ORIGINAL ARTICLE

Compliance With Screening Mammography Guidelines After a False-Positive Mammogram

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Abstract

Purpose: To assess whether women with a false-positive mammogram who do return for screening are less likely to be compliant with screening mammography guidelines than are women with a negative mammogram.

Methods: This institutional review board-approved, HIPAA-compliant retrospective cohort study includes women >40 years old who received 9,385 consecutive, nonbaseline screening mammograms between December 1, 2012 and December 31, 2013. Using linear regression, we evaluated differences in time between mammograms by prior recall status, after adjusting for location of current mammogram (outpatient office versus mobile unit) and age. Using Fisher's exact test, we evaluated the association between compliance with screening guidelines and the recall status on prior mammogram, and compared by location the proportions of noncompliant women who were recalled from prior mammogram.

Results: Time between mammograms does not differ based on prior recall status ($P = .83$). There is no association between compliance with screening mammography guidelines and recall status on prior mammogram (ACR guidelines $P = .398$, United States Preventive Services Task Force guidelines $P = .416$). Noncompliant women recalled on prior mammogram are more likely to undergo mammography at the outpatient office rather than the mobile unit (ACR guidelines $P = .0004$, United States Preventive Services Task Force guidelines $P = .0032$).

Conclusions: A prior false-positive mammogram is not a significant deterrent to compliance with screening guidelines in those women who return for screening.

Key Words: Screening mammography, false-positive mammogram, breast cancer

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INTRODUCTION

Screening mammography reduces mortality from breast cancer [1-4]. In screening mammography, some women are recalled for additional evaluation and they experience anxiety at the thought that they may have breast cancer [5]. The majority of these women do not have breast cancer; the interpretation of their screening mammogram is a false positive.

Many studies have surveyed women about the anxiety caused by a false-positive mammogram [5-20]. Results vary widely. One study found "long-term psychosocial harm" where women experienced psychosocial consequences that "ranged between those experienced by women with a normal mammogram and those with a diagnosis of breast cancer" three years later [13]. Another study showed this anxiety to be highest during the additional evaluation, elevated one week after being told there was no cancer, and resolved eight months later [20]. A meta-analysis reported that these women had "higher, but not apparently pathologically elevated, levels of distress and anxiety" compared with those with a normal mammogram [21]. A Cochrane review states that "for every 2000 women invited for screening throughout 10 years … more than 200 women will experience important psychological distress including anxiety and uncertainty for years because of false-positive findings" [6].

Fewer studies evaluate outcomes further downstream: women's participation in screening mammography after a false-positive mammogram [21-27]. Many of these studies were performed in countries where screening intervals and women's experiences when they are

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recalled vary from the practice of mammography in the United States. These findings may not be generalizable to women in the United States.

This retrospective cohort study of women's participation in nonbaseline screening mammography addresses the impact of being recalled from a prior mammogram on women's subsequent screening behavior. The study assesses whether women with a false-positive mammogram who do return for screening are less likely to be compliant with screening mammography guidelines than are women with a negative mammogram.

METHODS

The Institutional Review Board approved this HIPAA-compliant retrospective cohort study of all women undergoing screening mammography from December 1, 2012 to December 31, 2013 at this institution. The Institutional Review Board waived informed consent.

A fellowship-trained breast imaging radiologist with 15 years of experience abstracted data from the electronic medical record, including patient age, date and location of current mammogram (outpatient office or mobile unit), whether the current mammogram was a baseline, and, if not, the date of the most recent prior mammogram. If a woman's prior mammogram was performed at an outside institution, the date of the prior mammogram was obtained from the outside institution's report, if available. If not available, the date of the prior mammogram was obtained from the outside institution's mammographic images in the PACS. If neither the outside institution's report nor images were available, the woman's estimate of the date of her most recent prior mammogram was obtained via review of the patient history sheet from the current mammogram, and that date was recorded as "patient's estimated date of last mammogram."

For each nonbaseline screening mammogram, review of the report of the most recent prior mammogram determined if the patient had been recalled. Any woman undergoing screening mammography who had been recalled on her last mammogram had a false-positive prior mammogram, because if her prior mammogram had shown breast cancer, she would not be eligible for screening mammography for five years (she would undergo diagnostic mammography instead). When the prior mammogram was performed at an outside institution and no outside institution's report was available, the recall status on the prior mammogram was recorded as "unknown."

During the time period of this study, the ACR, the Society of Breast Imaging, the American College of Surgeons, the American College of Obstetricians and Gynecologists, and the American Cancer Society recommended annual screening mammography beginning at 40 years of age [28-31]. The United States Preventive Services Task Force (USPSTF) recommended screening every two years between 50 and 74 years of age [32]. Our breast imaging practice strongly recommends that women follow the ACR screening mammography guidelines, but many of our patients' referring providers advise the women to follow the USPSTF guidelines. Indicator variables for compliance with the ACR's guidelines and, separately, for compliance with the USPSTF's guidelines were created based on age and time between mammograms for all nonbaseline screening mammograms. Compliance with ACR guidelines was defined as receipt of a mammogram every year (plus two months to allow for minor scheduling issues) for women 40 years of age or older. Compliance with USPSTF guidelines was defined as receipt of a mammogram every two years (plus two months to allow for minor scheduling issues) for women aged 50-74 years.

Patients under 40 years of age who were screened as high-risk patients were too young for routine screening mammography guidelines to apply and were excluded from this analysis.

Data were analyzed separately when the date of prior mammogram was known (actual time between mammograms) and when the date of prior mammogram was estimated by the patient (estimated time between mammograms), because studies have shown that women underestimate the time since their last mammogram [33,34].

It was assumed that data regarding women who received mammography on the mobile unit and those who received mammography at the outpatient office were independent (ie, it was assumed that women in the cohort did not receive screening at both locations).

A biostatistician with a master's degree in public health used SAS Version 9.4 (SAS Institute, Cary, NC) to compute all statistics. Calculation of descriptive statistics included standard deviations and 95% confidence intervals. For all tests that evaluated differences between mobile mammography and office-based mammography, we used a Bonferroni correction type I error rate of 0.0125 (ie, 0.05 / 4 tests = 0.0125).

To evaluate the association between recall status on the prior mammogram and compliance with mammography screening guidelines for the present mammogram,