A New, Simple Technique to Prevent Water Condensation on Intraocular Lenses During Vitrectomy.

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Water condensation on the posterior surface of intraocular lenses in air-filled eyes during vitrectomy can significantly limit visibility of the retina. The problem seems to be more common in eyes with silicone lenses than in those with lenses made of other materials.[1] Fogging usually does not occur if the posterior capsule is intact.

Various solutions to this problem have been used. The water droplets can be simply wiped from the lens with a soft tipped cannula.[2] This maneuver is effective, but the fogging of the lens usually returns within minutes. A viscoelastic applied to the posterior lens eliminates the condensation, but irregularities in the surface of the viscoelastic can limit visual resolution of the retina. Warming of the anterior segment (and lens implant) with heated contact lens infusion fluid[3] may inhibit condensation, but this is a cumbersome solution; also, infusion contact lenses are rarely used in modern vitrectomy.

We have devised a simple technique to eliminate water condensation on the intraocular lens surface by lowering the humidity of the infused air.

If water droplet condensation is noted during vitrectomy, part of the gas infusion line is simply coiled and inserted into a beaker of ice water. The distal part of the infusion tubing is attached to the stopcock in the usual manner. As the air passes through this cooler tubing, water condensation occurs on the inner walls of the tube (Figure), lowering the humidity of the air delivered to the eye.

Suction with the vitrectomy instrument is applied to remove the humid air from the eye as the dryer air is infused. Wiping the intraocular lens to remove the water droplets may hasten clearing. As the dry air is infused, the fogging does not reoccur.

This technique has several advantages over those previously described. It is inexpensive. The optics of the lens implant are preserved. Advance preparation is not required: if fogging occurs, the air line can be immersed quickly in the ice water to dehumidify the infused air. Because air is sometimes infused at high pressures to control intraocular hemorrhage, the cooling of the infused air could have protective effects on the retina.[4]

The concept of dehumidifying infused air is obviously contrary to the suggestion that air should be humidified to prevent visual field defects occurring after vitrectomy for macular hole.[5] Our technique should not be necessary in macular hole surgery, because

visualization of the retina after air fluid exchange is not usually required. Also, the low humidity of infused air has not been proven to be the cause of the visual field defects after vitrectomy for macular hole.[6] In any case, the visual field defects noted after vitrectomy for macular hole do not seem to occur after surgery for other conditions (such as retinal detachment or proliferative diabetic retinopathy) in which visualization of the retina after air-fluid exchange is important.

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1 Hainsworth DP ; Chen SN ; Cox TA ; Jaffe GJ Condensation on polymethylmethacrylate, acrylic polymer, and silicone intraocular lenses after fluid-air exchange in rabbits [see comments] Ophthalmology, 103(9):1410-8 1996 Sep

[2]2 Jaffe, Management of condensation on a foldable acrylic intraocular lens after vitrectomy and fluid-air exchange. Am J Ophthalmol, 124(5):692-3 1997 Nov

3 Porter RG ; Peters JD ; Bourke RD De-misting condensation on intraocular lenses Ophthalmology, 107(4):778-82 2000 Apr

4 Tamai K ; Toumoto E Majima A Protective effects of local hypothermia in vitrectomy under fluctuating intraocular pressure. Exp Eye Res, 65(6):733-8 1997 Dec

5 Ohji M ; Nao-I N ; Saito Y ; Hayashi A ; Tano Y Prevention of visual field defect after macular hole surgery by passing air used for fluid-air exchange through water. Am J Ophthalmol, 127(1):62-6 1999 Jan

[6] Kokame editorial on macular hole field defects.