IOP MONITORING
Panel of glaucoma experts put the clinical utility of 24-hour monitoring under the microscope
by Roibeard O’hEineachain in Madrid

Growing evidence suggests that continuous or 24-hour IOP monitoring can improve the detection of peak pressures and pressure spikes and the degree of IOP fluctuation in glaucoma patients and glaucoma suspects. It could therefore be important in both diagnosing the condition and assessing treatment efficacy. How the data obtained in this way should be applied in clinical practice was the subject of a panel discussion led by Franz Grehn MD, University Eye Clinic, Würzburg, Germany, at the 9th European Glaucoma Society Congress.

Several studies where glaucoma patients have undergone 24-hour IOP monitoring have shown that peak pressures often occur outside of office hours. However, IOP-lowering treatment strategies that have proven successful in the past have been based on IOP measurements obtained during office hours. That raises the questions about whether night-time IOP measurements are necessary in all patients and how the measurements should influence therapeutic decisions, Dr Grehn said.

Subgroups that need closer monitoring
Panelist, Lutz E Pillunat MD, University of Dresden, Germany, said that diurnal IOP monitoring measurements are probably not needed in all glaucoma patients or glaucoma suspects, but should be used primarily in normal pressure glaucoma patients and those with aberrant IOP behaviour.

“We observe patients whose IOP always increases at night, completely independently of the body position, whether they are sitting or lying. The same happens to other people whose IOP increases around noon whether they are in a supine or sitting position. In these patients, I think it’s very necessary to get diurnal measurements to choose the right treatment,” he said.

Robert N Weinreb MD, University of California, San Diego, said that 24-hour IOP measurements can be useful for all glaucoma patients and those who are suspect for the disease. He added that the measurements could be particularly helpful in patients who progress despite apparently good IOP control during the day. However, he pointed out that without a dedicated sleep laboratory or appropriate 24-hour pressure sensor the measurements obtained might not be very useful.

On the other hand, there are several technologies currently under development aimed at providing continuous 24-hour IOP monitoring, Dr Weinreb said. They include contact lens-based IOP strain gauges and implantable sensors. The IOP-monitoring contact lens may be the first to become available for clinical use.

“I think we are very fortunate because we are on the threshold of a transformative event for glaucoma diagnosis and management. Continuous IOP monitoring will redefine how we manage not only our normal tension glaucoma patients, but all patients with glaucoma. In fact, many of the patients that we think have normal tension glaucoma do not have it. When evaluated over 24 hours, there are very few patients with normal tensions throughout the day. Look for the revolution that will come to glaucoma management with continuous IOP monitoring, particularly when it is linked with drug delivery,” he said.

Anastasios G Konstas MD, PhD, Aristotle University, Thessaloniki, Greece, agreed that single, infrequent IOP measurements are often inadequate for making therapeutic decisions in many patients. However, the practicalities and limitations of most centres generally restrict the use of 24-hour IOP monitoring to only a selected group of glaucoma patients.

“There are the three groups I focus on for daytime, or 24-hour measurements. They are patients who progress despite apparently good IOP control in the clinic with single measurements, patients at risk with worse 24-hour characteristics (eg, exfoliative glaucoma), younger glaucoma patients, because I think that they need more attention since they have longer to live, and also I focus on patients with advanced glaucoma,” Dr Konstas said.

Influence of 24-hour measurements on treatment
One of the ways that continuous monitoring could influence treatment decisions would be in cases where extreme 24-hour IOP fluctuations might be a concern. Dr Konstas noted that research has shown that surgical procedures like trabeculectomy significantly reduce 24-hour IOP fluctuation, far more effectively than medical treatment.

“We compared pressure over 24 hours in patients who had undergone successful trabeculectomy to that of patients who were receiving apparently successful maximal medical therapy and there is no question that one benefit successful trabeculectomy can bring is a very narrow fluctuation (less than 3 mmHg). This is significantly better than medical therapy. Of course then we have to consider how narrow fluctuation has to be in each stage of glaucoma,” he said.

However, Dr Weinreb countered that in his research with John Liu PhD, involving hundreds of glaucoma patients who underwent IOP monitoring in a sleep laboratory, there has been no relationship between glaucoma progression and fluctuation.

He also cautioned against following the advice of some authors, who suggest that at night patients should prop their heads up in bed with a pillow in order to reduce night-time IOP.

“There is no question that you lower intraocular pressure as you elevate the head. However, you’re changing so many other things. You’re changing the perfusion pressure, you’re changing the blood flow, and you’re changing the intra-cranial pressure. So, until we understand how all of these things interact, until we can measure all of these things continuously, I suggest that it still is acceptable for your patients to be sleeping supine without extra pillows,” he said.

Dr Weinreb added that future generations of ophthalmologists will consider the current practice of taking just one IOP measurement for diagnostic purposes to be just as absurdly inadequate as most of the current generation of ophthalmologists now consider the digital palpation technique to be.

“I would predict that 20 years from now, when many of you will be sitting in a conference hall like this at the 19th European Glaucoma conference, someone on the podium will be reminding us that in the year 2010 clinicians measured IOP just once in their office and then based much of their clinical decision making on that solitary measurement. Everyone in the congress will laugh, because it is so absurd and primitive,” he said.