Q&A With Glaukos CEO Thomas Burns

The process of validating a new category in glaucoma and transitioning from a startup to a public company.

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In June 2015, Glaukos completed its initial public offering and began trading on the New York Stock Exchange under the ticker symbol GKOS. The milestone marked the culmination of 17 years of discovery, research, testing, education, and ultimately, product commercialization (see Key Milestones*). Like many other med-tech startups, Glaukos had to overcome several obstacles that come with establishing and validating a new medical device: obtaining early-stage funding, finding the best clinical pathway, proving safety and efficacy, marketing and distribution, etc. Unlike many startup companies, Glaukos had the added challenge of establishing a completely new category: microinvasive glaucoma surgery (MIGS).*

As the pioneers of this new procedure and the first MIGS device, the iStent Trabecular Micro-Bypass Stent, Glaukos was tasked with establishing a viable regulatory pathway to approval. The Glaukos team designed a pivotal clinical protocol for what has become the defining regulatory and commercial pathway for future MIGS companies that are hoping to enter the space. Because Glaukos was establishing a new treatment class in the glaucoma marketplace, the company also endured heightened scrutiny from regulatory agencies and had to educate the physician community on the safety and benefits of the procedure. In addition, the company engaged Medicare administrative contractors early in the review process and was able to secure 100% Medicare approval for the iStent—a key factor in gaining acceptance of a new medical device.

Led by President and CEO Thomas Burns, Glaukos was able to persevere through the challenges, and in 2012, measuring 1 mm long and 0.33 mm wide, the iStent became the smallest medical device ever approved by the FDA. Since joining the company in 2002, Mr. Burns has been instrumental, not only in pushing to validate and commercialize the iStent and MIGS category, but also in setting up the company for sustained growth through a variety of emerging devices with multiple applications. Mr. Burns spoke with Glaucoma Today *about the early years of Glaukos and the unique regulatory pathway the company had to take.*

Stephen Daily: Thank you for joining me today. Can you talk about the origin of Glaukos? When, where, and how did it get started?

Thomas Burns: The founding of the company had an altruistic beginning. Olav Bergheim, who is a life science investor based here in Orange County, California, and the founder of several med-tech companies, had an outside family member who had developed a secondary glaucoma. This family member had advanced glaucoma and was in need of bilateral treatment. He brought this family member to Rick Hill, MD, who then was a professor and glaucoma specialist at [University of California, Irvine] for an appropriate diagnosis. Rick Hill diagnosed his advanced stage of glaucoma and told him that he needed to have bilateral trabeculectomies and described the surgical morbidity associated with the trabeculectomy procedure. Olav thought there had to be a better opportunity, a better treatment alternative, than the available end-stage surgical approaches. He talked to Rick about it. Rick explained that he had an idea of trabecular bypass by internal approach. The idea would require a stent made small enough to maintain the bypass and restore physiological outflow and thereby avoid the major drawbacks of current glaucoma surgeries. Rick added, however, that the idea had been deemed impossible by the current authorities on such things. Specifically, he had been informed that technology did not exist to make something so small with the necessary precision. Olav was not so sure, and he called on a friend, Mory Gharib, PhD, who was at Caltech and was an expert in the field of fluid dynamics. Both Olav and Dr. Gharib collaborated on the design for the stent. In combination, these three gentlemen were able

to develop the concept for the first prototype for the iStent. Since that time, I've been really blessed with having some immensely capable and prolific development teams at Glaukos develop a portfolio of microstents based upon this initial platform that treat the full range of disease severity in glaucoma.

Dave Haffner and Hal Heitzmann, PhD, have taken the initial device platform and have spawned several different species of stents, including a second-generation iStent called iStent Inject, a suprachoroidal stent, and a new stent called iDose [none available in the United States]. We recently disclosed iDose in our S-1 [the initial registration form for new securities required by the Securities and Exchange Commission], and we believe it may deliver several months of prostaglandin therapy with a single ab interno injection and can be easily removed and exchanged upon drug depletion.

Mr. Daily: How important a role did venture capital play during that early period of the company?

Mr. Burns: I was very fortunate to have two key investors in the earliest phases of our corporate development: Versant Ventures, represented by our chair, Bill Link, and Domain [Associates], which was represented by another prolific investor, Bob More. These gentlemen co-led our Series A and Series B private equity rounds. As investors, they have shown tireless engagement and support for us throughout the company's origin and development, over the decade-plus work that we put into building the business. Over that time, we raised $156 million in enterprise capital to create a complete portfolio of implantable microstents that will re-establish aqueous outflow and deliver ophthalmic drugs to effectively and safely manage glaucoma. We were fortunate to raise our venture capital over six rounds, each of which secured financing at a significant step up to prior rounds. In doing so, we were able to raise this capital at an efficient rate, which minimized overall dilution to the business.

Mr. Daily: Looking back at the period when the iStent was in clinical development, can you broadly discuss the process of getting the device from conception to the clinical trials to approval? What were some of the obstacles you faced along the way?

