

Breast cancer screening hope

David Adam, science correspondent
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New breast cancer screening technology that could offer a faster and more accurate diagnosis for thousands of women each year has been developed by British scientists.

Adapted from military image analysis equipment used to identify enemy targets, the system examines tissue samples taken during biopsies and automatically grades the severity of the disease to determine how it should be treated.

Some 400,000 of these samples are assessed each year by specialist hospital pathologists looking through microscopes, a complex and time-consuming task that has, until now, proved impossible to automate.

"We've demonstrated this system is at least as good as a fully qualified, fresh consultant pathologist," said Alun Williams of Qinetiq, which will unveil the new technology today. "It can be used 24 hours a day, 365 days a year. It never gets tired and it never makes mistakes."

Tissue removed after women find lumps in their breast or when they show up in routine screening is particularly difficult to analyse. Unlike diseases such as cervical cancer, which can be identified by looking at individual cells, pathologists can only diagnose breast cancer by making sense of the confusing bundles of cells and other biological markers found in whole tissue. It can take up to 45 minutes to grade a single patient.

In tests with 3,500 different tissue slides, Mr Williams said the computer correctly graded cancerous tissue each time. Manual diagnosis is more subjective: studies show more than a quarter of hospital pathologists grade identical tissue samples differently to their colleagues, a problem made worse by a nationwide shortage of trained staff. According to the Royal College of Pathologists, 300 of the 1,200 consultant pathologist positions in the UK are vacant.

The new system is billed as a clinical support tool: the research team stresses it is not intended to replace pathologists or, at this stage, to make a primary diagnosis of whether or not a patient actually has the disease. Instead it will analyse features such as the size, colour and shape of different cells to provide more reliable grading of tumours.

This indicates how aggressive the tumour is, and alongside other clinical information is used to decide if the patient should receive chemotherapy, radiotherapy or surgery - and how urgently. About 40,000 new cases of breast cancer are recorded in the UK each year, but there are no figures revealing the number of tumours that are incorrectly graded.

Professor Jim McGee, a pathologist at Oxford University who helped to develop the technology, said: "To train a machine to do that is not an easy thing to do. But that would be the single biggest benefit: every patient would start from the same starting point, therefore things like treatment could become a whole lot more reliable."

Qinetiq is talking to three companies about manufacturing and selling the technology; it will be about a year before it is made available to patients. The system's cost has not been revealed.

Army system targets cancer

Daily Mail, 11th June 2004

A defence system used to spot enemy targets has been adapted to help the fight against breast cancer.

Thousands of women a year are expected to receive a faster and more accurate diagnosis from the first automated method of assessing the severity of the disease. The development should also help offset the serious shortage of pathologists available to examine tumours.

Scientists developed the new technology from an existing defence image analysis system used to seek out military targets such as camouflaged tanks. It has been adapted to examine tissue samples taken from women with breast cancer, to determine how far the disease has spread and how it should be treated.

The prototype was tested on 3,400 samples from 100 patients in collaboration with Oxford and Cambridge universities. In all cases, the computer's conclusions matched those of pathologists. Currently, samples are assessed by hospital pathologists using microscopes and digital cameras in a complex process.

Tissue taken from women who find breast lumps is extremely difficult to assess because of the confusing bundles of cells it contains. Around 400,000 samples are examined each year, often taking up to 45 minutes per patient.

Studies suggest more than a quarter of pathologists grade identical tissue samples differently to colleagues. By comparison, the automated system, called PathScore, uses computer software to analyse digital images of tumours to measure how far they differ from normal breast tissue and the number of malignant cells that are actively dividing.

Extra information fed into the computer gives the tumour a grade, so that doctors can provide the most suitable treatment - drugs, surgery or radiation. Researchers said the system speeds up the process by making an objective, consistent assessment every time to support a pathologist's diagnosis.

"We've demonstrated this system is at least as good as a fully-qualified pathologist," said Alun Williams, managing director of QinetiQ, which normally specialises in providing military equipment for the Ministry of Defence. "It can be used 24 hours a day, 365 days a year. It never gets tired and never makes mistakes." Mr Williams said no extra expenditure was required for specialist equipment as the system could be used with existing computers, microscopes and cameras.

PathScore was developed with the help of a £10.8million government grant to QinetiQ to work with NHS hospitals to find new applications for defence technology. It is expected to be available to patients in about a year.

The Royal College of Pathologists said a quarter of the 1,200 consultant positions in the UK were currently vacant.

Around 35,000 cases of breast cancer are diagnosed in Britain each year, and more than 1,000 deaths from the disease are recorded each month.