered into this scoring system. Total score was obtained by adding the proportion and intensity. High score signifies the presence of many hormone receptors, and thus, cells are responsive to hormone treatments with drugs like tamoxifen [9].

Global and national studies revealed the sufferings of breast cancer. A number of drugs such as 5-fluorouracil, epirubicin, doxorubicin, cyclophosphamide, docetaxel/paclitaxel, and carboplatin are prescribed to tackle such type of patients. However, till date, there is no universally accepted guideline for better therapeutic management. Thus, there is a need to explore the drug prescribing pattern of these cancer patients. The present study described the pattern of breast carcinoma and also the drug prescribed in a tertiary care hospital, Kolkata, India.

METHODS

The present study was a cross-sectional observational questionnaire-based study, conducted from December 2016 to June 2017, at surgery outdoor patient department (OPD) and Department of Radiology of R. G. Kar Medical College and Hospital at Kolkata. Female patients diagnosed with breast carcinoma of different types and grade, attending surgery OPD and Department of Radiology, were included in the study. The study was cleared ethically by the Institutional Ethics Committee (RKC/5439 dated 14.12.2016), and then, those patients willing to sign the written informed consent form were included in the study. The menopausal status of the patients was identified. The type of carcinoma, the correlation of the time gap between untreated noticeable lump and initiation of treatment with the grade of tumor, Nottingham score, and the Allred score of the cancers were noted. The drugs prescribed to the patients were also evaluated.

RESULTS

The present study population included 28 breast cancer patients of different stage, with an average age of 51 years (± 10.5) ranging from 28 to 73 years, average weight of 55.3 kg (± 8.68) ranging from 40 to 78 kg, and average body surface area (BSA) of 1.47 m² as baseline.

Comparison of pre- and post-menopausal status of the patients revealed 7 (25%) were premenopausal and 21 (75%) were post-menopausal. As per type of carcinoma, 21 of the cases were of invasive ductal carcinoma (IDC) (25%), 4 cases of ductal carcinoma *in situ* (DCIS) (14%), 2 cases of triple negative breast cancer (7%), and 1 case of invasive lobular carcinoma (4%). Carcinoma in the right breast 61% (17) was higher as comparison to the left breast 39% (11).

The presence of hormonal receptors in the study population was evaluated and reported in Fig. 1. Majority of the patients (11, 42.3%) were found to contain both estrogen and progesterone receptors (PRs). Only estrogen receptor (+ve) breast tumor lesion was found in 8 cases (30.8%). 2 (7.7%) patients were found to be HER2 neu receptor positive. Triple negative was in 3 cases (11.5%), and estrogen, progesterone, and HER2 neu receptor were present in 2 cases (7.7%). Immunohistochemistry results were not obtained for two cases, so total study population in this case was 26 (n=26).

Progression of disease and status of abnormality of the tumor cells are expressed in terms of grade of the tumor. It is presumed that negligence in detection and treatment might influence the disease progression. Therefore, in the present study, the grade of tumor, at the time of diagnosis, was plotted against the time gap of noticing the lump and initiation of treatment. Statistical analysis showed that there was an insignificant correlation (2.2%) between time gap of untreated noticeable lump and initiation of treatment with the grade of tumor.

The present study tried to investigate the correlation between the differentiation of the cells through Nottingham score with that of the prevalence of hormonal receptors, expressed in term of Allred score. Thus, from the linear plot of Nottingham score and the corresponding Allred score (Fig. 2), it was observed that coefficient of determination (R²) was 0.0129, i.e., the Allred score influenced the Nottingham scoring of a tumor by 1.29%. Therefore, no significant correlation was observed between the stage of differentiation of the cancer cells and the presence of hormonal receptors.

The study population was categorized according to the primary symptoms of the diseases. 61% of the study population were having painless lump, 28% were having painful breast lump, and 12% were having primarily painless and then painful lump, at the time of self-identification of the disease. It was to be noticed that one subject presented with ulcerated breast with swollen up nodes, followed by foul smell. Some of the patients having pain as primary symptoms experienced and had a complaint of frequent headache, pain in underarms, pain in neck, and elbow pain.

Treatment of the breast cancer depends on the stage and type of the tumor. Lumpectomy is regarded as removal of the lump only, whereas surgical removal of the entire breast is termed as mastectomy [7]. In the present study population, 24 patients among 28 had mastectomy (simple, full, and partial), and others had lumpectomy. Mastectomies were performed for advanced disease, more than one tumor or for relatively small breast where obtaining negative margin was not possible.

Drugs used in the present study were documented in Fig. 3. The most common drug used in the present study was cyclophosphamide (20%), followed by docetaxel (13%), doxorubicin (12%), 5-fluorouracil (12%), paclitaxel (9%), epirubicin (9%), tamoxifen (8%), letrozole (7%), trastuzumab (6%), and carboplatin (4%). The most commonly used route of administration was intravenous. The anatomical therapeutic chemical (ATC code) and route of administration of these drugs were tabulated in Table 1.

