



Richard K Parrish

Growing arsenal of surgical alternatives for open-angle glaucoma

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in Sao Paulo

PHYSICIANS have an ever-growing variety of new and refined surgical approaches at their disposal for the treatment of open-angle glaucoma (OAG), but many of these experimental treatments need longer follow-up and properly controlled, randomised trials in order to confirm their safety and efficacy, say researchers.

Addressing a session on OAG during the World Congress of Ophthalmology, Richard K Parrish MD said that while many new approaches showed definite promise in lowering intraocular pressure (IOP), there were legitimate concerns about the methodologies employed in many of these treatments.

"We should bear in mind that the reports to date, with the exception of the controlled clinical trials of Drs Quaranta and Hitchings for ab-interno goniotrabeculotomy, have several methodological concerns. Few investigations have been performed as randomised clinical trials, the follow-up tends to be limited and most procedures look to be most effective in the early postoperative course. Furthermore, there is still failure to demonstrate that the IOP reduction with any of these devices is associated with stabilisation or slowing of the underlying glaucomatous optic neuropathy or visual field change," he said.

Discussing new concepts in angle surgery, Dr Parrish, professor of ophthalmology at the Bascom Palmer Eye Institute, Miami, Florida, US, said that there are three principal questions to ask in relation to the more recent surgical approaches to OAG.

"First, can we make the trabecular meshwork function more normally with any new treatment? I would respond 'probably not'. Second, can we permanently reduce the resistance to aqueous outflow at the level of the juxtacanalicular tissue or trabecular

meshwork to lower the IOP? I think the evidence will show 'possibly'. And last, can we increase uveoscleral outflow surgically to lower IOP? And I would respond 'possibly'.

Discussing some of the techniques in more detail, Dr Parrish highlighted approaches such as standard trabeculotomy, laser goniopuncture, goniosurrectomy, ab-interno trabeculectomy and pneumatic trabeculoplasty, as well as a variety of surgical implants such as the DeepLight Gold Micro-Shunt (Solx Corporation), the Trabectome (NeoMedix Corporation) and the Eyepass (GMP Companies, Inc).

Dr Parrish noted that while trabeculotomy in adults has been performed for quite some time, it was not until Quaranta and Hitchings published the results of their prospective, randomised clinical trials that the case could be convincingly made for trabeculotomy in the management of adult OAG. In that study, the authors concluded that ab-interno goniotrabeculotomy appears to be a viable and safe surgical treatment for adult primary OAG with two years' follow-up.

Dr Parrish said that the concept of disrupting or manipulating the trabecular meshwork to gain access to Schlemm's canal is not new. While initial results with trabeculotomy and goniosurrectomy using Nd:YAG lasers seemed encouraging, long-term review of surgical results has shown only limited success in IOP lowering over time, he said.

Another approach, goniosurrectomy, is an ab-interno, mechanically disruptive technique that uses an instrument similar to a cyclodialysis spatula with a microcurette at the tip to scrape pathologically altered trabecular meshwork off the scleral sulcus. Developed by a team at the University Eye Hospital in Cologne, Germany, the same researchers also came up with the concept of trabecular aspiration for patients with pseudoexfoliation glaucoma, removing

intertrabecular and pretrabecular debris of the trabecular meshwork.

"Neither one of these procedures has found subsequent application in long-term IOP management," said Dr Parrish.

Turning to pneumatic trabeculoplasty, Dr Parrish said that this technique seeks to lower pressure mechanically using a suction ring that fits externally over the corneal limbal area above the trabecular meshwork. The suction is designed to create changes within the trabecular meshwork complex that cause an increase in the facility of aqueous outflow and, theoretically at least, a subsequent lowering in IOP.

In a small pilot study published last year in the *European Journal of Ophthalmology*, 37 patients were treated using the device. The first eye was treated on day zero and then again on day seven, and then retreated on days 90 and 97. The authors claim that pneumatic trabeculoplasty lowered the average IOP by about 2 mmHg over the three-month follow-up period. Dr Parrish noted that virtually all patients (92%) experienced some adverse events, with conjunctival hyperaemia in 26 patients and conjunctival haemorrhage in 14 patients.

Focusing on new procedures which involve implanting devices to lower IOP, Dr Parrish said that the Eyepass glaucoma implant has shown promise. The device is a Y-shaped bidirectional tubular implant that bridges the trabecular meshwork and shunts aqueous from the anterior chamber into Schlemm's canal. There were no problems associated with device erosion, hypotony or a shallow anterior chamber after phase I and II trials, but later long-term follow-up is still pending, said Dr Parrish.

Another device with considerable promise is the iStent trabecular bypass micro stent (Glaukos Corp.). The device is a small L-shaped hollow tube implanted into Schlemm's canal by making a slit through the trabecular

meshwork. Initial results for the device presented at the 2005 ARVO meeting showed clinically significant decreases in IOP in 44 eyes of 51 patients with a maximum of 12 months' follow-up.

The NeoMedix Trabectome device is another new twist on an old idea, said Dr Parrish. It consists of a disposable surgical handpiece with irrigation, aspiration, and electrocautery used to focally ablate the target tissues. In a study of the device presented at the 2006 ARVO meeting, 90% of 49 patients maintained IOP of less than 21 mmHg after 24 months with or without medications.

This represented a 44% mean reduction in IOP from a pre-operative mean of 28 mmHg to an average of 15.3 mmHg at 24 months. The main complication experienced was transient intraoperative hyphaema from blood reflux into Schlemm's canal. There were no serious complications such as hypotony, endophthalmitis, choroidal effusions, wound leaks, or serious vision loss typically associated with traditional glaucoma surgery.

Finally, the DeepLight Gold Micro-Shunt is designed to increase uveal scleral outflow by creating a bridge between the suprachoroidal space and the anterior chamber. Insertion is a 2.5mm single-incision procedure. Dr Parrish said that initial reports not yet published in peer reviewed literature suggest effective IOP pressure lowering which is most pronounced in the immediate postoperative period, but continues to at least 18 months, with few serious adverse events in that timeframe.

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