Visual field progression software an important tool in glaucoma patient management

Cheryl Guttman
in Vienna

DETECTION of visual field progression is a crucial component of glaucoma patient management as it guides decisions about whether or not existing treatment is working. Clinical judgment alone based on comparisons of serial visual field printouts is insufficient to reliably determine progression. Fortunately, powerful software systems have been developed to ease the task of perimetric analysis, said Ananth C Viswanathan MD, at the 2007 Joint Congress of the European Society of Ophthalmology and the American Academy of Ophthalmology.

“Clinical judgment is still the most prevalent method for evaluating whether serial visual fields show stability or progression. However, results from three independent studies asking expert observers to decide about stability or progression of visual fields showed clinical judgment alone does not work. In those investigations, the level of agreement between the observers was little better than chance,” said Dr Viswanathan.

Happily, when clinicians used their clinical acumen in concert with computer-assisted analysis in deciding if areas of possible change highlighted by progression software were real or not based on their correlation with the clinical picture, the level of agreement on the modified dataset rose significantly. This experience indicates the visual field analysis software programmes provide needed decision support and should form part of the electronic management that most of the developed world is now moving to for the care of glaucoma patients.

Current software for analysing visual field changes uses either an event analysis or a trend analysis approach. The former is represented by the Glaucoma Progression Analysis software for the Humphrey Visual Field Analyzer (HFA) and the latter is exemplified by the PROGRESSOR R software package developed for the HFA by glaucoma experts at Moorfields Eye Hospital and the University College London.

“Event analysis is useful as an outcome endpoint in clinical trials as well as in clinical practice. However, it provides no information about the patient’s risk for developing sight-threatening glaucoma,” said Boel Bengtsson PhD.

Dr Viswanathan explained that event analysis looks at a visual field series and compares the follow-up test to a baseline to see how they differ. Trend analysis considers the behaviour of single points over time and fits a slope to it.

“A study comparing different methods for detecting glaucomatous visual field progression showed it took longer to confirm progression using the trend analysis approach compared with event analysis using the Glaucoma Change Probability method. It may be there is a trade-off where increased sensitivity of trend analysis is paid for by an increased detection time,” Dr Viswanathan said.

Addressing the question of whether it is better to use an event or a trend analysis approach, Boel Bengtsson PhD, University of Malmo, Sweden, noted that the event analysis can demonstrate small localised progression while the trend analysis is not that sensitive to small change. However, the trend analysis can provide important information about rate of progression.

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“Trend analysis displays the rate or velocity of progression, which is important because we know glaucoma is a progressive disease. Most patients progress if they live long enough, and measuring the rate is crucial for trying to estimate if it is occurring in a way that will impact quality of life.”

Data from clinical trials, such as the Early Manifest Glaucoma Trial, highlight that the rate of progression varies among patients. In that study where the average patient at enrolment was 68 years old and had a mean median deviation (MD) of -4.5 dB, the average rate of progression was 0.6 dB per year in the treated arm, the average was higher when including the untreated arm. However, the variation was similar in the treated and untreated arms, Dr Bengtsson said.

Recognising that it may be difficult for clinicians to interpret the perimetric MD plots and determine the rate of progression, Dr Bengtsson in collaboration with Anders Heijl MD, PhD, developed algorithms to create an improved metric of visual field loss. They are referring to the new software as the Glaucoma Progression Index (GPI). It is described in a paper accepted for publication and is expected to be commercially available toward the end of 2007 for use with the Humphrey Field Analyzer (Carl Zeiss Meditec).

The GPI describes the visual field as a percentage of a full field and is designed to reduce the contribution of cataract to the measurement of visual field loss. It also provides a graphic plot of the visual field index in relation to patient age with a projection of future field loss over the next five years assuming no change in therapy or the rate of glaucoma progression.

boel.bengtsson@oftal.mas.lu.se
ananth.viswanathan@ucl.ac.uk