

Alternative modalities being promoted for breast screening

Breast screening remains a controversial issue. In many countries it is a political issue as much as a medical one, and although there is an enormous amount of literature looking at the benefits of the standard modalities, there is no consensus about the efficacy of screening.

South Africa (SA) does not have a national mammographic breast screening programme. There are both economic and logistical reasons for this. The absence of a policy has resulted in alternative modalities being promoted as plausible substitutes. If a new modality is to be used for screening/symptomatic evaluation of the breasts, it should be compared with any of the established and well-researched existing modalities. This editorial serves to highlight some of the problems with the three commonest modalities being promoted in this country at present.

Breast light

Upon review, a limited number of small studies were found evaluating the accuracy of a hand-held breast light. The device was used on symptomatic patients in a breast clinic in all the studies. The Sunderland study found that in 300 women with breast cancer, the breast light identified 67% of the cases.^[1] In Iran, a study done to compare results using the breast light with those from clinical breast examination (CBE), mammography or ultrasound showed that the breast light missed 40% of the cancers picked up by CBE or mammography.^[2] A small study from Iraq showed a false-negative rate of 19.4% and a false-positive rate of 46.3%. The study concluded that these findings preclude the use of the breast light as a screening tool for breast cancer.^[3] Evaluation of 310 patients between 2012 and 2013 in Cairo reported much better results with the breast light, with sensitivity, specificity, positive predictive value, negative predictive value and total accuracy of 93.0%, 73.7%, 91.4%, 77.8% and 88.2%, respectively.^[4] Shir Yazdi *et al.*^[5] concluded in another Iranian study that the performance of the breast light in detection of lesions ≤ 1 cm assessed by CBE, mammography and sonography was 4.4%, 7.7% and 12.5%, respectively, and for masses >4 cm, 65%, 100% and 57.1%.^[5] The performance of the breast light in detection was significantly increased with larger masses ($p < 0.001$), which once again challenges the notion that this device can be used as a screening tool equivalent to mammography. The most recent publication found was in 2015 in the *Indian Journal of Cancer*, where only 35.8% of lesions that were detected by mammography were detected by the breast light.^[2]

On its SA website, the breast light is advertised as a self-examination adjunct and comes with a disclaimer that 'Breastlight is not capable of detecting all sizes, positions and types of breast abnormalities. It is not intended for use as a diagnostic device. PWB Health makes no claim that breast cancer, breast lumps or other breast diseases will be found when using Breast Light.'^[6]

In 2012, the Advertising Standards Authority in the UK upheld a complaint made against the claim made by breast light manufacturers that 'it could detect cancer earlier than it would normally be found'. There is no evidence that it can, and no published trials have looked at its use in screening.^[7] Health Canada banned its use in 2010.^[8]

Thermography

Clinical thermography has been in use since the 1960s and detects temperature variation on the surface of the skin. Breast thermography does not provide information on the morphological characteristics of the breast, but rather functional information on thermal and vascular conditions of the tissue.^[9]

A study performed by Sterns *et al.*^[10] indicated large numbers of false positives and false negatives with the use of the device. It also reported inconsistent interpretation of the thermograph. The most recent systematic review available on the modality was published in 2012. Fitzgerald *et al.*^[9] reported that the studies reviewed were of average quality. Sensitivity for thermography as a screening tool was 25% (specificity 74%) compared with mammography. Sensitivity for thermography as a diagnostic tool ranged from 25% (specificity 85%) to 97% (specificity 12%) compared with histology. They concluded that there is not sufficient evidence to support the use of thermography in breast cancer screening, or sufficient evidence to show that thermography provides benefit to patients as an adjunctive tool to mammography or to suspicious clinical findings in diagnosing breast cancer.^[9]

Breast tactile imaging (BTI)/ elastography

This modality measures breast tissue elasticity, which is electronically mapped. Data acquired by the device allow calculation of size, shape, consistency/hardness and mobility of detected lesions.^[11] The aim of the tool is cited to be potentially to supplant CBE through its higher sensitivity, quantitative record storage, ease of use and inherent low cost.^[12] There are still limited clinical data on the diagnostic/screening potential of breast BTI, with most of the studies published before 2010 and not much since. In one clinical study that included 110 patients with a complaint of a breast mass, BTI had a detection rate of 94% while physical examination identified 86%.^[13] Egorov *et al.*^[14] analysed 187 cases, collected at four different clinical sites, and reported that BTI produces a reliable image formation of breast tissue abnormalities with increased hardness and calculation of lesion features.^[14] However, these studies are very small and no conclusions can be drawn.

