

Frequency of triple negative breast cancer in referrals patients to an oncology radiotherapy section



Maedeh Barahman¹, Mohammad Bahadoram², Omid Madani Khoshbakh², Mohammad-Reza Mahmoudian-Sani^{2*}

¹Department of Radiation Oncology, Firoozgar Hospital, Firoozgar Clinical Research Development Center (FCRDC), Iran University of Medical Sciences, Tehran, Iran

²Thalassemia and Hemoglobinopathy Research Center, Research Institute of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Correspondence to:

Mohammad-Reza Mahmoudian-Sani;
Email: mohamadsani495@gmail.com, mahmoudiansani-m@ajums.ac.ir

Received: 16 Apr. 2021

Accepted: 19 June 2021

ePublished: 3 Aug. 2020

Keywords: Negative Triple, Breast Malignancy, Hormone therapy

Abstract

Introduction: Breast cancer is the most common cancer in women and the first cause of cancer death in women. This tumor often has hormonal receptors. The absence of these hormonal receptors leads to inability to treat the normal hormonal methods correctly.

Objectives: In the present study, frequency of triple negative breast cancer in referrals patients to all patients with breast cancer involvement was investigated.

Patients and Methods: This cross-sectional study was performed on patients with breast cancer. Accordingly, all patients with breast cancer involvement who referred to Firoozgar hospital from 2016 Until 2019 were evaluated sensually. The extracted parameters included the age, the status of the hormonal receptors in terms of positive or negative, and the degree of tumor based on the pathology in the case.

Results: In this study, 1840 patients were diagnosed with malignancies, of which 266 (14.5%) were infected with a variety of breast malignancies negative triple breast was 48 patients (20.6%). Mean and standard deviation of patients with triple negative malignancy were 47.63 ± 13.34 years. We also observed the stage of breast cancer, the second most common stage (23 patients and 47.9%), and the first stage with the lowest incidence (4 patients and 8.3%) among patients.

Conclusion: Considering the increased use of chemotherapy in treating this type of malignancy and the high cost of treatment in these patients, this malignancy should be considered in order to identify the disease early in order to plan for proper health and reduce the cost of the treatment.

Citation: Barahman M, Bahadoram M, Mahmoudian-Sani M. Frequency of triple negative breast cancer in referrals patients to an oncology radiotherapy section. J Prev Epidemiol. 2021;6(1):e09. doi: 10.34172/jpe.2021.09.



Introduction

Breast cancer is the most common cancer and the first cause of cancer death in women. Its prevalence is elevated at the age of 51, and it is also found that screening mammography reduces breast cancer mortality, which is important in assessing this type of malignancy (1). The receptors on breast cells and the genes that stimulate cancer growth are factors that stimulate cancer cells and grow them (2,3). Two receptors that are commonly seen on cancer cells are estrogen and progesterone receptors. In fact, despite these receptors and in contact with femininity hormones (estrogen and progesterone), abnormal cells begin to reproduce cancer (4). The third factor is the HER2/neu gene, which is able to stimulate the proliferation of cancer cells, which is seen in one-third of breast cancer cases and can be activated simultaneously in cells containing estrogen and progesterone receptors, if positive. This gene is divided

Key point

Triple-negative breast cancer is cancer that tests negative for estrogen receptors, progesterone receptors, and excess HER2 protein. In this study, 1840 patients were diagnosed with malignancies, of which 266 were involved with a variety of breast malignancies triple-negative breast cancer was 48 patients. Triple-negative breast cancer should be considered in order to identify the disease early in order to plan for proper health and reduce the cost of the treatment.

