

Increased Vulnerability to Poorer Cancer-Specific Outcomes Following Recent Divorce

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ABSTRACT

BACKGROUND: Prior studies have only considered the association between static marital status and cancer-specific outcomes. We aim to measure the effect of recent divorce on cancer-specific outcomes.

METHODS: There were 83,804 patients with 2 malignancies, diagnosed 12 to 60 months apart, from 1973-2006 from the Surveillance, Epidemiology, and End Results database. Patients were identified as newly divorced if married at their first diagnosis and single/divorced at their second. Multivariable logistic regression and competing-risks regression were used to analyze the association of becoming newly divorced or newly married with cancer-specific outcomes from the second malignancy, including advanced diagnosis (T4 or N1 or M1), receipt of treatment, and cancer-specific survival.

RESULTS: Four percent became newly divorced and 3.4% became newly married. Compared with long-term married, newly divorced patients were most likely to be diagnosed with advanced disease (adjusted odds ratio [AOR] 1.31; 95% confidence interval [CI], 1.19-1.43), followed by long-term divorced (AOR 1.18; 95% CI, 1.11-1.25), and were least likely to receive curative treatment (AOR 0.74; 95% CI, 0.67-0.81). Newly divorced patients had the worst cancer-specific survival (adjusted hazard ratio [AHR] 1.17; 95% CI, 1.05-1.30, $P = .005$), followed by long-term divorced (AHR 1.08; 95% CI, 1.01-1.16, $P = .032$), while newly married patients had similar cancer-specific survival to long-term married (AHR 0.96; 95% CI, 0.85-1.08, $P = .46$).

CONCLUSION: Recent divorce, which represents an acute disruption of a patient's social support network, was associated with the worst cancer outcomes, followed by long-term divorce. Clinicians should consider recent divorce as a risk factor for worse cancer outcomes, and encourage appropriate screening, treatment, and access to social and financial supports for recently divorced patients.

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INTRODUCTION

An estimated 1.7 million people will be diagnosed with cancer in 2015,¹ and all of these patients will provide demographic information to clinicians, including self-reported marital status. However, marital status can change over time,^{2,3} which may have an effect on health care utilization and health outcomes. Married patients have better cancer outcomes than divorced patients in prior studies,⁴⁻¹² but few population-based studies have considered the effect of recent changes

in marital status. These studies may miss the effect of a recent divorce, which likely causes an acute disruption of social support and financial stability, leaving patients even less capable to manage their health, especially in the face of a life-threatening cancer diagnosis. In this study, we use a novel approach in the Surveillance, Epidemiology and End Results (SEER) database, using 2 time-points for a single patient to measure the effect of recent divorce, compared with long-term marriage and long-term divorce, on cancer-specific outcomes.

METHODS

Data Set

The SEER database is a population-based registry sponsored by the US National Cancer Institute for cancer patients across 13 US regions. SEER collects demographic and clinical information including features of each cancer diagnosis, treatment, and survival outcome. We utilized a feature of SEER linking 2 primary tumors for a single patient, as well as the demographic data collected at each diagnosis.

Population

We identified 121,815 patients over age 18 years in SEER diagnosed with 2 primary malignancies between 12 and 60 months apart, from 1973 to 2011. All patients had complete marital status at both diagnoses. Patients were excluded if other demographics were not available at the second diagnosis ($n = 6227$). Finally, patients who were single or widowed at both primaries or newly widowed at their second primary were excluded ($n = 31,784$), leaving a final cohort of 83,804 patients.

Demographic and Clinical Variables

Demographic data, other than marital status, was collected at the second primary, including age, patient-reported race, county-level income, population density, and SEER region. As SEER individual-level insurance data were not available prior to 2007, patients were categorized as living in a high-uninsurance area if the uninsurance rate for their region was above the mean for regions included in this study ($>13.4\%$), based on state uninsurance rates in 2000.¹³ Finally, patients were categorized by marital status at each diagnosis as follows: long-term married (LTM) if a patient was married at both diagnoses, newly married (NM) if a patient was not married at the first and was married at the second diagnosis, long-term divorced (LTD) if a patient was divorced at both diagnoses, and newly divorced (ND) if a patient was married at the first and divorced or single at the second diagnosis. Pa-

tients who reported having a domestic partner were categorized as married.

Clinical data were collected for both primary diagnoses, including year of diagnosis, site, summary stage, and receipt of any radiation or surgery. Months between diagnoses were calculated. Patients were categorized as advanced stage if T4 or N1 or M1 disease at diagnosis and having received treatment if any radiation or surgery was performed.

Finally, survival outcomes included vital status in 2011, cause of death, and months survived beyond second diagnosis. Death during follow-up was categorized as being due to the second primary, the first primary, or another cause of death. If the first and second primaries were the same malignancy and the cause of death, then the death was categorized as due to the second primary ($n = 4479$).

CLINICAL SIGNIFICANCE

- Among 83,000 patients, recent divorce, which represents an acute disruption of a patient's social support network, was associated with the worst cancer outcomes, followed by long-term divorce.
- Clinicians should consider recent divorce as a risk-factor for worse cancer outcomes, and encourage appropriate screening, treatment, and access to social and financial supports for recently divorced patients.

Statistical Analysis

Basic demographic and clinical characteristics were compared by marital status using t test and chi-squared. Our primary outcome was cancer-specific survival (CSS) from the second primary with long-term married as the referent group, measured by Fine and Gray's competing-risks regression with death from the first primary or another cause considered competing risks. As social science literature on divorce continues to debate if the effect of divorce is different by age or sex,^{6,14-18} we measured for an interaction between age and marital

status as well as sex and marital status. Patients with advanced disease at their first or second primary were excluded from the CSS analysis ($n = 22,779$), as were patients diagnosed with their second primary after 2006 ($n = 11,782$) because they had <5 years of follow-up, leaving 33,925 patients in this analysis. The competing-risks regression was adjusted for sex, age, race, year of diagnosis with second primary, months between primaries, treatment of first primary, treatment of second primary, income, population density, and regional rate of un-insurance.

Our secondary outcomes were increased risk of advanced disease at second diagnosis and treatment of the second primary, measured by multivariable logistic regression (MVA) with long-term married patients as the referent group. Patients with advanced disease at their first primary were excluded from the MVA for advanced disease at second primary ($n = 8192$), leaving 59,110 patients. The MVA for advanced disease was adjusted for sex, age, race, year of diagnosis with second primary, months between primaries, treatment of first primary, income, population density, and regional rate of un-insurance.

SEER does not include data on receipt of chemotherapy, and therefore, patients with leukemia, Hodgkin lymphoma, non-Hodgkin lymphoma, and myeloma, for whom the primary

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