

Breast Cancer Detector That Uses Electricity Instead of X-Rays Under Study

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A painless, portable device that uses electrical current rather than X-ray to examine breasts for cancer is under study at the Medical College of Georgia.

MCG is one of some 20 centers across the world studying impedance scanning, a technique based on evidence that electrical current passes through cancerous tissue more easily than normal tissue.

Preliminary studies have shown the technique, which takes about 10 minutes and doesn't require often-uncomfortable breast compression, can pick up very small tumors, according to its developers, Z-Tech, Inc., which has offices in South Carolina and Ontario.

The study of some 4,500 women – about 500 at MCG Medical Center – will determine whether the device, which produces a report rather than a breast image, is accurate enough for widespread use, says Dr. James H. Craft, MCG radiologist and a principal investigator.

Impedance scanning involves placing a flower-shaped grouping of electrodes with a hole in the center for the nipple over each breast. A small amount of electricity is sent through the breasts and a computer immediately calculates and presents findings based on Z-Tech's benchmarks for negative and positive results. Rather than waiting for a radiologist to look at an X-ray, the computer immediately notes whether the image is HEDA negative, meaning no cancer detected, or positive.

“For a number of years now, it's been known that when a malignancy

happens in the breast, the impedance of electricity through that area decreases,” Dr. Craft says. “Apparently, cell permeability increases so water flows through the cells more than in normal tissue. The electrical signature of that tissue is different.” Electrocardiograms, which have been used for years to assess heart muscle, also are based on the theory that normal and diseased tissue conduct electricity differently.

Potential study enrollees include healthy women who get a screening mammogram and opt to get the additional electrical study within 90 days. Patients coming in for a first-time biopsy or tissue aspiration also are eligible prior to their procedure. “We want volunteers who want to help society,” says Dr. Craft of the additional test.

“Mammography currently is the standard around the world for imaging the breast,” Dr. Craft says. Healthy women are encouraged to do monthly self-exams, get yearly physician exams, get their first screening mammograms between ages 35-40 and begin yearly exams at age 40. Generally, the breast cancer risk increases with age.

Although he’s not convinced the new impedance scanning – called HEDA for Homologous Electrical Difference Analysis – will ever replace mammography, Dr. Craft sees its potential. “Society is always trying to find something better, more accurate, more precise, that doesn’t hurt, doesn’t give any radiation and doesn’t cost much.”

HEDA doesn’t use radiation so it doesn’t require lead-lined exam rooms and is highly portable, which enhances its usage potential in even the most remote areas of the world, says Dr. Craft. “You could put it in a van with a generator and go around and screen a lot of women.” HEDA may exceed mammography’s performance particularly in assessing the dense breasts of younger women. “As women age, breasts become more fatty; they lose the fibrous and glandular tissue that are there for milk production,” says Dr. Craft. Less-dense breasts appear darker in an X-

ray image, making them easier for the radiologist to assess. “If this is a very innocuous study that can be applied to younger people and we can pick up cancers in women who are 25, 27, 28 and save many lives without giving them radiation ... it could save people and money, too.”

HEDA is performed after breast tissue has had 24 hours to recover from the compression of mammography. Exclusionary factors include previous breast surgery, nipple rings, anatomical abnormalities and women who are pregnant or breast feeding. Potential side effects include localized irritation at the site of the electrodes, a rare occurrence that typically resolves within 24 hours.

A repeat study is performed a year later and participants will receive a small compensation after the second visit. Participants will not receive HEDA results but will receive their mammogram report per usual, says Helen Fain, a nurse and study sub-investigator and coordinator.

Source: Medical College of Georgia

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