

Non-penetrating procedures for less-developed glaucoma

by David Laber EyeWorld Staff Writer

Some benefits of non-penetrating and minimally invasive procedures for glaucoma patients include not requiring many meds post-op, thus leaving room for future procedures

Glaucoma specialists said they usually turn to non-penetrating and minimally invasive procedures as a secondary treatment option, but the procedures have some strengths that could make them viable treatment options for some primary open angle glaucoma (POAG) patients.

Richard A. Lewis, M.D., Sacramento, Calif., provided a synopsis of three treatment regimens he considers and what factors indicate the best approach.

"For an open angle patient with no prior glaucoma surgery, [my preference for a primary procedure] would be canaloplasty," Dr. Lewis

said. "For closed or secondary angle glaucoma with no prior glaucoma surgery, I use trabeculectomy with mitomycin C (MMC). And for patients with prior glaucoma surgery, I recommend a drainage device."

Non-penetrating's place in treatment

In addition, Dr. Lewis highlighted other patients for which non-penetrating procedures are beneficial. For example, Dr. Lewis said they are excellent for high myopes that are at risk for hypotony from MMC; patients that have had a failed trabeculectomy in the other eye due to scarring or complications with that procedure; contact lens wearers; patients with ocular surface disease; and for those on blood thinners.

For John R. Kearney, M.D., Johnstown, N.Y., he said he typically starts his patients on medications, and if those are not working, he will use selective laser trabeculectomy (SLT). In some patients, however, his initial treatment might be SLT.

If SLT is not improving the situation, then Dr. Kearney said he turns to non-penetrating procedures. They are safe procedures as far as potential risks and complications are concerned, and through early intervention, he said he is able to get intraocular pressure (IOP) under control.

Dr. Kearney said using non-penetrating procedures usually reduces the number of drugs the patient uses, which reduces compliance as a concern. Additionally, Dr. Kearney said he has had more success in pseudophakic patients and in patients having combined glaucoma and cataract surgery.

Roger L. Stamper, M.D., professor and director of glaucoma services, University of California, San Francisco, said as a general rule, first he assesses the patient's likelihood to succeed on medications and the risk of further vision loss depending on whichever methodology.

"For most patients, that means I will at least give them a trial on medication," Dr. Stamper said. "But if somebody has a real checkered

past in terms of not following up on check-up visits, that is the person I would consider laser surgery or invasive surgery for a first line of treatment."

Dr. Stamper said he uses non-penetrating surgery in patients that need pressure lowering either because of poor compliance with or inability to take medication or if the medication has shown to be ineffective.

Another type of patient would be one that did not need a significant lowering of IOP, which would include patients with relatively low optic nerve damage or that relatively early in the disease.

Also, younger patients or pigmentary or secondary glaucoma patients who do not tend to do well with penetrating surgery are candidates for a non-penetrating procedure.

However, Dr. Stamper noted that the term non-penetrating may be a misnomer for some procedures considered non-penetrating; rather, they ought to be called minimally invasive. "I think the distinction between penetrating and non-penetrating is becoming blurred with some of the newer techniques," he said.

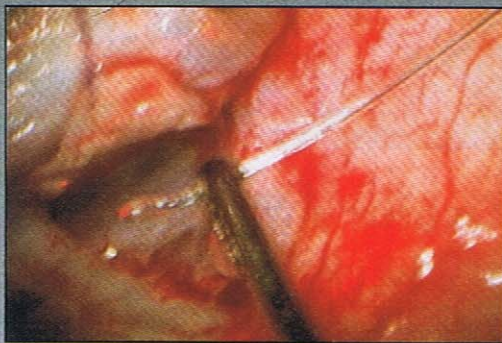
In his opinion, for a procedure to be non-penetrating surgery, the inner trabecular meshwork (TM) must be left intact. "I think there are some people who would consider surgery that just breaches the trabecular meshwork to be non-penetrating," Dr. Stamper said. "But for my purposes, I would say any surgery that leaves the inner trabecular meshwork intact and in which only the outer layer of the wall is breached is non-penetrating surgery."

Evaluating the procedures

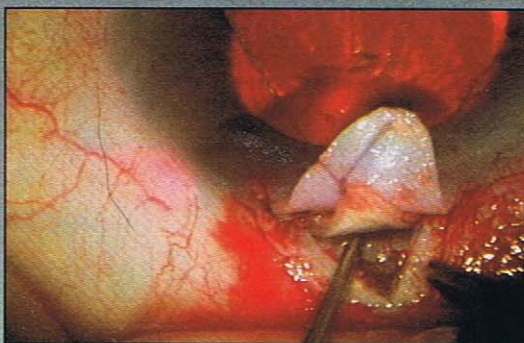
All three physicians said they prefer canaloplasty of the non-penetrating/minimally invasive procedures. Though Dr. Kearney said he does do viscocanalostomy on patients if their insurance does not cover canaloplasty, and he added he applies the same indicators for viscocanalostomy as he does for canaloplasty.