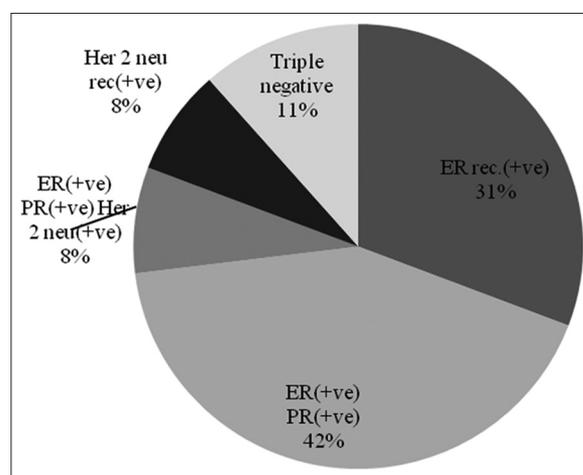


Fig. 1: Distribution of hormonal status of the study population (n=26)

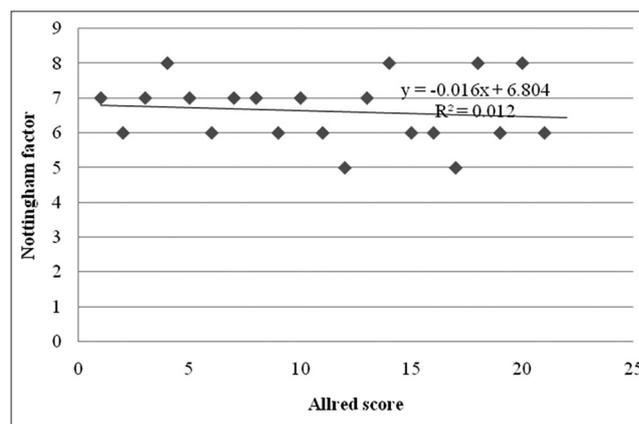


Fig. 2: Graphical representation of Nottingham scoring of the disease and corresponding Allred scoring (n=28)

DISCUSSION

Cancer cells are formed due to abnormal growth of normal cells because of mutation of DNA. Among the different types of cancers, breast cancer is most prevalent among the woman [10]. The present study was conducted on breast cancer patients attending a tertiary care hospital in Kolkata, West Bengal, India, to evaluate the pattern of breast carcinoma and therapeutic regimen provided to them.

The study population comprised of 28 breast cancer patients. The mean age of the population was 51 years (± 10.5) ranging from 28 to 73 years with the average weight of 55.3 kg (± 8.68) ranging from 40 to 78 kg. A survey on breast cancer patients in Manipal, India, estimated that the study participants belonged to the age group of 25–69 years [11]. A similar study among Turkish woman revealed the age ranged from 18 to 70 years [12]. A study in Iran showed that the average age of breast cancer patients was 47.49 years that was comparable with the present study [13]. In the present study, the average BSA was 1.47 m². Statistics from the United Kingdom revealed that the mean BSA was about 1.79 m² [14].

Hormones such as estrogen and progesterone play a major role in the prognosis of this disease. Disturbances in the homeostasis of hormones in the body are responsible for the advancement of this disease. Most of the breast cancer cells show predominant expression of receptors for these hormones. HER2 receptors are also seen in few cancer cells. Success of hormone-targeted therapy depends on the nature of these

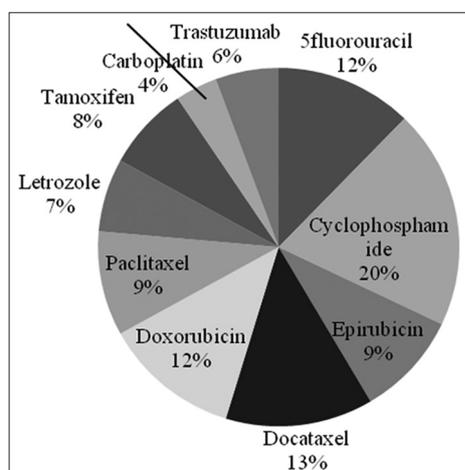


Fig. 3: Distribution of the prescribed drugs in the study population (n=28)

Table 1: Distribution of ATC classification of prescribed drugs along with their route of administration