into two categories amplification or overexposed (5,6). In this study, our target is to evaluating triple negative breast cancer. Triple negative breast cancer represents a heterogenous group of breast carcinomas that lack expression of estrogen receptor (ER), progesterone receptor (PR) and HER2. Triple-negative breast cancer accounts for about 10%-15% of all breast cancers (7). Although this is even less common, because of the absence of the receptors and the gene discussed, it is more difficult to find a

specific treatment and only chemotherapy or radiotherapy can be used to treat them. Therefore, many studies around the world have been carried out by physicians and researchers to find out the nature of this type of breast cancer and effective therapies and numerous studies are in progress (8). On the other hand, this is a high probability of spreading in the entire breast, and the probability of relapse after treatment is higher and its 5-year survival rate is lower than other types, as some studies have found that 77% of women with triple negative cancer have a survival rate of at least 5 years; and 93% of women with other types of cancers (9, 10). On one hand, in examining the behavior of the tumor, this category often has a high degree and belongs to stage three (11). On the other hand, 20% of patients with triple negative involvement also have the breast cancer gene (BRCA) mutations, while in patients who are not triple negative, less than 6% of BRCA mutations are seen. So when a person with a BRCA 1 hereditary mutation affects breast cancer, especially if it is less than 50 years old, the risk of triple negative breast cancer is higher (12, 13).

Objectives

In the present study, frequency of triple negative breast cancer in referrals patients to all patients with breast cancer involvement who referred to Firoozgar hospital's oncology radiotherapy section from November 2016 to November 2019 was investigated. Based on the findings, the importance of evaluating this type of breast cancer is evident, and this study seems to be an interesting topic for breast cancer research. We also found that the frequency of triple negative breast cancer in patients referring to Firoozgar hospital's oncology radiotherapy section from November 2016 to November 2019 based on the results of this study, and may be national health team planning for the costs of these patients.

Patients and Methods

Study design

This cross-sectional study was performed on patients with breast cancer. The sampling method was census in this study. After approval of the research project at the research council of the faculty of medicine and university and obtaining written permission from the authorities, the researcher, referring to the Firoozgar hospital, reviewed the cases of patients from November 2016 to November 2019, from the patients with breast cancer. Patient records have been used by census method and the investigator has used all patient records that have met criteria. In the evaluation of these patients, the extracted criteria included age, status of hormonal receptors for positive or negative, and tumor grade based on the pathology. Accordingly, in this study we extracted and recorded information from our records and all ethical issues are fully respected. There is also an effort to prevent any anti-ethical issues. Additionally, since this study was conducted on patients

referred to the hospital based on their records, there was no need for informed consent from patients.

Ethical issues

The research followed the tenets of the Declaration of Helsinki. The Ethics Committee of Iran University of Medical Sciences approved this study. The institutional ethical committee at Iran University of Medical Sciences approved all study protocols (IR.IUMS.FMD.REC1396.9423715007). Accordingly, written informed consent was taken from all participants before any intervention. This study was extracted from M.D thesis of Omid Madani Khoshbakh at this university (Thesis #3510).

Data analysis

At the end of the study, the data were imported into SPSS software and analyzed by statistical tests. Statistical tests used in this study included descriptive tests; graphs and mean, at the end and after the results of this study were compared with other relevant studies and presented as a final report. The significance level in the present study was less than 0.05.

Results

In our assessment, 1840 patients with a diagnosis of malignancy were referred to Firoozgar hospital's oncology radiotherapy department. After reviewing the patient records, 266 patients were diagnosed with breast cancer, and the prevalence of breast cancer among all malignancies was 14.5%. Of the 266 evaluated patients, 19 cases of mortality were observed and 34 (20%) were not cooperate to be involved in this study. Immunohistochemistry testing was not performed for them, of which 34 patients were excluded from the study and were not included in the calculation of the prevalence of triple negative malignancies. On the other hand, based on immunohistochemistry assessment, 48 patients had negative triple malignancies; thereby the ratio of negative triple malignancy in patients with breast cancer was 20.6%. After evaluating the age of patients with breast cancer, we observed that negative triple and the age of patients with triple malignancy was 47.36 ± 13.34 years. We observed that stage II malignancy was the most common malignancy stage in patients with triple negative malignancies, according to which 23 patients (47.9%) were in stage 2, On the other hand, in our evaluations on the case of patients, stage 1 had the lowest incidence in these patients with triple negative malignancy and only in 4 patients (8.3%), the other stages of the disease included the third stage (14 patients and 29.2%) and the fourth stage (7 patients and 14.6%).

