

Adopting New Technology

Guidelines for incorporating new diagnostic and surgical techniques into an established glaucoma practice.

BY STEVEN D. VOLD, MD

In the rapidly moving waters of health care, informed decisions about new technology are crucial to a practice's continuing success. Effective navigation can be challenging. Investing in innovations that fail to meet your expectations can lead to disappointing clinical outcomes, significant financial losses, and damage your practice's reputation as well as your own. Conversely, the early adoption of effective technology can produce superior patient outcomes and enhance your standing in the community. A systematic approach can help you make good decisions for your practice.

RISKS AND BENEFITS

Diagnostic Equipment

Before investing in new technology, you must accurately assess its potential value for patients. This process should include a thorough evaluation of how each device will affect your ability to make clinical decisions.

If the benefits of a diagnostic technology are limited primarily to improving patients' education, you may view a large financial investment less favorably than purchasing a new technology that clearly enhances your ability to diagnose and treat ocular disease. Optical coherence tomography (OCT), for example, not only assists in the diagnosis of glaucoma, but it has also revolutionized clinicians' ability to assess and manage retinal disease.

Medical Therapy

The development of new classes of medications and fixed-combination products has greatly improved the quality of glaucoma care over the past 2 decades. Acquiring a thorough understanding of a drug's pharmacology and drawing on personal and colleagues' experience make utilizing new medications and updating treatment paradigms enjoyable and mutually beneficial to doc-

tors and their patients. Key factors that affect a drug's clinical utility include its efficacy, dosing regimen, safety profile, and cost.

Surgical Therapy

On the surgical side, the use of antimetabolites has significantly improved the outcome of filtering procedures, and alterations in tube shunts have initiated discussions about their use as primary surgical therapy.¹ Procedures recently approved by the FDA such as the implantation of the



Figure 1. The Ex-Press Mini Glaucoma Shunt is implanted under a scleral flap to enhance the surgical precision of filtering glaucoma surgery.



Figure 2. The Trabectome system's handheld electro-surgical unit removes tissue from the trabecular meshwork and the inner wall of Schlemm's canal through a 1.7-mm corneal incision.



Figure 3. Canaloplasty is a promising technique in which the surgeon uses the iTrack microcatheter to place a tensioning suture in Schlemm's canal.

Ex-Press Mini Glaucoma Shunt (Optonol Ltd., Neve Ilan, Israel) (Figure 1), ab interno trabeculotomy with the Trabectome (NeoMedix Corporation, Tustin, CA) (Figure 2), and canaloplasty with the iTrack microcatheter (iScience Interventional, Menlo Park, CA) (Figure 3) offer additional surgical options with potential advantages over traditional trabeculectomy. Other new minimally invasive technologies such as the iStent (Glaukos Corporation, Laguna Hills, CA) and CyPass suprachoroidal implant (Transcend Medical, Inc., Menlo Park, CA) are currently under evaluation and may offer significant benefits to glaucoma patients as well.

The adoption of new techniques requires a systematic assessment of their efficacy and safety as well as the identification of the appropriate patient population and the optimal time for intervention. Some surgeons' trepidation may be slowing the adoption of many new technologies, but their skepticism may be well warranted. Without a fully elucidated pathophysiology of glaucoma, wound healing, and the aqueous outflow process, any new or modified surgical approach will unavoidably contain elements of trial and error. This uncertainty is well illustrated by failed technologies such as the Holmium laser.

Personal Threshold

Your willingness to adopt new technology often reflects your personality. If you are flexible, you may more easily embrace change and adopt a new technology soon after its introduction. This flexibility comes with a certain amount of risk, however, and may have detrimental clinical and financial consequences. If you are more cautious, you may wait to try new a technology until it has been proven safe and effective. By reducing risk, this strategy helps you avoid severe miscalculations. As expected, most of us fall in the central area of any bell-shaped curve.

