

Injecting and Imaging Patients With Wet AMD and Implanted Telescopes

Physicians need to make careful considerations when treating eyes implanted with telescopes.

BY JON ZICK AND BRIAN C. JOONDEPH, MD, MPS

Patients with end-stage age-related macular degeneration (AMD) with bilateral central scotomas due to geographic atrophy (GA) or inactive disciform scars may be eligible to receive the Implantable Miniature Telescope (IMT; VisionCare Ophthalmic Technologies). The device has been shown to improve vision and quality of life.¹ About 0.5% of eyes implanted with an IMT will develop choroidal neovascularization (CNV).²

Management of wet AMD in IMT-implanted eyes poses unique challenges: Given the large size and posterior extent of the implant, which injection protocol is best for these patients and how should they best be imaged?

RISK OF CNV

Eyes with end-stage AMD that develop CNV require imaging during diagnosis and anti-VEGF therapy. Sunness et al reviewed the risk of CNV in eyes with GA. In patients with bilateral GA and no CNV at baseline (a common scenario for IMT-implanted eyes), 2% of eyes developed CNV after 2 years of follow-up, and 11% developed CNV by 4 years. Among patients with CNV in one eye and GA in the fellow eye, about 18% developed CNV in the eye with GA after 2 years, and 34 % after 4 years of follow-up. Among patients with GA, 7% developed retinal hemorrhages without definite evidence of CNV.³

MACULAR IMAGING

The diagnosis and management of CNV requires optical coherence tomography (OCT) imaging of the macula,

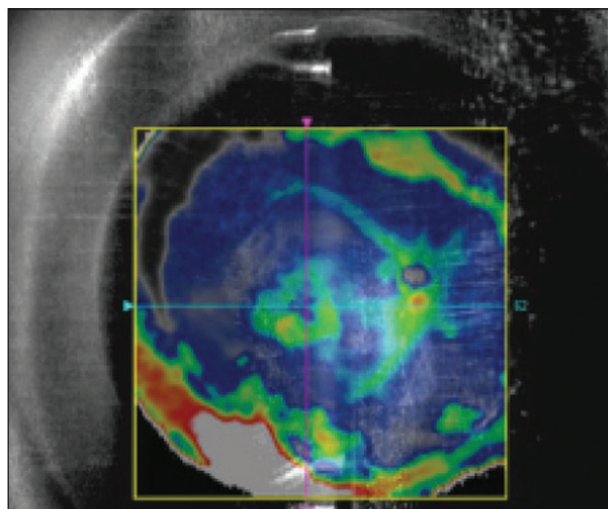


Figure 1. Fundus overlay view of the macula through the Implantable Miniature Telescope (IMT). This example depicts the difficulty of viewing the macula through an IMT.

At a Glance

- Intravitreal injections can be safely performed in patients implanted with telescopes for end-stage age-related macular degeneration.
- There is no evidence indicating that eyes implanted with telescopes respond differently to anti-VEGF agents or treatment regimens.

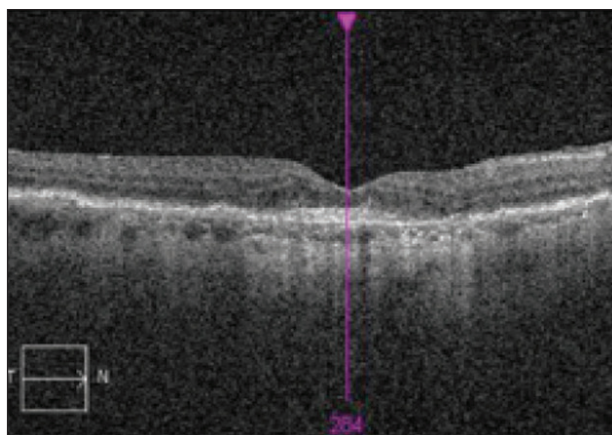


Figure 2. Cirrus OCT (Carl Zeiss Meditec) image of a retina through an IMT using the Mac Cube 512 x 128 scan.

which presents several challenges in patients with an IMT. Technicians and physicians must figure out how to obtain a clear view of the macula despite the presence of the IMT (Figure 1). Fundus photography or angiography through the IMT creates a minimized, distorted image.

Patients implanted with the IMT have typically lost their central vision, making it difficult for them to focus on a fixation target during OCT scanning (Figure 2). As well, the longer scan time required due to the aforementioned poor fixation may lead to drying of the corneal surface, further impairing the view of the fundus.

