Commentary: Retinal immaturity at first screening and retinopathy of prematurity: Image-based validation of 1202 eyes of premature infants to predict disease progression

Retinopathy of prematurity (ROP) has assumed epidemic proportions in India, thanks to the improved survival of low-birth-weight infants. If one considers the fact that every infant that is sent for screening requires a minimum of 2 visits to the retinologist even to declare normalcy, one can estimate the burden on the health care system. If unfortunately, they do have avascular retina or develop ROP, then the strain on the retinologist's time increases exponentially.

It is obvious that finding ways of predicting the occurrence of ROP is very useful in planning—in terms of focusing attention on infants at risk of developing ROP.

Pathogenetically one understands that the starting point is the presence of avascular retina secondary to the premature birth of the infant.[1] On top of this, more retina can become avascular by uncontrolled oxygen administration. The subsequent development of ROP, especially of the treatment-requiring stage, is dependent on several factors. Most studies have shown that in addition to the birth weight and gestation age, several postnatal factors influence the occurrence or otherwise of the treatment requiring stages of ROP, notable of which are, the number of days the infant is on ventilatory support, presence of respiratory distress syndrome, etc.[2-4]

Most studies have also shown that the gestation age and birth weight are independent risk factors for the development of ROP (adjusted for the other postnatal factors). We also understand that the extent of the avascular (immature) retina at the time of the birth of the infant is roughly proportional to the gestation age and birth weight. Hence, one would intuitively suspect that the extent of the avascular retina at birth should be an important predictor of the occurrence of treatment requiring ROP.

In this issue of *IJO*, Vinekar *et al*. have published their results of a study wherein they graded the retinal immaturity at the time of primary screening and correlated it with the development of treatment requiring ROP subsequently.[5] They found that the degree of retinal immaturity does predict the occurrence of any ROP as well as treatment-requiring ROP.

The following factors need however to be considered while interpreting the results of this study.

1. The photographs were taken at the time of the first examination and not immediately after birth. Hence, they reflect the level of the immature retina at about 4 weeks after birth and not at birth
2. We also understand that the extent of the avascular retina at birth (which reflects the level immaturity of the infant) is likely to alter by 4 weeks in the following way
   a. In the absence of any adverse postnatal factor, the avascular retina is likely to reduce because of the natural progression of vascularization
   b. Under some conditions, the normal vascularization may not progress as it should and by 4 weeks when the first examination is done, it probably has remained unaltered
   c. Under conditions of poor neonatal care with uncontrolled oxygen administration, formed vasculature may be damaged and the extent of the avascular retina can actually be more than what it was at birth

   Unfortunately, there is no way to retrospectively assess what the extent of the avascular retina was at the time of birth from the pictures taken at 4 weeks after birth
3. Vinekar *et al*. have graded the extent of avascular retina based on the anterior-most point that the vascularization has reached. However, this does not always reflect the percentage of the area of the retina that is avascular. A sharp dip posteriorly of the anterior limit of retinal vascularization even by 1 clock hour (circumferentially) can push a case from mild group to moderate or even severe group, even when the surface area of the avascular retina is minimal. A study that quantifies the avascular retina as a percentage of the overall retinal area may be truly reflective of the contribution of the avascular retina alone as a factor for the development of ROP
4. It is also to be noted that eyes in group 1 (958 eyes) with vascularization touching the zone 3 still had 15% incidence of any ROP (128 eyes) and of these 12.5% (16 eyes) needed treatment, i.e. only 1.6% of the group 1 eyes develop treatment needing ROP. This information reduces the pressure on the diligence and frequency of follow up needed in this group, but it also tells us that despite avascular retina being restricted to zone 3, one cannot relax our vigil and a few of them may still end up in needing treatment.

Despite these limitations, the contribution by Vinekar *et al*. is commendable and guides the retinologist in focusing the attention on high-risk infants better.

The burden of screening the infants is mainly on the retinal specialist in India (with some contribution from pediatric ophthalmologists). Hence, any knowledge that can modify the intensity of follow up needed is welcome.

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References

1. Harnett ME. Pathophysiology and mechanisms of severe retinopathy of prematurity. Ophthalmology 2015;122:200-10.
2. Chen YH, Lien RI, Tsai S, Chang CJ, Lai CC, Chao AN, *et al*. Natural history of retinopathy of prematurity: Two year outcomes of a prospective study. Retina 2015;35:141-8.
3. Enomoto H, Miki A, Matsumiya W, Honda S. Evaluation of oxygen supplementation status as a risk factor associated with the development of severe retinopathy of prematurity. Ophthalmologica 2015;234:135-8.
4. Van der Merwe SK, Freeman N, Bekker A, Harvey J, Smith J. Prevalence of and risk factors for retinopathy of prematurity in a cohort of preterm infants treated exclusively with non-invasive ventilation in the first week after birth. S Afr Med J 2013;103:96-100.
5. Jayadev C, Vinekar A, Bharamshetter R, Mangalesh S, Rao HL, Dogra M, *et al*. Retinal immaturity at first screening and retinopathy of prematurity: Image-based validation of 1202 eyes of premature infants to predict disease progression. Indian J Ophthalmol 2019;67:846-53.

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