

# Retinal Detachment Rates After Cataract or Presbyopic Lens Extraction

BY MALAIKA DAVID, ASSOCIATE EDITOR



This month, the "Peer Review" column focuses on the incidence of retinal detachment following cataract surgery. While the rate for all cataract surgery remains low, it should be considered in relation to the volume of cataract procedures performed annually in the United States. Based on data published by the American Society of Cataract and Refractive Surgery in 2005, ophthalmologists now perform approximately 3 million cataract surgeries annually in this country.<sup>1</sup> At a conservative rate of 0.5% of retinal detachments following cataract surgery, at least 15,000 detachments occur nationally every year after cataract surgery. As the age-adjusted rate of retinal detachment for the general population over 50 years old approaches 0.02%,<sup>2</sup> we ophthalmologists should be aware that cataract surgery is increasing their risk of detachment by as much as 10-fold. In addition to age as a risk factor, myopia greater than 5.00 or 6.00 D has been reported to account for up to 67% of all retinal detachments after cataract surgery, with the cumulative incidence rate closer to 2% annually.

Although we tell ourselves these rates are acceptable, our patients do not share that feeling. The growing popularity of refractive lens exchange and presbyopic corrections using accommodating and multifocal IOLs is driving down the average age of our patients, which may lead to a higher long-term rate of retinal detachment in the future. Will the incidence decrease with technologies like the Crystalens (Bausch + Lomb, Rochester, NY), which theoretically has a posterior vault that mimics the posterior curvature of the natural crystalline lens? What effect will the development of new lens technologies have, such as the Synchrony accommodating IOL (not available in the United States; Abbott Medical Optics Inc., Santa Ana, CA), which fills the capsular bag more generously than a standard IOL? Using the Synchrony may reduce the dynamic changes imposed on the vitreous cavity, which greatly influences the rate of retinal detachments and posterior vitreous detachment.<sup>3</sup>

I hope you enjoy this installment of "Peer Review," and I encourage you to seek out and review the articles in their entirety at your convenience.

—Mitchell C. Shultz, MD, section editor

## POSTERIOR VITREOUS DETACHMENT

In a prospective study of 188 eyes (188 patients), investigators at Ludwigshafen Hospital in Germany reported the incidence of posterior vitreous detachment (PVD) after small-incision phacoemulsification with implantation of a PCIOL. Participants underwent small-incision phacoemulsification with a foldable IOL implanted in the capsular bag. Preoperatively, 69.1% of participants had signs of PVD, and 30.9% had no signs

of PVD. By 1 year postoperatively, 58.7% of the eyes without preoperative signs of PVD developed a partial or complete PVD. There were no statistically significant associations between age, sex, spherical equivalent, or effective phaco time and the occurrence of PVD after phacoemulsification and the implantation of a PCIOL.<sup>4</sup>

In a comparative case study, 170 eyes (111 patients) that underwent cataract surgery by phacoemulsification were evaluated to determine the incidence of PVD.

Twenty-four of the eyes were phakic, and 146 were pseudophakic. The mean follow-up interval was 77 months. A PVD was documented in 50.8% of pseudophakic eyes versus 20.8% of phakic eyes; this difference was statistically significant ( $P < .0001$ ). The incidence of PVD was greater in pseudophakic eyes with an axial length of more than 25 mm than in those with a shorter axial length. Thirty-six eyes had undergone an Nd:YAG capsulotomy by the time of the recall examination, but that did not influence the prevalence of PVD.<sup>5</sup>

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After analyzing data from several studies, Coppé and Lapucci reported that cataract extraction induces modifications to the vitreous that can lead to PVD, which may play a role in the onset of peripheral vitreoretinal tractions, the development of retinal breaks, and an increased likelihood of retinal detachment. Male patients, young patients, and myopic patients reportedly had a higher incidence of retinal detachment and PVD after cataract extraction. Individuals with a history of retinal detachment in the fellow eye, intraoperative vitreous loss, and posterior capsulotomy also had an increased likelihood of retinal detachment and PVD. According to the researchers, “the available data suggest that none of these factors may represent, by itself, potential risk factors for postoperative development of retinal detachment in emmetropic eyes, however, the development of PVD after cataract surgery in eyes with lattice degeneration may be a possible risk factor for retinal detachment.”<sup>6</sup>