Dr. Stamper said he is tinkering a little with his canaloplasty procedure by adding suture tightening to it. He has done a few deep sclerectomy cases, but he said he was not impressed with the results.

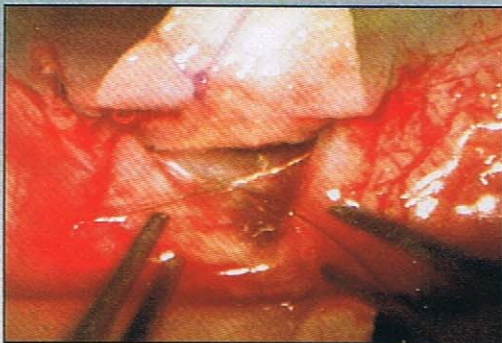
A drawback to canaloplasty, however, is its learning curve when



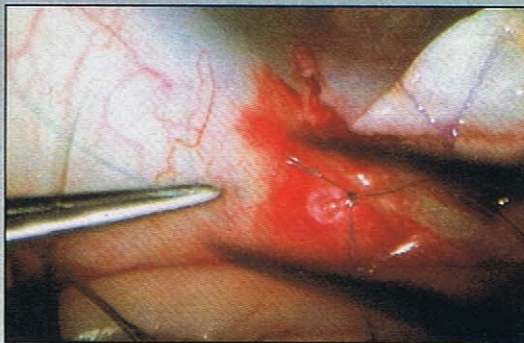
With the canaloplasty site prepared, a microcatheter with illuminated exiting tip are about to be placed into Schlemm's canal on the left; The trabecular meshwork and Descemet's window are seen above the tip



The microcatheter is being advanced clockwise in Schlemm's canal; The red light from the tip is seen glowing through the sclera at the limbus about 45 degrees to the left



The microcatheter has been advanced 360 degrees throughout Schlemm's canal and is seen exiting the canal on the right, over the scleral reservoir



A doubled 10-0 polypropylene suture is tied to the tip of the microcatheter

The old guard: probing penetrating glaucoma surgery

by Maxine Lipner Senior EyeWorld Contributing Editor

With its long history, we eye the penetrating approach

Long before the flash of lasers, for generations penetrating surgery has been the standard treatment choice for many—particularly with more severe cases of glaucoma. But, just where does this procedure stand today?

The numbers of trabeculectomies are down, according to Alan L. Robin, M.D., associate professor of ophthalmology and associate professor of international health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore. A study of Dr. Robin's published in the December 2007 issue of *Ophthalmology* indicate a significant decline. "[Based on numbers] from Medicare, there's probably about 60,000 a year and the numbers are dwindling," Dr. Robin said. The study results indicate that from 1995 to 2004 there was a 53% decrease in trabeculectomies in eyes without previous surgery or trauma. Meanwhile there was a 184% increase in placement of aqueous shunting devices and

likewise cyclophotocoagulation procedures rose 248%.

At the heart of the decline is inexperience, with up-and-coming surgeons stymied by the procedure, believes Dr. Robin. "New surgeons don't know how to do these," he said. "It is a different set of skill sets that is involved with what most residents do in residency, which is cataract surgery, and if you don't do many trabeculectomies you don't get good at them."

Richard A. Lewis, M.D., Sacramento, Calif., still pegs trabeculectomy as the principle procedure used for glaucoma cases today. "That's still the major surgical procedure for glaucoma," he said. "It's the old standby."

However, it is not the standard for all types of glaucoma, he stresses. "I think that the primary glaucomas are best suited to trabeculectomy and some of the secondary cases, really can only respond to having a tube in place," Dr. Lewis said.

Such secondary cases may arise from something as simple as pseudoexfoliation or may be more complicated resulting from the likes of something such as neovascular glaucoma. These neovascular cases

are often seen with diabetics. "Then you have this proliferation of new blood vessels and that doesn't respond well to trabeculectomy unless you have gotten rid of the initial blood vessel problem," Dr. Lewis said. "Then there are also others like central iris atrophy that tends to have this creeping closure of the angle and putting a tube in front of that is more advantageous."