Discussion

In our study, 266 patients out of a total of 1840 patients were malignant with breast cancer, suggesting a 14.5% increase in breast cancer in our study. Mirzaei et al, in their study,

evaluated 138 patients with breast cancer and found that they account for 18% of the total number of malignancies (10). Abdollahi et al, also evaluated 586 patients with breast cancer and estimated the prevalence of breast cancer 15% (9). Peshkin et al, also observed in their study that the prevalence of breast malignancies was similar to that of other studies and somewhat similar to our study and 10% among other malignancies (14). On the other hand, we observed in our study that the prevalence of triple malignancies in patients with breast cancer was 48 patients in 232 patients with breast cancer that were evaluated to the end, 20.6%. Overall, patients with breast cancer have had a triple negative malignancy. Samizadeh et al, have observed in their study of patients with breast cancer that the prevalence of triple negative malignancies was 90 patients and 15.3%, which is largely similar to the results of our assessments (9). Mirzaei et al also found that estrogen receptor was positive in 31.2%, progesterone receptor in 36.2% of patients and HER-2 receptor in 47.1% of patients, while they observed that only 13.7% Of the patients were triple negative, which is less than the observed result in our evaluation. This difference can be due to demographic differences (10). Additionally, Peshkin et al observed in their assessment that out of 3593 cases of breast cancer, 2019 had specific hormonal receptors. Accordingly, they have stated after their statistical evaluations that negative estrogen receptor has been detected in 34% of cases and negative progesterone receptor has been seen in 40% of cases. However, the HER-2 outbreak was 42%, respectively, and by comparing the three groups, the prevalence of triple negative was 10% (14). We observed in our evaluations that the mean and standard deviation of patients with triple negative malignancy was 47.63 ± 13.34 years. Meanwhile, Mirzaei et al have observed in their study of patients with breast cancer that the mean age of patients with breast cancer was 46.86 ± 10.39 years, which is largely similar to that in our study (10). Likewise, Peshkin et al stated in their assessment that the mean and standard deviation of the age in them was 44.45 ± 8.96 years, which is somewhat less than our assessment (14). We also observed that stage 2 was the most common stage of breast malignancy (47.9%), which was seen in patients with triple negative malignancies. On the other hand, in evaluation, we have had the lowest incidence in patients with triple negative malignancy in stage 1 and only in 4 patients (8.3%). Mirzaei et al also observed in patients with breast cancer that there was no significant difference between stage and grade of tumor and hormonal receptors, while in our study only patients with triple negative malignancy we have evaluated (10). Accordingly, Peshkin et al observed that grade 1 and 2 were more common in patients with negative triple malignancy, and grade 3 prevalence was lower in patients with triple negative malignancies (14).

Conclusion

According to studies conducted in this regard, the

prevalence of triple negative malignancies is not a small prevalence, and similar to other studies, our study also accounts for 20.6% of breast cancer cases, which is important to note this type of malignancies, the high prevalence of triple negative malignancies indicates the importance of paying attention to this kind of malignancy. Therefore, due to the inadequacy of conventional methods of hormone therapy used in breast cancer with positive hormonal receptors, as a result of more chemotherapy in treating this type of malignancy and the high cost of treatment in these patients, the initial attention to this malignancy should be emphasized, hence as to recognize the evolution of the disease in order to properly plan health care to reduce the cost of treatment and proper treatment of these patients.

Limitations of the study

The small number of negative triple breast cancer was the most significant limitation of our study.

Acknowledgements

This article resulted from the MD thesis (grant no. 3510) of Omid Madani Khoshbakh and approved by the Ethics Committee of Iran University of Medical Sciences. We gratefully thank Research and Technology Deputy of Iran University of Medical Sciences for funding the project.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contribution

All authors passed four criteria for authorship contribution based on recommendations of the international committee of medical journal editors. MB and OMK were the principal investigators of the study. MB, MMS and OMK conducted the research and prepared the primary draft. MB and MMS edited the paper extensively. All authors read and signed the final paper.

