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Trends in the receipt of guideline care and survival for women with ovarian cancer: A population-based study

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HIGHLIGHTS

- Guideline care improves ovarian cancer survival, yet guideline care is underused.
- Less than half of women received guideline surgery with no increase, 2002–2011.
- Multiagent chemotherapy use has increased, but rates remain low.
- Gyn/oncs use rose, 2002–11, but rates of guideline care from gyn/oncs were not optimal.
- Low rates of guideline care may explain lack of improvement in 2-year survival.

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ABSTRACT

Background. We assessed trends in the receipt of guideline care and 2-year cause-specific survival for women diagnosed with ovarian cancer.

Methods. This retrospective cohort analysis used National Cancer Institute's Patterns of Care studies data for women diagnosed with ovarian cancer in 2002 and 2011 (weighted n = 6427). Data included patient characteristics, treatment type, and provider characteristics. We used logistic regression to evaluate the association of year of diagnosis with receipt of guideline surgery, multiagent chemotherapy, or both. Two-year cause-specific survival, 2002–2013, was assessed using SEER data.

Results. The adjusted rate of women who received stage-appropriate surgery, 48%, was unchanged from 2002 to 2011. Gynecologic oncologist (GO) consultations increased from 43% (2002) to 78% (2011). GO consultation was a significant predictor for receipt of guideline care, although only 40% of women who saw a GO received guideline surgery and chemotherapy. The percent of women who received guideline surgery and chemotherapy increased significantly from 32% in 2002 to 37% in 2011. From 2002 to 2011, 2-year cause-specific ovarian cancer survival was unchanged for Stages I-III cancers, with slight improvement for Stage IV cancers.

Conclusion. Receipt of guideline care has improved modestly from 2002–2011 for women with ovarian cancer. Current treatment is far below clinical recommendations and may explain limited improvement in 2-year cause-specific survival. Most women consulted a GO in 2011 yet did not receive guideline care. There needs to be a better understanding of the decision-making process about treatment during the consultation with GOs and other factors precluding receipt of guideline care.

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1. Introduction

In the United States, ovarian cancer is the most common gynecologic cancer and the leading cause of gynecologic cancer deaths, accounting for >22,000 newly diagnosed ovarian cancer cases and >14,000 ovarian cancer deaths in 2016 [1]. Most women with ovarian cancer are diagnosed at an advanced stage with a poor prognosis, although the 5-year relative survival rate for women with ovarian cancer has increased from 36% in 1975–1977 to 46% in 2005–2011 [2].

Prior studies have demonstrated that guideline care is associated with improved survival for ovarian cancer patients [3,4]. However, studies have also shown that many women with ovarian cancer do not

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receive guideline care [3–6]. Over the past 15 years, there has been little change in the treatment guidelines for ovarian cancer. Guideline care consists of stage-appropriate surgery performed by a gynecologic oncologist for all women with ovarian cancer and multi-agent chemotherapy for patients with Stages IC–IV disease [7,8]. Between 2002 and 2011, the only additional standard for ovarian cancer treatment was a 2006 evidence-based recommendation from the US National Cancer Institute (NCI) that intraperitoneal (IP) chemotherapy be given to women with Stage III cancer who undergo optimal debulking [9].

In this study, we evaluate population-based trends in ovarian cancer treatment and survival, focusing on receipt of guideline care for women diagnosed with ovarian cancer in 2002 and 2011. We also assess patient and provider characteristics associated with receipt of guideline care. Finally, we estimate trends in 2-year cause-specific survival, defined as the percent of women diagnosed with ovarian cancer between 2002 and 2011 who have not died from ovarian cancer, 2002–2013.

2. Methods

2.1. Data used

Data for this analysis came from two population-based sources supported by the National Cancer Institute - the Surveillance, Epidemiology and End Results (SEER) cancer registries and the Patterns of Care data which include a subset of the SEER cases. The SEER registries ascertain all incident cancers occurring in defined geographic regions that include 30% of the U.S. population. The SEER registries routinely collect data on cancer site, date of diagnosis, tumor characteristics, type of surgical treatment, demographic characteristics, and date and cause of death. Information about stage at diagnosis and treatment for each patient comes primarily from hospitals records. Data from all cases reported to the SEER registries were used to calculate population-based trends in 2-year cancer-specific survival through 2013 [10].

The SEER registries data do not capture complete information about chemotherapy as such treatment is often provided in the outpatient setting and thus under-reported [11]. To obtain information about chemotherapy, NCI annually conducts Patterns of Care (POC) studies on selected cancer sites. Ovarian cancer was selected for inclusion in 2002 and 2011. The POC studies collect information about cancer treatment from the patient's hospital record and from each cancer patient's treating physician. The identified treating physician is asked if any other health care professional provided care, if so these providers are also contacted for treatment information.

