Health Disparity or Bad Biology? An Analysis of Triple Negative Breast Cancer Patients in an Urban Academic Hospital

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Abstract

Background: 10-25% of patients diagnosed with breast cancer have triple negative breast cancer (TNBC). TNBC is more aggressive than receptor-positive breast cancer.

Objective: The objective of this study is to examine the demographics of this patient population.

Methods: The Commission on Cancer breast tumor registry was queried for breast cancers from 2006 to 2013. The tumors were divided into groups according to receptor status. Patient demographics were then analyzed along with TNM staging defined by the American Joint Committee on Cancer.

Results: Breast cancer tumors were identified (n=3267) and complete receptor data was available for 1238 tumors. Of these, 83% (1028/1238) of tumors were non-TNBC, while 17% (210/1238) were TNBC. Patients with TNBC were more likely be <40 years of age (p=0.018) and African American (p<0.0001). No significant difference was found comparing insurance type, median household income, or duration from diagnosis to definitive treatment between the TNBC and non-TNBC groups.

Conclusion: TNBC is more common among African-American and younger women, but not more common among uninsured patients or those below the poverty level. This suggests an actual difference in tumor biology and not simply a health disparity.

Keywords: Triple negative breast cancer; Health disparity; Tumor biology

Introduction

Breast cancer is a disease with several different molecular subtypes, with each subtype carrying its own prognosis and treatment modality. Ten to twenty-five percent of patients diagnosed with breast cancer have triple negative breast cancer (TNBC), which is defined as tumors negative for estrogen, progesterone, and Her2-neu receptors. TNBC is more aggressive than receptor-positive cancer, with lower likelihood of relapse-free survival and overall survival [1]. TNBC also has limited options for medical management, as it lacks a known target for hormonal or immunotherapy.

Reviews suggest TNBC may represent a higher proportion of tumors in African American patients and it presents at a later stage [2,3]. An analysis of the Surveillance, Epidemiology, and End Results (SEER) California Cancer Registry showed that African American women are more likely than white women to be diagnosed with TNBC by an odds ratio of 1.4 [4]. A comparison of TNBC and all other subtypes of breast cancer showed that TNBC presents at a more advanced disease stage [4]. In the same study, the authors demonstrate that compared to women living in areas of high socioeconomic status, women living in areas of lower socioeconomic status are more likely to be diagnosed with TNBC [4].

The objective of this study is to examine the demographics of a population of patients with TNBC. Factors such as race, age, socioeconomic status, and insurance coverage are compared to distinguished features that are more prevalent among patients with TNBC. By further investigating the demographics of this population, we are better able to clarify whether health disparities truly play a role in patients with TNBC.

Materials and Methods

The Commission on Cancer registry tumor database was queried for breast cancers from 2006 to 2013. The tumors were divided into groups according to receptor status. Patient demographics were then analyzed along with TNM staging defined by the American Joint Committee on Cancer. Analyses using the Chi-Square test were conducted in R 3.3.2. Data is presented as both ratios and percentages of the final cohort for which complete data was obtained. This study was approved by and performed in accordance with the guidelines and policies of our Institutional Review Board.

Results

Initially, all breast cancer tumors were identified in the database (n=3267). Complete receptor data was available for 1238 tumors. Eighty-three percent (1028/1238) of breast tumors were non-TNBC, while 17% (210/1238) were TNBC. Statistically, there were more patients under age

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Discussion

TNBC is more common among African-American and younger women, but TNBC is not more common among patients below the poverty level or without insurance. African-American women and women less than 40 years of age are more likely to have TNBC compared to other subtypes of breast cancer. Furthermore, patients diagnosed with TNBC are more likely to present with stage III cancer, while patients with non-TNBC are more likely to present with stage I. However, when comparing rates of patients without insurance and patients with Medicaid, no significant differences were found between the two groups (non-TNBC and TNBC). Furthermore, no significant difference was found in patients with and without TNBC when comparing the proportion of patients below the poverty level.

The majority of the data and results from this study support the existing literature. TNBC has been shown by multiple other studies to be much more common in African American women than any other ethnicity [1,3,6]. The reasons behind this are likely multifactorial and are thought to be largely in fact due to tumor genomics causing more aggressive tumor carcinogenesis from ancestral migratory patterns as recently highlighted by Newman and Kaljee [7]. We demonstrated that the tumors in patients with TNBC were more likely to be grade III, as recently highlighted by Newman and Kaljee [7]. We demonstrated that the tumors in patients with TNBC were more likely to be grade III, as recently highlighted by Newman and Kaljee [7].

