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Retinopathy of Prematurity

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The incidence of ROP in India is reported to vary between 38 – 51.9% in low birth weight infants. Out of the approximate 26 million annual live births in India, approximately 8.7% of newborns in India are < 2000 grams in weight. This would imply that almost 2 million newborns are at risk for developing ROP.

The fundamental Pathological process underlying ROP stems from incomplete vascularization at birth.
Term infants have completely vascularized retina and hence are not at risk for developing ROP. Premature infants have avascular or incompletely vascularized retina at birth; ROP evolves over 4-5 weeks after birth.

- Which neonates should be screened for ROP ?
- When should such screening be initiated ?
- How frequently should the infants be screened ?
- When is the screening complete ?
- Where and how should the examinations be done ?
- When is treatment of ROP indicated ?

Which infants should be screened for ROP ?

Screening for ROP should be performed in all preterm neonates who are < 34 weeks gestation and / or < 1750 grams birth weight. Apart from these infants, those preterm infants between 34 to 36 weeks gestational age or a birth weight between 1750 and 2000 grams with risk factors for ROP should also be screened. Risk factors for ROP in larger infants have not been clearly established. Multi – centre studies need to be undertaken to determine the incidence, risk factors and natural course of ROP in the larger preterm infants.

When should the first screening be done ?

The first screen should be performed not later than 4 weeks of age or 30 days of life infants > 28 weeks of gestational age. They may also be screened by the third week of life to enable diagnosis of AP – ROP, Infants<28 weeks of <1200 grams birth weight should be screened early at 2-3 weeks of age, to enable early identification of Aggressive Posterior ROP.

How frequently should the infants be screened ?

Follow up examination intervals are based on the retinal findings; these findings are classified according to the revised international classification of ROP (ICROP). The Major changes from the previous ICROP classification are the description of aggressive posterior ROP (AP –ROP), the inclusion of pre-plus disease and a practical guide to measuring the extent of zone I. Based on the retinal findings, the follow up examination schedule is suggested.

When should the screening be terminated ?

Retinal examinations may be terminated based on postmenstrual age or retinal findings. The following are the recommendations to guide when to stop further examinations:

a) Full retinal vascularization; this usually occurs at about the 40th weeks of postmenstrual age and mostly completes by the 45th week.

b) Regression of ROP noted

It is advisable to screen the baby every 1-2 weeks at least until the infant is 38-40 weeks of postmenstrual age.

Where and how should the examinations be done?

The ideal setting for screening is under a radiant warmer in the NICU, under the guidance of the neonatologist. Discharged and stable babies may be screened in the trained ophthalmologist's clinic or in the NICU itself. The treating team should not forget to communicate with the parents regarding the risk of ROP; the need for screening preterm babies must be addressed along with the initial admission counseling itself. The possible findings and consequences must be explained prior to the initial examination. Documentation of such a communication is highly desirable.

The examination is carried out topical anesthesia without any sedation, using the indirect ophthalmoscope and a 20 D or 28 D condensing lens. Recordings of the findings should be done in the chart or card using standard notations. The date of subsequent follow –up should be clearly stated, and the neonatologist and parent counseled about the same. It must be remembered that retinal examinations are stressful and may be even painful to the infant. Swaddling the infant firmly in a thin blanket and administering 0.5 -1 ml of 24% sucrose orally by syringe 1-2 minutes prior to the examination will help to provide comfort and relieve pain. Apnea and bradycardia may rarely develop during the examination in very premature babies. Resuscitation measures should be readily available.

When is treatment of ROP indicated?

The Guidelines from the above study are the currently recommended indications for ablative treatment and are summarized in table2. AP-ROP also needs early and aggressive laser treatment, often in multiple sessions to prevent retinal detachment.

How should ROP be treated?

The aim of the treatment is to ablate the entire avascular retina up to the ora serrata in a confluent burn pattern getting as close to the edge of the ridge as possible. Treatment should be carried out in the NICU or in a setting where monitoring and resuscitation facilities and trained personnel are readily available. Laser photocoagulation delivered by the indirect ophthalmoscopic device is the mainstay of ROP treatment. Laser has supplanted cryotherapy due to better structural and functional outcomes. It is a safer and a more controlled procedure. Laser therapy can be done under topical anesthesia (0.5% proparacaine HCL, 4% xylocaine), general anesthesia or sedation. Laser treatment, using the ETROP guidelines, has a greater than 90% successful outcome.

