In their current study, Kwan et al.\(^1\) introduce the mammographic breast density category in the Breast Imaging Reporting and Data System (BI-RADS) as a novel predictor of lymphedema development in patients with breast cancer. The authors postulated that the fatty content of a woman's breast, which provides a more direct measure of regional adiposity than body mass index (BMI), might be predictive of lymphedema risk independent of BMI. They evaluated patient, tumor, and treatment characteristics of 373 women who completed primary treatment for breast cancer and who were referred to the Cancer Rehabilitation and Survivorship Program for a 30-month period. Approximately 20% of patients in their cohort developed lymphedema at a median follow-up of 1 year. Kwan et al.\(^1\) identified the BI-RADS category of breast density along with age, BMI, pathological nodal stage, and axillary lymph node dissection (ALND) as predictors of lymphedema severity. Patients who had the lowest breast density (BI-RADS 1) were found to have the highest risk of developing severe lymphedema. The follow-up period was short but should have been sufficient to capture most patients who developed lymphedema.

The management of the axilla for patients with breast cancer has undergone a massive paradigm shift toward less axillary dissection. The deescalation of ALND has been driven in large part by the recognition that this procedure results in the development of lymphedema in nearly 25% of patients.\(^2\) The American College of Surgeons Oncology Group Z0011 randomized clinical trial\(^3\) has provided the oncologic data to support omission of ALND in patients with minimal nodal disease. However, for patients with clinically node-positive disease or for those whose cancer was not downstaged by neoadjuvant chemotherapy, ALND remains the standard of care. The ability to better predict the risk of lymphedema in these patients is essential not only for appropriate counseling but also for earlier identification and intervention to mitigate the risk of developing this potentially disabling complication.

The interplay between BMI and mammographic breast density as risk factors is complex. Elevated BMI as an indirect measurement of overall body fat has consistently been shown to be an important risk factor for breast cancer development and recurrence.\(^4\) A high BMI is also the most well-recognized patient variable associated with lymphedema.\(^2\) Higher fat content in the breast, however, as reflected in a lower BI-RADS breast density score, is associated with lower breast cancer risk.\(^5\) This same fatty composition in the breast, according to Kwan et al.,\(^1\) appeared to be associated with increased lymphedema risk as well. The authors postulated that the association between low breast density and lymphedema risk may be attributed to impaired adipose homeostasis in the breast and compromised lymphatic vasculature. The lower risk of breast cancer in women with fatty breasts is presumably associated with the decreased number of epithelial cells at risk for carcinogenic transformation. Both BMI and mammographic breast density can change over the course of a patient’s lifetime. Understanding these patient-specific variables and their association with cancer recurrence and lymphedema risk is necessary to improve patient counseling and care personalization.

In a larger study of more than 1000 patients and with a longer follow-up period of 60 months, Bevilacqua et al.\(^6\) identified age, BMI, and ALND to be risk factors for lymphedema, in addition to radiotherapy field, chemotherapy, seroma formation, and early edema. Based on their data, the authors developed 3 nomograms that were predictive of lymphedema risk at 5 years.\(^6\) However,
their model dichotomized lymphedema outcome to either positive (>200 mL difference in volume between the affected and unaffected cohorts) or negative (<200 mL difference). Kwan et al presented a clinical tool that incorporated the BI-RADS mammographic breast density category to predict not only the development but also the severity of lymphedema on the basis of volumetric outcomes. From a practical standpoint, these findings by Kwan et al should be clinically relevant given that lymphedema development is more often a continuous rather than a categorical measure. Kwan et al appropriately cautioned that the use of this clinical model needs to be further validated against independent data sets, but the uniform availability of mammographic breast density data makes this model a readily available and attractive tool.

As more and more patients with breast cancer are cured from this disease, the implications of the available treatments for long-term quality-of-life outcomes must continue to be addressed. Because the data lag for the deescalation of ALND for all patients with breast cancer, we must continue to counsel patients (according to patient, tumor, and treatment characteristics) about the possibility of developing lymphedema. Kwan et al have identified a novel predictor of lymphedema in the BI-RADS mammographic breast density category, which could improve the identification of patients at risk. Fortunately for these patients, early intervention with manual lymphatic drainage and decongestive therapy have shown promise, and surgical techniques, including lymphatic transfer and debulking with liposuction, are being studied for both prevention and treatment of this otherwise debilitating condition.

ARTICLE INFORMATION
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REFERENCES