The participating registries included the metropolitan areas of San Francisco/Oakland, Detroit, Seattle, Atlanta, San Jose/Monterey, Los Angeles County, and the states of Connecticut, Hawaii (2011 only), Iowa, Kentucky (2011 only), Louisiana, New Jersey, New Mexico, and the remainder of California. Institutional review board approval was received as required by the registries. Abstractors responsible for the ovarian cancer POC study underwent centralized training. The focus of the analysis was on trends in initial treatment. Because the SEER registries collect the month of cancer diagnosis, but not the exact diagnosis day, we assumed that patients were diagnosed on the first day of the month. Hospital records were re-abstracted for the sampled patients to verify tumor characteristics of the ovarian cancer, demographic, and insurance information. Type of surgical procedure was obtained from SEER data routinely collected by cancer registrars who operate under nationally established standards for data collection. Hospital bed size and teaching status was obtained from the American Hospital Association data. Specialty of the treating physicians was obtained from the registries. Physician specialty was used to identify patients who had a consultation with a gynecologic oncologist (GO). Each patient's physician was asked to provide information about the types of chemotherapy agents given, if intraperitoneal chemotherapy was administered, and if the patient had participated in a clinical trial. Therapy was verified for 97% of cases in 2002 and 98% of cases in 2011. For quality control, 5% of patients had their records re-abstracted.

2.2. Study sample

The POC study included a sample of SEER patients diagnosed with invasive ovarian cancer (ICD-O-3 Site code C56.9) not diagnosed at autopsy or on death certificate only. Patients with a previous diagnosis of any cancer other than non-melanoma skin cancer, lymphomas, or diagnosed under age 20 were ineligible for the study. Eligible patients were stratified by registry, racial/ethnic group, stage, and age (2011 only) and randomly sampled within strata. Sampling weights varied based on the race/ethnicity of the patient. Sampling fractions were used to calculate weighted percentages which reflect SEER populations from which the data were obtained. Non-whites and women with Stage I and II disease were oversampled to obtain more stable estimates. Patients with non-epithelial ovarian cancer were excluded from the analysis. To obtain a larger sample to estimate trends in 2-year cause-specific survival, we used data for all women with non-epithelial ovarian cancer included in the SEER data from 2002 to 2011 with follow-up through 2013.

2.3. Measures

Stage was determined using the SEER modified American Joint Commission on Cancer (AJCC) definition at the time of diagnosis, AJCC 3rd edition in 2002 and AJCC 6th edition in 2011 [12,13]. Patient comorbidities and type of health insurance were abstracted from the medical record; comorbidity was coded centrally by a single Certified Tumor Registrar and assessed using the Charlson comorbidity index [14]. Insurance was classified into mutually exclusive groups of private insurance, any Medicaid, Medicare only (no supplemental coverage), or no or unknown health insurance. Bed size was categorized as large (400+ beds), medium (200–399 beds), small (100–199 beds), and very small (1–99 beds). Type of hospital reflects a composite measure of bed size and whether the hospital had an approved residency training program, except for small/very small hospitals where teaching was not assessed. Use of intraperitoneal chemotherapy was evaluated only in women for whom it is recommended- those with Stage III cancer who had undergone debulking.

Guideline care was determined using National Comprehensive Cancer Network (NCCN) guidelines for ovarian cancer for 2002 and 2011 [7,8]. Guideline surgery was defined as oophorectomy with node dissection for Stage I disease and debulking for women with Stages II-IV cancer. Debulking is defined by the SEER program as surgical removal of as much macroscopic ovarian tumor as possible in the pelvis and abdomen with partial or complete omenectomy. It may involve removal of other involved abdominal organs including intestine, genital organs, bladder, ureters and ligamentous attachments. We did not assess hysterectomy as there were no data on prior surgeries and many women may have undergone hysterectomy prior to their cancer diagnosis. Guideline adjuvant chemotherapy was defined as the receipt of multi-agent chemotherapy, a platinum drug (cisplatin or carboplatin) and a taxane (paclitaxel or docetaxel). Receipt of chemotherapy included only patients for whom chemotherapy is recommended, those with Stages IC–IV disease.

We wanted to estimate trends in stage-specific survival. Given the limited number of cases and years in the POC data, we calculated two-year cause-specific survival for the POC data and using the SEER data, although we only show results of the SEER data. Deaths due to ovarian cancer were identified based on the SEER cause of death site recode variables [15].

2.4. Statistical analyses

The number of cases was weighted using sample weights to obtain estimates that are representative of all eligible patients from which

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