### **HIGH MYOPIA**

In a prospective cohort study, researchers examined the possibility and characteristics of a late increase in the cumulative risk of retinal detachment after cataract extraction and IOL implantation. They analyzed the records of 5,235 female and 4,153 male insurance beneficiaries who underwent cataract extraction and IOL implantation between August 1, 1999, and December 1, 2001, for a total of 9,388 cases. Before the end of the study, 1,084 cases were

counted as lost to follow-up. The cumulative 8-year retinal detachment rate was 2.31% in the total group. The mean interval between cataract extraction and diagnosis of retinal detachment was  $40.6 \pm 13.34$  months. Factors that significantly affected the risk of retinal detachment included male gender ( $P = .01$ ), age less than 50 years ( $P = .002$ ), increased axial length, and a history of retinal detachment in the fellow eye ( $P = .005$ ). Patients with high myopia had a significantly increased risk of retinal detachment 4 years after cataract extraction and IOL implantation, whereas individuals with moderate myopia or no myopia did not. The investigators stated, “Our findings support the need for a full preoperative explanation and continued education of the long-term risk of [retinal detachment] in high-risk patients, especially myopic men.”<sup>7</sup>

Neuhann et al conducted a retrospective study of 2,356 eyes (1,519 patients) with an axial length greater than 27.0 mm who underwent phacoemulsification and the implantation of a PCIOL in the capsular bag. The investigators sought to determine the incidence of and risk factors for retinal detachment in highly myopic eyes after cataract surgery. Follow-up analysis occurred more than 24 months postoperatively for 84% of eyes. Investigators noted a 1.5% to 2.2% incidence of postoperative retinal detachment. They found that sex, history of laser capsulotomy, and increased axial length did not have a statistically significant effect on the incidence of retinal detachment. However, the risk for retinal detachment after cataract surgery in highly myopic eyes was greater than in emmetropic eyes, and there was a statistically significantly higher risk of retinal detachment in young patients and individuals who received preoperative prophylactic treatment for retinal degeneration.<sup>8</sup>

In a letter to the editor, Rosen commented on the study by Neuhann et al<sup>8</sup> and other research in which investigators assessed the risks associated with refractive lens exchange. He stated that the greater the axial length of an eye, the greater the vitreoretinal stretching. Rosen noted that the crystalline lens specifically increases the risk of PVD, because its removal changes the internal environment of the eye, which appears to be a major cause of retinal breaks. He also noted that the implantation of a phakic IOL appears to be safer than refractive lens exchange in terms of rhegmatogenous retinal detachment in young cohorts with myopic eyes who are seeking refractive correction. He added, “Of course, refractive lens exchange surgery presents more risks than rhegmatogenous retinal detachment, but the risks of surgery in general, including endophthalmitis and myriad other rare events, must not be forgotten; it is only recently that rhegmatogenous retinal detachment risks in myopic eyes have become more clear.”<sup>9</sup>

Mehdizah and Nowroozzadeh responded to the study by Neuhann et al<sup>7</sup> by providing explanations of why the rate of postoperative retinal detachment was significantly higher in young patients than in patients who had preoperative prophylactic treatment for retinal degeneration. Mehdizah and Nowroozzadeh stated that preoperative laser treatment of retinal lesions may raise the risk of retinal detachment by increasing the rate of PVD and inducing abnormal adhesions. They suggested that careful and regular postoperative retinal examinations may be the best prophylaxis for postoperative retinal detachment in all eyes except those with preoperative horseshoe retinal tears bearing traction. Neuhann IM and Neuhann TF replied that they strongly agree with this conclusion but noted that their study was designed to “effectively demonstrate an increase in the rate of retinal detachment by preoperative prophylactic retinopexy and added that the issues leading to retinal detachment in pseudophakia cannot be clarified.”<sup>10,11</sup>

