Suture Loop to Aid in Ganciclovir Implant Removal

Mathew W. MacCumber, MD, PhD; Scott Sadeghi, DO; Jack A. Cohen, MD; Thomas A. Deutsch, MD

Background: The ganciclovir implant (Vitrasert; Bausch & Lomb Inc, Claremont, Calif) has been a useful device in the management of cytomegalovirus retinitis. Seven months after placement, implant exchange is often considered. However, removal may be difficult and may result in vitreous hemorrhage or intraocular dislocation.

Objective: To describe a suture loop attached to the implant strut and left in the sub–Tenon space to aid in implant removal.

Methods: Twenty-five eyes of 17 patients received a ganciclovir implant with an 8-0 nylon suture loop left beneath the Tenon capsule and underwent at least 6 months of follow-up. Two of these eyes subsequently had a similarly modified ganciclovir implant placed at a separate site (inferonasally) with at least 6 additional months of follow-up. Six eyes of 3 patients had the implant removed as part of an exchange and underwent at least 4 months of follow-up.

Results: In the 25 eyes, there were no cases of endophthalmitis, wound leak, suture exposure, or other complications. At implant removal in the 6 eyes previously mentioned, the loop was used for traction on the implant and aided in localization of the implant strut. In these 6 eyes, there were no cases of retinal or choroidal detachment, visually significant vitreous hemorrhage, implant dislocation, or other complications.

Conclusion: A sub–Tenon capsule suture loop is well tolerated and can assist in ganciclovir implant removal.


Cytomegalovirus (CMV) retinitis is a common ocular infection in individuals infected with the human immunodeficiency virus. The ganciclovir implant is a widely used device for the control of CMV retinitis. The implant provides a sustained release of ganciclovir for 6 to 8 months. If the patient’s immune system remains seriously compromised at this time, the clinician must decide whether the placement of an additional implant, implant exchange, or the use of a different treatment modality is clinically indicated. Additional implants in the same eye can be well tolerated, however, this approach has several limitations: multiple large sclerotomies cause weakening of the eye wall, multiple implants can reduce the view of the peripheral retina, there are subsequent restraints on the position of sclerotomies for vitrectomy if necessary, and there is often a worse cosmetic appearance. Implant exchange is a safe alternative but can be difficult to perform in some cases due to shifting of the implant and scar formation and runs the risk of increased intraocular bleeding and intraocular dislocation during manipulation of the implant (J. S. Duker, MD, oral communication, November 1998).

We describe the placement of a suture loop on the strut of the ganciclovir implant designed to aid in implant removal.

SURGICAL TECHNIQUE

Placement of a Ganciclovir Implant with a Suture Loop

Retrobulbar injection of 2% lidocaine hydrochloride and 0.75% bupivacaine hydrochloride was given to the operated on eye. The eye was prepared and draped, and a wire eyelid speculum was placed. A corneal cover was applied to avoid light toxicity. A radial incision was cut in the temporal (or nasal) conjunctiva with Wescott scissors and extended inferiorly at the limbus for approximately 3 clock hours. Cauterization of the episclera was meticulously performed.

From the Departments of Ophthalmology, Rush Medical College, Rush University (Drs MacCumber, Cohen, and Deutsch) and Chicago Osteopathic Hospitals and Medical Centers (Dr Sadeghi), Chicago, Ill. None of the authors has a proprietary interest in the methods or products mentioned in this article.
Attention was then turned to the ganciclovir implant (Vitrasert; Bausch & Lomb Inc, Claremont, Calif). The implant strut was trimmed to 2.0 to 3.0 mm, and the corners were rounded. Two holes were then placed in the strut 0.5 mm from the cut end, 1 centrally and 1 in what will be the inferior corner. A double-armed 8-0 nylon suture was tied to the central hole. A second single-armed 8-0 nylon suture was then used to fashion a 1-cm 8-0 nylon suture loop tied to the second hole (insert). It was easier to subsequently remove the implant if the loop was tied to the implant so that the knot was at the end or on the rounded corner of the strut instead of on the side.

Underwent the procedure, the loop was sutured to the sclera as shown, but this was later found to be unnecessary. Subsequently remove the implant if the loop was tied to the implant so that the knot was at the end or on the rounded corner of the strut instead of on the side.

