Gynecologic Oncology 122 (2011) 38–41

Contents lists available at ScienceDirect

Gynecologic Oncology

journal homepage: www.elsevier.com/locate/ygyno

Disparities in treatment and survival between African American and White women with vaginal cancer

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ARTICLE INFO

Article history:
Received 19 November 2010
Available online 15 April 2011

Keywords:
Disparities
Race
Vaginal cancer

ABSTRACT

Objective. The study aims to compare the difference in treatment and survival between White (W) and African American (AA) patients with vaginal cancer (VC).

Methods. Patients with a diagnosis of invasive vaginal cancer were identified from Surveillance, Epidemiology, and End Results (SEER) program from 1988 to 2007 and were divided into White (W) and African American (AA) subgroups. Student's *t* test, Kaplan–Meier survival methods, and Cox regression proportional hazards were performed.

Results. A total of 2675 patients met the inclusion criteria, with histologic distribution of squamous cell carcinoma (SCC; 2190, 82%) and adenocarcinoma (AC; 485, 18%); 2294 (85.8%) were W, and 381 (14.2%) were AA. Median age was 69 for W and 65 for AA ($p<0.001$). SCC and AC were equally distributed between W and AA. Advanced stage disease (FIGO III and IV) was more prominent in AA compared with W (30.4% vs. 23.1%, $p=0.019$). Radiation therapy was utilized equally in both racial groups; however, surgical treatment alone or combined with radiation therapy was more frequent in W compared with AA (27.7% vs. 17.5%, $p<0.001$).

The 5-year survival was 45% in W and 38.6% in AA ($p=0.008$). In multivariate analysis, AA had significantly poorer survival compared with Whites when controlling for age, histology, stage, grade and treatment modality (HR 1.2, 95% CI 1.1–1.4, $p=0.007$).

Conclusions. African American women with vaginal cancer were more likely to present, at a younger age, advanced stage and less likely to receive surgical treatment. Our data suggests that AA race is an independent predictor of poor survival in vaginal cancer.

Introduction

Racial disparities in the delivery of health care and outcome represent a complex interplay of social, economic and genetic environments. Health disparities between African Americans and Whites have been reported for many years with higher mortality and morbidity among the former group [1,2]. This healthcare problem has received national recognition and driven the decision of the National Institute of Health to establish the National Center on Minority Health and Health Disparities (NCMHD) in 2000 and the Center to Reduce Cancer Health Disparities in 2001, with a strategic plan to reduce cancer-related disparities [3,4]. In gynecologic cancers, disparities in treatment and survival between African Americans and Whites have been reported in uterine, ovarian and cervix with an increased mortality rate among African American patients [3,5–8].

Identification of factors that might account for these differences in health is a challenging process. Many investigators examined factors such as inherent biologic differences, clinico-pathologic factors, reproductive and health behaviors, socioeconomic and cultural differences that affect access to healthcare, unequal treatment, and healthcare obstacles that may prevent uninsured people from getting a timely management. Within equal access medical care settings, data about racial discrepancy are controversial [5,9,10]. Consensus data suggest that the African American population is expected to nearly double from its present size by 2050 [11]. Therefore, focused efforts to increase our

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doi:10.1016/j.ygyno.2011.03.018

understanding of such disparities are important to identify factors associated with poor outcome among African Americans.

Primary invasive carcinoma of the vagina is a rare cancer. It accounts for 1–2% of gynecologic malignancies with less than 2400 new cases and less than 800 deaths attributed to this disease in 2010 [12]. Stage, tumor morphology and treatment modality have been shown to have significant effect on outcome [13,14]. In the study of the prognostic factors affecting mortality in vaginal cancer by Shah et al., ethnicity was not an independent predictor of survival; however, information on difference in survival and treatment patterns between African American and White women with vaginal cancer is limited.

Using retrospective data from the Surveillance, Epidemiology and End Results (SEER) program, the objective of this study is to report on the survival outcome of African Americans with vaginal cancer compared with Whites. Furthermore, differences in demographic as well as clinical and surgical treatment variables that impact survival are analyzed to further delineate the relationship between race and survival.

Methods

Subjects with a diagnosis of vaginal cancer were identified using the Surveillance, Epidemiology and End Results (SEER) program from 1988 to 2007 [15]. Patients were divided into two groups based on race classification: W (Whites) and AA (African Americans). Histology codes (ICD-O3) were used to identify patients with squamous cell carcinoma (SCC) and adenocarcinoma (AC). Racial subgroups other than Whites and African Americans were excluded. Other exclusion criteria were patients with unknown age, histology other than SCC or AC and a diagnosis by autopsy or death certificate. The staging of the disease for this study was clinical staging per FIGO criteria. The FIGO stage was determined according to the SEER guidelines [16–18]. When detailed information on extent of disease was not available, those cases were classified as unknown stage. Patients were categorized in the lymphadenectomy group if any lymph nodes were recovered. Surgery was defined as only those surgeries in which partial/simple, complete or radical removal of the vagina was performed. Demographic, clinicopathologic, treatment, and survival information was extracted using the "Case Listing" option of the SEER Stat 6.6.2 software.

