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Survival differences of Asian and Caucasian epithelial ovarian cancer patients in the United States☆

Katherine C. Fuh [a], Jacob Y. Shin [a], Daniel S. Kapp [b], Rebecca A. Brooks [a], Stefanie Ueda [a], Renata R. Urban [c], Lee-May Chen [a], John K. Chan [d,*]

[a] Division of Gynecologic Oncology, Department of Obstetrics, Gynecology & Reproductive Sciences, University of California, San Francisco, 1600 Divisadero Street, San Francisco, CA 94143-1702, USA
[b] Department of Radiation Oncology, Stanford University, 400 Pasteur Drive, Stanford, CA 94305, USA
[c] Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, University of Washington Medical Center, 1959 NE Pacific Street, Seattle, WA 98195-6460, USA
[d] Division of Gynecologic Oncology, California Pacific & Palo Alto Medical Foundation/Research Institute, Sutter Cancer Research Consortium, 3838 California Street #410, San Francisco, CA 94115, USA

HIGHLIGHTS

- Asians have improved 5-year DSS compared to Caucasians with epithelial ovarian cancer.
- Particular Asian subgroups (Chinese, Filipino, Korean, and Vietnamese) were independent predictors for improved 5-year DSS.
- Immigrant Asians had an improved survival compared to U.S. born Asians.

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ABSTRACT

Objective. To compare the racial differences in treatment and survival of Asian-Americans and White patients with epithelial ovarian cancer.

Methods. Data were obtained from the Surveillance, Epidemiology, and End Results Program between 1988 and 2009 and analyzed using Chi-squared tests, Kaplan–Meier methods, and Cox regression analysis.

Results. Of the 52,260 women, 3932 (7.5%) were coded as Asian, and 48,328 (92.5%) were White. The median age of Asians at diagnosis was 56 vs. 64 years for the Whites ($p < 0.001$). Asians were more likely to undergo primary surgery, have an earlier stage of disease, have a diagnosis of a non-serous histology, and have lower grade tumors. The 5-year disease-specific survival (DSS) of Asians was higher compared to Whites (59.1% vs. 47.3%, $p < 0.001$). On a subset analysis, Vietnamese, Filipino, Chinese, Korean, Japanese, and Asian Indian/Pakistani ethnicities had 5-year DSS of 62.1%, 61.5%, 61.0%, 59.0%, 54.6%, and 48.2%, respectively ($p = 0.015$). On multivariate analysis, age at diagnosis, year of diagnosis, race, surgery, stage, and tumor grade were all independent prognostic factors for survival. Asians were further stratified to U.S. born versus those who were born in Asia and immigrated. Asian immigrants presented at a younger age compared to U.S. born Asians. Immigrants were found to have an improved 5-year DSS when compared to U.S. born Asians and Whites of 55%, 52%, and 48%, respectively ($p < 0.001$).

Conclusion. Asians were more likely to be younger, undergo primary surgery, have an earlier stage of disease, non-serous histology, lower grade tumors, and higher survival.

Introduction

Ovarian cancer is the leading cause of death among U.S. gynecologic cancer patients [1]. Patients from various racial backgrounds have different survival outcomes; however, most studies have focused on comparing Whites and African-Americans [2–13]. Prior studies have shown that Asians have different clinical outcomes compared to Whites, but it is unclear which underlying factors may be responsible for the difference including socioeconomic, clinico-pathologic and treatment

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* Corresponding author at: California Pacific & Palo Alto Medical Foundation/Research Institute, Sutter Cancer Research Consortium, 3838 California Street #410, San Francisco, CA 94115, USA.
E-mail address: chanjohn@sutterhealth.org (J.K. Chan).

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variations [14]. Asians are one of the fastest growing groups in the U.S. with a four-fold higher increase in population compared to overall population growth in the year 2013 (0.73% to 2.9%) [15].

Recent results from prospective clinical trials in ovarian cancer have shown significant survival differences between various racial groups. Cross trial comparisons of the results of patients on the control arm receiving conventional carboplatin and paclitaxel treatment every 3 weeks showed that Japanese natives had a progression-free survival of 17.5 months (JGOG) [16] compared to 17.3 months for patients in Italy (MITO-7) [17] and compared to 10.3 months for patients in the U.S. (GOG 218) [18]. Within the trial performed in the U.S. (GOG 218), Asians were found to have a better survival [19]. One of the challenges in studying Asian-Americans is the diversity of the population which is comprised of patients with more than 50 different countries of origin [20].

In a recent California state-wide analysis on ovarian cancer surgical care, investigators found that Asians were more likely to undergo procedures such as a hysterectomy and lymphadenectomy, and less likely to have a bowel resection or abdominal/peritoneal excision compared to Whites [13]. However, there are few studies that have analyzed the survival of Asians vs. Whites and furthermore have explored the potential underlying factors that may be responsible for these differences including socioeconomic, clinico-pathologic and treatment variations.