Mr. Burns: We were especially privileged to be able to found and to build this entire MIGS marketplace. Our first major challenge was the development of the microstent implant and procedure. Being able to load 12-foot lengths of titanium rods into Swiss Screw machinery and hone these rods into microdevices, where the lumens are the width of a human hair, challenged the then-current limits of micromachining.

Our next major challenge was establishing a viable regulatory path and predicate for Glaukos and for the emerging MIGS category. As you can imagine, that process took quite a bit of time, working with the FDA to determine what might be the best basis upon which the iStent could be evaluated for demonstrated safety and efficacy. Jeff Wells and his team here at Glaukos deserve immense credit for designing the pivotal clinical protocol for what today has become the defining regulatory pathway for nonrefractory MIGS devices. Once we achieved and defined the regulatory pathway, we were challenged with recruiting for what could charitably be described as an onerous clinical trial.

The recruitment phase of our clinical trial was burdensome. We successfully completed clinical enrollment in our pivotal phase after many months' time. We then submitted our PMA [premarket approval application] in December 2008 and needed to prepare for a successful PMA Advisory Panel, which occurred in June 2010. Since we were establishing an entirely new glaucoma treatment class, our PMA file underwent intense and lengthy review, and we were finally able to secure FDA approval in June 2012. As you can imagine, raising the required enterprise capital during these years of clinical trial enrollment and uncertain and lengthy regulatory review put the company under considerable duress at several time points. I believe we were quite fortunate to be able to bring this device to market so that we could provide a meaningful treatment alternative to glaucoma patients worldwide.

Mr. Daily: One of the major factors considered during the development process was reimbursement. Can you discuss how you were able to secure reimbursement for the iStent and how that aided in the early adoption of the device?

Mr. Burns: Great question. We took the option and action toward filing for a category B2 designation as part of our US pivotal trial. The B2 designation allows us to charge for the stent and allows for our customers to be able to bill Medicare administrative contractors as part of the investigative clinical trial. In that way, Medicare administrator contractors adjudicated on our customer claims for several years prior to our commercial launch, and we were able to build up a product charge history that would aid us in future discussions with [the Centers for Medicare & Medicaid Services] on coding and coverage decisions prior to our US commercial launch in June

KEY MILESTONES

2015

- Glaukos completes an initial public offering, and its common stock begins trading on the New York Stock Exchange under the ticker symbol GKOS. Total net proceeds to Glaukos from the offering were approximately $112.3 million.

2014

- The iStent is approved in Australia, South Korea, and Taiwan for use in patients with open-angle glaucoma in conjunction with cataract surgery.
- CE Mark for the iStent, iStent Inject, and iStent Supra is renewed until 2019.

2013

- Glaukos closes $30 million in Series F financing to fund the continuing global launch of the iStent.
- Glaukos forms a wholly owned subsidiary in Germany and establishes its first direct sales organization outside the United States.

2012

- The iStent is approved by the FDA for insertion in conjunction with cataract surgery for the reduction of IOP in adult patients with mild to moderate open-angle glaucoma. With US iStent approval, Glaukos initiates the global launch of the first commercially available microinvasive glaucoma surgery device.

2010

- The iStent Inject and iStent Supra receive CE Mark approval. The approved indications in Europe include use in conjunction with cataract surgery or as a standalone procedure in patients with primary open-angle glaucoma, pseudoexfoliative glaucoma, or pigmentary glaucoma.
- The FDA Advisory Panel votes seven to one that the benefits of the iStent outweigh its risks for the proposed indication for use in patients with open-angle glaucoma in conjunction with cataract surgery.

2009

- The iStent's US premarket approval application submission is accepted by the FDA for review.
- The iStent is approved in Canada for use in conjunction with cataract surgery.

2008

- Glaukos receives a temporary Category 3 Current Procedural Terminology code to describe insertion of devices such as the iStent using microinvasive glaucoma surgery procedures. This marks the first step to allow reimbursement of the iStent procedure by Medicare and private insurers.

2005

- An investigational device exemption for iStent US clinical trials is granted by the FDA.

2004

- The iStent obtains CE Mark approval. Approved indications in Europe include use in conjunction with cataract surgery and as a standalone procedure in patients with primary open-angle glaucoma, pseudoexfoliative glaucoma, and pigmentary glaucoma.

2001

- Glaukos commences operations.
- The first human implantation of a Glaukos microbypass glaucoma stent is performed.

1999

- Glaukos produces its first prototype of a microbypass glaucoma stent.

1998

- Company incorporates in Delaware by life sciences entrepreneur and executive Olav Bergheim.

Source: Glaukos.

2012. By engaging Medicare administrative contractors in that process in an early and dedicated way, we were able to secure 100% Medicare approval in just 7 months from the time of our US commercial approval.

If you look at any med-tech company establishing new treatment codes, reimbursement is not always a first order of priority for these companies, and they try to figure out reimbursement dynamics once they commercially enter and engage the market. In doing so, the reimbursement process to gain full Medicare approval can take many years before adequate coding or coverage can be established to provide meaningful product adoption. By securing a Category B2 designation and early Medicare coverage, we enabled our customers to rapidly and seamlessly adopt the iStent.