As physicians, we must be careful to avoid excessive resistance to change. This attitude will ultimately render us clinically irrelevant and doom our practices to failure. For example, surgeons who were slow to or who never adopted phacoemulsification quickly became relative nonentities in the arena of cataract surgery. Fortunately, all glaucoma specialists can take advantage of new technology and minimize risk by following a few simple guidelines.

IMPLEMENTATION

Preparation

The key to incorporating new technology into your practice is preparation. For diagnostic instruments, start by reviewing your current clinical processes and, wherever necessary, adapting your routine to accommodate potential changes in patient flow. Education is mandatory for anyone who will be affected by the new device (eg, physicians, staff, and patients). You must have a comprehensive

understanding of testing procedures and printouts in order to interpret results appropriately. Your support staff (including technicians) should be able to perform tests and overcome potential challenges to avoid unreliable or misleading results. Patients should also understand how they might benefit from specific diagnostic tests and what they should expect during the evaluation.

Before you try a new procedure in the OR, you not only need to understand every step of the procedure thoroughly, but you must prepare for unplanned events and potential complications. Discussing and observing the procedure with experienced colleagues, watching detailed surgical videos, and practicing in wet labs or simulators are useful strategies for successfully implementing a new surgical modality. In short, be completely sure about your operative plan before stepping into the OR.

When preparing to offer a new surgical procedure, you must choose your first patients carefully and decide how you will discuss the technique with the candidates. Patients who desire to learn more about the procedure before they make a decision often find educational brochures and online resources helpful and reassuring. Full disclosure is always the best strategy, because it helps set the expectations of your patients and staff and thus their perceptions of you and the procedure.

Assess Outcomes

Avoid knee-jerk reactions while assessing the outcomes of new procedures. Completing a single anecdotal case will not make you an expert on the technique. If the rationale for a surgical procedure does not make sense, you should probably delay its implementation.

I cannot overemphasize the importance of choosing appropriate patients for new procedures. If a poor candidate achieves an unsatisfactory result, you may form an unfairly negative opinion about the procedure's efficacy.

Recognize that your level of surgical experience may influence the outcomes of new procedures. To identify potential problems, critically review your first few cases, perhaps by watching videotapes of your early procedures. To accurately assess more challenging surgical procedures, minimizing the time between your first few cases may be necessary to shorten your learning curve and enhance clinical outcomes.

OTHER CONSIDERATIONS

Finances

In tough economic times, financial considerations play an important role in the adoption of new technology. The market for a test or procedure will be small if physicians are not reimbursed for its use. Even if reimbursement is available, the value of the technology must warrant using the equipment frequently enough to offset initial expendi-

tures. A careful financial pro forma assessment of potential utilization, opportunities for reimbursement, and staffing costs can help you decide if you should invest in a new device or procedure. You should consider, but not overestimate, potential marketing advantages.

Intellectual Benefits

If you are inquisitive and academically minded, the adoption of new technology can bring tremendous joy to your practice of medicine. The early adoption of new technology provides you with a unique opportunity to evaluate and possibly improve diagnostic/surgical devices and techniques. In efficacious surgical procedures, the opportunity to help better define their place in the glaucoma surgical treatment paradigm can be rewarding as well.

Future Innovation

The conservative adoption of new technology helps to ensure patients' safety, but the excessive criticism of new procedures slows the development of better clinical strategies. Consider again, for example, the development of phacoemulsification by Charles Kelman, MD. Despite early resistance from many in the medical profession and government, small-incision phacoemulsification is now the gold standard for cataract extraction. Similar surgical breakthroughs in glaucoma are overdue.

CONCLUSION

Even the most adventurous of us must remember that the decision to try a new diagnostic device or surgical technique should always be based on a desire to improve our patients' well-being. Enhancing patients' care rather than any perceived personal benefits must always be our motivation. By focusing on our patients and thoughtfully implementing new technology, we can continue to develop innovative strategies for managing glaucoma. □

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1. Gedde SJ, Schiffman JC, Feuer WJ, et al. Three-year follow-up of the Tube Versus Trabeculectomy Study [published online ahead of print August 10, 2009]. *Am J Ophthalmol*. doi:10.1016/j.ajo.2009.06.018.