Conflicts of interest

The authors declare no competing financial interests.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

Funding/Support

This study was supported by grants from vice chancellor for research affairs, Iran University of Medical Sciences.

References

1. Harbeck N, Penault-Llorca F, Cortes J, Gnant M, Houssami N, Poortmans P, et al. Breast cancer. *Nat Rev Dis Primers*. 2019;5:66. doi: 10.1038/s41572-019-0111-2.
2. Lehmann BD, Bauer JA, Chen X, Sanders ME, Chakravarthy AB, Shyr Y, et al. Identification of human triple-negative breast cancer subtypes and preclinical models for selection of targeted therapies. *J Clin Invest*. 2011;121:2750-67. doi: 10.1172/JCI45014.
3. Sun Y-S, Zhao Z, Yang Z-N, Xu F, Lu H-J, Zhu Z-Y, et al. Risk Factors and Preventions of Breast Cancer. *Int J Biol Sci*. 2017;13:1387-97. doi: 10.7150/ijbs.21635.

4. da Silva JL, Cardoso Nunes NC, Izetti P, de Mesquita GG, de Melo AC. Triple negative breast cancer: A thorough review of biomarkers. *Crit Rev Oncol Hematol*. 2020;145:102855. doi: 10.1016/j.critrevonc.2019.102855.
5. Ray PS, Bagaria S, Cui X, Wang J. Methods for diagnosis, prognosis and treatment of primary and metastatic basal-like breast cancer and other cancer types. Google Patents; 2015.
6. McCormack VA, dos Santos Silva I. Breast density and parenchymal patterns as markers of breast cancer risk: a meta-analysis. *Cancer Epidemiol Biomarkers Prev*. 2006;15:1159-69. doi: 10.1158/1055-9965.EPI-06-0034.
7. Lee H, Lee J, Gourley L, Duffy S, Day N, Estève J. Dietary effects on breast-cancer risk in Singapore. *Lancet*. 1991;337:1197-200. doi: 10.1016/0140-6736(91)92867-2.
8. Seigneurin A, Labarère J, François O, Exbrayat C, Dupouy M, Filippi M, et al. Overdiagnosis and overtreatment associated with breast cancer mammography screening: A simulation study with calibration to population-based data. *Breast*. 2016;28:60-6. doi: 10.1016/j.breast.2016.04.013.
9. Abdollahi A, Etemadi M. Pathological Characteristics of Triple-Negative Breast Cancer at Main Referral Teaching Hospital, April 2014 to April 2015, Tehran, Iran. *Int J Hematol Oncol Stem Cell Res*. 2016;10:200-205.
10. Mirzaei H, Sabahat A, Nasrollahi F, Mohammadi-Yeganeh L. Correlation between ER, PR, HER2 receptors and prognostic factors in breast cancer. *Pajooohande*. 2010;15:152-156.
11. Al-Mahmood S, Sapiezynski J, Garbuzenko OB, Minko T. Metastatic and triple-negative breast cancer: challenges and treatment options. *Drug Deliv Transl Res*. 2018;8:1483-507. doi: 10.1007/s13346-018-0551-3.
12. Mango VL, Morris EA, Dershaw DD, Abramson A, Fry C, Moskowitz CS, et al. Abbreviated protocol for breast MRI: are multiple sequences needed for cancer detection? *Eur J Radiol*. 2015;84:65-70. doi: 10.1016/j.ejrad.2014.10.004.
13. Rashid MU, Muhammad N, Bajwa S, Faisal S, Tahseen M, Bermejo JL, et al. High prevalence and predominance of BRCA1 germline mutations in Pakistani triple-negative breast cancer patients. *BMC Cancer*. 2016;16:673. doi: 10.1186/s12885-016-2698-y.
14. Peshkin BN, Alabek ML, Isaacs C. BRCA1/2 mutations and triple negative breast cancers. *Breast Dis*. 2010;32:25-33. doi: 10.3233/BD-2010-0306.