A swift and as silent as a black panther, the ‘sneak thief of sight’ struck. Glaucoma had been dancing in one room, and finally it pounced, reducing my vision and ability to see clearly.

One of the world’s leading causes of irreversible blindness, glaucoma affects more than 60 million people globally. It is mostly caused by too much fluid pressure inside the eye, which in turn exerts pressure on the optic nerve, leading to damage.

Glaucoma occurs when the nerve cells that form the optic nerve fail to regenerate in the constant pressure. It cannot be cured, but in most cases it can be controlled.

Unfortunately, even with the best treatments, a small percentage of it can be controlled. It cannot be cured, but in most cases it can be managed.

As my eye began to decompose, there was an ‘acute angle-closure’ event, where the intraocular pressure would suddenly and slowly, leaving me with significant (and permanent) loss of vision in one eye. I sought the guidance of a leading glaucoma specialist, Dr Collin Clement.

"The key to successful outcomes in glaucoma is to diagnose early and to treat early," says Dr Clement. "This is because with effective treatments you can prevent further loss of the nerve tissue, but you can’t get any of the nerve tissue back that you have lost."

As Dr Clement proceeds with my examination, he finds me to have a long-standing problem with my eye, in which models and charts of eyes talk about the importance of the iris and cornea.

EYES WIDE OPEN

Scientific advances in gene therapy, stem cell research and artificial intelligence could offer future treatments for glaucoma.

Traditional people, with glaucoma are treated with eye drops, laser treatments and sometimes the complex surgery. However, a new class of surgery, called ‘minimally invasive glaucoma surgery’ or ‘MIGS’, is adding a cut of cutting edge treatments to the surgeon’s arsenal.

It is considered too high and unstable for some patients, and was deemed a suitable candidate for the revolutionary titanium stent known as iStent. It is just a few micrometres in length, it is one of the smallest medical devices to be implanted in the human body.

"The benefit of the iStent is that it works using the natural outflow pathways of the eye," says Dr Clement. "It does this by allowing the eye to control pressure in the way it normally would but more effectively."

This advantage is that procedure is that it is very safe, with minimal disruption to the eye and it has no impact on the patient from a visual point of view.

While advances in MIGS surgery are leading to improvements in glaucoma management, they are unlocking exciting possibilities for earlier detection, better treatment and, potentially, the restoration of sight.

Professor Keith Martin is managing director of Melbourne’s Centre for Eye Research Australia (CERA) and head of ophthalmology at the University of Melbourne, working to develop innovative new treatments to repair the optic nerve.

"The focus of my research is to not only prevent people from going blind, but also to bring back visual functions that have been lost due to glaucoma.

"The clinical trial published in Clinical and Experimental Ophthalmology in 2015, showed significant early improvements in the visual function of glaucoma patients who received a daily dose of vitamin B3 (niacinamide) in addition to the regular treatment to reduce eye pressure. I know we will not be the only optimists patient with this project as it moves into a collaborative international study.

Other groundbreaking projects at CERA include a new bionic eye prosthesis, an artificial intelligence (AI) to undertake eye screenings in remote Indigenous communities, and exploring ways to 'scaffolding molecules' that could provide a new treatment for glaucoma.

"It is both small and geographically close to the brain, allowing it to receive information to the brain, producing promising results." says Professor Martin. "The start of my own glaucoma journey was an eye examination he seems to fade, no longer anchored in his consulting chair, in his office, where models and charts of eyes talk about the importance of the iris and cornea.

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Professor Martin explains the process by using the analogy of a pelican surrounded by an oil slick. 'The key to saving the pelican is to remove the oil slick,' he says. "Similarly, my view is that protect the optic nerve, the key is to alter the environment to reduce the level of nerve cell death or damage following optic nerve insult."

"Working in collaboration with Professor Colin Green, also from the University of Auckland, Professor Martin says, "the next step is to translate this finding into a clinical trial."

Professor Danesh-Meyer says he is actively involved in research using AI to identify early warning signs of a risk of developing glaucoma. "If we can identify who is likely to develop glaucoma before it develops, then our management strategies can prevent visual loss."

Around 400,000 Australians have glaucoma – 50 per cent of those over 40, about one in 200 Australians in 2020 will have developed the condition.

Professor Martin says that the research into the retinal nerve fibre layer (RNFL) is far-reaching implications for other fields, from predicting the outcome of vision in patients suffering from visual loss caused by brain tumours, to the future management of neurological disorders such as Alzheimer’s disease.

PROTECT YOUR VISION

Having regular eye checks will ensure you get proper treatments to repair the optic nerve.

"The focus of my research is to not only prevent people from going blind, but also to bring back visual functions that have been lost due to glaucoma."

It is ‘a brave new world’ for glaucoma patients, says Professor Martin. "The advantages of this procedure is that it is very safe, with minimal disruption to the eye and it has no impact on the patient from a visual point of view."

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