

Discussion

by

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The effectiveness of indirect laser photocoagulation for the management of threshold retinopathy of prematurity (ROP) has been well reported. A meta-analysis of the available literature suggested that laser was probably at least as effective as cryotherapy for threshold ROP and may be superior.¹ All of the reports assessed in this analysis described the desired treatment strategy. Although some variation exists, these reports essentially agreed that the desired treatment endpoint was a moderately intense, gray-white burn spaced no more than 1 burn width apart to the entire avascular retina anterior to the ridge. Several subsequent reports have described a similar treatment strategy with similarly favorable results (see Table 1).²⁻⁹ The mean number of laser applications for treatment of threshold ROP in these reports, when reported, ranges from 410 to 1556. The unfavorable outcome rate, using the same definition as the Cryo-ROP study, ranged from 0% to 27% in these reports.

Ferrone et al are the first to report on a substantial variation in this treatment strategy and on its impact on the anatomic results. The treatment strategy used by the surgeon in cohort 1 is quite similar to that described in previous reports. The desired density of laser spots and the mean number of applications are consistent with prior studies, and the very low rate of progression to an unfavorable result is consistent as well. In contrast, the technique described in cohort 2 represents a substantially reduced intensity of treatment when compared with previous studies. This is especially apparent when considering the mean number of laser applications in the 18 eyes in zone 1. In cohort 2, the mean number of applications was 592 with a range of 295 to 861 spots for eyes in zone 1. Previous reports have described applications numbering approximately 1000 and ranging as high as 2300 for eyes in zone 1. The 21% rate of progression for eyes in zone 2 and 44% rate for eyes in zone 1 in cohort 2 are higher than nearly all other published reports.

Several theoretic benefits of relatively light laser treatment exist. Shorter treatment time means potentially less physical stress on a sometimes fragile, medically unstable infant. Fewer laser applications may reduce the risk of cataract, minimize the impact of treatment on the peripheral visual field, and lessen the tendency toward significant myopia. Late-onset retinal detachment resulting from tears at the edge of treatment scars may be less likely as well. Although this is the first report specifically addressing the effectiveness of light treatment with laser photocoagulation, Nissenkorn et al¹⁰ have reported on partial cryoablation for threshold ROP. Complete

regression was reported with treatment limited to the area just anterior to the ridge of neovascularization in 23 of 23 eyes.

Although the impact of other variables such as retreatment timing and systemic parameters cannot be assessed in this study, it is apparent that the theoretic benefits of light laser treatment come at the expense of a higher rate of treatment failure. Considering the suboptimal visual results associated with surgical repair of retinal detachment in ROP, even when the anatomic goals of surgery are achieved, all efforts should be focused on prevention of stage 4 and stage 5 disease. Reducing the likelihood of developing threshold disease by alternative medical management of the neonate remains a critical avenue of research. The evidence presented by Ferrone et al suggests, however, that when threshold disease develops, it is vital that sufficiently dense laser treatment, similar to that used in cohort 1 and previously reported studies, be applied initially to achieve best results.

References

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Table 1. Previous Reports of Laser for Retinopathy of Prematurity

Author	Mean No. Burns	Spacing	Unfavorable Outcome (%)	Comment
Landers et al ²	696	Contiguous	27	
Iverson et al ³	410	Not specified	0	
McNamara et al ⁴	816	½ Burn	6	Argon
Seiberth et al ⁵	1556	¼ to 1 Burn	0	
Hunter and Repka ⁶	Not specified	¼ to ½ Burn	6	
McNamara et al ⁷	959	½ Burn	11	Diode
Fleming et al ⁸	960	½ Burn	0	Posterior dz
Capone et al ⁹	Not specified	½ to 1 Burn	17	Zone 1

dz = disease.