

# Cone-Beam CT faster, potentially more accurate than conventional mammography

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Cone-beam breast CT provides exceptional tissue contrast and can potentially reduce examination time with comparable radiation dose to conventional 2D mammography, according to a new study by a team of researchers from the University of Texas M. D. Anderson Cancer Center in Houston.

Cone-beam breast CT employs a large area x-ray beam in conjunction with a flat panel x-ray detector to scan and generate 3D images of the breast. The scanner is placed below a table on which the patient lies prone with the breast protruding through an opening. Only the breast is exposed to radiation resulting in improved image quality and sparing the rest of the patient's body from unnecessary radiation exposure. The scan can be completed in less than one minute with a single complete rotation of the x-ray tube-detector gantry around the breast. Unlike conventional CT, the patient is not moved through the gantry during scanning.

For the study, the researchers used cone-beam CT on 12 mastectomy specimens. The researchers discovered that structured noise on cone-beam CT was minimal because of the absence of overlapping tissue; that breast anatomy was well resolved on all images as skin, adipose, and glandular regions; and that microcalcifications within cancers were clearly shown. In addition, they discovered that the detection of cancers based on morphologic assessment of tissue structures could potentially be improved compared with mammography because of the lack of overlapping glandular tissue.

Conventional 2D mammography is currently the most prevalent imaging technique for screening and diagnosis of breast cancers. However, the 2D projection images can overlap normal tissue, soft tissue masses, and calcifications and affect the detection and visualization of cancer.

“Despite the advantage of excellent spatial resolution, conventional mammography is unable to diagnose all cancers, especially early cancers in dense breasts, and cancers in high risk women such as genetic carriers,” said Wei Tse Yang, MD, lead author of the study.

The researchers believe that cone-beam CT may potentially be used to replace mammography in screening and diagnostic breast imaging. “In addition to overcoming the problem of overlapping breast tissue, cone-beam breast CT has the ability to provide true 3D images of the breast that may help depict the 3D morphology and distribution of lesions, and that may provide incremental benefit in the differentiation of abnormalities from background breast tissue. In addition, the multiplanar high-resolution surveys it provides are at a radiation dose comparable to routine mammography,” said Dr. Yang.

Besides those benefits of cone-beam breast CT, the researchers pointed out others, as well. “Scanning using this method takes less than one minute. This compares with 40 minutes for breast MRI, and 10 minutes for mammography. It also eliminates the discomfort associated with compression during mammography and the problem of claustrophobia during MRI,” said Dr. Yang.

The full results of this study appear in the December issue of the *American Journal of Roentgenology*, published by the American Roentgen Ray Society.

Source: American Roentgen Ray Society

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