Photographic Evidence of Vitreous Wicks After Intravitreal Injections

The prolapse of vitreous strands at the wound site has been noted after intravitreal injections.

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The use of intravitreal injection in the treatment of several ocular disorders has increased substantially over the last few years. Intravitreal injection of triamcinolone acetonide (Kenalog; Bristol Myers Squibb, Princeton, NJ) has been shown to be an effective therapeutic option in the treatment of macular edema due to diabetes, uveitis, retinal vein occlusion, and exudative age-related macular degeneration (AMD).[1-4] Cytomegalovirus retinitis can effectively be treated by intravitreal injection of antiviral agents in patients with AIDS.[5,6] Pegaptanib (Macugen, Eyetech/OSI and Pfizer, New York, NY) and ranibizumab (Lucentis; Genentech, San Francisco) have been approved by the US Food and Drug Administration for treatment of neovascular AMD.[7] Intravitreal injection of gas for pneumatic retinopexy has also become an established popular technique to repair rhegmatogenous retinal detachments with final visual outcomes comparable to the more invasive scleral buckling repair of retinal detachments.[8]

Intravitreal injections have a well-recognized risk of endophthalmitis.[9,10] Prevalence is estimated at 0.3% per injection.[11] Currently, no formal guidelines exist for delivery of intravitreal injection, which have been shown by clinical trials to reduce the risk of endophthalmitis.[12]

DOCUMENTED VITREOUS WICKS

Vitreous wicks—the prolapse of vitreous strands at the wound site—have been noted after intravitreal injections.[13,14] This study shows documented photographic evidence of vitreous wicks following intravitreal injections.

> The intravitreal injection was then administered into the anterior vitreous either with a 27-gauge or 30-gauge needle.

This is a prospective consecutive case series. All patients receiving an intravitreal injection between June 6, 2005 and July 14, 2005, at our eye center by two retinal specialists (ie, Dr. Beer or Dr. Falk), were either photographed or videotaped at the time of their injection. Eyes receiving intravitreal triamcinolone acetonide injection, pegabtanib injection, or eyes involved in the unmasked extension arm of ranibizumab study receiving ranibizumab injection, were included. Triamcinolone acetonide injections of either 0.05 mL or 0.1 mL and pegabtanib injections of 0.9 mL were given using a 27-gauge needle. Ranibizumab injections of 0.05 mL were injected using a 30-gauge needle.

The intravitreal injection procedure was the same for all patients. All patients received a topical antibiotic drop and a drop of 0.5% proparacaine HCl (Alcain; Alcon Laboratories, Fort Worth, TX). The eye was disinfected by 5% povidine-iodine solution. The lids and periocular skin were then cleansed with 10% povidine-iodine solution and a sterile lid speculum was placed. A subconjunctival injection of approximately 0.1 mL of 2% lidocaine was placed over the injection site by a 30-gauge needle. The injection site was identified 3.5 mm from the limbus. The intravitreal injection was then administered into the anterior vitreous either

Figure 1. Example of vitreous strands at the tip of the withdrawing needle.

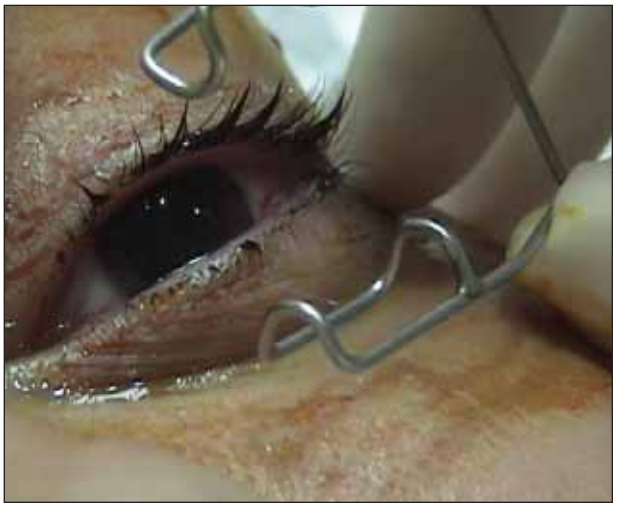

Figure 2. A vitreous wick attached to the eyelid speculum.

with a 27-gauge or 30-gauge needle with the contents aimed toward the inferior retina. The needle withdrawal and the removal of the speculum were either photographed with 2 megapixel (MP) Olympus (Center Valley, PA) camera or recorded with a Sony Cybershot DSC-P200 7.2 MP digital camera (Shinagawa, Tokyo). Visual acuity and/or indirect ophthalmoscope were done after the procedure to ensure adequate perfusion of the retinal arteries and veins. No anterior paracentesis was done either before or after the injection. Postoperatively, patients were educated about the signs and symptoms of endophthalmitis, and instructed to immediately seek follow-up if they experienced any of the symptoms. Patients were seen in follow-up 2 days to 7 days after the injection.