Associations between categorical covariates were assessed using chi square tests. Group differences in continuous covariates were assessed using Student's t test. Survival curves were estimated using the Kaplan–Meier method. Comparisons were made using log rank statistics. Cox proportional hazard (PH) regression was used to adjust for age, stage, grade, histology, lymph node dissection, nodal metastasis and treatment modality. All p values are reported as raw values for single comparisons, and a p value of <0.05 was considered statistically significant. STATA 10.0 program (College Station, TX) was used to analyze the data.

Results

A total of 2675 patients met the inclusion criteria, 2294 (85.8%) of whom were W and 381 (14.2%) were AA. Patient characteristics are listed in Table 1. African Americans were younger at presentation than Whites with mean age of 63.5 years compared to 67.7 years, respectively ($p<0.001$). The majority of patients (1710 or 75.8%) presented with early stage (I and II) disease, while almost one quarter (545 or 24.2%) presented with advanced (III and IV) stage disease. A significantly higher proportion of African Americans presented with distant site (stages III–IV) disease compared to Whites (30.4% vs. 23.1%, $p=0.019$). The grade and histologic distribution was similar in the two groups (Table1). When the analysis was restricted to untreated patients with vaginal cancer, a significantly higher proportion of African Americans presented at a younger age (<65 years) (47% vs. 32%, $p=0.003$).

Table 1
Key variables in African Americans and Whites with vaginal cancer.

Variable		W (%)	AA (%)	p
Age	Median	69	65	<0.001
	Mean	67.7	63.5	
	<65	904 (39.41)	189 (49.61)	
	≥65	1390 (60.59)	192 (50.39)	
Histology	SCC	1878 (81.87)	312 (81.87)	0.99
	AC	416 (18.13)	69 (18.11)	
Stage	FIGO I	890 (38.8)	124 (32.55)	0.022
	FIGO II	598 (26.07)	98 (25.72)	
	FIGO III	166 (7.24)	33 (8.66)	
	FIGO IV	282 (12.29)	64 (16.8)	
	Unknown stage	358 (15.61)	62 (16.27)	
Stage	Early (I and II)	1488 (76.9)	222 (69.6)	0.019
	Late(III and IV)	448 (23.1)	97 (30.4)	
Grade	Low	879 (38.3)	144 (37.8)	0.56
	High	745 (32.5)	116 (30.4)	
	Unknown	670 (29.2)	121 (31.8)	
Lymphadenectomy	No	1885 (82.17)	328 (86.09)	0.046
	Yes	360 (15.69)	42 (11.02)	
	Unknown	49 (2.14)	11 (2.89)	
Nodal metastasis	No	250 (69.5)	34 (81)	0.12
	Yes	110 (30.5)	8 (19.0)	
Treatment	Yes	1655 (72.15)	263 (69.03)	0.1
	No	554 (24.15)	106 (27.82)	
	Unknown	85 (3.70)	12 (3.15)	
	Radiotherapy	1197 (72.26)	217 (82.5)	<0.001
	Surgery	230 (13.89)	23 (8.74)	
	Surgery/radiation	228 (13.77)	23 (8.74)	
Status	Alive	1005 (43.81)	137 (35.96)	0.004
	Dead	1289 (56.19)	244 (64.04)	
Year of diagnosis	1988–1994	465	84	
	1995–1999	398	69	
	2000–2007	1431	228	

However, there was no significant difference in stage, grade and histology distribution.

Only 75.3% of the overall study population underwent treatment, whereas the remaining one quarter of the entire cohort received no treatment. The proportion of Whites who underwent surgery or combined surgery/radiotherapy was significantly higher than that of African Americans (27.7% vs. 17.5%, $p<0.001$). These findings were consistent when the analysis was restricted to early stage disease (I and II) (25.7% vs. 15.9%, $p=0.002$). Lymphadenectomy was performed in 15.4% of all patients. W were more likely to undergo lymphadenectomy than AA (16% vs. 11.3%, $p=0.02$). The incidence of lymph node involvement was higher in W compared to AA (31% vs. 19%); however, the difference was not statistically significant, $p=0.12$.

The total study population observed 1533 (57.31%) deaths, with 1289(56.19%) in W and 244(64.04%) in AA ($p=0.004$). In the overall study group, the 5-year survival was 44.0%. Overall 5-year survival was significantly poorer for African Americans compared with Whites (38.6% vs. 45.0%, $p=0.008$, Fig. 1). The racial disparity in survival was more pronounced in the younger age group (<65 years) of women (49.3% vs. 62.6%, $p<0.001$). African Americans with adenocarcinoma had lower survival than their White counterparts (19.6% vs. 46.8%, $p<0.001$). There was no significant survival difference noted for squamous cell carcinoma between the two groups (42.9% vs. 44.5%, $p=0.44$). While a trend toward lower survival rates for African Americans was seen in patients with early stage disease (52.7% vs. 56.1%), this did not reach statistical significance ($p=0.13$). In advanced stage disease, African Americans had a significantly worse survival (16.6% vs. 22.4%, $p=0.04$). These findings were consistent in high-grade disease where African Americans had significantly poorer survival compared with Whites (30.1% vs. 50.4%, $p=0.019$). In patients with early stage disease who underwent surgical treatment, AA had improved survival compared to W (84.3% vs. 70.7%, Fig. 2); however, this was not significantly different ($p=0.36$). Among untreated