Conclusions

There is no current evidence to support the use of the breast light, thermography or BTI/elastography as a screening or diagnostic tool for breast conditions. Non-governmental organisations should not be promoting them, and any practitioner using them should be obliged to provide clinical information detailing their shortcomings.

Jenny Edge

Division of Surgery, Faculty of Medicine and Health Sciences, Stellenbosch University and Tygerberg Academic Hospital, Cape Town, South Africa
dr@jennyedge.co.za

Liana Roodt

Busamed Paarlvelei Private Hospital, Somerset West, South Africa

1. Iwuchukwu O, Dordea M, Keaney N. Analysis of Breastlight findings in patients with biopsies. Paper presented at the 12th Milan Breast Cancer Conference, Milan, Italy, 16 - 18 June 2010.
2. Shir Yazdi SM, Kargar S, Nasaj HT, Neamatzadeh H, Ghasemi N. The accuracy of Breastlight in detection of breast lesions. *Indian J Cancer* 2015;52(4):513-516. <https://doi.org/10.4103/0019-509X.178389>
3. Al-Alwan NAS, Hussain I, Wahid HA, et al. Evaluating the accuracy of the breastlight as a screening tool for breast cancer in Iraq. *Int J Adv Res* 2014;2(10):522-531. <https://doi.org/10.21275/ART20176232>
4. Labib NA, Ghobashi MM, Moneer MM, Helal MH, Abdalgaleel SA. Evaluation of BreastLight as a tool for early detection of breast lesions among females attending National Cancer Institute, Cairo University. *Asian Pac J Cancer Prev* 2013;14(8):4647-4650. <https://doi.org/10.7314/APJCP.2013.14.8.4647>
5. Shir Yazdi SM, Kargar S, Taheri-Nasaj H, Neamatzadeh H. BreastLight apparatus performance in detection of breast masses depends on mass size. *Asian Pac J Cancer Prev* 2015;16(3):1181-1184. <https://doi.org/10.7314/APJCP.2015.16.3.1181>

6. breastlight. <http://breastlightsouthafrica.co.za> (accessed 15 May 2018).
7. McCartney N. Can you really put your trust in home health tests from the local chemist? *The Times* 2012; 13 November.
8. Breastlight recalled as screening device. <http://www.cbc.ca/news/technology/breastlight-recalled-as-screening-device-1.965504> (accessed 15 May 2018).
9. Fitzgerald A, Berentson-Shaw J. Thermography as a screening and diagnostic tool: A systematic review. *N Z Med J* 2012;125(1351):80-91. <https://www.ncbi.nlm.nih.gov/pubmed/22426613> (accessed 13 November 2018).
10. Sterns EE, Curtis AC, Miller S, Hancock JR. Thermography in breast diagnosis. *Cancer* 1982;50(2):323-325. [https://doi.org/10.1002/1097-0142\(19820715\)50:2<323::AID-CNCR2820500226>3.0.CO;2-S](https://doi.org/10.1002/1097-0142(19820715)50:2<323::AID-CNCR2820500226>3.0.CO;2-S)
11. Egorov V, Sarvazyan AP. Mechanical imaging of the breast. *IEEE Trans Med Imaging* 2008;27(9):1275-1287. <https://doi.org/10.1109/TMI.2008.922192>
12. Sarvazyan A, Egorov V, Son JS, Kaufman CS. Cost-effective screening for breast cancer worldwide: Current state and future directions. *Breast Cancer (Auckl)* 2008;1:91-99. <https://doi.org/10.4137/BCBCR.S774>
13. Kaufman CS, Jacobson L, Bachman B, Kaufman L. Digital documentation of the physical examination: Moving the clinical breast exam to the electronic medical record. *Am J Surg* 2006;192(4):444-449. <https://doi.org/10.1016/j.amjsurg.2006.06.006>
14. Egorov V, Kearney T, Pollak SB, et al. Differentiation of benign and malignant breast lesions by mechanical imaging. *Breast Cancer Res Treat* 2009;118(1):67-80. <https://doi.org/10.1007/s10549-009-0369-2>

S Afr Med J 2018;108(12):1010-1011. DOI:10.7196/SAMJ.2018.v108i12.13679