

Monitoring Intraocular Pressure in Glaucoma

Open-angle glaucoma is a blinding disease with progressive optic neuropathy and visual field loss, which is typically associated with an elevated intraocular pressure (IOP). Total population surveys in Europe, North America and Australia, however, reveal open-angle glaucoma with normal intraocular pressure in 15-25 % of the population surveyed. In Japan, 50-60 % of patients with open angle glaucoma have normal intraocular pressure. The pathogenesis of the condition remains unclear. Vascular insufficiency, myopia, migraines, nocturnal blood pressure drop, and decreased intracranial pressure are all associated with normal-tension glaucoma (NTG).¹ In these patients, relentless progression of the disease with complete loss of vision may occur despite seemingly good IOP control and appropriate treatment.

High variance of IOP is a common finding in glaucoma, especially in patients with co-existing medical conditions and systemic medications. It would be essential for clinicians to know if the IOP measured in the office truly represents the IOP of the patient, or if it is part of a large scale fluctuation of IOP captured at one point in time.

Continuous, 24-hour IOP monitoring is now possible with a new device: TRIGGERFISH (Sensimed, Switzerland). This device provides an automated recording of changes in ocular dimensions over 24 hours, somewhat like a Holter monitor for the eye.

How does it work?

The patient wears the Triggerfish Sensor system for up to 24 hours and is free to go about his/her normal activities, including sleep periods. The sensor is a soft, disposable silicone contact lens with an embedded micro-sensor that captures

spontaneous circumferential changes at the corneo-scleral area (1.) The adhesive Triggerfish Antenna (2), which is placed around the eye, wirelessly receives information from the contact lens. That data is transmitted through a thin, flexible cable (3) from the antenna to the portable recorder (4). The portable recorder, worn by the patient, stores the acquired data during the monitoring session. At the end of the recording period, the data is transferred via Bluetooth from the recorder to the software previously installed on the physician's computer.

The device will be a good tool for glaucoma specialists not just to identify patients with high level of IOP fluctuation and occult ocular hypertension, but also to create a predictive model to identify patients at risk for glaucomatous progression.² The device will also allow appropriate adjustment of glaucoma treatment based on 24-hour IOP data instead of based single data points, as is current standard of care.³ The Triggerfish is now FDA approved but not yet available in the United States.

1. Hayreh SS, Zimmerman MB, Podhajski P, Alward WL: Nocturnal arterial hypotension and its role in optic nerve head and ocular ischemic disorders **Am J Ophthalmol 1994; 117: 603-624.**
2. DeMoraes G, Mansouri K, Liebmann J, Ritch R: 24 hour IOP related profile with a contact lens sensor is associated with visual field progression in treated glaucoma patients: a multicenter study. **Presented at the 27th Annual American Glaucoma Society**

Meeting March 4, 2017 Coronado CA

3. Mansouri K, Medeiros FA, Tafreshi A, Weinreb RN: Continuous 24-hour monitoring of intraocular pressure patterns with a contact lens sensor. **Arch Ophthalmol 2012; 130(12):1534**

By Judith Mohay, MD

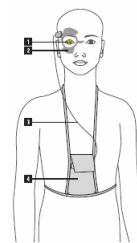


Figure 1 Triggerfish monitoring system

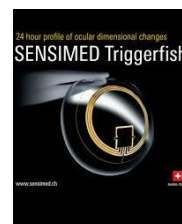


Figure 2 Silicone contact lens with sensor

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