AUCKLAND RADIOLOGY GROUP

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DIGITAL MAMMOGRAPHY

Digital and computerised mammography have revolutionised breast imaging.

In older women and women with more fat than glandular tissue in the breasts, film screen mammography performs well and has been the basis of successful screening programmes in many countries to detect breast cancer early and to reduce mortality. The recent nationwide evaluation of BreastScreen Australia is confirmatory[1]. The results have led the Minister of Health and Aging in Australia to commit to continuing the programme in the hope that improvements such as digital mammography and increased participation by women will further reduce mortality.

But mammography is not perfect. It is less sensitive in women with dense breasts where there is extensive fibroglandular tissue. These are mainly younger women. Digital mammography has the ability to change this[2]. The whole breast from skin surface to chest wall is seen on the mammogram making small cancers stand out, aiding detection (Fig.1). There is better detection and analysis of small clusters of microcalcifications: calcifications can be accurately typed as benign or malignant; either in DCIS or in a small invasive cancer (Fig. 2).

What are the down sides? Digital mammography increases recall rates, meaning more lesions will initially be thought to be suspicious but turn out benign. For every breast cancer detected in younger women, 556 women will have a mammogram, 49 will have additional imaging and 5 will have biopsies. The magnitude of harm seems modest in comparison to a life saved.

Ultrasound is an adjunct to mammography in young women and those with dense breasts. It finds cancers with a similar sensitivity and specificity to mammography. It finds small cancers but it does not find calcifications and thus it does not have the ability to detect the smallest cancers and DCIS. Ultrasound guided biopsies of lesions detected at mammography and/or with ultrasound have made preoperative diagnosis of breast cancer easier.

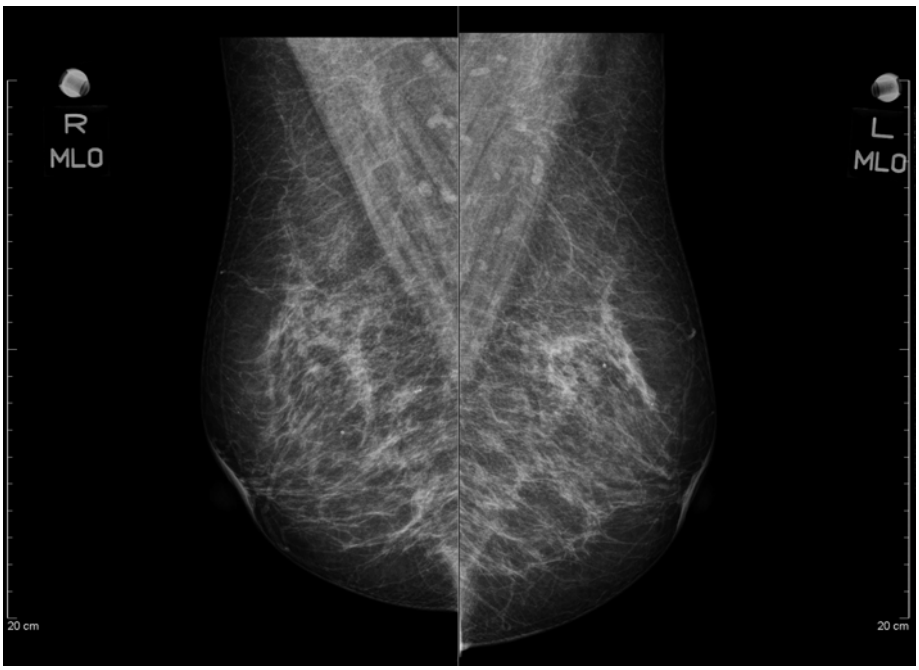

Fig 1. MLO views of both breasts. Note that the whole breast, from skin surface to chest wall, is clearly shown.

Fig 2. A cluster of microcalcifications (red circle).

Most ARG branches have converted to digital or computerised mammography. The few remaining branches will be converted this year.

THERMOGRAPHY

Thermography is being currently promoted as a test for breast cancer. It is not new. The technique was studied extensively in the 1960s and 70s. It was used in the first major randomised controlled clinical trial aimed at detecting breast cancer, the Health Insurance Plan of New York (the HIP Study). In comparison to mammography, **thermography was unable to detect many cancers and its use was discontinued before the trial finished**. A breast cancer had to be large to be detected (several centimetres in diameter) by thermography. At the time it was suggested that only 50% of breast cancers detected on mammography had an abnormal thermogram. Is modern equipment better? Computerisation of the information obtained has not changed the basic information, only the way it is displayed. A case study[3] reported in the radiological literature in 2003 using then state of the art equipment showed thermography had no better results. It could detect cancers that had already been shown by mammography but it was less sensitive and specificity was low at 14%. This could be improved to 18% if a subset of patients with calcifications were excluded. Compare this to the NZ guidelines to primary care providers recommending use of the Triple Test, with a clinical examination, mammography and ultrasound, and needle biopsy for detecting breast cancer of 91% sensitivity and 93% specificity.

A New Zealand Health Technology Assessment[5] was performed in 2004 by Dr Jane Kerr[4] . It reviewed thermal imaging looking at two parameters; the effectiveness for population screening and the diagnosis of breast cancer. It used available evidence and a literature review. The aim was to provide unbiased evidence to the National Screening Unit of the NZ Ministry of Health. The review found no papers that offered supporting or comparative evidence for statistical review. Most were case reports of an anecdotal nature with small numbers of patients. The conclusion reached was that **"the evidence that is currently available does not provide enough support for the role of thermography either in population screening or diagnostic testing for breast cancer".**

Thermography can find breast cancers but anecdotal cases of thermography finding breast cancer are insufficient to support its use. Justification that it does not use radiation and therefore does no harm is an indefensible statement. **It should not be promoted as a screening test and give women a false sense of security.** In young women hormonal changes influencing blood flow in normal tissue will produce abnormalities or false positive results on the thermogram. What if a thermogram is "hot"? There is no way of making a positive diagnosis unless other imaging is used. If there is no palpable abnormality and the mammogram and ultrasound are normal there is no means of localising the abnormality and obtaining a tissue sample for a pathological diagnosis.

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4. Kerr J. Review of the effectiveness of infrared thermal imaging (thermography) for population screening and diagnostic testing of breast cancer. NZ HTA Tech Brief Series. 2004;3(3)