Mr. Daily: Because it was a new category in ophthalmology, I know there was, and still is, a lot of education involved when it comes to cataract surgeons performing the MIGS procedure. Could you take us through that process? Was the educational part of it difficult for the company?

Mr. Burns: I wouldn't say it was difficult; I would say that we were quite prudent and methodical in how we engaged the market and how we brought the product out. Chris Calcaterra and his team created a comprehensive training program where prospective iStent surgeons need to undergo a mandated, comprehensive training program. The first part of that program consists of participating in a webinar series online, which consists of multiple chapters and multiple quizzes at the end of those chapters, so surgeons understand many of the aspects of the implantation and what they can expect with the iStent procedure. Next, the surgeons engage with our sales representatives in wet lab training prior to their initial surgical cases. Our representatives will then proctor surgeons in their initial cases until they become acclimated to the nuances of implanting the iStent. Because the procedure is straightforward, we find that, within 15 to 20 cases, most surgeons become fully acclimated to the procedure and are comfortable performing it with no further oversight.

Mr. Daily: You spent most of your time as CEO leading a private, entrepreneurial-type company trying to validate a new device within the marketplace, and now you find yourself leading a well-known, publicly traded company. Can you talk about what it was like being the CEO of a private company versus being the CEO of a publicly traded company?

Mr. Burns: I'm not sure I can address your question on the transition fully, because I've only been the CEO of a public company for about 2 months. I will tell you that you see a significant bandwidth of change from running a raw startup with a half a dozen people, with a technology that was initially challenged with immense skepticism, in terms of whether you could define a successful regulatory pathway, whether you could establish new [Current Procedural Terminology] codes and coverage, whether you could attract seasoned talent, and whether you could raise the capital required to build a complete portfolio of microstents for treating the full range of glaucoma disease severity.

You also start from the early stage of managing and doing everything that you can imagine as a CEO. CEO is probably a vaunted title when you first start out and then, over many years, overcoming the obstacles I've mentioned, recruiting highly capable people that share your vision, and building what you hope will become a formidable and leading company that may advance the care and treatment of millions of glaucoma patients worldwide.

We are now in a position where we just completed our first earnings call. We reported quarterly revenues that exceeded analysts' expectations, and I've been profoundly grateful for the journey. I'm grateful to be on the other side of the gauntlet we faced and to have achieved what we believe is a validation of the company.

Mr. Daily: Looking at the entire glaucoma industry now, there are several companies, due in large part to the work of Glaukos, jumping into the MIGS space. What is your opinion of the other companies offering MIGS products and services, and are you impressed with the potential of some of the emerging technology?

Mr. Burns: Yes, clearly, other companies have chosen to follow us into the field, and we have a high degree of respect for what they are trying to accomplish. As more companies enter the MIGS field, I think it will validate the market, and the market will continue to grow. We are at a very embryonic stage of MIGS market penetration, and bringing more mass and more marketing and promotion into the marketplace will undoubtedly foster further growth. Each MIGS device, if approvable, will find some place within the glaucoma treatment framework and provide benefit to the glaucoma community and glaucoma patients.

We have been privileged to lead and build the MIGS category and will provide further leadership by seeking indications that expand the market to treat phakic and

pseudophakic patients with mild to moderate glaucoma in standalone procedures. By doing so, we will be able to aggressively expand the number of patients who may be able to benefit from iStent therapy.

Mr. Daily: Finally, can you provide an update on the portfolio of Glaukos and talk about the near- and long-term future of the company?

Mr. Burns: We are attempting to build a hybrid medical technology company that can provide both outflow and extended drug delivery treatment alternatives that utilize our proprietary injectable microstent platform to treat glaucoma. In so doing, we hope to provide clinicians and surgeons with customizable, titratable, and combinatorial treatment approaches. This will enable them to achieve patient target pressures based upon disease stage severity at benefit-to-risk calculus that can best serve each patient.

With our iStent, we're building a significant platform and have a strong first-mover advantage in building the current and expanded MIGS marketplace.

We believe our next-generation product, the iStent Inject, will transition the market into an injectable therapy marketplace where a single ab interno injection may provide months to years of effective glaucoma treatment. Our iStent Inject is currently in an FDA-approved phase 1 [investigational device exemption] trial evaluating the safety and efficacy of the product in phakic and pseudophakic glaucoma patients as a standalone procedure. We also are enrolling an expanded-phase pivotal trial for our iStent Supra, which utilizes the suprachoroidal pathway as an alternative physiologic outflow pathway to treat glaucoma. We are encouraged with the [outside-the-United States] data evaluating this product and believe that this product may be used in combination with trabecular bypass stents to provide dual physiologic outflow in patients with progressive glaucoma.

Finally, we are developing an extended drug delivery and implantable platform called iDose that may be able to deliver several months of prostaglandin therapy to manage glaucoma. We believe this product fills a clear unmet need in glaucoma treatment and will be widely embraced by the ophthalmic physician community, particularly in light of the longstanding and material clinical issues associated with patient noncompliance and nonadherence to glaucoma medical treatment. If we are successful in creating this drug delivery platform, we will be able to develop new products that can greatly add value to our product pipeline, to the glaucoma community, and—we hope—to glaucoma patients worldwide. ■