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Report

Breast cancer stage at diagnosis: Caucasians versus Afro-Americans

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Summary

In the Department of Defense health care system, all women have the same ability to access health care. Thus, there should be no racial differences in stage at diagnosis solely based on ability to seek health care. A retrospective review of breast cancer cases from 1976–1992 was conducted to determine if there were any differences in stage at diagnosis between Caucasian and Afro-American females. Data was available for 6414 Caucasian and 746 Afro-American females. Stage at diagnosis was similar for both groups. However, Afro-Americans had fewer tumors ≤ 1.0 cm than Caucasians. Afro-American females were younger (median age 50 years versus 58 years in Caucasians). Twenty-four per cent of Afro-Americans were < 40 years old compared to only 9% Caucasians. When access to care is not an issue, there are no racial differences in stage of breast cancer at diagnosis.

Introduction

Although Caucasian women have higher age-adjusted incidence rates of breast cancer than Afro-American women, numerous studies [1–8] have demonstrated that the latter are more likely to be diagnosed with advanced disease and have lower survival rates. A few studies have shown a shorter survival in Afro-American women than Caucasian women after adjusting for stage of disease at presentation, suggesting that stage alone may not account for the survival difference [6, 9].

Advanced stage at diagnosis may reflect an underlying difference in the biological behavior of breast cancer among racial-ethnic groups. There is some indication that Afro-American women are more likely to have aggressive disease based on histopathology, receptor status, and tumor grade [2]. Ownby *et al.* [10] found a lower incidence of well-differentiated breast cancers in Afro-American women.

A lower socioeconomic status resulting in a reduced access to health care is the major explanation for the racial differences in breast cancer mortality. Also, poorer women are usually less well educated; are less likely to pursue preventive medical care; and report longer delays in responding to the symptoms of cancer [2, 11]. Ayanian *et al.* showed in a recent study that women without health insurance and those covered by Medicaid had more advanced breast cancer at diagnosis than women with private insurance [12].

In the Department of Defense (DoD) health care system, all female beneficiaries have the same ability to access care, regardless of socioeconomic status. Thus, there should be no difference in stage at presentation between racial-ethnic groups. The following retrospective review of breast cancer cases in the DoD Automated Tumor Registry was conducted to determine if there were any differences in stage at diagnosis or survival between Caucasian and Afro-American females.

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Methods

The study population consisted of all women with breasst cancer whose cases are recorded in the DoD Automated Tumor Registry (ACTUR). Women eligible for care in the DoD health care system are active duty women and the dependents of active duty soldiers or retired military. Veterans and their dependents are not eligible for care in the DoD health care system. Medical care in DoD facilities is free to those individuals eligible for care. Since it was implemented in 1986, tumor registrars have been entering data into ACTUR both from recently diagnosed cancers and from cancer cases that have been followed in the individual institution registries. Currently, there are 72 participating institutions with nearly 139,000 cancer cases in the data bank. Eventually all DoD cancer cases will be accessioned into ACTUR.

A total of 8198 breast cancer cases were in the registry. Analysis was limited to those cases (total of 7160) which were diagnosed between 1976–1992 (6414 Caucasians and 746 Afro-Americans).

The subjects were stratified according to year of diagnosis; age at diagnosis; race; and stage at diagnosis. The patients were staged according to the American Joint Committee on Cancer. The method of detection of these cancers was either through the patient or health care provider finding a suspicious mass or by mammographic screening. DoD facilities follow nationally established cancer screening procedures.

Information on tumor size was available in 6880 cases, 6180 Caucasians and 700 Afro-Americans. The data on the number of involved axillary nodes (in contrast to a notation of nodal positivity or negativity) was less reliably available and thus could not be analyzed.

Statistical analysis (chi square test) was performed using the Primer of Biostatistics software package [13].

Table 1. Stage at diagnosis

	Caucasians	Afro-Americans	p-value
Stage 0	5%	4%	0.445
Stage I	52%	45%	0.026
Stage IIA	29%	34%	0.035
Stage IIB	7%	8%	0.204
Stage IIIA	1%	2%	0.140
Stage IIIB	2%	3%	0.028
Stage IV	4%	3%	0.636

Table 2. Stage at diagnosis by year groups

	1976–1981		1982–1987		1988–1992	
	C*	AA**	C	AA	C	AA
Stage 0	2%	2%	4%	0%	6%	6%
Stage I	41%	43%	48%	41%	56%	47%
Stage IIA	41%	43%	31%	30%	27%	35%
Stage IIB	11%	8%	9%	13%	5%	6%
Stage IIIA	1%	2%	2%	5%	1%	1%
Stage IIIB	1%	0%	2%	6%	2%	2%
Stage IV	3%	2%	4%	5%	3%	3%

* Caucasian; ** Afro-American

Results

There was no statistically significant difference in stage at presentation (Table 1) between Caucasian and Afro-American females. Caucasians had slightly more Stage I tumors and Afro-Americans had slightly more Stage IIA tumors. Over the time interval studied, the numbers of Stage 0 and Stage I cancers diagnosed (Table 2) has increased in both racial groups. Caucasian females had significantly ($p = < 0.0001$) more tumors ≤ 1.0 cm than Afro-American females (Table 3). Afro-American women had a tendency for more tumors in the 2.1–3.0 cm range.

