

#14066: Microwave imaging breast cancer detection: A multi-centre study.

Authors

T. Doshi¹, M. Shere¹, A. W. Preece², I. Lyburn³, L. Jones¹, N. Ridley⁴, C. Gillett¹; ¹Bristol/UK, ²Bristol, AVON/UK, ³Cheltenham/UK, ⁴Swindon/UK

Type

EPOS for Radiologists (poster)

Preferred Presentation Format:

EPOS Scientific Poster

Keywords

Retrospective, Not applicable, Multicentre study, Breast, Breast, Oncology, Digital radiography, Experimental, Experimental investigations, Cancer

Purpose / Learning objectives

To present clinical results of breast cancer detection using microwave imaging.

Methods and materials / Background

A commercially-available, non-ionising, non-compressing, radio wave breast imaging system (MARIA[®], Micrima Limited, Bristol), was deployed in multi-site clinical trials. This system uses harmless radio-waves to create volumetric (3D) images to show changes in dielectric properties in the breast tissue which are associated with the presence of lesions.

The inclusion criteria for trials were patients attending a symptomatic clinic with a palpable breast lump. Following informed consent, MARIA[®] scans were obtained for patients, with different breast volumes (range:197–459 ml) and were correlated with clinical information and ultrasound and/or mammogram to determine cancer cases and consequently sensitivity scores.

Results / Findings and procedure details

From 318 breasts (cases) scanned using the MARIA[®] system, between 2012-2017, 122 breasts were confirmed having cancers by means of imaging or histology or post-image guided biopsy. From 122 cases, MARIA[®] detected 88 cancers with overall sensitivity of 72% (Table1) (mean age:58.9 years, range:24-87 years). In pre-/peri-menopausal cases, sensitivity was 68%, in post-menopausal it was 75%. In cases with dense breasts (BIRADS c and d) it was 85% and 100% in BIRADS d (very dense breasts).

Table 1: Clinical Breast cancer detection results from the MARIA[®] system based on menopausal status and breast density (BIRADS score).

	Cancer Cases	Cancer Sensitivity Score	Mean age (years)	Age range (years)
All	122	88 (72%)	58.9	24-87
Pre-/ Peri-menopausal	57	39 (68%)	46.6	24-68
Post-menopausal (inc HRT)	64	48 (75%)	68.5	50-89
Menopausal status not available	01	01 (100%)	45	45
Lucent tissue (BIRADS a + b)	66	43 (65%)	62.0	38-89
Dense tissue (BIRADS c + d)	41	35 (85%)	52.4	24-81
Only BIRADS d	08	08 (100%)	54.3	24-81
BIRADS not available	15	10 (67%)	56.2	41-72

Table 1 Clinical Results

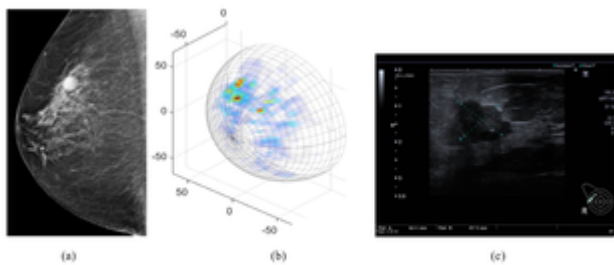


Figure 1: Patient 064, BIRAD "b" Right (a) Mammogram (b) MARIA[®] showing finding in Upper Outer Quadrant (red areas) (c) US from image-guided biopsy which confirmed Grade 2 invasive ductal carcinoma.

MARIA image P064

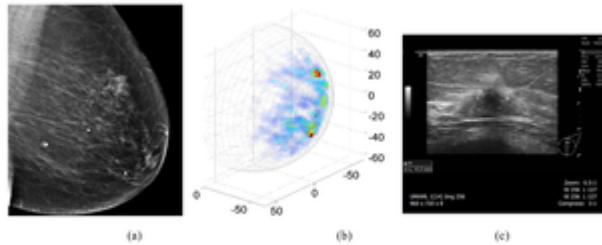


Figure 2: Patient 209, BIRAD "a" Left (a) Mammogram (b) MARIA[®] showing finding in Upper Outer Quadrant (red areas) (c) US from image-guided biopsy which confirmed Grade 2 ductal + lobular.

