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Avoidable surgical consultations in women with a positive screening mammogram: Experience from a southern region of the Dutch breast screening programme☆

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ABSTRACT

Introduction: According to current Dutch guidelines, all women with a positive screening mammogram are referred for a full hospital assessment, which includes surgical consultation and radiological assessment. Surgical consultation may be unnecessary for many patients. Our objective was to determine how often surgical consultations can be avoided by radiological pre-assessment.
Materials and methods: All women with a positive screening mammogram, referred to our radiology department between 2002 and 2007, were included ($n = 1014$). Percentage of women that was downstaged to BI-RADS category 1 or 2 by radiological pre-assessment was calculated. Negative predictive value (NPV) for malignancy was estimated from the in-hospital follow-up, which was available up to September 2012.
Results: 423 of 1014 women (42%) were downstaged to BI-RADS category 1 or 2 by radiological pre-assessment. During follow-up, 8 of these 423 women (2%) developed a malignancy in the same breast. At least 6 of these malignancies were located at a different location as the original screening findings which led to the initial referral. The estimated NPV for malignancy was 99.5% (95%CI, 98.3–99.9).
Conclusion: By referring women with a positive screening mammogram to the radiology department for pre-assessment, a surgical consultation was avoided in 42%, with an estimated NPV of 99.5% for malignancy.

1. Introduction

Breast cancer is the top cancer in women worldwide, comprising 22.9% of all female cancers [1]. It is estimated that 458 503 women died in 2008 due to breast cancer [1].

Screening programmes have been developed to detect breast cancer at an early stage, in order to improve patient outcome and survival. All medical professional organizations in industrialized countries recommend screening mammography for women between 50 and 69 years of age [2]. The Dutch breast cancer population-based screening programme, targeted at all women aged 50–74 years, provides biennial screening mammography. Since 2007, the Dutch national guideline prescribes that all patients with a positive screening mammogram (i.e. those assigned with a BI-RADS category not being a 1 or a 2) are being referred for a full hospital assessment, which includes outpatient surgical consultation and radiological assessment [3]. However, such an approach may not be efficient, because not all referred women turn out to have a breast malignancy. A radiological pre-assessment may obviate unnecessary surgical consultations for many patients, decrease workload for health professionals, and lower costs. Up to 2007, all women in our region with a positive screening mammogram still underwent a pre-assessment at our radiology department; women who could subsequently be downstaged to BI-RADS category 1 or 2 [4] were not referred for further surgical consultation. Therefore, the objective of the present study was to determine how often surgical consultation in women with a positive screening mammogram could be avoided by a radiological pre-assessment. Secondarily, we assessed the negative predictive value (NPV) for malignancy by radiological pre-assessment.

2. Materials and methods

All women with a positive screening mammogram (i.e. those assigned BI-RADS category 3, 4 or 5) who underwent a pre-assessment at our radiology department from January 2002 until

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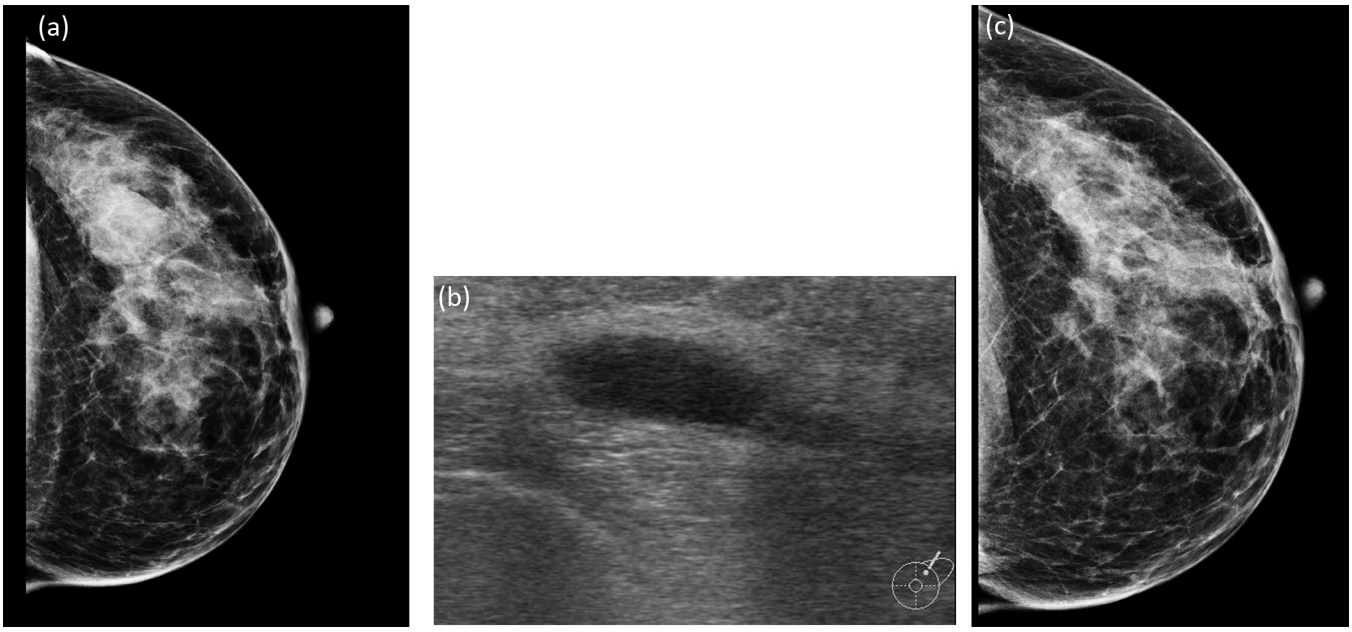

