Analyzing Age-Related Patterns of Second Primary Cancer Sites Following a Primary Breast Cancer Diagnosis

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OBJECTIVE

This study aims to evaluate age-related patterns pertaining to the anatomical sites of second primary cancers occurring within five years of an initial breast cancer diagnosis.

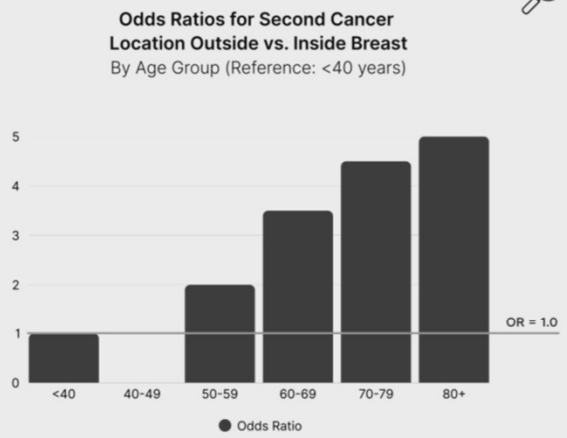
METHODS

Our analysis focuses on patients (n=68,109) whose first recorded cancer diagnosis was early-stage breast cancer, diagnosed between 2008 and 2019. Age, diagnosis dates, and all anatomical cancer sites of these 68,109 patients were extracted from the Q-Centrix Clinical Data Warehouse. The Q-Centrix Clinical Data Warehouse is a proprietary database of de-identified clinical data produced through expert-driven human abstraction. The subset sourced from the Clinical Data Warehouse includes information from 78 hospitals, health systems, and cancer centers across the country. Patients were split into 6 age groups: <40 (n=2,628), 40-49 (n=10,306), 50-59 (n=16,508), 60-69 (n=19,486), 70-79 (n=13,209), and 80+ (n=5,967). Five patients did not have a recorded age group in the data warehouse. The occurrence of a second cancer within 5 years of the initial breast cancer diagnosis was categorized as "Yes" or "No". Logistic regression was used to assess the odds of a patient developing a second non-same-day cancer within 5 years in patients >40 years of age compared to those < 40 years of age. A p-value cutoff of <0.05 was considered significant.

A second analysis was conducted on the subset of patients who developed a second non-simultaneous cancer within five years of the initial breast cancer diagnosis. Of the 68,109 patients who had breast cancer logged as their first cancer in our data warehouse, 4680 (~7%) fit these criteria. The site of the second cancer was categorized as breast or non-breast. 29 patients in this group did not have a second cancer site stored in the data warehouse. 2 additional patients did not have their age stored in the data warehouse. These patients were dropped from the final set, bringing the total to 4,649. A logistic regression model was then run to determine the odds of the second primary site being located outside the breast versus inside the breast in patient age-groups >40 years of age compared to those <40 years of age. A p-value cutoff of <0.05 was considered significant. The age distribution of this group included 119 patients <40 years of age, 40-49 (n=561), 50-59 (n=1070), 60-69 (n=1426), 70-79 (n=1038), and 80+ (n=435).

RESULTS

The odds of developing a second non-simultaneous cancer within 5 years of an initial early-stage breast cancer diagnosis relative to the <40 age group was .68 in the 50-59 age group, .60 in the 60-69 age group, .55 in the 70-79 age group and .59 in the 80+ age group (p-value <0.05). The odds of the 40-49-year age group relative to the <40-year age group was not statistically significant. In the group that did develop a second cancer diagnosis within 5 years, the odds of the tumor location being outside the breast versus inside the breast were 2.05 times greater for patients aged 50-59 years. A 60-69-year-old patient was 3.49 times likelier, a 70-79-year-old patient was 4.76 times likelier, and a patient 80 years or older was 5.05 times likelier to have a second cancer site outside of the breast relative to a patient who was <40 years of age (p-value<.05). The odds of the 40-49-year age group developing a cancer located outside the breast versus inside the breast relative to the <40-year age group was not statistically significant.



CONCLUSIONS

The odds ratios in the second analysis suggest that the odds of developing a second cancer outside the breast, relative to within the breast, within five years of an initial early-stage breast cancer diagnosis, increase progressively with patient age. Further analyses are required to determine how this relationship differs with respect to the original breast cancer diagnosis receptor type, stage, and anti-neoplastic treatment modality.