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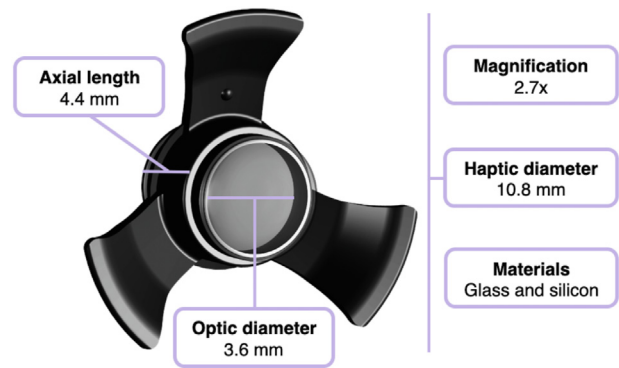
## A New Intraocular Telescopic Device for Age-Related Macular Degeneration



Age-related macular degeneration (AMD) includes both an atrophic form and a neovascular type. Of all forms of AMD, the dry form accounts for 85% to 90% and the wet form for 10% to 15%, and the subtypes may overlap in a given patient.<sup>1</sup> Age-related macular degeneration is the leading cause of irreversible vision loss and legal blindness in individuals aged > 65 years, and the condition is projected to affect almost 290 million people by 2040.<sup>2</sup> Current clinical trials are also evaluating therapeutics that may slow the progression of geographic atrophy.<sup>3,4</sup> However, patients who progress to late-stage AMD, which results in the loss of central vision or results in a blind spot (scotoma) that is uncorrectable by glasses, drugs, injections, or cataract surgery, remain an underserved population. Until now, surgeons have had limited options to manage the loss of central vision caused by late-stage AMD, with successful improvement in patients' quality of life.<sup>5</sup>

Intraocular, vision-improving devices, such as implantable telescopic devices and intraocular lens implants for advanced AMD, are rapidly evolving.<sup>6</sup> Forthwith, we described our recent surgical experience in managing a smaller-incision, new-generation (SING) implantable miniature telescope (IMT), a Galilean telescope implant designed to improve visual acuity and the quality of life for patients with late-stage AMD (Fig 1).<sup>7</sup>

We collected data on these cases with approval from our institutional review board, and informed consent was obtained from all patients. The study was in adherence with the tenets of the Declaration of Helsinki. Three male patients (mean age, 75.6 years; standard deviation, 2.1 years) out of 15 were eligible for surgery because they



**Figure 1.** Detailed characteristics of the latest technology available described: smaller-incision, new-generation, implantable, miniature telescope.

were affected by cataract and geographic atrophy at the same time and matched the other inclusion criteria (Table S1, available at [www.ophtalmologyretina.org](http://www.ophtalmologyretina.org)). Operations were performed at the Ophthalmology Unit, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy, in February 2022 (S.R.).

Ten minutes before surgery, the patients underwent anesthesia using a sub-Tenon block. A sclerocorneal incision of 8.0 mm was marked at the 12-o'clock position, and the conjunctiva and Tenon capsule were opened underneath the corresponding clock hours. Scleral bleeding was coagulated using bipolar coagulation forceps. Next, the surgeon performed a 2.2-mm sclerocorneal tunnel built up on 3 levels, as per standard cataract surgery, with the entrance positioned slightly posterior to the corneal limbus. Two side service keratocentesis (1.2 mm) were performed at the 9- and 3-o'clock positions. Dispersive viscoelastic was then injected into the anterior chamber, and continuous manual circular anterior capsulorhexis was carried out with a diameter of at least 6.0 mm. Cataract hydrodissection, hydrodelamination, and cataract nucleus rotation were then carried out before starting phacoemulsification, and cortical cataract residuals were then removed using infusion or aspiration cannulas. The anterior chamber was then filled with a cohesive viscoelastic.

Immediately before device implantation, the SING IMT injector was prepared according to the instructions for use. The preloaded system allowed the surgeon to make the device ready for injection in < 1 minute once the T-vert plunger was unlocked and then pushed until the surgeon could confirm visually through its upper window that the device was loaded and in the proper position. The final step was to remove the unintended injection blocker from the syringe plunger and, importantly, fill the empty space of the injector tip with a cohesive viscoelastic before injecting the implant.