A second single-armed 8-0 nylon suture was tied to the central hole. A 1-cm 8-0 nylon suture loop was tied to the second hole (insert). It was easier to subsequently remove the implant if the loop was tied to the implant so that the knot was at the end or on the rounded corner of the strut instead of at the side (Figure 1, left).

Attention was turned back to the eye. Old interrupted sutures were cut and removed. The suture loop was then grasped with forceps and used to stabilize the globe (Figure 2, left). A microvitreoretinal blade was used to enter the globe parallel to the limbus directly at the point where the suture loop exits the sclera (on the posterior side to avoid the drug pellet). The incision was then extended along the tract of the previous sclerotomy. The anchoring suture can be cut without fear of losing control of the implant because of support by the suture loop. Occasionally, the corner of the implant prolapsed through the sclerotomy at the time of the incision (Figure 2, right). If the strut did not prolapse, a toothed forceps was used to grab the corner of the old implant, which was found beneath the episclera. Cauterization of the episclera was meticulously performed around the sclerotomy.

A second implant was prepared in the identical fashion described in the “Placement of a Ganciclovir Implant With a Suture Loop” subsection of the “Surgical Procedures” section.

Figure 1. Left, The ganciclovir implant prepared for implantation. Two holes were placed in the strut 0.5 mm from the cut end, 1 centrally and 1 on what will be the inferior side. A double-armed 8-0 nylon suture was tied to the central hole. A 1-cm 8-0 nylon suture loop was tied to the second hole (insert). It was easier to subsequently remove the implant if the loop was tied to the implant so that the knot was at the end or on the rounded corner of the strut instead of on the side. Right, The ganciclovir implant with a suture loop implanted in the globe. The suture loop was placed beneath the inferior Tenon capsule. In the initial eyes that underwent the procedure, the loop was sutured to the sclera as shown, but this was later found to be unnecessary.

EXCHANGE OF THE IMPLANT

Retrobulbar injection of 2% lidocaine and 0.75% bupivacaine was given to the operated on eye. The eye was prepared and draped, and a wire eyelid speculum was placed. A corneal cover was applied to avoid light toxicity. A radial incision was cut in the temporal conjunctiva with Wescott scissors and extended inferiortly at the limbus for approximately 3 clock hours to expose the previous implantation site. Overlying tissue was removed with sharp and blunt dissection. The suture loop was released from overlying tissue. Cauterization of the episclera was meticulously performed around the sclerotomy.
the “Placement of a Ganciclovir Implant With a Suture Loop” subsection of the “Surgical Procedures” section.

RESULTS

A medical record review in our practice disclosed 25 eyes of 17 patients that received a ganciclovir implant with a suture loop and were followed up for at least 6 months (Table 1). Two of these eyes subsequently had a similarly modified ganciclovir implant placed at a separate site (inferonasally) with at least 6 additional months of follow-up. Surgeries were performed by 2 of us (M.W.M. [25 implants in 23 eyes] and J.A.C. [2 implants in 2 eyes]).

The clinical diagnosis was CMV retinitis in 24 eyes and progressive outer retinal necrosis in 1 eye. No surgery required more than 10 additional minutes for placement of the suture loop. Two eyes underwent a simultaneous deep vitrectomy, and 1 underwent placement of silicone oil for retinal detachment repair. All eyes had return of the visual acuity to within 3 lines of the preoperative visual acuity; in 13 of 25 eyes, the visual acuity was unchanged or improved. Most patients did not desire (and thus did not have measured) a postoperative change in spectacle correction, so the final best-corrected visual acuity could have been better (pinhole acuity was not used for analysis). In most patients, the suture loop in the sub–Tenon capsule was barely visible to the unmagnified eye, and no patient complained of its cosmetic appearance. There were no cases of cataract formation, retinal or choroidal detachment, visually significant vitreous hemorrhage, wound leak, hypotony, implant or suture exposure, or other ocular complications.

