

New tools provide greater sensitivity in assessment of macular oedema after cataract surgery

Daithí Ó hAnluain



Pedro Melo

Several new emerging technologies appear to be effective in detecting macular oedema after cataract surgery and in quantifying its impact on visual acuity, according to Mr Pedro Melo of the University of Coimbra in Portugal.

Macular oedema is an excessive collection of fluid in the macula. Estimates of its incidence after cataract surgery vary and range from approximately 50% after intracapsular cataract extraction to 10% after phacoemulsification surgery. Clinically significant macular oedema occurs in about 1.5 to 2.3% of patients after cataract surgery, Mr Melo noted.

To examine the effectiveness of various new diagnostic tools, Mr Melo carried out a study involving cataract patients aged over 50 years who were scheduled for cataract surgery. All underwent testing for macular oedema at three, six and 12 weeks postoperatively with the Retinal thickness analyser (RTA), the Retinal leakage analyser (RLA) and by Ocular Coherence Tomography (OCT). Patients also had visual acuity tests.

Preoperatively all patients had a normal fundus and intraocular pressure no greater than 20 mmHg. Exclusion criteria included previous ocular surgery, ocular pathology, diabetes and systemic eye diseases.

Sub-clinical macular oedema a common finding

Macular oedema was detected in a high percentage on all visits by all three methods. The exams showed increased levels of macular oedema from the third to the sixth week as evaluated by OCT and RLA. From the sixth to the twelfth week there was some decrease in the retinal thickness shown by OCT.

Mr Melo said that there is a correlation between visual acuity, retinal thickness and leakage of macular retina. However, results with the RTA were somewhat compromised by optical problems.

"Localised areas of retinal oedema, areas of abnormal increase in retinal

thickness, are identified in all mapping methods. From our experience, the RTA appears not to be a good method to evaluate macular oedema in pseudophakic patients because of image aberrations, high refractive errors and tear film abnormalities," he said.

Fluorescein angiography was the first test to be used for evaluating macular oedema and detects macular fluid leakage, Mr Melo noted. Both the RTA and OCT assess macular oedema by analysing the thickness of the retina, identifying any swelling caused by the condition, while the RLA, like FA, tests for fluid escaping from the macula, he explained.

RTA is a reproducible and quantitative method to evaluate retinal thickness. It projects a thin helium-neon laser slit, like a slit lamp, on the retina. The separation between the reflections from the vitreoretinal interface and chorioretinal interface is a measure of the retinal thickness. The reflected image is recorded by video camera and digitized. Nine scans are obtained and cover the central 20° of the macula. The image is processed, and the results can be presented in a colour-coded topographic map in two or three dimensions, or as a numeric report.

OCT is a diagnostic technique that provides cross-sectional tomographs of retinal structure in vivo. Optical interferometry is used to resolve the distances of the reflective structures

within the eye. Low coherence light from a diode source is divided into two beams. The beams are recombined, and optical interference is detected by a photodiode. Algorithms analyse the interference, producing data that can be displayed as a numeric report and as a false colour topographic map.

RLA, on the other hand, quantifies fluorescein leakage from the retina into the vitreous and produces 3 D images. Blood retinal barrier leakage is displayed on a map.

"Fluorescein angiography was the first method to evaluate macular oedema, but unlike OCT, the RTA or the RLA it is not a quantitative method," said Mr. Melo.

Mr Melo presented his findings at the 2nd Annual Meeting of ESONT in Paris.

Pedro Melo
renata@aibili.pt