Device implantation was performed by the opening of the sclerocorneal incision line at the previous 8.0 mm mark using a 2.2 blade. The surgeon gently injected the SING IMT, positioning the tip of the cartridge just below the level of the anterior capsulorhexis and securing the now opened haptics directly into the capsular bag. For correct implantation, the tip of the cartridge had to be totally inserted into the anterior chamber and not only pushed to the corneal incision. With the SING IMT properly positioned within the anterior chamber, 2 of the haptics should be positioned inferiorly to avoid any dislocation.

Once the SING IMT was implanted and correctly positioned with the 2 haptics inferiorly and 1 superiorly into the capsular bag, 5 single sclerocorneal sutures (10-0 monofilament nylon) were performed. Iridectomy was created at the 12-o'clock position using colibri corneal forceps to grab the iris tissue, and Vannas scissors were used to perform basal superior iridectomy. The cohesive viscoelastic was then removed, and finally, intracameral cefuroxime (0.1 mL) was injected and the conjunctiva sutured using 2 single absorbable sutures (Video 1).

In these 3 cases, the surgery was carried out uncomplicated in approximately 45 minutes each. The surgical technique reminded the surgeons of extracapsular cataract extraction. One of the most important key points to emphasize is that the anterior capsulorhexis should be a least of 6.0 mm in diameter to ensure that the tip of the injector fits easily in the capsular bag. The surgeon, at this point, can hold the tip of the cartridge in the right position before starting implantation and avoid complications.

Notably, the tip of the injector being transparent presented challenges in identifying its edge during the implantation maneuver. However, once the injection of the SING IMT started, its haptics were easily detectable and the implant was carried out without any difficulties. The design of the device allowed the surgeon to place and move the device inside the bag easily until the final position was achieved. While evaluating candidates for SING IMT, they must be counseled that after the procedure, there is a requirement for substantial visual rehabilitation ( $\geq 6$  weeks) to allow the device recipient to learn how to use their new vision in both stationary and dynamic environments, practicing to become accustomed to the device for central vision, while the other nonoperative eye assists with navigation and depth perception using peripheral vision. Some activities of daily life, such as reading, writing, or watching television could improve significantly after rehabilitation time. Currently, follow-up at 4 weeks after surgery did not show any significant side effects or complications (corneal endothelial cell loss, inflammatory or pigment deposits, transient cornea edema, intraocular elevation, and anterior uveitis development), and rehabilitation is ongoing.

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#### Disclosure(s):

All authors have completed and submitted the ICMJE disclosures form. The authors have no proprietary or commercial interest in any materials discussed in this article.

#### HUMAN SUBJECTS:

Human subjects were included in this study. We collected data of these cases with approval from our institutional review board. The study was in adherence to the tenets of the Declaration of Helsinki. Informed consent was obtained from all patients.

No animal subjects were used in this study.

#### Author Contributions:

Conception and design: Savastano, Caporossi, Sasso, De Vico, Rizzo  
Data collection: Savastano, Caporossi, Sasso, De Vico, Rizzo  
Analysis and interpretation: Savastano, Caporossi, Sasso, De Vico, Rizzo  
Obtained funding: N/A  
Overall responsibility: Savastano, Caporossi, Sasso, De Vico, Rizzo

#### Abbreviations and Acronyms:

AMD = age-related macular degeneration; IMT = implantable miniature telescope; SING = smaller-incision, new-generation.

#### Keywords:

Age-related macular degeneration, Implantable ophthalmic micro telescope, SING IMT, Surgical technique.

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## Angiogenesis and Anastomosis on Graft Retina after Autologous Retinal Transplantation



Autologous retinal transplantation (ART) has been introduced as an innovative surgical technique to close large macular holes (MHs), with a large-scale, multicenter, clinical study previously conducted to evaluate its effectiveness in the treatment of refractory MHs.<sup>1–3</sup>

The success of free tissue transplantation, in general, is highly dependent on vascularization, including microvessel anastomosis between the host and graft retinas. It has been speculated that successful ART surgery allows for graft retinal angiogenesis, which prevents ischemic changes in the free tissue.<sup>4</sup> We designed a study to