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Feasibility of automated 3D breast ultrasound scanning in screening of women with high risk

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Purpose: Automated 3D-breast ultrasound (ABVS) is investigated as a six-monthly addition to annual breast cancer screening with MRI+mammography (MM) in high-risk women (LTR> 50%). ABVS, an inexpensive radiation-free technique, allows more frequent screening and temporal comparison. This study assesses effects of additional ABVS examinations at baseline.

Methods and Materials: The study population consists of 234 women in whom ABVS and MM were performed on the same day. All ABVS and MM examinations were read by one of 4 breast radiologist. The recall rate (RR), biopsy rate (BR), cancer detection rate (CDR), sensitivity and specificity of ABVS and MM screening were analysed.

Results: Based upon MM, 28 patients were recalled for further examination (RR=12%). With ABVS 12 of these patients were also recalled, as well as 17 other women. Consequently, the RR increased to 45/234. Biopsies were deemed necessary in 21 patients after MM and increased to 26 with ABVS added, an increase from 9%-11%. 17 additional ABVS findings were resolved with targeted ultrasound. In total 4 cancers were found by MM (CDR 1.7%, sensitivity 100%, specificity 89%). Two of these cancers were also detected by ABVS (CDR 0.9%, sensitivity 50% specificity 88%). The two missed cancers were retrospectively visible, but misinterpreted due to post-operative scarring.

Conclusion: Adding ABVS to high-risk MM screening increased RR and BR at baseline. Whether these negative effects are reduced when radiologists gain more experience and whether they are balanced by earlier detection of breast cancer due to the six-month interval of ABVS remain to be determined.