Review Article

Retinopathy Of Prematurity (ROP)

Khan ZK[1]

1. **Zahirul Kabir Khan, Professor and Head, Department of Pediatrics, Jahurul Islam Medical College & Hospital, Kishoregonj.*

****Address of correspondence***

It is a complex disease of the developing retinal vasculature in premature infants. It was first reported by Theodore L. Terry in 1942[1]. Previously it is called Retrolental fibroplasias, also called Terry syndrome[2]. It is one of the preventable causes of blindness of early onset in children. Although many premature babies eventually develop some degree of ROP, but most do not develop severe form.

Bangladesh is the eighth most populous country in the world and is currently ranked as a low middle income country[3]. Advances in neonatal care & improvement in the country's economy have significantly increased survival of preterm infant. This improvement in neonatal care, which is sometimes suboptimal because of limited facilities and manpower, contributes to the current epidemic of ROP in Bangladesh[4].

The actual prevalence of ROP in Bangladesh is unknown but the rate of ROP has been found to affect as many as 40% of preterm infant. Approximately 3.75 million babies are born in Bangladesh each year. Among them, about 604,000 babies are born prematurely (<37wk), with a preterm birth rate of 19%. Approximately 22,0000 are born with low birth weight (<25.00gm) and 22,000 babies are born before 28 weeks of gestation. About 25,000 of these weigh 1500gms or less and are at high risk of ROP[5].

Prematurity is the single most important risk factor for ROP and the incidence increases with decreasing gestation & birth weight. Poor early weight gain during the first weeks of life is also a risk factor for ROP[6,7]. Other risk factor's include high exposure to oxygen, low birth weight, respiratory distress, apnea, bradycardia, heart disease, infection, hypercarbia, acidosis, anemia, blood transfusion[8,9,10,11].

Beginning at 16wks of gestation, retinal angiogenesis normally proceeds from optic disc to the periphery, reaching the outer rim of the retina (ora serrata) nasally at about 36wks and extending temporally by approximately 40 weeks. Injury to this process results in various pathologic & clinical changes. ROP begins to develop between 32 and 34 wks after conception regardless of General Anesthesia (GA) at delivery and has two distinct phases[12]. During the acute phase, the normal vasculo-genesis of the retina is disturbed by the relative hyperoxia of the extra uterine environment. This causes vaso obliteration and non-vascularization of some areas of the anterior retina[13]. The subsequent hypoxia causes a second chronic phase, characterized by the proliferation of vascular and glial cells with arteriovenous shunt formation. The second phase is caused by over production of vascular endothelial growth factor (VEGF), other growth factors, such as insulin like growth factor 1 and placental growth factor

are also implicated the vascular changes . If extensive, particularly if scar tissue forms can lead to retinal detachment and blindness[14,15].

According to ICROP (International Classification of Retinopathy Of Prematurity). 3rd edition ROP is divided into 5 stages[16].

Stage 1- A thin white line which separates the vascular from the avascular retina.

Stage 2- A ridge develops from the demarcation line, which has both height & width.

Stage 3- Extra retinal fibro vascular tissue which extending into the vitreous.

Stage 4- Subtotal retinal detachment.

Stage 5- Complete retinal detachment.

Aggressive ROP (A-ROP): It is severe form of ROP which develops rapidly without sign of other stages such as a ridge.

To detect ROP need routine ROP screening program. By this program we can detect severe, sight-threatening ROP early. So that urgent treatment can be given. Based on the incidence and risk factors reported in the Indian literature, the following group of neonates should be screened for ROP in Bangladesh-

Criterion 1- Babies birth wt ≤ 2000gm

Criterion 2- Babies born at a GA ≤ 35wks

Criterion 3- Selected preterm (>35 - <37wks)

Infant who are sick & have needed extensive cardio pulmonary support and prolonged O_2 therapy, or apnea of prematurity, anaemia needing blood transfusion, thombocytopenia, sepsis or attending pediatrician or neonatologist considers them to be at high risk[17].

The timing of the first screening examination must be early enough to identity the first signs of ROP but late enough that the ophthalmologist has a good view of the retina. Adapted from the Indian model to meet local needs, the timing of first screening strategy, which is called 'The day-20, Day 30 strategy'[18].

Timing	**Indicators**
20 day strategy	Babies with a GA of ≤ 30wks or Birth weight of ≤ 1500gm
30 day strategy	Babies with a GA of ≤ 35wks or Birth weight of ≤ 2000gm

During ROP screening patient is examine under a radiant warmer in the NICU, under the guidance of neonatologist with assistance from nursing staff. Ideal procedure for ROP screening is indirect ophthalmoscopy and wide field imaging done by a trained ophthalmologist.

The principle of treatment is to remove the stimulus for growth of new blood vessels by ablating the peripheral avascular retinal which will in turn reduce the incidence of retinal detachment and consequent blindness. The treatment involves ablation of peripheral avascular retina by laser therapy which is less expensive, less traumatic and standard treatment option for ROP. Other treatment option includes, cryotherapy, anti VEGF treatment such as bevacizumab[19] and in advanced disease sugery such as minimal vitrectomy and removal of traction bands in case of stage 4 ROP. After treatment follow up examination for infants at risk should be done every 2-3 weeks in tervels until the retina is fully vascularized.

If patient remains untreated patient may developed complications such as refractive errors including

myopia (most common), Squint, Amblyopia, Glaucoma, Retinal detachment, Visual field defect & blindness[20].

Prevention of ROP is very important. Prevention includes primary prevention, secondary prevention & tertiary prevention. Primary prevention is prevention of preterm birth by Family planning, maternal nutrition, bed rest of mother, delayed age at marriage.

Secondary prevention includes antenatal steroids for fetal development in preterm birth, avoid ventilation, avoid 100% supplemental oxygen, delayed cord clamping, maintained body temperature, gentle resuscitation in room air, prevent sepsis, promote breast feeding, avoid unnecessary blood transfusion & provide supportive care.

Tertiary prevention by weekly screening for ROP in neonatal unit. Urgent treatment of sight threatening ROP. Follow up for risk infant & surgery for retinal detachment.

So evidence suggests that current recommended ROP screening and treatment could reduce the likelihood of severe visual disability and blindness, therefore ROP screening programs should be established throughout Bangladesh**.**

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