



Blinded double reading yields a higher programme sensitivity than non-blinded double reading at digital screening mammography: A prospected population based study in the south of The Netherlands



Elisabeth G. Klompenhouwer^{a,*}, Adri C. Voogd^{b,c}, Gerard J. den Heeten^d,
Luc J.A. Strobbe^e, Anton F.J. de Haan^f, Carla A. Wauters^f, Mireille J.M. Broeders^{d,g},
Lucien E.M. Duijm^h

^a Department of Radiology, Catharina Hospital, PO Box 1350, 5602 ZA Eindhoven, The Netherlands

^b Comprehensive Cancer Centre South (IKZ)/Eindhoven Cancer Registry, PO Box 231, 5600 AE Eindhoven, The Netherlands

^c Department of Epidemiology, Maastricht University, PO Box 616, 6200 MD Maastricht, The Netherlands

^d National Expert and Training Centre for Breast Cancer Screening, PO Box 6873, 6503 GJ Nijmegen, The Netherlands

^e Department of Surgical Oncology, Canisius Wilhelmina Hospital, PO Box 9015, 6500 GS Nijmegen, The Netherlands

^f Department of Pathology, Canisius Wilhelmina Hospital, PO Box 9015, 6500 GS Nijmegen, The Netherlands

^g Department for Health Evidence, Radboud University Medical Centre, PO Box 9101, 6500 HB Nijmegen, The Netherlands

^h Department of Radiology, Canisius Wilhelmina Hospital, PO Box 9015, 6500 GS Nijmegen, The Netherlands

Received 4 September 2014; received in revised form 6 December 2014; accepted 11 December 2014

Available online 5 January 2015

KEYWORDS

Breast cancer
Screening mammography
Double reading
Referral rate
Sensitivity
Positive predictive value

Abstract Purpose: To prospectively determine the screening mammography outcome at blinded and non-blinded double reading in a biennial population based screening programme in the south of the Netherlands.

Methods: We included a consecutive series of 87,487 digital screening mammograms, obtained between July 2009 and July 2011. Screening mammograms were double read in either a blinded (2nd reader was not informed about the 1st reader's decision) or non-blinded fashion (2nd reader was informed about the 1st reader's decision). This reading strategy was alternated on a monthly basis. Women with discrepant readings between the two radiologists were always referred for further analysis. During 2 years follow-up, we collected the radiology reports, surgical correspondence and pathology reports of all referred women and interval breast cancers.

Results: Respectively 44,491 and 42,996 screens had been read either in a blinded or non-blinded fashion. Referral rate (3.3% versus 2.8%, $p < 0.001$) and false positive rate

* Corresponding author. Tel.: +31 402395282; fax: +31 202398567.

E-mail address: elisabethgenevieve@hotmail.com (E.G. Klompenhouwer).

(2.6% versus 2.2%, $p = 0.002$) were significantly higher at blinded double reading whereas the cancer detection rate per 1000 screens (7.4 versus 6.5, $p = 0.14$) and positive predictive value of referral (22% versus 23%, $p = 0.51$) were comparable. Blinded double reading resulted in a significantly higher programme sensitivity (83% versus 76%, $p = 0.01$). Per 1000 screened women, blinded double reading would yield 0.9 more screen detected cancers and 0.6 less interval cancers than non-blinded double reading, at the expense of 4.4 more recalls.

Conclusion: We advocate the use of blinded double reading in order to achieve a better programme sensitivity, at the expense of an increased referral rate and false positive referral rate.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

In the last two decades, regional and nation-wide screening mammography programmes have been implemented in many Western countries [1]. The reduction in breast cancer mortality is attributed to the combination of earlier breast cancer detection through mammography screening and substantial improvements in breast cancer treatment [2–5].

Assessment of screening mammograms can be performed in several ways, e.g. by single radiologist reading, single reading with computer aided detection (CAD), or double reading. Double reading by two specialised breast screening radiologists is considered to be the standard of reference in Europe [6]. This reading strategy significantly increases the cancer detection rate when compared to single reading [7–9]. Assessment by CAD or screening mammography technologists, in addition to radiologist single reading, may be considered when radiologist double reading is not feasible due to a shortage of trained and experienced radiologists.

Since 1995, the Dutch nationwide breast cancer screening programme provides biennial screening mammography for women aged 50–75 years. The mammograms are always read by two certified screening radiologists, mostly in a non-blinded fashion. In case of a discrepant reading, the two radiologists may discuss the case together to reach consensus about referral, a third reader may be added for arbitration, or the woman may routinely be referred without consensus reading or arbitration [10].

In our screening region in the Southern Netherlands, digital mammography was introduced in 2009 and the transition from screen film mammography (SFM) to full-field digital mammography (FFDM) was completed at the beginning of 2010. Our screening region has a close collaboration with the National Expert and Training Centre for Breast Cancer Screening, the Comprehensive Cancer Centre South (IKZ)/Eindhoven Cancer Registry as well as the breast cancer departments in community hospitals. With the introduction of FFDM it became technically possible to perform blinded double reading instead of non-blinded double reading. The purpose of the current study was to prospectively determine

screening mammography outcome at blinded versus non-blinded double reading.

2. Methods

2.1. Study population

We included a consecutive series of 87,487 full-field digital screening mammograms performed between July 1, 2009 and July 1, 2011. The screens were obtained at three specialised screening units in a southern biennial screening mammography region of the Netherlands (BOZ, Bevolkings Onderzoek Zuid). Women participating in the nationwide Dutch screening programme are routinely asked to give permission for the use of their data for scientific purposes. Two women screened at our units did not give this permission and they were excluded. This study was performed within the national permit for breast cancer screening, which is issued by the secretary of health after advice of the national health counsel. The study did not require a special permit according to the Dutch Law on Population based screening as both blinded and non-blinded double reading were considered ‘standard of care’ at the time of the study.

2.2. Screening procedure and referral

Details of the nationwide breast cancer screening programme have been described previously [10]. Mammograms were acquired with a Lorad Selenia FFDM system (Hologic Inc, Danbury, CT), with a 70 μm pixel size and a 232 \times 286 mm field of view. The mammographic examinations were double read by a team of 12 certified screening radiologists. Each radiologist evaluated at least 6000 screening mammograms yearly. Prior screening mammograms were always available for comparison at the time of a subsequent screening round. To facilitate comparison of subsequent FFDM screens with prior SFM screens, the most recent screen-film mammograms were digitised by fusion equipments designed for mammography (DigitalNow;R2/Hologic).

Screening mammograms were double read in either a blinded (2nd reader was not informed about the 1st

Download English Version:

<https://daneshyari.com/en/article/8442593>

Download Persian Version:

<https://daneshyari.com/article/8442593>

[Daneshyari.com](https://daneshyari.com)