Fig. 1. Example of downstaging to BI-RADS category 1 or 2. Fifty-year-old woman was referred with a positive screening mammogram. Craniocaudal mammographic view (A) showed a low-density radiopaque, oval lesion with partly ill-defined border in the left breast. Ultrasonography (B) showed a oval lesion with posterior acoustic enhancement and a sharply defined border in keeping with a simple cyst. Cyst aspiration was performed under ultrasound guidance. Repeated craniocaudal mammographic view (C) after cyst aspiration proved that the detected lesion on the screening mammogram was caused by a cyst and had disappeared after cyst aspiration.

December 2006 were included. Downstaging to BI-RADS category 1 or 2 was performed by using old in-hospital mammograms for comparison if available, acquisition of additional (spot compression magnification) views, and by performing ultrasonography and cyst aspiration.

All patients had undergone analogue screen-film mammography as part of the Dutch breast cancer population-based screening programme. In our region of the Dutch breast cancer population-based screening programme, all eligible women were invited by mail and screening mammograms were performed in out-of-hospital mobile units [5]. Screening mammograms were performed by dedicated radiographers trained at a national level by the National Expert and Training Centre for Breast Cancer Screening. According to national guidelines, screening mammograms were performed in two views (craniocaudal (CC) and Mediolateral Oblique (MLO)) per breast for the initial screening round. In subsequent screening rounds, the radiographer would review the new MLO-views and compare these views with previous screening mammograms in order to decide whether an additional CC-view was necessary. All screening mammograms were independently read by two screening radiologists trained at a national level by the National Expert and Training Centre for Breast Cancer Screening. Cases with discrepant ratings were reevaluated in a consensus read. In the initial screening round, no prior mammograms were available for review. In subsequent rounds, all prior screening mammograms were available for review.

In our hospital, an analogue mammography system (Mammo Diagnost UM, Philips, Eindhoven, the Netherlands) till January 2004 or digital mammography systems (Lorad Selenia M-IV DR, Tromp Medical, Castricum, The Netherlands) since August 2002 were used. Ultrasonography was performed using ultrasound machines (Aloka, SSD-3500, Biomed, Almere, The Netherlands) with 5–15 MHz linear transducers. Downstaging was performed by one of 3 senior radiologists, all with more than 10 years of experience in breast imaging. All imaging of one woman referred with a positive screening mammogram was interpreted in daily practice by one of the 3 above mentioned senior radiologists in a prospective fashion, i.e. interpreters were unaware of follow-up data. Ultrasonography was performed in every woman referred with a positive screening mammogram. Depending on the findings of the screening mammogram, downstaging to BI-RADS category 1 or 2 could be reached in several ways. For example, by using old in-hospital mammograms for comparison to prove that a mass on the screening mammogram was caused by an already histologically proven benign lesion that had not changed in size. Or by acquisition of additional (lateral, CC, MLO, or spot compression magnification) views to prove that a suspected architectural distortion could not be reproduced and was in fact normal fibroglandular breast tissue. Or by performing ultrasonography and cyst aspiration and repeating the mammogram to prove that the mass on the screening mammogram was caused by a cyst and had disappeared after cyst aspiration (Fig. 1).

In-hospital follow-up data were collected up to September 2012. All imaging and patient follow-up data were prospectively collected by one senior breast radiologist.

Percentage of women that was downstaged to BI-RADS category 1 or 2 was calculated. This analysis was performed for all patients together and stratified according to initial BI-RADS category assigned after screening. In addition, NPV for malignancy with 95% confidence interval (CI) was assessed using the in-hospital follow-up data. Patients who potentially developed a malignancy at the same location as the original screening findings which led to the initial referral were assigned as false negatives. Patients who developed a malignancy at another location, and patients in whom follow-up revealed no abnormalities or benign findings in the in-hospital follow-up database up to September 2012 were assigned as true negatives.

This study was approved by the local medical ethics committee of our hospital. Patient informed consent was not required.

3. Results

From January 2002 until December 2006, 1014 screened women with a mean age of 60 years (range 50–75 years) were referred for a pre-assessment at our radiology department. All these women were included in the present study. Numbers and percentages of