Post – treatment recommendation: the child can be fed after about 30minutes following completion of the procedure. Vital signs must be monitored. It is preferable that the child be under the supervision of the neonatologist or an anesthesiologist for at least 2-3 hours following the procedure. Post-treatment hypothermia and hypoglycemia are common and must be prevented. Mild conjunctival chemosis and hyperemia following the procedure may last for a few

days and the parents must be counseled regarding this. Follow-up visits recommendation: This may be typically scheduled after week 1,2,4 and 12 following treatment based on the findings recorded by the treating ophthalmologist. Long-term follow up for development of visual problem is also essential.

How should retinal detachment be treated?

Stage 4 or 5 ROP requires vitreo-retinal surgical intervention: retinal detachment carries a high risk of irreversible blindness. Lens sparing vitrectomy is the procedure of choice in stage 4A and subtypes of 4B. Timely lens sparing surgery may in fact result in reasonable to fairly good visual outcomes. A lensectomy-vitrectomy may be performed in stage 5. The prognosis is guarded and results continue to be poor. Visual rehabilitation must be offered to all visually challenged ROP babies.

How should the long term follow up of these infants be planned?

Recommendation: Following development of ROP, babies need to be under more intensive follow up for the first 6months followed by a less intensive follow up schedule until young adulthood period to identify long term complications promptly.

What is the future of ROP screening and what is the role of photo-documentation and Tele-ophthalmology in ROP screening?

The use of retinal wide field digital imagining (WFDI) using a portable pediatric fundus camera such as the RETCAM II, III and RETCAM shuttle (Clarity MSI, CA, USA) has become a useful adjunct to the documentation of ROP and as a screening and teaching tool. The Photo-ROP study reports have shown that WFDI compares well with indirect ophthalmoscopy with a high diagnostic sensitivity.

Summary of Recommendations

- Retinopathy of prematurity (ROP) is emerging as one of the leading causes of preventable childhood blindness in India.

- Screening for ROP should be performed in all preterm neonates who are born<34 weeks gestation and/or < 1750 grams birth weight; as well as in babies 34-36 weeks gestation or 1750-2000 grams birth weight if they have risk factors for ROP.

- The first retinal examination should be performed not later than 4 weeks of age or 30days **of li**fe in infants born >28 weeks or gestational age. Infants born<28 weeks or < 1200 grams birth weight should be screened early, by 2-3 weeks of age, to enable early identification of AP-ROP.

- The retinal findings should be classified and documented based on the international Classification of Retinopathy of prematurity guidelines (ICROP).

- Follow up examinations should be based on the retinal findings and should continue until complete vascularization or regressing ROP is documented or until treated based on the ETROP guidelines.

- Laser photocoagulation delivered by the indirect ophthalmoscopic device is the mainstay of ROP treatment.

- The responsibility of recognition of infants for screening lies with the pediatrician / neonatologist.

- Communication with the parents regarding timely screening for ROP, seriousness of the issue, possible findings and consequences is extremely important.

Table 1. Follow up examination schedule based on retinal findings

Zone of retinal findings	Stage of retinal findings	Follow up interval
Zone 1	Immature vascularization Stage 1 or 2	1-2 weeks 1week or less
Zone 2	Regressing ROP Immature vascularization Stage 1 Stage 2 Stage 3	1-2 weeks 2-3 weeks 2 weeks 1-2 weeks 1 weeks or less
Zone 3	Regressing ROP Stage 1 or 2 Regressing ROP	1-2 weeks 2-3 weeks 2-3 weeks

Table 2: Treatment guidelines for ROP adapted from the current ETROP guidelines

ZONE 1	NO PLUS	Stage 1	Follow
		Stage 2	Follow
		Stage 3	Treat
	PLUS	Stage 1	Treat
		Stage 2	Treat
		Stage 3	Treat
ZONE 2	NO PLUS	Stage 1	Follow
		Stage 2	Follow
		Stage 3	Follow
	PLUS	Stage 1	Follow
		Stage 2	Treat
		Stage 3	Treat

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Play and children

Children learn from the time they are born and parents or guardians are primarily responsible for providing quality experiences from which their children learn. Play is essential for learning in children. Parents often want to know about appropriate toys, books and computer or video games because they know that these tools may be important for their child's development.

