



Diabetic Retinopathy Severity and Cataract Surgery

When Less Is More

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A common scenario for referral to a retina specialist is the diabetic patient in need of evaluation before cataract surgery. Patients with diabetic retinopathy (DR) and diabetic macular edema (DME) often demonstrate comorbid cataracts, which occur earlier and more commonly in the diabetic population. Although advancements in cataract surgery have improved outcomes, the uncomplicated procedure may still result in pseudophakic macular edema in both diabetic and nondiabetic patients, and concern exists that the procedure may exacerbate DR. Recent studies have provided guidance for improved management of diabetic patients with cataracts.

In the standard preoperative management of diabetic patients with cataracts, the severity of DR and extent of DME are determined, and needed treatment is initiated before cataract surgery. Today, many choices for therapy are available, and a customized treatment strategy is determined based on individual factors. Although improved systemic control of hyperglycemia and hypertension has an extremely powerful effect on reducing progression of DR, it takes months to years to show a benefit,¹ so it may not impact surgical outcomes for patients scheduled for cataract surgery in the near future. Vitreoretinal surgery may be indicated in advanced proliferative DR when tractional retinal detachment and vitreous hemorrhage are present. Laser photocoagulation is still recommended by the American Academy of Ophthalmology 2020 Preferred Practice Patterns for treatment of proliferative diabetic retinopathy (PDR) and extrafoveal DME,² although recent studies have demonstrated the benefits of anti-vascular endothelial growth factor (VEGF) treatment in these conditions. Commonly, anti-VEGF therapy is the initial therapy for both DR and DME, and is typically continued through the postoperative period. The perioperative use of topical NSAIDs has been adopted widely and has been demonstrated to improve outcomes.³ Steroid therapy may be useful in the management of DME, although caution must be taken to monitor for side effects, especially in steroid responders who may experience intraocular hypertension. The coordination of retina therapy with the timing of the cataract surgery can optimize results and minimize complications.

The report by Han et al in the current issue (see pg 351) provides interesting insight into the effect of cataract surgery on diabetic patients of all Early Treatment of Diabetic Retinopathy Study (ETDRS) diabetic retinopathy severity score (DRSS) subgroups.⁴ Their retrospective study

analyzed clinical data from the medical records of diabetic patients undergoing cataract surgery during a 5-year period (2013–2018) at a large academic medical center. Patients who were receiving intravitreal injections within 1 month before cataract surgery were excluded, thereby attempting to select those without DR or DME and those with stable DR for the study. Included patients had documented preoperative and postoperative DRSSs and best-corrected visual acuities (BCVAs).

A total of 355 patients were sorted into subgroups by the preoperative DRSS as follows: (1) no DR (n = 138), (2) mild or moderate nonproliferative DR (NPDR; n = 125), (3) severe NPDR (n = 20), and (4) PDR (n = 72). The primary outcome measured was BCVA at 1 year after cataract surgery. All 4 cohorts showed significant median improvements of 10 ETDRS letters or more. The multivariate analysis found that lower preoperative DRSS was significantly predictive of greater overall improvement in BCVA.

This report complements the findings of recent studies that have reported the effect of cataract surgery on DR and DME in patients receiving anti-VEGF therapy for DME.

Interestingly, at 1 year after cataract surgery, the incidence of macular edema (ME) was found to increase in all 4 cohorts (ranging from 25% to 46.2%); however, the percentage of patients who received intravitreal injections as treatment for ME was low at 0.6% for the no DR group and 6.4% for the mild or moderate NPDR group. Higher injection rates for ME were seen in the more severe DRSS groups: 50% of severe NPDR patients received injections, as did 16.7% of PDR patients. Significantly, DR severity progression at the 1 year follow-up examination was found to be low in all subgroups. Increased DRSSs were found in only 6.5% of no DR patients, 2.4% of mild or moderate NPDR patients, and 4.0% of severe NPDR patients.

