Kiwi cancer research 'revolutionary'

Eye-scanning method leads to better care of brain tumour patients

by Martin Johnston
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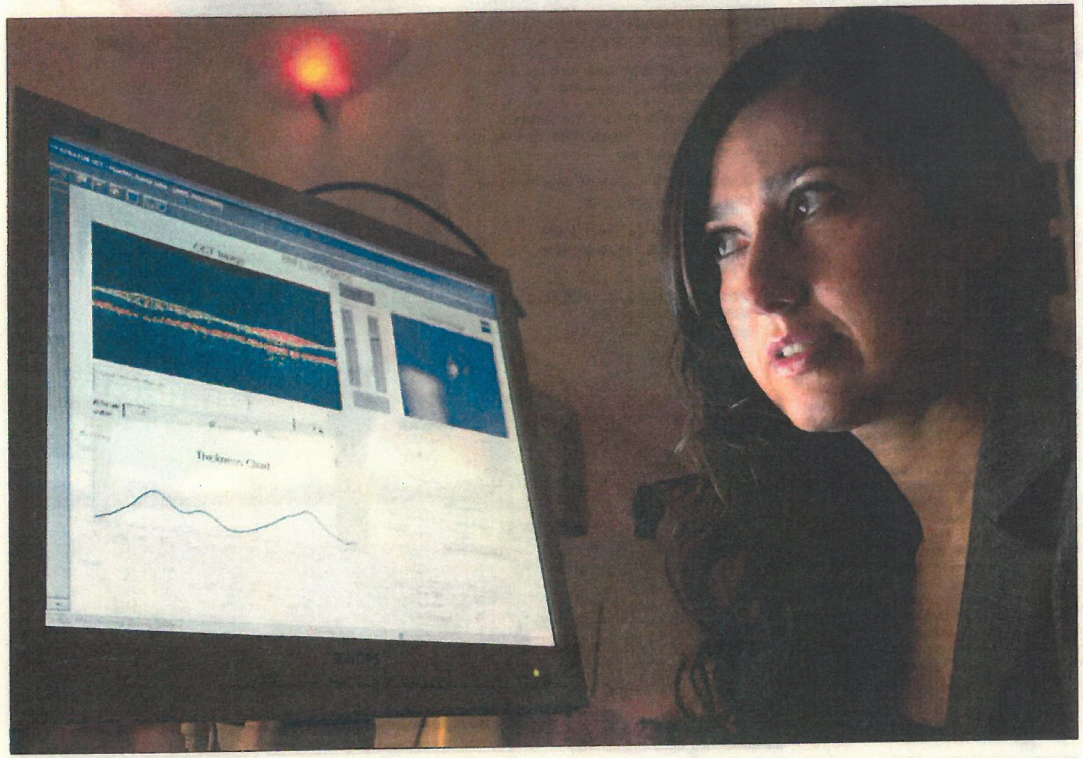

LEADER: Professor Helen Danesh-Meyer helped develop scans that can tell how brain tumour patients will recover from surgery. PICTURE / PAUL ESTCOURT

A new technique pioneered in Auckland for predicting the effect on vision of brain-tumour surgery has been hailed overseas as a revolutionary improvement in the care of patients.

The development of the new method, which uses special measurements of a layer of nerves at the back of the eye, was led by Associate Professor Helen Danesh-Meyer, of Auckland University.

"It's an exceptional piece of work that has revolutionised our approach to tumours in the region of the optic apparatus," Professor Andrew Kaye, director of neurosurgery at Royal Melbourne Hospital, said yesterday.

It has led to safer treatment of brain-tumour patients, including women who are pregnant, and allows them to be given clearer information on whether their vision will improve after surgery.

About 70 patients a year in Auckland have surgery to remove a tumour that is pressing on the optic nerves between the eyes and the brain, causing reduced vision.

Until the new technique, described by Dr Danesh-Meyer and her international team this month in medical journal *Investigative Ophthalmology & Visual Science*, there was no reliable way of predicting visual recovery following surgery, which was known to be variable.

The technique involves testing the thickness of the retinal nerve fibre layer at the back of the eye using optical coherence tomography (OCT), a computer-based system for making an image of tissue structures in the body. It is similar to ultra-sound scanning, but uses reflected light beams instead of sound waves.

The retinal nerve fibre layer is normally 0.085 millimetres to 0.11mm thick. Research on 40 brain-tumour patients found that eyes, in which it was of normal thickness, showed improvements in visual acuity and visual field after surgery; those in which it was thin showed no significant improvements.

Dr Danesh-Meyer said the predictive power of the OCT test was very strong. "The thickness of the retinal nerve fibre layer at the back of the eye as measured with OCT correlates strongly with how damaged the parts of the brain that deal with vision are."

The test had become very helpful, she said, citing a pregnant patient whose brain surgery was able to be deferred, protecting the woman's foetus, after the thicknesses of the nerve layers was shown to be normal.

She had a benign tumour causing serious loss of vision in one eye and legal blindness in the other. She was 24-weeks pregnant and surgery at that stage would have risked inducing labour.

The survival of her baby would have been unlikely.

The OCT tests showed the optic nerve was not permanently damaged; it was compressed by the tumour, impairing its functioning.

The surgery was delayed, the baby was born healthy, and after neurosurgery the woman's vision returned to normal.

Several hospitals worldwide had already changed their management of such patients by performing the scans, Dr Danesh-Meyer said. She said it was good to be able to tell patients the likely effect of the surgery on their vision, even if the news was bad. "Often the unknown is worse than having a clear picture of where you are at."

HOW IT WORKS

- The scan, using optical coherence tomography (OCT), shines light into the eye and records the reflections, similar to the principle of an ultrasound scan. It is non-invasive and takes only a few minutes.
- The optic nerve carries visual information from the retina, at the back of the eye, to the brain.
- 40 patients with a tumour pressing on the optic nerve, causing reduced vision, had the thickness of the retinal nerve fibre layer measured by OCT scan before surgery to remove the tumour.
- After surgery, visual acuity improved significantly in eyes which had a retinal nerve fibre layer of normal thickness, but not in eyes where the layer was at least 2.5 per cent thinner than normal.
- The study has proved the OCT test as the first reliable way of showing the difference between a temporary reduction in optic nerve function and permanent damage.