Photos and videos were retrospectively analyzed independently for evidence of vitreous wicks. A vitreous wick was defined as a strand of material extending from the incision site to the needle (Figure 1) or from the eyelid margin to the lid speculum as the speculum was removed (Figure 2). Subconjuctival blebs and leakage of fluid from the incision site into the conjuctival fornix were not counted as wicks.

11 WICKS WERE IDENTIFIED

A total of 72 intravitreal injections were photographed or videotaped over a 5-week period. A 27-gauge needle was used for 55 of the intravitreal injections and a 30-gauge needle was used for 17 of the injections. Vitreous wicks were identified by photography or video in 11 injections. All vitreous wicks were seen in injections using a 27-gauge needle.

Triamcinolone acetonide was administered in 19 of the injections, pegabtanib was administered in 36 of the injections, and ranibizumab was administered in 17 of the injections. Vitreous wicks were identified in 6 triamcinolone acetonide injections and 5 pegabtanib injec-

TABLE 1. BASELINE DATA OF INTRAVITREAL INJECTIONS THAT WERE PHOTOGRAPHED OR VIDEOGRAPHED

	Number of Injections	Pharmacologic Substance	Volume (mL)	Needle Gauge	Vitreous Wicks
	14	triamcinolone acetonide	0.05	27	5
	5	triamcinolone acetonide	0.1	27	1
	36	pegabtanib sodium	0.09	27	5
	17	ranibizumab	0.05	30	0
Total	**72**				**11**

tions. No vitreous wicks were seen with ranibizumab injections (Table 1).

Volumes of 0.05 mL, 0.09 mL, and 0.1 mL were injected intravitreally. Vitreous wicks were seen in five of 31 injections with volume of 0.05 mL, in five of 36 injections with a volume of 0.09 mL, and in one of five injections with volume of 0.1 mL.

The incidence of endophthalmitis in follow-up was zero.

DISCUSSION

The photographic evidence of vitreous strands confirms that intravitreal injections do lead to potential communication between the inner and outer eye. We have dismissed subconjuctival blebs or pooling of fluid in the conjunctival fornix after the injection; these could be caused by liquified vitreous only. During our study, vitreous wicks were identified in injections given with a 27-gauge needle only. We also only identified vitreous wicks with two of the three pharmacologic substances injected. Vitreous wicks were seen with all three volumes analyzed. Although our study suggests that vitreous wicks may only occur with injections using the larger 27-gauge needle or only with certain pharmacologic substances, this data is not statistically significant for these independent variables and further study is needed before these conclusions can be made. In our clinical practice, we have noticed vitreous strands after ranibizumab injection with 30-gauge needles as well.

> Intravitreal injections do lead to potential communication between the inner and outer eye.

We also acknowledge that resolution of our recording devices may not be sensitive enough to identify all vitreous wicks that occurred during the injections. It is feasible that if a video recording device with greater resolution and substantially brighter illumination were used, more vitreous wicks may have been identified. The wicks were generally very thin, clear, and extended for approximately 1 cm or more from the eye to the needle or speculum. As the distance between the instrument and the eye was increased the vitreous strands released from the instrument end and retracted towards the eye. This process of vitreous wick stretching and release is fast and easily missed by the injector. Some physicians advocate the use of a cotton-tipped applicator to compress the injection site after needle withdrawal. However it is doubtful that the applicator can prevent the external displacement of vitreous fibers when they are attached to the needle tip.

CONCLUSIONS

Vitreous wicks, as seen in our study, confirm movement of vitreous strands extraocularly through the injection site in 15.3% after intravitreal injections. Vitreous entrapped in the injection site may lead to a potential conduit for bacteria entering the intraocular space. This evidence promotes the need for increased sterile technique in the delivery of intravitreal injections, and may support a role for topical antibiotics and or topical betadine. Movement of the vitreous through the injection site may be more likely with a larger bore needle. ■

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