Obtaining both a macular cube scan and a 5-line raster scan provides adequate visualization of the macula, allowing detection of both intraretinal and subretinal fluid (Figure 3). See “OCT Imaging in Eyes With an Implanted Telescope” on page 51 of the January/February 2015 issue of *Retina Today* for a detailed review of these techniques and several suggestions for optimizing OCT imaging.⁵

TREATMENT OPTIONS

Focal laser photocoagulation has been successfully performed through an IMT.⁶ Fortunately, this technique is rarely necessary in the era of anti-VEGF therapy for wet AMD.

Whether or not an eye is implanted with an IMT has no bearing on the decision process for selecting an anti-VEGF agent. Available medications include bevacizumab (Avastin, Genentech), ranibizumab (Lucentis, Genentech), or aflibercept (Eylea, Regeneron), and no evidence indicates any safety or efficacy differences in an IMT-implanted eye compared with phakic or pseudophakic eyes. The treatment regimen is also at the discretion of the treating physician; monthly injections, treat-and-extend, or as-needed (PRN), treatments are all reasonable options in eyes implanted with the IMT, in the authors’ experience. These patients should receive the standard first-line

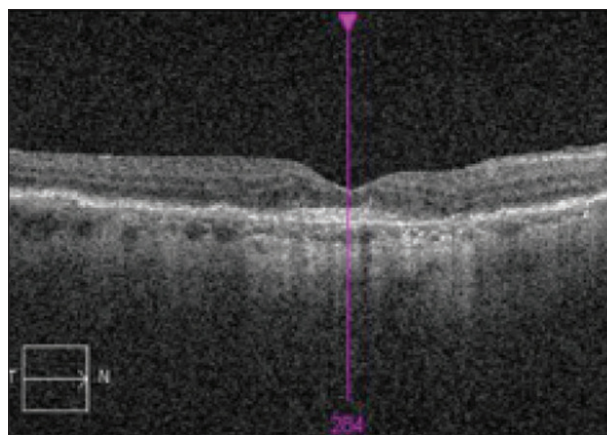


Figure 3. OCT image using a 6-mm Cirrus HD 5 Line Raster displaying subretinal fluid just temporal to the fovea. The 6-mm scan provides a view farther from the fovea than the 3-mm scan.

therapy used by the treating physician, based on personal preference, insurance coverage, and other concerns. In other words, telescope-implanted eyes should be treated in the same manner as any other patient diagnosed with wet AMD.

In our experience, eyes with end-stage AMD that develop new or recurrent CNV usually do not require long-term treatment. New disease activity over a fibrotic disciform scar or at the edge of large area of GA generally responds to a short course of therapy. On the other hand, potential worsening GA with long-term anti-VEGF therapy is a concern. In CATT, eyes receiving monthly injections had a greater area of GA compared with eyes receiving PRN injections.⁷ These telescope-implanted eyes already have poor central vision, often limited by large GA area. Measures should be taken to effectively balance the risks from undertreated CNV with worsening GA from excessive treatment, meaning a shorter course of treatment, if possible.

The authors’ preference for treating CNV in an IMT-implanted eye is to begin with three monthly injections. Following fluid resolution, which usually occurs after three injections, the eye should be monitored closely and treated on a PRN basis. OCT imaging to assess treatment efficacy is performed at each monthly visit. Medication changes may be made due to suboptimal efficacy or safety concerns, applying the same criteria used for other eyes with wet AMD. A short course of therapy is usually adequate in these eyes; the short course reduces the risk of worsening GA and compromising central vision.

INJECTION TECHNIQUE

Intravitreal injections can be performed safely in an IMT-implanted eye with several caveats. Physicians must be

