ABUS in a public screening program

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Breast cancer remains a significant global health challenge, necessitating effective screening methods to enhance early detection and improve patient outcomes. Screening with mammography has the ability to detect breast cancer, but the diagnostic accuracy of mammography largely depends on the breast density meaning that dense tissue may 'mask' cancers on mammography.

Besides that, women with extremely dense breasts in the screening age range have an increased risk of developing breast cancer. Supplemental modalities, such as functional imaging techniques (magnetic resonance imaging and contrast-enhanced mammography) or conventional imaging (hand-held ultrasound (HHUS), automated breast ultrasound (ABUS) and digital breast tomosynthesis) increase sensitivity over mammography alone for the dense breast tissue.

The reported studies suggest that magnetic resonance imaging (MRI) and contrast-enhanced mammography (CEM) generally offer superior screening performance versus other modalities. However, current recommendations reserve MRI screening for high-risk women because of false positive results, high price, and relatively low availability of equipment. The use of iodine contrast medium and the increased radiation dose in CEM are the main reasons why it is not yet adopted in screening settings. Currently, for women with dense breasts no supplemental imaging modality to mammography is considered standard of care and guidelines are unclear as to the optimal supplemental modality.

Supplemental ultrasound in dense breast tissue increases cancer detection and adding breast ultrasound examination to the screening regimen for breast cancer is a safe and inexpensive approach to reduce the false negative rates of the screening process. Main disadvantages of HHUS are duration of examination, operator-dependence, and poor reproducibility. ABUS represents a new imaging technique developed to overcome the limitations of HHUS. ABUS is a volumetric sonographic technique in which the whole breast volume is acquired with almost isotropic voxels, providing multiplanar reconstruction of the breast. The advantages of ABUS in comparison to HHUS are 3D coronal images, larger field of view, reproducibility, and time-efficiency.

Supplemental HHUS and ABUS have 100% sensitivity, but ABUS has higher specificity (95.0% vs 85%). Furthermore, supplemental ABUS has a higher diagnostic accuracy (97.1%) than HHUS (91.4%) for breast cancer. Reported cancer detection rate for HHUS ranges from 2.0 to 4.9 per 1000 screens and for ABUS ranges from 6.6 to 12.3 per 1000 screens. The sensitivity of supplemental ABUS in detecting breast cancer is comparable to MRI, while offering a more cost-effective alternative for large-scale screening initiatives. Additionally, ABUS is non-ionizing, reducing concerns related to radiation exposure in younger women and those requiring frequent screening.

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Despite potential benefits, the implementation of supplemental ABUS in public screening programs faces certain challenges. One major obstacle is the high initial cost of ABUS equipment and the need for specialized training for operators. Unfortunately, it has been shown that adding ABUS significantly increases the false positive recall rate which can be reduced by double reading of ABUS during early phase adoption. Additionally, ABUS generates a considerable volume of data that requires efficient management and interpretation.

The potential impact of supplemental ABUS in a public screening program cannot be underestimated. Improved detection of early-stage breast cancers can lead to a decrease in advanced-stage diagnoses, resulting in reduced morbidity and mortality rates. By enabling earlier treatment and intervention, ABUS can positively impact overall survival rates and significantly reduce the economic burden of breast cancer on healthcare systems.

In conclusion, ABUS is a valuable addition to public breast cancer screening programs. Its ability to overcome the limitations of mammography, especially in dense breast tissue cases, and its potential to improve overall breast cancer detection rates makes it an essential tool for early diagnosis and enhanced patient outcomes.

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