Six eyes of 3 patients underwent ganciclovir implant exchange approximately 32 weeks after placement of the implant with the suture loop. All surgeries were performed by one of us (M.W.M.). Retinitis was inactive in 5 of 6 eyes, and 1 eye had indolent activity. Both eyes of 1 patient underwent a simultaneous deep vitrectomy for visually debilitating vitreous debris immediately before the implant exchange (Table 2). All patients had CD4+ cell counts of less than 0.035 × 10⁹/L (35/µL) (the CD4+ cell count was 0.009, 0.013, and 0.034 × 10⁹/L in cases 1 and 2, 3 and 4, and 5 and 6, respectively). At implant removal, the loop was used for traction on the implant and aided in localization of the implant strut. In all cases, the loop was found to be intact in the position that it was left beneath the Tenon capsule, with no apparent weakening during the previous 32 weeks. In some cases, traction on the suture loop promoted prolapse of a corner of the implant strut, which ensured particularly easy implant removal (Figure 2, right). All eyes had a final visual acuity within 2 lines of the preoperative visual acuity; in all cases, this was achieved within 2 weeks after surgery. Most patients did not desire (and thus did not have measured) a postoperative change in spectacle correction, so the final best-corrected visual acuity could have been better (pinhole acuity was not used for analysis). In all eyes, retinitis was inactive at the final postoperative visit without the requirement of additional anti-CMV medications. There were no cases of cataract formation, retinal or choroidal detachment, visually significant vitreous hemorrhage, implant dislocation, or other complications.

COMMENT

We describe the use of an 8-0 nylon suture loop left in the inferior sub–Tenon space to aid in ganciclovir implant removal at implant exchange. The need for replacement of ganciclovir implants has decreased because of the advent of new medi-

Figure 2. Left, The ganciclovir implant with suture loop removal. The suture loop is used to apply traction, rotating the globe. The microvitreoretinal blade is inserted through the previous sclerotomy site immediately adjacent to the suture loop (on the posterior side to avoid the drug pellet). Arrows indicate direction of the microvitreoretinal blade. Right, The ganciclovir implant with suture loop removal. Toothed forceps are used to grab the corner of the implant. In some cases, as shown, the implant corner prolapses through the wound. If the strut has not prolapsed, it is found beneath the lip of the incision at the location of the suture loop. Arrow indicates movement and traction of suture.
Table 1. Characteristics and Visual Acuity of Eyes That Received a Ganciclovir Implant With a Suture Loop

<table>
<thead>
<tr>
<th>Case No./Sex/Age, y</th>
<th>Eye</th>
<th>Zone of Disease</th>
<th>Total Follow-up Time, mo</th>
<th>Initial Visual Acuity</th>
<th>Final Visual Acuity</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/M/39</td>
<td>OS</td>
<td>2 8</td>
<td>20/20</td>
<td>20/30</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>2/F/42</td>
<td>OD</td>
<td>2 10</td>
<td>20/25</td>
<td>20/30</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>3/M/37</td>
<td>OD</td>
<td>2 9</td>
<td>20/30</td>
<td>20/40</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>4/M/35</td>
<td>OS</td>
<td>2 11</td>
<td>20/20</td>
<td>20/15</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>5/M/35</td>
<td>OS</td>
<td>2 14</td>
<td>20/30</td>
<td>20/20</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>6/M/35</td>
<td>OS</td>
<td>2 7</td>
<td>20/25</td>
<td>20/20</td>
<td>Placed inferonasally (previous inferotemporal implant [case 5])</td>
<td></td>
</tr>
<tr>
<td>7/M/36</td>
<td>OD</td>
<td>1 8</td>
<td>20/20</td>
<td>20/20</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>8/M/36</td>
<td>OS</td>
<td>3 10</td>
<td>20/20</td>
<td>20/20</td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>9/M/35</td>
<td>OD</td>
<td>2 10</td>
<td>20/20</td>
<td>20/25</td>
<td>Placed inferonasally (previous inferotemporal implant)</td>
<td></td>
</tr>
<tr>
<td>10/M/38</td>
<td>OD</td>
<td>1 9</td>
<td>20/200</td>
<td>20/400</td>
<td>Placed inferonasally (previous inferotemporal implant); retinal tears previously treated by laser photocoagulation</td>
<td></td>
</tr>
</tbody>
</table>