In this current study, we compared the racial differences in treatment and survival of Asian and White patients with epithelial ovarian cancer (EOC). Furthermore, we evaluated subgroups of Asians and their immigration status for the impact on survival.

Materials and methods

Demographic, clinico-pathologic, treatment, and survival information of women with invasive EOC from January 1, 1988 to December 31, 2009 was abstracted from the Surveillance, Epidemiology, and End Results (SEER) database of the National Cancer Institute. All borderline and non-epithelial ovarian cancers were removed from the study group. Data are reported from twelve population-based registries that represent approximately 28% of the U.S. population including: Utah, Hawaii, Iowa, New Mexico, Connecticut, Alaska, the metropolitan regions of Detroit, San Francisco–Oakland, Seattle, Atlanta, San Jose–Monterey, and Los Angeles. All women identified by SEER as an Asian or Non-Hispanic White race with a primary diagnosis of EOC were included in the analysis. This study was exempt from Institutional Review Board approval given that the information obtained is not individually identifiable, and was not collected by direct contact with participants specifically for this study. Statistical analysis was performed using the Intercooled STATA 8.0 program (College Station, TX). Demographic, clinico-pathologic, and treatment data including differences in age, stage, grade of disease, histology, and the performance of lymphadenectomy were compared using the Chi-square test. Survival analysis by race, age, stage, histology, and extent of surgical treatment were performed using the Kaplan–Meier estimates of survival probability. Race was analyzed for Asians as a single group and subsequent analyses were performed for Asian subgroups of Vietnamese, Filipino, Chinese, Korean, Japanese, Asian Indian/Pakistani, and Asian NOS. The outcome of interest was death from ovarian cancer and time to death was censored in women who died from causes other than ovarian cancer. Cox-proportional hazards model was used to identify independent predictors of survival. Factors entered in the multivariable analysis include age at diagnosis, race, stage of disease, grade of disease, and histologic cell type. A two-sided p-value < 0.05 was considered statistically significant.

Results

A total of 52,260 Asian and White patients were diagnosed with EOC of whom 3932 were Asians and 48,328 were White. Of the Asians with available immigration status, 2086 were immigrants and 780 were born

Table 1
Demographics and clinico-pathologic characteristics (n = 52,260).

	Total	Asian	White	Chi-square p-value
Overall	52,260	3932	48,328	$p < 0.001$
Age				$p < 0.001$
Median (range)	63 (12–109)	56 (12–98)	64 (12–109)	
≤63 years	25,405 (48.6%)	2621 (66.7%)	22,784 (47.1%)	
>63 years	26,855 (51.4%)	1311 (33.3%)	25,544 (52.9%)	
Year of diagnosis				$p < 0.001$
1988–1993	8631 (16.5%)	495 (12.6%)	8136 (16.8%)	
1994–1999	10,233 (19.6%)	889 (22.6%)	9344 (19.3%)	
2000–2004	17,346 (33.2%)	1219 (31.0%)	16,127 (33.4%)	
2005–2009	16,050 (30.7%)	1329 (33.8%)	14,721 (30.5%)	
Histology				$p < 0.001$
Serous	29,076 (55.6%)	1753 (44.6%)	27,323 (56.5%)	
Clear cell	3247 (6.2%)	527 (13.4%)	2720 (5.6%)	
Endometrioid	7238 (13.8%)	681 (17.3%)	6557 (13.6%)	
Mucinous	4444 (8.5%)	460 (11.7%)	3984 (8.2%)	
Adenocarcinoma, NOS	8255 (15.8%)	511 (13.0%)	7744 (16.0%)	
Surgery				$p < 0.001$
Yes	44,324 (84.8%)	3441 (87.5%)	40,883 (84.6%)	
No	7754 (14.8%)	479 (12.2%)	7275 (15.1%)	
Unknown	182 (0.3%)	12 (0.3%)	170 (0.4%)	
Stage				$p < 0.001$
I	11,852 (22.7%)	1257 (32.0%)	10,595 (21.9%)	
II	4445 (8.5%)	386 (9.8%)	4059 (8.4%)	
III	20,675 (39.6%)	1360 (34.6%)	19,315 (40.0%)	
IV	15,288 (29.3%)	929 (23.6%)	14,359 (29.7%)	
Grade				$p = 0.041$
1	4357 (8.3%)	367 (9.3%)	3990 (8.3%)	
2	9357 (17.9%)	714 (18.2%)	8643 (17.9%)	
3	24,229 (46.4%)	1778 (45.2%)	22,451 (46.5%)	
Unknown	14,317 (27.4%)	1073 (27.3%)	13,244 (27.4%)	