MARIA image P209

Conclusion

Improved results in dense breasts (BIRADS d) at 100% demonstrates MARIA[®]'s effectivity at detecting cancers in younger, pre-menopausal women. The ongoing trial and further trials, due to commence shortly, will assist to validate MARIA[®]'s performance on new patient populations.

Limitations

These were research trials with no power and/or sample size estimation.

Ethics committee approval

The initial study including 86 patients was approved by Central & South Bristol Research Ethics Committee (REC) 06/Q2006/30). Further multi-site symptomatic clinical study was approved by Yorkshire & The Humber and South Yorkshire REC15/YH/0084, ClinicalTrials.gov NCT02493595).

Funding

The study was funded by Micrima Ltd, the manufacturers.

Author Disclosures:

Mrs. Dr. Trushali Doshi

Employee: Micrima Limited

Mrs. Caroline Gillett

Employee: Micrima Limited

Mr. Dr. Mike Shere

nothing to disclose

Mr. Prof. Alan William Preece

Founder: Micrima Limited

Iain Lyburn

nothing to disclose

Ms. Dr. Lyn Jones

nothing to disclose

Mr. Dr. nicholas ridley

nothing to disclose

Affirmations

Presentation at The Voice of EPOS: If my abstract is accepted, I agree to present my poster in person at ECR 2020 during a moderated poster session at [The Voice of EPOS](#). I understand that participation is subject to invitation. (I apply)

Poster publication: In case of abstract acceptance for ECR 2020, I understand that

- a) I will have to upload the digital material of my poster to EPOSTM within the given deadline.
- b) I will have the option to select during poster upload either onsite only publication (during the congress) or permanent online publication.
- c) permanent online publication will include registration with a DOI (digital object identifier) and publication under an open license as outlined in the [Agreement for the use of EPOS](#). (Yes)

Material used: I affirm to the ESR that my abstract does not contain any material that is libellous, defamatory, or otherwise unlawful, and that it does not contain any material that invades the right of privacy, any proprietary or copyrights owned by another and has not been previously submitted to EPOS or presented at ECR. (Yes)

Patient privacy: I affirm that my abstract (including uploaded images, if applicable) does not contain material that reveals patient identity. If there is any chance that a patient can be identified, I confirm to have obtained written informed patient consent for use in this abstract. (Yes)

Copyright and licenses: -- I affirm that I have the right to assign license to my work. -- I further affirm that if my work contains any material that has been previously published, I was entitled to use this material by applicable law or have obtained a transferable license from the copyright holder. -- In case that my study is under evaluation/accepted/published in a scientific journal, I understand that I am advised to consult the respective editorial office regarding copyright and license issues. -- I also affirm that I will acknowledge in writing (i.e. on a slide or poster, not limited to verbal acknowledgement) the interim (i.e. between abstract submission and congress presentation) acceptance/publication of the study in a scientific journal during my presentation at ECR 2020. (Yes)

Co-Authors agreement: If my abstract is submitted on behalf of co-authors, I, the submitting author, warrant that I was given authorisation to represent the other co-authors (co-licensors) as listed in the author line of this abstract. (Yes)

Disclosure: On behalf of all authors, I certify that all relationships (remunerated or not) with pharmaceutical companies, biomedical device manufacturers or other corporations whose products or services may be related to the subject matter are outlined completely and correctly. (Yes)

Presenter registration: I understand that the presenting author of each accepted abstract has to register for ECR 2020 in order to hold a presentation or show a poster at the congress. Reduced registration fees are available under certain conditions ([see here](#)). (Yes)

ECR Online, recording and general license for ESR: I understand that some **oral presentations** at ECR 2020 will be broadcast live on the ECR streaming service, and a recorded version of some oral presentations (presentation slides/poster as well as the speaker) will be available in a login-protected online platform during and after the congress.

Further details will be provided upon the upload of the digital presentation material/poster, and it will be possible to withdraw consent to the above at any time. (Yes)