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Data from the California Cancer Registry demonstrates that regardless of race or ethnicity, women living in areas of lower economic status are more likely to be diagnosed with TNBC than any other type of breast cancer compared to women living in higher socioeconomic areas [4]. Our results from the SEER database were not consistent with this conclusion, as the data did not show that patients below the poverty line were more likely to be diagnosed with TNBC. This is likely due to the fact that this finding was based off of a comparison of the highest quintile of socioeconomic status and the lowest. Instead, our study analyzed the proportion of patients below the poverty level compared to patients living above the poverty level.

The data was collected from a database with no subjective variables analyzed, making it a heterogeneous and a reliable representation of the local population seeking care or referred to our institution. Although the data did not show that TNBC was more common among patients without insurance, this could be due to the fact that only 8 patients in the non-TNBC group were uninsured, and zero patients in the TNBC group were uninsured. It is possible that with a larger patient population, there would be enough power to analyze the data for a difference. However, this is unlikely to have influenced our results, as the number of uninsured patients with TNBC was n=0, while the non-TNBC group was higher with n=8.

The overarching implications of our data suggest that further research needs to be done on the actual tumor biology and identifying a molecular target for drug therapy versus focusing on socioeconomic influences on TNBC. Furthermore, since TNBC presents at a later stage than non-TNBC, better methods of screening that lead to earlier diagnosis should be studied, identified, and implemented. For future steps, factors such as parity and length of breastfeeding could also be studied, as some studies have shown an association between these two variables and patients with TNBC [6].

Conclusion

We found that there is no statistical difference among patients with TNBC that are below the poverty level or without insurance compared to those above the poverty line or insured patients. However, our data did demonstrate that TNBC is more common among African-American women and women of younger ages. This suggests an actual difference in tumor biology with TNBC patients, and not simply a health disparity.

Conflict of Interest

The authors have no disclosures. There was no financial or material support. This study was approved by and performed in accordance with the guidelines and policies of the Rush University Medical Center Institutional Review Board. There was no ethnic consent or standards of animal care that were applicable to this study.

References

1. Anders CK, Carey LA (2009) Biology, metastatic patterns, and treatment of patients with triple-negative breast cancer. Clinical Breast Cancer 9: S73-S81.
2. Krishnamurthy S, Poonimma VR, Challa YG, Basavana Goud YG (2012) Triple negative breast cancer - our experience and review. Indian J Surg Oncol 3: 12-16.
3. Siziopikou KP, Cobleigh M (2011) Race and triple negative breast cancer. Int J Clin Exp Pathol S1: 001.
4. Bauer KR, Brown M, Cress RD, Parise CA, Caggiano V (2007) Descriptive analysis of estrogen receptor (ER)-negative, progesterone receptor (PR)-negative, and HER2-negative invasive breast cancer, the so-called triple-negative phenotype: A population-based study from the California cancer Registry. Cancer 108: 1721-1728.
5. Eastman A, Tammaro Y, Maldrem A, Andrews V, Huth J, et al. (2013) Outcomes of delays in time to treatment in triple negative breast cancer. Ann Surg Oncol 20: 1880-1886.
6. Brewster AM, Chavez-MacGregor M, Brown P (2014) Epidemiology, biology, and treatment of triple-negative breast cancer in women of African ancestry. Lancet Oncol 15: e625-e634.
7. Newman LA, Kaljee LM (2017) Health disparities and triple-negative breast cancer. JAMA Surg 152: 487-493.
8. Rauscher GH, Allgood KL, Whitman S, Conant E (2012) Disparities in screening mammography services by race/ethnicity and health insurance. J Women's Health 21: 154-160.

Table 4: Comparison of non-triple negative tumor patients and triple negative tumor patients in Illinois (IL) counties with median household income of <$25,000 and >$25,000.

| Residents of Illinois Counties Annual Median Household Income | Non-triple negative tumors (n=1028) | Triple negative tumors (n=210) | p-value |
|-------------------------------------------------------------|------------------------------------|-------------------------------|---------|
| <$25,000                                                    | 15/954 (2%)                        | 6/196 (3%)                    | 0.15    |
| >$25,000                                                   | 939/954 (98%)                      | 190/196 (97%)                 | 0.15    |