



DOI: 10.19187/abc.20174237-38

Breast Cancer Screening: A New Era?

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By the time the initial clinical trials has started population screening with mammography, this technique has widely been used in many countries. The Health Insurance Plan (HIP) trial started in 1963 and was offered to women with an age ranging from 40 to 64. The participants was randomized in 2 groups: the first were followed up with clinical exploration and mammography, while clinical follow up was offered to the control group. Ten years later, the mortality of the intervention group was reduced by 30% compared to the control group. Other trials, like the Two-County, showed similar results.¹

Despite these good results, some controversies about mammographic screening have arisen in the last decade. The arguments of the critics against mammography can be grouped in several categories: a) small, if any, reduction of mortality due to mammography (inadequate aleatorization of the participants in the clinical trials, which makes it impossible to calculate the real mortality decrease), b) the rate of locally advanced breast cancers has not significantly decreased despite the use of the mammographic screening, c) false positive results that generate anxiety and unnecessary biopsies, d) overdiagnosis and overtreatment (less aggressive cancers are diagnosed and treated, which would be unlikely to kill the patient), e) high risk women (bearing BRCA mutations) do not achieve benefit from mammographic screening, but from MRI follow-up, f) the sensitivity of mammography decreases to 50% in dense breasts, and g) radio-induced cancers.²

In the last decade, new technologies have demonstrated to increase the sensitivity of mammography, especially in dense breasts. On one hand, Digital Breast Tomosynthesis (DBT), a new breast imaging technique capable of showing multiple slices of the breast parallel to the detector, is a well-established technique.³ Multiple studies have reported an important increase in the sensitivity of mammography, up to 43%. The majority of the cancers detected by DBT were invasive cancers, which means that overdiagnosis should not be relevant.³ On the other hand, ultrasound (US) is, nowadays, widely used as a complementary technique after mammography. In a recent Japanese study (J-START), US has demonstrated to significantly increase the sensitivity of mammography and to reduce the rate of interval cancers.⁴ As reported with DBT, the vast majority of US-detected cancers were invasive. The Automated Breast Ultrasound System (ABUS) offers the technologists the possibility to perform a 3D US examination of both breasts, which can be later reviewed by the radiologist in a work station.^{3,4}

Finally, Magnetic Resonance Imaging (MRI) is, nowadays, considered the technique of choice for the screening of high risk patients (mutations BRCA 1&2), because MRI shows the highest sensitivity compared to conventional techniques.⁵

Taking into account the referred controversies about screening and the new imaging techniques, the question is: How should the breast cancer screening be designed in this century? It is not easy to answer this question, but, in my opinion, the key is to classify the patients according to their risk to develop breast cancer in future. High risk patients do not achieve benefit from participating in screening programs based on mammography; therefore, these patients should undergo screening with MRI. Fortunately, these patients are only a minority of the female population.

Middle risk patients, including women with positive family history of breast cancer as well as

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histologically proven risk lesions (atypical ductal hiperplasia, lobular carcinoma in situ) could benefit from adding DBT or even US after mammography. Finally, women with fatty breasts and no positive family history for breast cancer, likely the majority of women in a screening, could be studied with mammography alone (or combined with DBT at the most). By using these criteria, the sensitivity of breast cancer screening could increase and the interval cancers decrease; and this is the way to reduce the mortality due to breast cancer.

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