Care algorithm

In addition, there can be marked variation in when practitioners turn to the trabeculectomy procedure in an overall algorithm of care. This has evolved over time. "Historically the standard treatment for glaucoma was to use medications first and then to use laser and then to go to surgery," Dr. Lewis said. "Now there are a good number in the glaucoma community who are doing surgery, much earlier in the paradigm, particularly with somebody who has more advanced damage."

In some cases medical treatment is being given only a cursory nod or avoided altogether. "Now sometimes patients will have just one (drug) treatment or maybe no

treatment," Dr. Lewis said.

"Sometimes people are financially unable to afford medications but may be covered by surgery, so you may opt to go the surgical route first in someone with well defined glaucoma."

Some practitioners, however, are putting the penetrating approach off indefinitely. Dr. Robin finds that in satellite offices there can be a whole backlog of patients who nobody has done anything about for years. "The referring doctors don't want to operate because it's a different set of skills," he said. "So, there is a ton of people who are going blind because of lack of surgical intervention."

One thing to consider when determining whether to move forward with surgery or stick with medications can involve taking into consideration how good patients are at actually delivering the drops to their eyes noted Amy L. Hennessy, M.D., associate, International Health, Bloomberg School of Public Health, Johns Hopkins University.

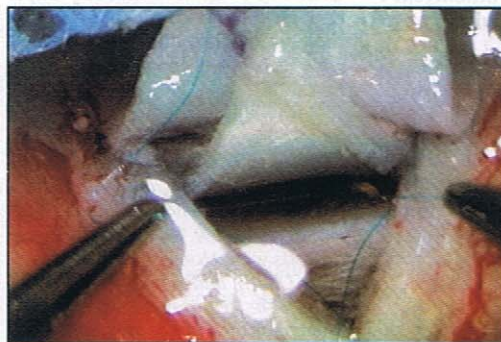
Dr. Hennessy is currently conducting a trial to see how patients with low-vision fare with instilling eye drops. "We are specifically looking at a population with poor vision such as macular degeneration, which affects the central vision, or cases involving the peripheral vision, like in glaucoma," she said. "We targeted a population that we think needs to do their drops the best."

Investigators here have been video taping patients as they attempt to get the drops in their eyes. "Some of the people are really actually surprisingly good at it—they've adapted," Dr. Hennessy said. "But most of the people are really just terrible at localizing the drop over their eyeball." She estimates that 50% aren't getting the drop into their eyes, but instead are dropping it on the lid or surrounding area. They are also at times contaminating the tip, stubbing it into the eye. As vision drops it may be more and more important to move on to surgery more rapidly. "Our science gives us better methods," Dr. Hennessy said. "But what good is it if patients have bad vision already?"

Maximizing outcomes

Outcomes with trabeculectomy can vary and depend somewhat upon technique, Dr. Robin finds. "If

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After the microcatheter is withdrawn, placing the double suture in the canal, the suture is removed from the microcatheter; one suture is being tied, cinching and stretching the trabecular meshwork 360 degrees; the second suture is seen directed toward the apex of the reservoir, awaiting to be tied.

Source: John Kearney, M.D.

ses canaloplasty with his patients as an option for treatment, he said he details the comparative data with them.

Drs. Lewis, Kearney and their fellow researchers published one-year results from a prospective study of canaloplasty performed in the United States and Germany. The study, which is designed to include a five-year follow-up, first appears in the July 2007 issue of the

Journal of Cataract & Refractive Surgery.

Group 1 comprised 94 patients with a pre-op IOP of at least 16 mmHg and open angles, and Group 2 comprised 74 of those patients that also had successful suture placement, according to the study.

it comes to identifying the canal, Dr. Lewis said during a presentation at the American Academy of Ophthalmology's annual meeting in Atlanta in November. Also, it can cause post-op scarring of the ostia and collapse of the canal and it provides insufficient long-term IOP control. That said, when he discus-

The mean baseline IOP in Group 1 was 24.7 ± 4.8 mmHg, using 1.9 ± 1 medications per patient. In Group 2, the mean IOP was 16.1 ± 4.7 mmHg three months after the sutures were inserted; 15.6 ± 4 mmHg at six months, and 15.3 ± 3.8 mmHg at one year.

Patients with measurable TM distension as a result of suture tension did even better; they had a mean IOP of 15.9 ± 5.2 mmHg at six months and 14.5 ± 3 mmHg at 12 months. For the entire sutured group, medication use dropped to a mean of 0.6 ± 0.9 medications per patient at 12 months. ☺

Editors' note: Dr. Lewis has financial interests with iScience Interventional (Menlo Park, Calif.). Drs. Kearney and Stamper have no financial interests related to their comments.

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