Afro-American females presented with breast cancer at a younger age than Caucasian females (Table 4). Overall median age at diagnosis for Cau-

Table 3. Tumor size at diagnosis

	Caucasian (n = 6180)	Afro-American (n = 700)	p-value
≤ 1.0 cm	21%	14%	< 0.0001
1.1–2.0 cm	31%	29%	0.522
2.1–3.0 cm	17%	22%	0.023
3.1–5.0 cm	13%	15%	0.103
≥ 5.1 cm	18%	19%	0.518

Table 4. Age at diagnosis

	Caucasians	Afro-Americans	p-value
< 40	9%	24%	< 0.0001
40–49	20%	24%	0.026
50–59	26%	30%	< 0.0001
60–69	31%	17%	< 0.0001
> 70	14%	5%	< 0.0001

casians was 58 years and for Afro-Americans, 50 years. Twenty-four percent of Afro-Americans were < 40 years old at presentation compared to only 9% of Caucasians (p = < 0.0001). There was no difference in stage at diagnosis (Table 4) between the two groups in those females < 40 years old. The lower percentage of Afro-American females > 50 years old may be reflective of a lower number of Afro-American soldiers who have retired from active duty and are thus eligible for care.

Discussion

There are numerous reports of racial differences in breast cancer stage at diagnosis. The results of a national survey of female breast cancer conducted by the American College of Surgeons and published in 1980 [1], showed that Afro-American females were more likely to have advanced stage at presentation. Other studies [2–8] have shown a similar trend. A review by Hoff *et al.* [14] of racial differences in women with invasive breast cancer showed Afro-American women were more likely to present at age < 55 years and with regional and remote stage disease.

Table 5. Staging elements, age < 40 years

	Caucasian (n = 600)	Afro-American (n = 181)	p-value
Stage 0	4%	3%	0.541
Stage I	40%	42%	0.797
Stage IIA	37%	39%	0.803
Stage IIB	11%	14%	0.286
Stage IIIA	2%	3%	0.561
Stage IIIB	2%	3%	0.647
Stage IV	4%	3%	0.541

Dayal *et al.* [9] examined the effects of age, stage of disease at diagnosis, and socioeconomic status on racial differences in survival. They showed that racial differences in survival become insignificant when adjusted for the distribution of socioeconomic levels. This data suggests that the observed difference in breast cancer survival between Afro-Americans and Caucasians is, to a large extent, due to the difference between the two races with respect to the distribution of socioeconomic status. Polendak [15] found that when Black-White differences in socioeconomic status are small, there are few differences in the distribution of stage at diagnosis. Cella *et al.* [16] reviewed data from eight Cancer and Leukemia Group B protocols to determine if socioeconomic status had any impact on survival. Patients with lower annual incomes and those with lower educational levels had significantly shorter survival times than those with higher income or education. Race alone was not a significant predictor of survival time. Hunter *et al.* [8] reviewed data from the National Cancer Institute's Black/White Cancer Survival Study and also showed more advanced disease for lower socioeconomic income strata. These studies all suggest that socioeconomic status plays an important role in the outcome of breast cancer. A lower socioeconomic status with limited access to health care contributes to the advanced stage at diagnosis.

In the study reported here, there was no difference in stage at presentation for Caucasian or Afro-American females, although there was a trend for less Stage I and more Stage IIA tumors in Afro-American females. This is reflective of the tendency for Afro-American females to have more tumors 2.1–3.0 cm. The reason for this difference is not clear and could reflect cultural barriers to screening or seeking access to care. The lower rates of early breast cancer diagnosed among Afro-American women in the Swanson study and the significantly fewer tumors < 1 cm reported here for Afro-American females indicate that efforts to encourage annual screening examinations should be targeted at all ethnic groups. In addition, efforts should be made to understand any cultural barriers that may interfere with receptiveness to educational and screening programs.

Among women over age 40, the rate of breast cancer is higher in Caucasian women compared with Afro-American women. For women under the age of 40, the rate of breast cancer is higher among Afro-American females [18]. The data reported here also supports that Afro-American females were significantly more likely to be < 40 years old at diagnosis than Caucasian females. However, there was no difference in stage distribution of those < 40 years old. The significantly lower numbers of Afro-American females > 50 years old is most likely a reflection of lower numbers of retired Afro-American soldiers.

Ease of access to health care and free health care erases the racial differences in stage at diagnosis of breast cancer. This study confirms previous reports that a higher percentage of Afro-American females with breast cancer are < 40 years old. Further studies need to be done to continue to better define these racial differences.

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