Combining ABUS – DBT – CEM in diagnostic and treatment monitoring

Pr. Elżbieta ŁUCZYŃSKA

Nowadays, digital mammography is a basic tool in the diagnostics of clinically asymptomatic breast cancers. Breast cancer detection on mammography depends on several factors such as proper performance of the examination, experience and knowledge of the physicians describing the images, and most importantly – the type of breast tissue composition.

Overlapping tissues while acquiring two-dimensional images on mammography may cause masking of the existing lesions or producing the image of pseudo lesions. Therefore, numerous mammography examinations require complementary studies which enable appropriate breast lesion diagnostics.

The most common diagnostic method complementary to mammography is hand held ultrasonography – HHUS. However, this procedure has a few significant limitations: long-lasting process of training individuals performing the examination, the necessity of direct performance by a physician, lack of the possibility of image reproduction, narrow field of view (FOV), high percentage of false positive results.

An alternative method to HHUS appeared to be automated breast ultrasonography (ABUS), with its multiple advantages in comparison to HHUS. The most important ones are: performance by technicians, possibility of image recording and its multiple reproduction, sending to the workstations and creating its reconstruction, wider FOV, possibility of computer aided detection application.

Digital breast tomosynthesis (DBT) is a method based on 2D mammography technique. In DBT the X-ray tube moves around a compressed breast and images are acquired at a limited scan angle.

It allows to detect more breast lesions due to the fact that during image reconstruction thin layers are produced resulting in better visualization of lesions localized in the proximity of a given layer. Not only does this method enable detection of a bigger number of lesions, but also exclude the lesions being a result of tissue overlapping.

Contrast-enhanced mammography (CEM) is a mammography examination based on dual-energy acquisition with iodine contrast medium administration. During exposition low and high-energy images are acquired: low-energy images are equivalent to the images obtained on FFDM, whereas subtraction images show areas of contrast enhancement and glandular tissue suppression.

CEM has higher sensitivity and accuracy than FFDM, particularly in patients with dense breast composition and patients with medium risk of breast cancer incidence. Moreover, CEM is more precise in estimating the real size of the lesions than both FFDM and HHUS.

Combining ABUS – DBT – CEM in Diagnostic and Treatment Monitoring

Pr. Elżbieta ŁUCZYŃSKA

In our Clinic all imaging techniques are applied. Screening mammography is followed by ABUS, while in wide-spectrum diagnostics DBT and HHUS are most commonly performed. In cases posing a diagnostic challenge CEM is carried out. A retrospective single centre study includes a comparative analysis of the diagnostic performance of FFDM, CEM and ABUS in the group of patients with breast type C and D as well as A and B (according to ACR classification).

The study involved 301 patients. Breasts type C and D were determined in 40% of patients on ABUS and FFDM. CEM was performed in 76 patients. Focal lesions were found in 133 patients, of which 117 were verified by histopathology. The number of lesions detected in patients with multiple lesions were 40 from 48 on ABUS, 13 on FFDM and 21 on CEM. Accuracy in determining the number of foci was 82% for FFDM and 90% for both CEM and ABUS.

In breasts type C and D: 72% of all lesions were found on ABUS, 56% on CEM and 29% on FFDM ($p=0.009$, $p=0.000$); all invasive cancers were diagnosed on ABUS, 83% on CEM and 59% on FFDM ($p=0.000$, $p=0.023$), 100% DCIS were diagnosed on ABUS, 94% on CEM and 44% on FFDM.

The size of lesions on histopathology in breasts type A and B was 14 – 26 mm, while in breasts type C and D 11 – 37 mm. In breasts type C and D sensitivity (%) of ABUS, FFDM and CEM was respectively: 78.05, 85.37 and 92.68; specificity (%): 40, 13.33 and 8.33.

NOTES

_____

_____

_____

_____

_____

_____

_____