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Letter to the Editor

Transpupillary Diode Laser Retinal Photocoagulation for the Treatment of Retinopathy of Prematurity: Experience in Southern Iran

Dear Editor,

Retinopathy of prematurity (ROP) is an ischemic retinopathy of premature and low birth weight infants. According to the early treatment for retinopathy of prematurity (ETROP) study, 68% of infants with birth weight less than 1,251 grams developed ROP of any degree.[1] ROP is a potentially blinding disorder and approximately 300 children per million live births have at least one eye blinded by ROP.[2]

Laser photocoagulation, typically a dense or near confluent pattern, is currently used as the standard treatment for high-risk prethreshold or worse ROP.[3] The incidence and severity of ROP are claimed to be influenced by the quality of neonatal intensive care unit facilities and probably by ethnicity. Therefore, the screening and treatment guidelines developed by the US physicians may not be fully applicable to neonates from other countries. Consequently, every country should conduct studies on its own population to refine such guidelines.

The aim of the present study was to report our experience with the safety and efficacy of transpupillary diode laser photocoagulation for the treatment of type 1 ROP infants according to the definitions specified by the ETROP study.[1] In this retrospective chart review, we studied the clinical records of 51 (102 eyes) consecutive patients with type 1 ROP. These patients underwent transpupillary diode laser photocoagulation by one of the three surgeons (MA, MHN, or FR) at the Khalili Eye Hospital (Shiraz, Iran) between July 2011 and March 2013. Eyes with concomitant disorders such as congenital glaucoma or congenital eye disorders, and patients without timely referral or poor follow-up were excluded. Type1 ROP was defined[1] as:

- Zone I, any stage ROP with plus disease (n=6 eyes, 5.9%)
- Zone I, stage 3 ROP without plus disease (n=2 eyes, 2.0%)
- Zone II, stage 2 ROP with plus disease (n=14 eyes, 13.7%)
- Zone II, stage 3 ROP with plus disease (n=80 eyes, 78.4%).

All patients were treated within 48 hours of diagnosis. The research protocol adhered to the tenets of the Declaration of Helsinki. Detailed informed consent was obtained from parents or legal guardians of infants. The study protocol (number: 6129) was approved by the Ethics Committee of Shiraz University of Medical Sciences.

Before treatment, pupils were fully dilated with one drop of phenylephrine hydrochloride 2.5%, tropicamide 1% and cyclopentolate 1% instilled into each eye 3 times in10-minute intervals. Laser photocoagulation was performed under general anesthesia with sevoflurane and endotracheal intubation. A head-mounted 808 nm diode laser (DC-3300,Nidek Co., Ltd., Japan) through an indirect delivery system (Keeler Ophthalmic instruments, UK) and a wide-field aspheric handheld condensing lens (MaxField 28D,Ocular Instruments Inc., WA, USA) were used in all treatments. The avascular retina between the ridge and ora serrata was treated with near confluent laser photocoagulation. All included infants were followed at least 4 months after therapy. Repeated laser therapy of skipped avascular retinal areas were performed if deemed necessary. Unfavorable structural outcome was defined as progression to stage 4 or worse ROP.

The mean (±SD) birth weight of treated patients was 1,269±336 grams, mean gestational age of patients was 29±1.9 weeks, and 30 (58.8%) were male. 37 (72.5%) out of 51 pregnancies were terminated using cesarean delivery. There were 30 (58.8%) singleton births, 18 (35.3%) twin births, and 3 (5.9%) triplet births. The mean chronological age at the time of laser therapy was 51.1±9.1 days and the interval between diagnosis of type 1 ROP and laser treatment was 25.3±12.6 hours. The mean number of laser spots delivered per eye was 1,102±247. Supplemental laser therapy of skipped area was performed in 8 eyes (7.8%). For these eyes, the mean interval between the first and second laser treatment was 9.5±3.1 days. Follow-up ranged from 4 to 7 months with a mean of 5.2±1.1 months. Overall, 99 eyes (97.1%) showed a satisfactory response to diode laser photocoagulation and 3 eyes (2.9%) eventually progressed to stage 4 ROP. Of those who failed, two (66.7%) had ROP in zone Iand, one in zone II. In other words, progression to stage 4 ROP was found in 25.0% of eyes with type 4ROP

in zone I, and 1.1% of those in zone II. Five patients (9.8%) had difficult intubation, but no significant intra- or post-operative systemic complications were observed. Significant ocular complications included vitreous hemorrhage (2.9%), transient corneal edema (2.0%), and exudative retinal detachment (1.0%); all were resolved spontaneously after several weeks.

The findings of our study suggest that transpupillary diode laser photocoagulation under general anesthesia is an effective and safe procedure for treating type 1 ROP. Overall, 97.1% of treated eyes showed favorable structural outcome in short-term. However, this approach was less effective for zone I ROP than zone II; corroborating findings from previous studies.[4] Parvaresh et al.[5] used transscleral diode laser photocoagulation under topical anesthesia for treating ROP and found similar structural outcomes as the present study (96.1% vs. 97.1% anatomical success, respectively). The mean gestational age of treated neonates in our study was 29.0±1.9 weeks, similar to that reported by Parvaresh et al.[5] (29.2±2.2 weeks). The greatest gestational age for type 1 ROP recorded in these studies were 35 and 34 weeks, respectively. The greatest recorded birth weight was 2,000 grams in our study and 1,850 grams in Parvaresh et al.[5] Consequently, it is unlikely that in our region a neonate with gestational age >35 weeks and birth weight > 2,000 grams turns into type 1 ROP.

The major drawbacks of the present study include the retrospective nature, short follow-up period, and the absence of functional data due to the very young age of infants at the time of data collection. These limitations could be partially mitigated in future reports on medium- and long-term results of the same cohort. The strengths of the study comprise the uniformity in screening, treatment approach, and diversity of treated infants that were referred from the entire part of southern Iran.

Conflict of Interest: None declared.

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Mehrdad Afarid, MD; Mohammad Hossein Nowroozzadeh, MD, FICO; Feisal Rahat, MD, FICO; Kazem Kamran, MD; Fatemeh Sharifi, MS

Poostchi Eye Research Center, Department of Ophthalmology, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence:
Mohammad Hossein Nowroozzadeh, MD, FICO;
Poostchi Ophthalmology Research Center, Zand Street, P.O. Box: 7134997446, Shiraz, Iran
Tel: +98 71 32302830
Fax: +98 71 32355936
Email: norozzadeh@gmail.com
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