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## Alcohol and Risk of Breast Cancer

Steven A. Narod, MD

IN THIS ISSUE OF *JAMA*, CHEN AND COLLEAGUES<sup>1</sup> REPORT findings from the Nurses' Health Study exploring the relationship between alcohol consumption and breast cancer risk. The authors' principal findings were that the cumulative amount of alcohol a woman consumes during adulthood is the best predictor of her breast cancer risk and that low levels of alcohol consumption (as few as 3 drinks a week) are associated with an increased risk of breast cancer. In addition, the risk of breast cancer was increased with the quantity consumed; for example, women who drank 2 or more drinks per day had a risk of breast cancer approximately 1.5 times higher than women who never consumed alcohol, and their 10-year risk of breast cancer increased by 1.3% (from 2.8% to 4.1%). For women who drank 1 drink per day, the risk was approximately 1.2 times higher than expected and their 10-year risk increased by 0.7% (from 2.8% to 3.5%).

The association between alcohol use and increased risk of breast cancer is not a novel finding, but the report by Chen et al provides more detail about the risks associated with different patterns of consumption. Chen et al and other investigators<sup>2,3</sup> suggest that alcohol probably acts through the modification of the hormonal milieu. There are few bona fide breast cancer carcinogens; the 2 most well established are ionizing radiation and hormone therapy. Ionizing radiation (implicated through exposure to nuclear explosions,<sup>4</sup> diagnostic fluoroscopy,<sup>5</sup> and radiotherapy in adolescence<sup>6</sup>) is thought to act through induction of DNA mutations. The relevant years of exposure are thought to be at the time of breast development, and there is a long latent period between exposure and the first appearance of cancer (usually 20 years or longer). Conversely, hormone

therapy has a more immediate effect on breast carcinogenesis, with an increase in risk seen within a few years after initiating hormone therapy and the risk dissipating within 2 years after cessation.<sup>7</sup> Among current users of hormone therapy, lifetime hormonal exposure is also the best predictor of cancer risk.<sup>7,8</sup>

Alcohol, a third breast carcinogen, appears similar to hormone therapy in that lifetime exposure also is associated with annual risk. An important issue is whether these carcinogens both act through a common pathway. Unlike hormone therapy, exposure to alcohol in adulthood is more or less stable; relatively few women initiate or cease alcohol use later in life. Most women start drinking at an age when their breast cancer risk is low, and few women stop drinking as adults. What is not known is how the onset or cessation of alcohol use at age 50 years, for example, would alter a woman's risk of breast cancer. If the effect of alcohol on breast tissue is analogous to that of hormone therapy, then onset of alcohol use would be expected to increase risk and cessation of alcohol consumption would diminish risk. Alcohol use resembles hormone therapy in several other respects; both exposures are associated with breast cancer risks that are greater for lobular breast cancer than for ductal cancer,<sup>7,9</sup> and for both alcohol use and hormone therapy, the risk appears to be greater for progesterone receptor–positive cases than for progesterone receptor–negative cases, regardless of estrogen receptor status.<sup>10</sup> Thus, extrapolation from the literature on hormone therapy and breast cancer risk would suggest that risk of breast cancer also may be expected to decline after alcohol intake ceases.

Are these findings relevant for women of any age with breast cancer? Probably not. Among women with premenopausal

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**Author Affiliation:** Women's College Research Institute, Toronto, Ontario.  
**Corresponding Author:** Steven A. Narod, MD, Women's College Research Institute, 790 Bay St, Toronto, ON M5G 1N8, Canada (steven.narod@wchospital.ca).

breast cancer in the Nurses' Health Study cohort, risk estimates for several categories of alcohol consumption exceed unity but are not statistically significant, and the absolute risk increases are small. Unlike the dose-response relationship observed for postmenopausal breast cancers, there was no clear dose-response for premenopausal breast cancers, and women who reported consumption of 2 to 3 drinks per day had a lower breast cancer risk than those who consumed fewer than 2 drinks per day. However, this should not imply that alcohol use in the early adult years is innocuous vis a vis the risk of breast cancer; rather, if the model of risk proposed by Chen et al is plausible, then early exposure to alcohol in young adulthood would contribute to an increased risk of breast cancer in the postmenopausal period.

These findings raise an important clinical question: should postmenopausal women stop drinking to reduce their risk of breast cancer? For some women the increase in risk of breast cancer may be considered substantial enough that cessation would seem prudent. However, there are no data to provide assurance that giving up alcohol will reduce breast cancer risk. Moreover, it would likely be easier for a woman who consumes 1 drink a week to stop drinking than for a woman who consumes 2 drinks a day. Furthermore, women who abstain from all alcohol may find that a potential benefit of lower breast cancer risk is more than offset by the relinquished benefit of reduced cardiovascular mortality associated with an occasional glass of red wine.<sup>11</sup> Exploration of the risk-benefit relationships between low levels of alcohol consumption and all-cause and cause-specific morbidities and mortalities might be the topic of future analy-

ses of the Nurses' Health Study and other prospective cohort studies.

**Conflict of Interest Disclosures:** The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

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