Lens-Sparing Vitrectomy for Progressive Tractional Retinal Detachments Associated With Stage 4A Retinopathy of Prematurity

Andrew A. Moshfeghi, MD; Michael J. Banach, MD; Gohar A. Salam, MD; Philip J. Ferrone, MD

Objective: To describe the results of lens-sparing vitrectomy in infants with progressive, fovea-threatening, tractional retinal detachments associated with stage 4A retinopathy of prematurity.

Methods: In a retrospective, interventional, consecutive clinical case series, the records of patients with stage 4A retinopathy of prematurity who underwent lens-sparing vitrectomy for progressive retinal detachments were reviewed. Retinal attachment status, reversed or arrested retinal dragging, and visual acuity were assessed after the procedure.

Results: Thirty-two eyes of 29 patients underwent lens-sparing vitrectomy at a mean postconceptional age of 43 weeks. Thirty (94%) of 32 eyes had complete retinal reattachment and arrest or reversal of retinal dragging after 1 lens-sparing vitrectomy. Visual acuity of at least central, steady, and unmaintained was observed in 17 (81%) of the 21 eyes in which it was tested and at least central, steady, and maintained vision was measured in 13 (62%) of 21 eyes, with 1 eye achieving 20/40 visual acuity.

Conclusions: Lens-sparing vitrectomy is a safe and effective procedure for the treatment of fovea-threatening retinal detachments in patients with stage 4A retinopathy of prematurity.

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Lens-sparing vitrectomy (LSV) has been shown to be an effective and safe alternative to scleral buckling for management of retinal detachments associated with stage 4A retinopathy of prematurity (ROP).1-5

To further evaluate the efficacy and safety of LSV, we retrospectively analyzed a consecutive series of patients with stage 4A ROP who had progressive, fovea-threatening, tractional retinal detachments treated by a single surgeon. Herein, we report their anatomic and visual results.

We performed a noncomparative, retrospective, consecutive case series of 32 eyes of 29 patients with progressive, fovea-threatening retinal detachments associated with stage 4A ROP. All infants were initially examined and treated at 2 large retina referral practices by a single surgeon (P.J.F.). No eye was considered for surgery unless more than 4 temporal clock hours or 6 total clock hours of nontemporal retinal detachment were seen by indirect ophthalmoscopy. The LSV was performed as previously described.1

The patients’ records were reviewed for the following data: gestational age, birth weight, involved eye, lowest zone of ROP involvement, whether the infant had received preoperative laser ablation or a scleral buckle, the postconceptional age at the time of LSV, postoperative crystalline lens status, retinal reattachment status, final visual acuity (if available), and length of follow-up.

Main outcome measures included retinal reattachment, reversed or arrested retinal dragging, and visual acuity.

RESULTS

Thirty-two eyes of 29 patients were analyzed. Sixteen of the infants were female and 13 were male. Birth weights ranged from 550 to 1420 g, with a mean birth weight of 776 g. The infants’ postconceptional ages at the time of LSV ranged from 38 to 63 weeks, with a mean of 43 weeks. The infant who underwent LSV at 63 weeks was an exception resulting from a delayed referral. All eyes had progressive stage 4A disease (2 had undergone a previous scleral buckling procedure). All eyes had received laser ablation.

Comprehensive patient data are summarized in the Table. Thirty (94%) of 32 eyes had complete retinal reattachment and arrest or reversal of retinal dragging after...
Two eyes had progressive retinal traction postoperatively and were successfully treated with scleral buckling. Therefore, retinas were ultimately reattached in all 32 eyes. Six eyes had zone 1 disease and 26 had zone 2 disease. Specific visual acuity data were available for 21 eyes. A visual acuity of at least central, steady, and unmaintained was found in 17 (81%) of 21 eyes and at least central, steady, and maintained vision was seen in 13 (62%) of 21 eyes, with 1 eye achieving 20/40 visual acuity (via Allen pictures). Mean length of follow-up was 766 days (range, 60-2114 days).

Two eyes developed cortical cataracts, one of which developed more than a year after the LSV. These were treated successfully (one with cataract extraction and posterior chamber intraocular lens implant, and the other with lensectomy and aphakic contact lens correction).

No eyes had endophthalmitis or developed a rhegmatogenous retinal detachment.

**COMMENT**

This study demonstrates that LSV is a safe and effective technique for the management of eyes with progressive, fovea-threatening, tractional retinal detachments in patients with stage 4A ROP. The most important finding is the high rate (94%) of anatomic success in patients with advanced and progressive ROP with more than a 2-year follow-up. Many children in this series were too young for Snellen visual acuity measurement and some were lost to follow-up. However, in 21 eyes we were able to obtain visual acuity data, and they demonstrated an encouraging trend toward development of useful vision with LSV.

Because such a high rate of anatomic success can be achieved with this technique, it is important to emphasize the benefits of close comanagement with a pediatric ophthalmologist for the treatment of significant refractive errors and amblyopia to have a successful visual outcome in these visually immature infants. By maintaining the crystalline lens and effectively reducing retinal traction, LSV offers the infant good visual potential. Patient 22 responded remarkably well to LSV intervention and attained 20/40 visual acuity.

Scleral buckling, which has been the standard of care in these cases, can be helpful, although it has drawbacks. These drawbacks include usually inducing sig-
nificant refractive error and not directly treating vitreous traction, which can allow for further retinal dragging, even though there may be posterior retinal reattachment.8

All eyes operated on in the present series were considered to have progressive, fovea-threatening retinal detachments associated with stage 4A ROP. Although small, nonprogressive stage 4A detachments may resolve without intervention, all eyes in our study had at least 4 temporal clock hours of a fovea-threatening, rapidly progressive retinal detachment (followed up weekly by 1 examiner), or a total of at least 6 clock hours of progressive nontemporal retinal detachment. It is likely that these eyes would have progressed without some form of intervention.

Although LSV may have a steep learning curve, the anatomic and visual results are good, with a low complication rate.8 As with other LSV studies,1,2,7 no significant complications of iatrogenic retinal detachment or endophthalmitis were encountered. Although 2 cataracts formed after this procedure, one developed well beyond a year after the LSV and thus was probably not the result of direct surgical trauma. Both cases of cataract were managed effectively.

Compared with a previous series,2 which found a 90% retinal reattachment rate, our study found a comparable rate of 94%. Visual acuity potential was similar between the 2 studies as well. As both cohorts of patients become older, we expect to gain further insight with regard to their visual acuity development. The present study, in addition to other studies of LSV,1,2,7 demonstrates the effectiveness, safety, and long-term benefit of this technique as a viable treatment option for selected patients with advanced ROP.

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Correspondence: Philip J. Ferrone, MD, Long Island Vitreoretinal Consultants, 600 Northern Blvd, Suite 216, Great Neck, NY 11021.

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REFERENCES