1/M/51 OS 1 9 20/25 20/50 ... |
2/M/51 OS 1 9 20/20 20/25 ... |
3/M/33 OD 1 16 CF at 30 cm CF at 30 cm ... |
4/M/33 OS 1 16 20/25 20/30 ... |
5/M/33 OS 1 8 20/30 20/30 Placed inferonasally (previous inferotemporal implant [case 14]) |
16/F/39 OD 2 8 20/40 20/40 ... |
17/F/39 OS 2 7 20/20 20/20 ... |
18/M/39 OS 2 7 20/20 20/20 ... |
19/F/36 OS 2 16 20/40 20/40 ... |
20/F/36 OD 2 16 20/100 20/100 ... |
21/M/36 OS 1 11 20/100 20/80 Placed inferonasally (previous inferotemporal implant) |
22/M/35 OD 1 11 20/40-3 20/40-2 ... |
23/M/35 OS 1 11 20/25 20/30-2 ... |
24/M/51 OD 1 6 20/70 20/70-2 ... |
25/M/51 OS 1 6 CF at 60 cm CF at 60 cm ... |
26/M/46 OS 2 15 20/40 20/50 Simultaneous deep vitrectomy for vitreous debris |
27/M/46 OD 1 16 CF at 90 cm 20/200 Simultaneous deep vitrectomy for vitreous hemorrhage and retinal detachment |

* The diagnosis for case 18 was progressive outer retinal necrosis; all other cases, cytomegalovirus retinitis. CF indicates counting fingers; ellipses, no comment.

Table 2. Characteristics and Visual Acuity of Eyes That Had a Ganciclovir Implant With a Suture Loop Removed at Implant Exchange

<table>
<thead>
<tr>
<th>Case No./Sex/Age, y</th>
<th>Eye</th>
<th>Zone of Disease</th>
<th>Total Follow-up Time, mo</th>
<th>Initial Visual Acuity</th>
<th>Final Visual Acuity</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/M/36</td>
<td>OD</td>
<td>1 7</td>
<td>20/20</td>
<td>20/20</td>
<td>Mild vitreous hemorrhage occurred, which was not visually significant at 1 wk. The eye has since had a third implant placed inferonasally</td>
<td>...</td>
</tr>
<tr>
<td>2/M/36</td>
<td>OS</td>
<td>3 9</td>
<td>20/20-2</td>
<td>20/20</td>
<td>Indolent activity of retinitis</td>
<td>...</td>
</tr>
<tr>
<td>3/F/39</td>
<td>OD</td>
<td>2 4</td>
<td>20/40</td>
<td>20/60</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>4/F/39</td>
<td>OS</td>
<td>2 4</td>
<td>20/40</td>
<td>20/40</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>5/M/51</td>
<td>OD</td>
<td>1 5</td>
<td>20/15</td>
<td>20/20</td>
<td>Simultaneous deep vitrectomy for vitreous debris</td>
<td>...</td>
</tr>
<tr>
<td>6/M/51</td>
<td>OS</td>
<td>1 5</td>
<td>20/20</td>
<td>20/30</td>
<td>Simultaneous deep vitrectomy for vitreous debris</td>
<td>...</td>
</tr>
</tbody>
</table>

* The diagnosis for all cases was cytomegalovirus retinitis. Ellipses indicate no comment.
arose because of the suture loop. In no case did it shift or become exposed, and there was no apparent weakening caused by 7 months in the sub–Tenon space. Although not addressed in this study, we presume that the suture eventually would decompose.

A second implant was placed at an inferonasal site instead of performing an exchange in 2 eyes because the opposite eye had poor visual acuity and the complication rate for removal of an implant with a suture loop was not yet adequately established. Subsequently, a third implant was placed at a separate site in 1 eye when the second implant became exhausted. A 75% risk of dense vitreous hemorrhage has been reported if the same site is used a third time. However, because it may be easier to locate and remove the implant in cases with a suture loop, the rate of significant vitreous hemorrhage at the time of exchange of such an implant may be less for additional surgeries.

No significant complications for the initial implant placement and the implant exchange were identified. Postoperative retinal detachment was not a problem, as reported in the larger series of implant exchange by Martin et al, probably because retinitis was less active and involved a smaller area of the retina than in earlier studies. We recommend particularly careful management of the vitreous during implant exchange in eyes with extensive active CMV retinitis or progressive outer retinal necrosis.

Placement of a suture loop need not be considered in all cases, but it appears to be a safe modification of the ganciclovir implant surgical technique for eyes in which future implant exchange may be indicated.

Accepted for publication May 2, 1999.

This study was supported in part by the Louise C. Norton Trust, Chicago, Ill.

Reprints: Mathew W. MacCumber, MD, PhD, Department of Ophthalmology, Rush Medical College, Rush University, 1725 W Harrison St, Suite 931, Chicago, IL 60612 (e-mail: macretina@aol.com).

REFERENCES