Generic name of the drug	ATC code	Classification	Route of administration
5-Fluorouracil	L01BC02	Antineoplastic immunomodulating agent, antimetabolite, pyrimidine analogue	IV
Doxorubicin	L01DB01	Antineoplastic immunomodulating agent, cytotoxic antibiotics, anthracycline derivative	IV
Epirubicin	L01DB03	Antineoplastic immunomodulating agent, cytotoxic antibiotics, anthracycline derivative	IV
Cyclophosphamide	L01AA01	Antineoplastic immunomodulating agent, alkylating agent, nitrogen mustard analog	IV
Docetaxel	L01CD02	Antineoplastic immunomodulating agent, plant alkaloid, taxane	IV
Paclitaxel	L01CD01	Antineoplastic immunomodulating agent, plant alkaloid, taxane	IV
Tamoxifen	L02BA01	Antineoplastic immunomodulating agent, hormone antagonist, selective estrogen receptor modulator	Oral
Trastuzumab	L01XC03	Antineoplastic, monoclonal antibody	IV
Carboplatin	L01XA02	Antineoplastic, platinum compound	IV
Letrozole	L02BG04	Antineoplastic immunomodulating agent, endocrine therapy, aromatase inhibitor	Oral

ATC: Anatomical therapeutic chemical, IV: Intravenous

receptors. However, few breast cancer cells fail to express any types of receptors are termed as triple negative cancers. Triple negative cancers are related to poor prognosis of the disease as no hormone-targeted therapy is useful [15,16]. Menopausal status is associated with the prognosis of this disease. Research showed that delay in menopause incurs a risk for developing breast cancer. Moreover, breast cancers diagnosed at a younger age have aggressive clinicopathologic features. Studies have revealed that postmenopausal woman with high serum concentrations of sex hormones carries a greater propensity of developing breast cancer [17]. Distribution of the present study population by their menopausal status found that 25% (7) of the patients were premenopausal and 75% (21) were postmenopausal. Average age of breast cancer patients, who were postmenopausal, was 55.28 years (± 8.18) and that for women in premenopausal state was 38.85 years (± 6.44). A national study among breast cancer patients in a tertiary care hospital in South India reported that 48% belonged to premenopausal state and 52% had reached menopause [18]. Similar study in Lahore reported that 42.7% were premenopausal and 57.3% postmenopausal [19].

Among the different forms of breast cancer obtained in the present study, the most prevalent were IDC, accounting to 75% of the study population. This was supported by other studies that highlighted IDC was the most common form of breast cancer, representing 80 percent of all breast cancer [11]. A study from New Delhi observed that IDC was the most common type (88%), followed by infiltrating lobular carcinoma (3.7%), colloid carcinoma (1.1%), DCIS (1.1%), and metaplastic types (0.9%) [20]. IDC mostly expresses the estrogen receptor (ER)+PR+cancer. Among the 21 cases of IDC, 10 patients had ER+, 9 had ER+PR+, and 2 cases of HER2 neu+ve.

Triple negative carcinoma accounted for 7% of the present study population that was much lower as compared to studies from North and South India, where the percentages were 18% [21] and 31.5% [22], respectively. Thus, most of the patients in the present study population responded better in hormonal therapy. The treatment schedule included surgery followed by chemotherapy depending on the current status of the disease and entire breast radiotherapy. This type of tumor does not respond to hormonal treatment and therefore not recommended.

It is presumed that negligence in treatment might influence the disease progression. However, in the present study, no significant correlation was observed between time gap of untreated noticeable lump and initiation of treatment with the grade of tumor.

The patients in the study population were categorized according to the primary symptoms of the diseases. Distribution of study population

according to the symptoms showed that 61% of patients presented without pain, 28% experienced painful lump, and 11% reported it to be painless initially, followed by painful. Only one patient had ulcerated breast cancer with foul smell.

The chemotherapeutic drugs used in the present study were documented. The most common drug used in the present study was cyclophosphamide (20%), followed by docetaxel (13%), doxorubicin (12%), 5-fluorouracil (12%), paclitaxel (9%), epirubicin (9%), tamoxifen (8%), letrozole (7%), trastuzumab (6%), and carboplatin (4%). A study in Nigerian Tertiary Hospital revealed that 38% of breast cancer patients were prescribed the combination of cyclophosphamide, methotrexate, and 5 fluorouracil [23], whereas a study in Chandigarh, India, reported that 41.58% of patients were prescribed fluorouracil+doxorubicin+cyclophosphamide, while paclitaxel was prescribed to 22.77% of patients [24].

CONCLUSION

The risk of breast cancer is alarming, especially in developing countries like India. The present study was conducted on breast cancer patients attending a tertiary care hospital in Kolkata, West Bengal, India, to evaluate the pattern of breast carcinoma and therapeutic regimen provided to the patients. This type of study is essential to evaluate the epidemiological profile of the disease, the risk factors associated with them, and the treatment provided to these cancer patients. Awareness about the screening procedure and treatment of breast cancer among common people can be helpful in reducing the mortality of this disease.

CONFLICTS OF INTERESTS

None

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