The inferences to be drawn from this large study of cataract surgery in diabetic patients with stable or no DR are: (1) the procedure is intrinsically beneficial, resulting in improved BCVA for all DRSS subgroups; (2) the procedure is associated with minimal progression of DR severity or need for anti-VEGF injection; and (3) improvements in BCVA are greater in patients with less severe DR at baseline.

This report complements the findings of recent studies that have reported the effect of cataract surgery on DR and DME in patients receiving anti-VEGF therapy for DME. Post hoc analysis in the RIDE and RISE and the VISTA and VIVID studies found that the subgroups of diabetic patients undergoing cataract surgery were significantly less likely to

demonstrate ME or DR severity progression in the treated cohorts versus patients receiving sham treatment.^{5,6} Moreover, these studies and the PANORAMA study demonstrated that diabetic patients are more likely to experience reversal of DRSSs as a result of anti-VEGF therapy.⁵⁻⁹

How do these studies guide the rationale for customized therapy of DR for patients anticipating cataract surgery? Note that patients with lower DRSSs seem to achieve better outcomes after cataract surgery. It seems reasonable to study whether anti-VEGF therapy to reduce DR severity before cataract surgery could improve postoperative results. Questions include how to determine the optimal duration of preoperative therapy or whether specific targets in severity reduction exist that should be met before cataract surgery. Moreover, is the estimation of DR severity by the DRSS adequate in the modern clinic? Ultra-widefield fluorescein angiography may facilitate better detection of ischemia and proliferative changes, and it is perhaps a more accurate method to describe DR severity.¹⁰

The increased medical need of diabetic eye disease is a challenge to our society and our profession. As clinical studies elucidate the scope and relative usefulness of therapy, reasons for optimism exist that the need can be met.

References

1. Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Research Group. Prolonged effect of intensive therapy on the risk of retinopathy complications in patients with type 1 diabetes mellitus, 10 years after the Diabetes Control and Complications Trial. *Arch Ophthalmol*. 2008;126:1707–1715.
2. Flaxel CJ, Adelman RA, Bailey ST, et al. Diabetic retinopathy Preferred Practice Pattern. *Ophthalmology*. 2020;127:66–145.
3. Singh RP, Lehmann R, Martel J, et al. Nepafenac 0.3% after cataract surgery in patients with diabetic retinopathy. *Ophthalmology*. 2017;124:776–785.
4. Han MM, Song W, Conti T, et al. Visual Acuity Outcomes after Cataract Extraction with Intraocular Lens Implantation in Eyes with Diabetic Retinopathy. *Ophthalmol Retina*. 2020;4:351–360.
5. Moshfeghi AA, Shapiro H, Lemmon LA, Gune S. Impact of cataract surgery during treatment with ranibizumab in patients with diabetic macular edema. *Ophthalmol Retina*. 2018;2:86–90.
6. Moshfeghi AA, Thompson D, Berliner AJ, Saroj N. Outcomes in patients with diabetic macular edema requiring cataract surgery in VISTA and VIVID studies. *Ophthalmol Retina*. In press.
7. National Library of Medicine, National Institutes of Health. Study of the efficacy and safety of intravitreal aflibercept for the improvement of moderately severe to severe non-proliferative diabetic retinopathy (NPDR) (PANORAMA). <https://clinicaltrials.gov/ct2/show/NCT02718326>; March 24, 2016. Accessed January 25, 2020.
8. Ip MS, Zhang J, Ehrlich JS. The clinical importance of changes in diabetic retinopathy severity score. *Ophthalmology*. 2017;124:596–602.
9. Ip MS, Domalpally A, Sun JK, Ehrlich JS. Long-term effects of therapy with ranibizumab on diabetic retinopathy severity and baseline risk factors for worsening retinopathy. *Ophthalmology*. 2015;122:367–374.
10. Ehlers JP, Jiang AC, Boss JD, et al. Quantitative ultra-widefield angiography and diabetic retinopathy severity. *Ophthalmology*. 2019;126:1527–1532.

Footnotes and Financial Disclosures

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