Toys bring parents and children together in play. Early brain development is enhanced through these relationships. It is important for parents to understand the role of play in all areas of development, including cognitive, language, social, physical and emotional development. Toys should never be used as a substitute for love and unconditional attention from parents and other caregivers; toys enhance these interactions. When adults participate in the play of children, learning is enhanced. A child's self esteem and level of mastery are also enhanced when adults participate in play. Parents are able to observe the skills in their child and also help in expanding them.

All children benefit from toys that promote safe physical activity. But some toys pose emotional or social risks. Graphic depictions of violence presented in an interactive way, such as in some computer or video games, can lead to acts of violence by the child. Although video games are rated, even those deemed for 'everyone' may contain significant violence. Toy weapons or other toys that promote violence should be discouraged. Parents should also consider whether a toy promotes any negative racial, cultural or gender stereotypes. The toys parents provide (or do not provide) send children a message about what is valued. People marketing toys claim that specific toys will facilitate specific development milestones. There is no scientific evidence to suggest that a particular toy is sufficient for optimal learning. These advertisements can promote misinformation, inappropriate expectations and unnecessary expenditure. It could lead to parents feeling guilty when they cannot afford or they choose not to make such purchase. Just because a product is in the market does not mean it is safe. The characteristics of the toy, how the toy might be used or abused and the amount of supervision or help needed will determine its safety level or appropriate needs for use. It is important for parents to be familiar about toy safety guidelines.

Guidelines for parents and caregivers

- Most educational toys are those that encourage the interaction of an adult with a child in supportive, unconditional play. Toys should never be considered as substitutes for the attention of parents.

- Children should be provided with safe, affordable toys that are developmentally appropriate. Include toys that help to promote learning and growth in all areas of development and encourage creativity.

- Those toys should be avoided that discourage children from using their imagination. Social, emotional and cognitive skills are developed and enhanced when children use play to work out real – life problems.

- Use books and magazines to play and read together.

- Be skeptical of educational or development claims made by advertisers, especially claims of intellectual enhancement through certain toys.

- There are some toys that promote violence or negative social, racial or gender stereotypes. These toys are not recommended for children.

- It is good to limit video and computer games. The total screen time, including television and computer use, should be less than 1 to 2 hours per day. Children younger than 5years should play with computer or video games only if they are developmentally appropriate, and a parent or caregiver should accompany the child.

- Toys should be made of safe nontoxic material. They should not have sharp edges. Small toys or toys which can easily be dismantled into parts should not be given to infants or toddlers as they may put them in their mouth. Toys should be stored safely.

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Ask Your Doctor

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This page consists of answers to questions asked by the patients and public to Doctor K. GIREESH eminent Physician Neurophysician and Neurosurgeon in his regular out patient clinic and answers to questions which he has received by email and online chat.

Is drinking water or swimming along with an HIV – positive person risky?

Q. if an HIV – positive patient drank water from a container and some quantity of the blood form his lips mixes with the water, then if I drink the remaining water, will I be infected? What if my gums had cuts too? Secondly, if an HIV – positive person has many wounds on his body and he swims in the same pool where I am swimming, what are my chances of getting infected? Let us assume that the blood from wounds on his body blends in the water or his urine or seminal fluid mixes in the water and I have a wound on my body too. What will happen in such a situation? And also tell me are the symptoms of HIV?
Mr. S. Murugan, Thambaram.

Ans. The chances of contracting HIV infection are very slim. It depends on how much water is remaining in the container which got contaminated with a tinge of blood from a wounded lip! I will be more concerned about other infections such as hepatitis B and C viruses, herpes simplex virus (HSV)-1, etc. Secondly, water in swimming pools is heavily chlorinated. Also keep in mind the large volume of water in a swimming pool; any blood would be greatly diluted. Most of the infections agents get inactivated and destroyed by the chlorine content of the water. HIV is one of them. Please remember, HIV is a very sensitive virus and gets destroyed very easily. Do not worry about swimming. The symptoms of AIDS are the symptoms of the diseases that attack the body because of a weakened immune system. One should never, therefore, attempt to diagnose HIV infection on the basis of symptoms or signs only. Patient with HIV / AIDS may present with a variety of manifestations:

- Fever, sweats, chills
- Fatigue
- Loss of appetite, weight loss
- Nausea, vomiting
- Sore throat
- Diarrhoea
- Cough
- Shortness of breath
- Rash
- Other skin problems

It is important to always keep in mind that all the above symptoms are non-specific and commonly occur in a variety of conditions. To establish a diagnosis of HIV/AIDS a blood test that has been confirmed is essential. A physical examination and other tests are necessary to rule out other illnesses.

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