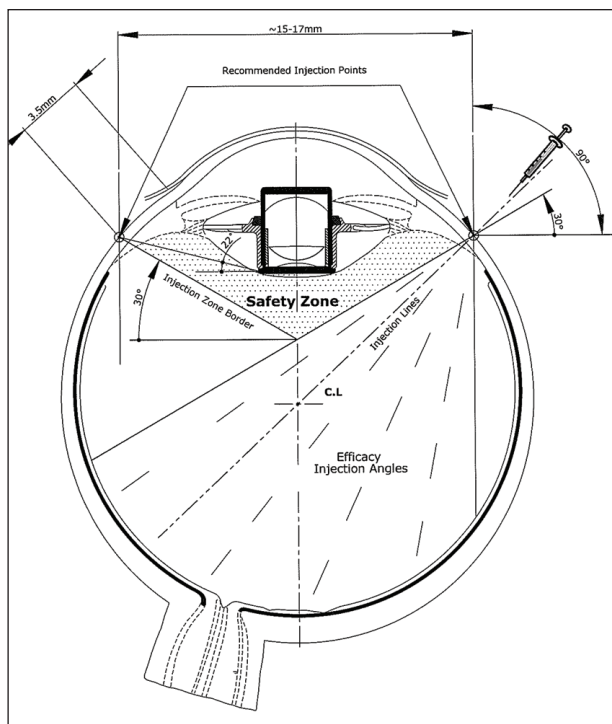


Figure 4. This schematic representation of an eye with an IMT shows recommended injection techniques, beginning with an injection point 3.5 mm from the limbus. (Image reprinted with permission from *Retina Cases and Brief Reports*. Joondeph BC. Anti-vascular endothelial growth factor injection technique for recurrent exudative macular degeneration in a telescope-implanted eye. *Retin Cases Brief Rep*. 2014;8(4):342-344.)

mindful of the IMT while performing the injection. Due to the thickness of the telescope compared with that of a standard intraocular lens, there is an increased risk of the needle contacting or damaging the telescope. The IMT is relatively large in volume and dimensions (4.4 mm anterior-posterior length and 4.2 mm posterior diameter). It is placed in the capsular bag after standard phacoemulsification, and the longer posterior portion of the device stretches the posterior capsule.⁴ These unique geometric considerations increase the risk of the needle touching the IMT or perforating the lens capsule if angled too anteriorly.

Based on our experience, we have several recommendations for injection.⁴ Given the posterior placement of the lens, the injection needle should be aimed more posteriorly, specifically toward the optic nerve. This reduces the risk of injecting anteriorly and damaging the telescope or posterior capsule. The standard injection location of 3.5 mm posterior to the limbus is recommended (Figure 4).

Eyes with recent IMT implantation have another consideration. The telescope is implanted through a 12-mm

limbal incision. If an injection is needed in the early postoperative period, the injection quadrant should be away from the surgical wound. Excessive pressure on the globe should also be avoided because of the large sutured incision.

Examining the fundus immediately after injecting is difficult through the IMT. However, there is a clear area around the central cylinder that allows a limited view of the peripheral retina. Examination of the optic nerve to check for perfusion after the injection will be challenging due to the highly minified view through the telescope. Instead, optic nerve perfusion following injection may be verified by confirming hand motion vision.

CONCLUSION

The IMT provides patients with end-stage AMD improved quality of vision and quality of life by reducing the relative size of their central scotoma. Because these patients have AMD, they are at risk for new or recurrent CNV, which may further compromise their limited central vision. Despite the challenges of examining the macula in these eyes, OCT imaging can be successfully performed to diagnose CNV and assess the response to treatment. Intravitreal injections can be performed safely as long as several caveats are kept in mind.

Overall, IMT-implanted eyes are managed much like any other eye with wet AMD. The possibility of having to manage wet AMD in these eyes should not deter retina specialists from recommending this novel technology to appropriate patients. ■

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1. Hudson HL, Lane SS, Heier JS, et al. Implantable miniature telescope for the treatment of visual acuity loss resulting from end-stage age-related macular degeneration: 1-year results. *Ophthalmology*. 2006;113(11):1987-2001.

2. Schatz H, McDonald HR. Atrophic macular degeneration. Rate of spread of geographic atrophy and visual loss. *Ophthalmology*. 1989;96(10):1541-1551.

3. Sunness JS, Gonzalez-Baron J, Bressler NM, et al. The development of choroidal neovascularization in eyes with the geographic atrophy form of age-related macular degeneration. *Ophthalmology*. 1999;106(5):910-919.

4. Joondeph BC. Anti-vascular endothelial growth factor injection technique for recurrent exudative macular degeneration in a telescope-implanted eye. *Retin Cases Brief Rep*. 2014;8(4):342-344.

5. Schlimgen M, Fortin MJ, Joondeph BC. OCT imaging in eyes with an implanted telescope. *Retina Today*. 2015;10(1):51-52.

6. Garfinkel RA, Berinstein DM, Frantz R. Treatment of choroidal neovascularization through the implantable miniature telescope. *Am J Ophthalmol*. 2006;141(4):766-767.

7. CATT Research Group, Martin DF, Maguire MG, et al. Ranibizumab and bevacizumab for neovascular age-related macular degeneration. *N Engl J Med*. 2011;364(20):1897-1908.