GonioPEN promises faster, cheaper glaucoma diagnoses

The GonioPEN is now in the process of being commercialized (Credit: Nanyang Technological University)

In order to diagnose glaucoma, a device known as a gonioscope is most often used … and it has to be pressed against the patient's eyeball. That may not be necessary for much longer, however, thanks to a new pen-shaped camera called the GonioPEN.

When someone has glaucoma, it's usually caused by a blockage in the drainage channels of their eye. This blockage causes an imbalance between the amount of aqueous humor fluid that's produced by the eye,
and the amount that is able to drain out. That imbalance creates high pressure within the eye, which can in turn damage the optic nerve, causing blindness.

Additionally, there are different types of glaucoma, requiring different treatments.

Eye doctors typically determine which type a patient has by visually inspecting their eyes' drainage channels, using a gonioscope – basically a hand-held glass scope that's linked to a microscope. In a procedure that takes about 15 minutes, the scope's lens is held against the patient's eye, while the doctor looks through the microscope.

Needless to say, the procedure is uncomfortable for the patient, plus images of the eye can't be saved for future reference. While there are systems in which images can be recorded, and which don't involve direct contact with the eye, they cost in the range of US$25,000 to $120,000.

That's where the GonioPEN comes in.

Created by scientists from Singapore's Nanyang Technological University and the Singapore Eye Research Institute, it combines a high-resolution camera with LEDs for illumination, and is linked to a computer by a USB cable.

In just three minutes and involving minimal contact at the side of the cornea, it captures digital images of the eye from four different perspectives. These images are subsequently examined by a doctor in
order to determine what type of glaucoma the patient has – there is also software that assists in the diagnosis.

The GonioPEN has already been tested on 20 patients, all of whom found it more comfortable than a traditional gonioscope. It is hoped that once it's commercialized, the device will cost no more than $5,000.