Detecting glaucoma progression: imaging or clinical symptoms?

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in Chicago

With the world population aging and the number of glaucoma specialists shrinking in proportion, detecting and tracking glaucoma progression is getting to be a bigger part of every ophthalmologist’s practice.

“It’s a worldwide problem,” Dr. Reynolds, told a seminar at the 2008 ASCRS annual meeting.

Yet not every case presents with classic symptoms such as elevated intracocular pressure or reduced visual fields. That presents non-glaucoma specialists with a challenge: identifying when aging patients at risk for glaucoma are actually developing it.

“There is a lot of emphasis now on identifying glaucoma early in its progression, and there are a lot of new technologies and the issues are confusing. It’s important to be able to tell the difference between test variability and a true positive,” said Adam C Reynolds MD, University of Oklahoma, Oklahoma City, US.

It helps to know when and how to use traditional tests, including visual fields and stereophotography, and when to bring in more advanced tools that measure the thickness of the retina nerve fiber layer, such as optical coherence tomography (Carl Zeiss Meditec, Heidelberg, Reichert, Topcon, et al.), Heidelberg retinal tomography (HRT) and scanning-laser polarimetery (GDx), Dr. Reynolds said. It could mean the difference between accurately diagnosing glaucoma, and missing or misdiagnosing a case.

Dr. Reynolds recommended using a variety of approaches when examining a potential open-angle glaucoma case, and taking several observations over time.

“You want to get all your ducks lined up, and if it looks like one to you and quacks like one on the computer, it’s probably glaucoma.”

What visual field tests might not show

Since loss of visual fields is the major functional symptom of primary open-angle glaucoma, it makes sense to test for it in suspected cases. However, a case is often well advanced, with up to 40 per cent of ganglion nerve cells destroyed, before detectable visual field loss occurs, Dr. Reynolds pointed out.

Also, interpreting visual field results can be problematic due to interference of cataracts or other ocular pathologies. For this reason, Dr. Reynolds suggests giving more weight to pattern standard deviation, which correlates more consistently with glaucoma, than either mean deviation scores or the grey scale, both of which can be affected more by cataract development or removal, or other conditions that affect visual acuity. He notes that individual pattern deviation scores vary and the more they vary the worse the glaucoma.

Dr. Reynolds also recommends taking more than two field tests to rule out “regression to the mean.” He often takes four or five tests over a period of weeks to diagnose a case. He emphasizes using point analysis to spot true progression as opposed to normal fluctuation. This generally requires computer analysis of individual point score variations over time.

The various imaging modalities, including stereoscopic cameras, HRT, OCT and GDx, all offer the capability of tracking retinal nerve fibre layer, peripapillary changes and optical disc cupping, all of which may appear long before detectable visual field loss. The laser devices in particular tout their ability to precisely track progression of nerve damage before it is clinically evident by visual examination or fundus photography. The HRT system even has built in regression models that predict glaucoma progression. Similar software is expected soon for OCT and GDx, Dr. Reynolds noted.

So effective are these technologies in tracking progression that they are recommended as the best available methods in the American Academy of Ophthalmology’s current preferred practice pattern for suspected primary open-angle glaucoma, noted Ike Ahmed MD, University of Toronto, Canada. He emphasizes the desirability of using scanning technologies early and often. Non-stereoscopic photography and drawings are a distant second best, he believes.

“Do we use glaucoma imaging? My answer is ‘of course.’ This question is like the battle between the old and the new. By the time visual field symptoms emerge the disease is often far advanced. Our goal as ophthalmologists is to catch the patient before they get too far down the slope and that means looking at disc and retinal nerve fibre layer changes,” Dr. Ahmed said.

These technologies may be able to detect progression in about 65 per cent of patients before symptoms emerge. Even for the 35 per cent who go undetected the images give a good baseline for assessing further progression after symptoms emerge and treatment begins.

Still, about 40 per cent of ophthalmologists do not use imaging to follow suspected or even manifest glaucoma patients, Dr. Ahmed noted. Cost and availability of equipment may be a factor, said Douglas Rhee MD, of Harvard Medical School, Boston, US.

Dr. Rhee pointed out that most glaucoma cases can be diagnosed without imaging equipment.

“If you cannot make a diagnosis with a clinical exam, expensive toys won’t help you. There is no kind of glaucoma today that can be diagnosed solely by relying on these expensive machines, and there is no course of treatment that can be devised based on anything other than optical nerve assessment, visual fields and IOP.”

Dr. Rhee notes that many asymptomatic cases of glaucoma are missed because the retina exam is incomplete. He recommends looking for degradation of the peripheral nerve fiber layer, and nerve fibre layer, cupping of the disc and notching. A careful retinal exam will often reveal nerve fibre changes and loss of blood flow, he noted. He believes it is possible to effectively track and manage glaucoma progression using instruments found in every ophthalmic office.

For doctors without access to computerised equipment to track glaucoma, Dr. Reynolds suggested that comparisons be made using the same photographic equipment from exam to exam. Looking at the retina through a slit lamp and comparing it with a previous photo or drawing is not an apple-to-apples comparison and should be avoided, he said.

Dr. Ahmed also believes imaging is just one part of the process. “We don’t do imaging in a clinical vacuum,” Dr. Reynolds also emphasised the utility of a good clinical exam, cautioning that changes in structure do not always precede symptoms, and a good exam can reveal nearly as much as a computerised laser scan.

“Your own skills are sometimes just as good, or even better than, any current technology to detect glaucomatous structural progression,” he said.