Canaloplasty has its learning curve but is much safer than trabeculectomy

**by Dr Soosan Jacob MS, FRCS, DNB**

Non-penetrating glaucoma surgery has come to the forefront because of the advantages it offers over penetrating surgeries by being bleb-independent. It has a lower complication rate and is rarely associated with a flat anterior chamber/bleb-related complication after surgery. Described by Epstein and Krasnov in the form of paralimbal deep sclerectomy and sinusostomy, it has evolved into an elegant technique by Robert Stegmann. Further refinements have followed, canaloplasty being one of them.

The Glaucolight is a new surgical device for performing canaloplasty which combines viscosanalostomy with stretching suture technology for circumferential dilatation of Schlemm’s canal. Devised by Gabor Scharioth from Germany, Glaucolight is a specially designed flexible microcatheter for catheterisation of Schlemm’s canal and for inserting a suture to keep the inner wall permanently stretched 360°. This prevents collapse of Schlemm’s canal and re-establishes physiological aqueous outflow through trabecular meshwork. Schlemm’s canal, collector channels and episcleral venous system. It has a 150µm light fibre and an integrated, sterile LED lightsource for illumination and visualisation of fibre tip.

“I prefer non-penetrating glaucoma surgeries and the stretching suture technology because as a resident in the early 1990s I experienced the higher rate of complications associated with trabeculectomies,” said Dr Scharioth. “Surgeons were discouraged from performing glaucoma surgery because of having to handle postoperative complications. I was trained 15 years ago to perform viscosanalostomy and since then have never performed a trabeculectomy again. This approach is much more physiological because natural outflow is re-established instead of being bypassed. Complications are lesser than with trabeculectomy and combination with phaco is better. Being bleb-independent, patient satisfaction is improved and visual recovery is fast.”

**Relative contraindications**

Canaloplasty may be used for open-angle, pigmentary and pseudo-exfoliative glaucomas. It can be used after failed deep sclerectomy/viscosanalostomy. It is less dependent than trabeculectomy on preoperative inflammation/allergy from topical therapy. Relative contraindications include previous trabecular laser surgery, goniodyne, narrow angles, silicone oil-related secondary glaucoma, congenital glaucoma, IICE syndrome etc. Indications can be extended towards narrow angles if combined with phaco (either simultaneously or after phaco, if phaco alone fails). Absolute contraindications for canaloplasty include previous trabeculectomy, trabecular surgery (trabeculotomy, iStent, Trabectome), neovascular glaucoma, closed angle and Sturge-Weber-Syndrome.

“Canaloplasty is better than other non-penetrating glaucoma surgeries,” said Dr Scharioth. “For the first time the entire Schlemm’s canal is treated. During catherisation, thin septae in the canal are opened allowing easy 360º passage in the canal. Placing the stretching suture keeps the canal open and allows circumferential flow of aqueous in the canal. Causes for failure in viscosanalostomy (eg, collapsed surgical ostia of Schlemm’s canal, collapsed Schlemm’s canal, absent collector channels near deep sclerectomy, collapsed Descemet window etc) are solved. With canaloplasty, selection of surgical site is independent of location near good collector channels. The Schlemm’s canal is permanently kept open. Episcleral venous pressure is the limiting factor and therefore postoperative IOP achieved is independent of preoperative IOP.”

Steps for performing canaloplasty consist of creating a 5 x 5mm superficial scleral flap (1/3rd scleral thickness) going anteriorly for about 1-1.5mm into perlimbal cornea, followed by deep sclerokeratectomy close to suprachoroidal space below the flap. Scleral spur is identified and Schlemm’s canal is de-roofed. Blunt dissection at Schwalbe’s line is advanced towards clear cornea to create a Descemet window (Figure 1A) and the deep flap is excised. Endothelium of Schlemm’s canal and juxtanacalicular trabecular meshwork are peeled. The Glaucolight is then used to catheterise Schlemm’s canal (Figure 1B). The illuminated tip allows visual confirmation of catheter location in the right plane (Figure 1C). After 360 degree cannulation, a 10-0 prolene suture is pulled into the canal by fixing it to the Glaucolight tip which is then withdrawn in reverse direction. Knotting the suture under tension stretches Schlemm’s canal (Figure 1D). OVD is injected under the flap to decrease bleeding and scarring. Scleral flap and conjunctiva are closed.

Postoperatively, hyphema is a common occurrence. It is not a complication but rather a sign of reflux bleeding through trabecular meshwork in the period of early postoperative relative hypotony. Serious complications such as hypotony or associated maculopathy/choroidal detachment that sometimes occur after trabeculectomy are extremely rare. A bleb does not form and therefore bleb-related complications such as blebitis, endophthalmitis etc, are unlikely. Postoperative inflammation is low as the anterior chamber has not been entered. Possible complications can include Descemet’s membrane detachment or a postoperative IOP rise which is often steroid induced. Discontinuing steroids and changing to non-steroidal anti-inflammatory drugs is generally sufficient. Late postoperative IOP rise could be secondary to decreased trans-trabecular flow and is addressed by goniopuncture (Nd-YAG Descemetotomy) which opens up the flow or possibly by selective laser trabeculoplasty.

Regarding the learning curve, Dr Scharioth advises that experienced anterior segment surgeons need 15-20 cases to master canaloplasty. “I advise everyone who wants to learn it to visit a surgeon who is experienced in canaloplasty and then, if available, start with the help of an application specialist. Surgery should be recorded, reviewed and compared with that of an experienced surgeon. No one would expect to be successful in mastering phacoemulsification by watching a video and starting off. The same is to be said about canaloplasty,” he said.

Dr Scharioth said canaloplasty is a major step forward in solving the problem of glaucoma. “I believe that in the future, surgery will be the first line of treatment and medical therapy will become only an add-on in most cases,” he said. “Canaloplasty has its learning curve but is much safer than trabeculectomy. It saves a lot of time postoperatively, gives a smoother postoperative course and increases the outcome and satisfaction of our patients.”

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