### LASER THERAPY

A prospective study was conducted among patients at the Liaquat National Hospital and Medical College in Karachi, Pakistan, to document the frequency of retinal detachment and other complications associated with Nd:Yag laser capsulotomy. A total of 104 eyes (52 patients) that underwent Nd:Yag laser capsulotomy between 2005 and 2006 were analyzed. The procedure was performed to treat posterior capsular opacification after phacoemulsification/extracapsular cataract extraction and IOL implantation. Of the 93.3% of patients who presented within 3 years of cataract surgery, the frequency of retinal detachment was 1.9%, and the incidence of cystoid macular edema was 9.6%.<sup>12</sup>

In a retrospective, consecutive interventional study, Morris et al reported the safety and efficacy of peripheral 360° laser retinopexy performed at the time of vitrectomy for the removal of a retained cataract fragment as a prophylaxis against rhegmatogenous retinal detachment. The charts of 78 patients (78 eyes) that underwent pars plana vitrectomy for removal of retained cataract material by the same surgeon between 1995 and 2000 were reviewed. The mean interval between cataract surgery and pars plana vitrectomy with 360° laser retinopexy prophylaxis was 14 days. One of 78 eyes had postoperative rhegmatogenous retinal detachment during a mean follow-up of 6 years, and no laser-related complications occurred. Investigators concluded that “360° laser retinopexy prophylaxis could significantly reduce the incidence of this visually disabling complication.”<sup>13</sup>

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### CAPSULAR COMPLICATIONS

In a case-controlled study, Jakobsson et al analyzed data from the Swedish National Cataract Register that consisted of cataract surgery cases with and without capsular complications during 2003. From this cohort, the investigators randomly selected 324 patients with a capsular complication to be in the study group and 331 patients without a capsular complication to be in the control group. The medical records of patients in both groups were analyzed for up to 3 years after cataract extraction, at which time 13 patients in the study group were identified as having retinal detachment related to cataract extraction. One patient in the control group had a retinal detachment. Therefore, the 3-year incidence of retinal detachment was 4% in the study group and 0.3% in the control group. Multivariate data analysis showed an adjusted odds ratio of 14.8 for retinal detachment after capsular complications ( $P = .01$ ). Variables that were significantly associated with retinal detachment in single-factor analyses were male sex, long axial length, lensicular remnants in the vitreous, and a PCIOL not located in the capsular bag. The researchers also found that visual outcomes after retinal detachment in eyes with a capsular complication were poor.<sup>14</sup>

### POPULATION-BASED STUDIES

By reviewing records spanning a 25-year period, investigators estimated the long-term cumulative risk of retinal detachment after cataract extraction in a population-based cohort study. They analyzed data on all residents of Olmsted County, Minnesota, who underwent cataract extraction from 1980 through 2004. Each retinal detachment case was matched to two controls chosen from the primary cataract surgery cohort by age, gender, and duration of follow-up. Of 10,256 eyes (7,137 patients), 82 cases of retinal detachment were identified. Retinal detachment rates were 0.27% 1 year after cataract extraction and phacoemulsification, 0.71% at 5 years, 1.23% at 10 years, 1.58% at 15 years, and 1.79% at

20 years. At the 20-year mark, the risk of retinal detachment remained four times higher than would be expected in a comparable group of residents who did not have cataract surgery ( $P < .001$ ). Male gender, young age, myopia, increased axial length, and a posterior capsular tear were associated with an increased risk of retinal detachment ( $P < .01$ ).<sup>15</sup>

Mitry et al conducted a systematic review of all population-based epidemiological studies of rhegmatogenous retinal detachment published between January 1970 and January 2009 using an online database and search engine. The overall incidence of rhegmatogenous retinal detachment is not well established due to the varying estimates, inclusion criteria, and other design features of the studies conducted. The researchers reported that the incidence of rhegmatogenous retinal detachment varies with patients' ethnicity and is strongly associated with increasing age, myopia, and certain vitreoretinal degenerations.<sup>16</sup> ■

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