Raj Rangayyan is one of a team of U of C engineers who have found a way to identify dangerous breast abnormalities before tumours form.

Program advances breast-cancer detection

AMANDA STEPHENSON
CALGARY HERALD

Researchers at the University of Calgary have developed a software program they say can detect early signs of breast cancer, months before the formation of a tumour.

The program was designed by engineers with the University's Schulich School of Engineering, in partnership with radiologist Dr. Leo Desautels.

The team looked at 106 mammogram images, all taken from women who were even-tually diagnosed with breast cancer but were given a clean bill of health after their initial screening.

Using their newly developed software program to examine the mammograms again, the team was able to identify suspicious areas that were missed the first time — on average, 15 months before lumps or other signs of cancer were clinically diagnosed.

"There is cancer there, but no tumour yet," said lead researcher Raj Rangayyan. "There is no mass or lump. ... What we are identifying is what we call 'architectural distortions.'"

In a normal breast, ligaments, ducts, blood vessels, and tissues all converge toward the nipple. But when cancer is forming, Rangayyan said, some of these tissues get pushed and pulled in other directions — leading to the so-called "architectural distortions" on the mammogram image. These distortions can be very difficult for even a trained radiologist to identify with the naked eye. In fact, one recent study published in the medical journal Clinical Ra-diology found that "architectural distortion" accounts for 12 to 45 per cent of overlooked or misinterpreted breast cancer cases. Even existing computer-assisted diagnostic systems often miss this form of early warning sign, since the changes within the breast can be so subtle.

Dr. Steven Narod — a professor at the University of Toronto's Women's College Research Institute and a Tier One Canada research chair in Breast Cancer — said the U of C research holds promise, because mammograms as they are now are not a foolproof screening method.

"We can switch to another screening method like an MRI — and the problem there is they're very expensive — or we can improve the quality of the mammogram itself through more advance screening techniques," Narod said. "Or we can get computers to read the mammograms better than the human eye. ... So I think what they're doing here (at the U of C) is very interesting and exciting."

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CANCER: Direct help

FROM B1

Shantanu Banik, a PhD student involved in the project, was awarded a Publication Prize from Canada's Institute for Cancer Research in recognition of the U of C work, which was dubbed "a significant contribution to cancer research."

Bank said his field of engineering, called "biomedical engineering," is a growing field that has many applications.

In addition to medical imaging diagnostic tools, biomedical engineers are the brainpower behind developments in medical instrumentation, state-of-the-art clinical equipment, and even prosthetics.

"You get to work with real-life problems, not hypothetical problems," Banik said. "And your research can help physicians directly; people can benefit from your research."

The U of C researchers believe their software system could ultimately save lives, by leading to earlier detection of breast cancer.

They hope to eventually partner with a company that markets computer-aided diagnostic systems, although more testing must be done before the software is ready to be used in a real-life medical lab.

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