The False Negative Rate of Digital Mammography at an American Academic Medical Center

The Problem
The false negative rate of annual digital mammography performed at an American academic medical center has not been previously investigated.

Aim/Goal
The purpose of this quality assurance project is to determine the rate and features of false negative breast cancers diagnosed among our cohort of patients. While these rates have previously been described based largely on European data, this is the first such study to evaluate American women in an annual screening program at an academic medical center using digital mammography. Additionally, we aim to identify the mammographic features of false negative cancers to help improve the sensitivity of our breast cancer screening program.

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The Interventions
We investigated 50 consecutive cancer cases diagnosed at BIDMC between January 1, 2012 and September 30, 2012 which had normal screening mammograms (BIRADS 1 or 2) performed at BIDMC within the preceding 15 months (the "index mammogram").

The negative index mammogram was independently reviewed by three subspecialty breast radiologists who were blinded to the location of the cancer. Subsequently, the mammogram performed at the time of diagnosis was reviewed by the radiologists. Next, the index mammogram was retrospectively re-reviewed by the radiologists for the presence of findings.

Consensus was defined as agreement of at least two of the three radiologists. Using definitions established in prior European trials, cases were classified as true negative or false negative.

True negative cases included minimal signs which would not have resulted in a recall, interval cancers, and mammographically occult cancers. False negative cases included those considered to be secondary to reader error or technical error, or those with minimal signs that would have resulted in a recall.

All true negative and false negative cancers were evaluated for age at diagnosis, mammographic features at diagnosis, size at surgical excision, pathologic subtype, and hormonal status.

The Results/Progress to Date
Of the 50 cases, 41 (82%) were true negative, and 9 (18%) were false negative. Of the true negative cases, 24 (59%) were interval cancers, 14 (34%) had minimal signs, and 3 (7%) were mammographically occult. Of the 14 true negative cases with minimal signs, 4 presented as calcifications, 5 as asymmetry, 3 as a mass, and 2 as focal asymmetry. All 9 of the false negative cases were due to reader error, and of those cases, 4 presented as calcifications, 2 as asymmetries, 1 as a mass, and 2 as focal asymmetries.

Lessons Learned
The rate of false negative cancers at BIDMC was found to be 18% (95% CI: 9-32%), which is similar to the published rate of 20-30%. All false negative cases were due to reader error and no distinguishing mammographic features were associated with this group.

Next Steps
We plan to investigate additional cases to determine significant differences between the mammographic presentation of true negative and false negative cancers. By better understanding these important differences, we hope to improve the sensitivity of the breast cancer screening program at BIDMC.

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