Editorial: Retinopathy of Prematurity; A Synopsis

**Abbreviations:** ROP: Retinopathy of Prematurity; ETROP: Early Treatment for Retinopathy of Prematurity; VEGF: Vascular Endothelial Growth Factor; UCB: Umbilical Cord Blood

Retinopathy of prematurity (ROP) or retrolental fibroplasia is a vasoproliferative disorder that occurs to the retina of premature infants and was first diagnosed in 1942 by Terry [1]. ROP in severe cases damage the retina by detaching from the wall of the eye and possibly causing visual impairment and blindness [2, 3]. In the last 7 decades, there have been several advancements in the understanding and treatment of ROP. In spite of these advances, there are approximately 50,000-60,000 children globally who are blind as a result of ROP [4]. Every year in the U.S. about 14,000 get affected by ROP out of which about 1,100-1,500 develop advanced or severe diseases which require medical treatment and eventually 400-600 infants become blind [5]. In Middle East, over the last 10 years there is an increase observed in the ROP incidence from 23.1% to 56%. The burden of ROP is increasing rapidly and there is a need to focus on the earlier intervention and implementation of effective treatment strategies as this is a lifetime disease [6].

The major risk factors include prematurity, low birth weight, time of achievement of full feeding and hyperoxia. Other possible risk factors include anemia, blood transfusion, respiratory distress, and breathing difficulties. The underlying physiologic mechanism through which breast milk may protect against the development of ROP may reflect the antioxidant and immune protective properties of human milk [2,3,7,25].

ROP screening is generally done in babies whose birth weight is <1500 g or ≤32 weeks of gestation or selected infants by their neonatologist who are at higher risk. ROP is classified based on the location (zones I-III) and severity (stages I-V) as well as plus disease. Screening is required immediately within 48 hours [4]. Consanguinity may affect the ROP incidence. The BEAT-ROP trial presented the results that eyes with zone I threshold disease was better managed by bevacizumab than with conventional laser and zone II eyes was managed similarly by both therapies. Most ROPs required single bevacizumab injection [14]. The outcomes of ROP treatment with bevacizumab after 2 years showed that 82% of infants have not had recurrence or any other complications that required intraocular vascular endothelial growth factor (VEGF) levels that was successfully treated with intravitreal bevacizumab [14]. The BEAT-ROP trial presented the results that eyes with zone I threshold disease was better managed by bevacizumab than with conventional laser and zone II eyes was managed similarly by both therapies. Most ROPs required single bevacizumab injection [15-17]. The outcomes of ROP treatment with bevacizumab after 2 years showed that 82% of infants have not had recurrence or any other complications that required intraocular vascular endothelial growth factor (VEGF) levels that was successfully treated with intravitreal bevacizumab [14].

Treatment strategies for ROP include surgeries (like vitrectomy and scleral buckle), laser or cryotherapy etc. According to the CRYO-ROP trial, timely ablation (laser photocoagulation or retinal photocoagulation) of the avascular peripheral retina decreases the incidence by 40%. However, the failure rate of the therapy remained high. Hence frequent follow up and timely surgical intervention is warranted [13]. There is a correlation between the neovascular drive in ROP eyes with stage 3 disease and intraocular vascular endothelial growth factor (VEGF) levels that was successfully treated with intravitreal bevacizumab [14]. The BEAT-ROP trial presented the results that eyes with zone I threshold disease was better managed by bevacizumab than with conventional laser and zone II eyes was managed similarly by both therapies. Most ROPs required single bevacizumab injection [15-17]. The outcomes of ROP treatment with bevacizumab after 2 years showed that 82% of infants have not had recurrence or any other complications that required intraocular vascular endothelial growth factor (VEGF) levels that was successfully treated with intravitreal bevacizumab [14].

The Early Treatment for Retinopathy of Prematurity (ETROP) study produced favorable results yielding new guidelines for treatment of infants with ROP. These included, early treatment of high-risk prethreshold ROP improves retinal and visual outcomes at 9 months corrected age and also indicated that early treatment can be avoided for certain eyes and be observed for signs of disease progression [11]. Katargina L study also showed that modern methods like optical coherence tomography and extraretinal growth parameters are an important criteria for the early diagnosis and helps in the detection of a preclinical negative trend in cicatricial ROP [12].
Prevention of ROP [3,16,23-25]

i. Regulation of oxygen supply as both hypoxia and hyperoxia is detrimental to the baby so oxygen therapy should be carefully monitored by pulse oximetry. The saturation limit should be maintained between 90-95%.

ii. Permissive hypercapnia: reduced carbon dioxide is a risk factor for ROP. But this factor enables lower ventilator settings reducing the occurrence of lung diseases which requires prolonged oxygen use.

iii. Cautious use of blood transfusions: Adult RBCs are rich in 2,3-diphosphoglycerate and adult haemoglobin which binds less firmly to oxygen, thus releasing excess oxygen to the retinal tissue.

iv. Human milk feeding potentially plays a protective role in preventing any-stage ROP and severe ROP for very low birth weight infants.


vi. Prenatal steroids help in preventing respiratory distress and intraventricular haemorrhage, which are two important risk factors of ROP.

vii. Screening program with a proper neonatal unit, effective ROP surveillance and management decreases the severity of disease.

Conclusion

Risk factor analysis helps in understanding ROP development and can predict it in severe preterm infants. Hospitals should employ well-trained and experienced ophthalmologists for early ROP screening and treatment. Physicians should collaborate with neonatal intensive care unit coordinators for a good tracking system, which includes initial screenings to follow-up until post-discharge care. A high priority is given to the screening program conducted by the World Health Organization’s “Vision 2020 program”. These help in the institution of appropriate treatment to prevent blindness and offer child a better overall development.

References


