Follow up care pertaining to ROP

This module is designed to improve knowledge, skills and clinical practice of all stakeholders involved in the care of preterm neonates in follow up care pertaining to ROP

Learning objectives

The participants will learn:

- To understand the importance of timely screening for ROP and other aspects during follow-up visits
- To be able to plan and conduct follow-up for ROP screening, growth monitoring, vaccination and neurological assessment
- To be able to monitor and improve process and outcome indicators related to ROP screening using quality improvement methods relevant to local context

Module contents

This module includes following elements:

- **Script:** Easy to read format, gives quick introduction and is an essential reference material for the participants
- **Key messages:** After having read through the script, these key messages summarize the important learning points in the webinar and the script
- **Video demonstration:** The videos in this module cover the counseling of parents for infants who are eligible for ROP screening
- **Webinar:** The webinar in this module shall help the participant to gain knowledge of clinical course of ROP, types, complications, legal implications, ROP treatment and follow up.
- **Poster demonstration:** The participant shall learn about ROP staging, screening, management, patient information sheet and equipments required for ROP
- **Self-assessment:** This will be done at the end of each objective, based on what participant has already learnt. The participant is free to consult text material if required for recapitulating
- **Role play:** Observing steps of a situation where an infant is getting discharged or transferred but needs a follow up. Participants will also be provided with opportunity to perform role play.
- **Skill check:** The skill check includes evaluation of participant skills on "How to counsel the parents of an infant with ROP?", "Dilatation of eyes for ROP screening" and "Nursing care during ROP screening and treatment"

Learning Objective 1

To understand the importance of timely screening for ROP and other aspects during follow-up visit

This objective covers the importance of timely screening for ROP and other aspects during follow-up visit and will be delivered as:

- Webinar
- Script
- Key messages
- Self-check MCQ's

After viewing and listening to the webinar, and reading the script along with the key messages you shall undergo a self-evaluation based on what you have already learnt.

1.1: Webinar

You will view and listen to webinar on concept of clinical course of ROP along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

ROP-clinical course

DR. J. KUMUTHA
MD, DCH
Professor & Head
Department of Neonatology
Saveetha Medical College
Thandalam, Chennai

Objectives

In this webinar we will learn about the

- Magnitude
- Risk factors for ROP
- Clinical course of ROP

Introduction

ROP is one of the leading causes of severe visual impairment in childhood.

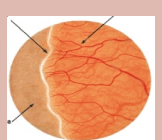
Category	Percentage
ELBW	16 to 48
VLBW	27 to 35
LBW(> 1500 g)	32

Risk factors

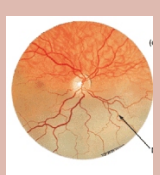
- Prematurity and Low birth weight (LBW) are the most important risk factors for the development of ROP
- Injudicious use of oxygen - also an important risk factor
- Repeated blood transfusions and sepsis are other risk factors
- Any sick LBW child has higher chance of developing ROP

Clinical course of ROP

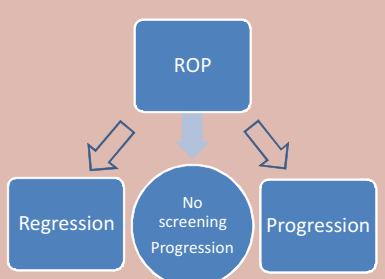
- ROP is a condition characterized by the development of new abnormal blood vessels in the eyes of preterm babies



- ROP begins at 31-32 weeks postmenstrual age (PMA) and progresses over the next 2 to 5 weeks
- However ROP usually does not manifest before 2-3 weeks of Post natal age



Course of ROP



Progression to retinal detachment leads to blindness

Key messages

- **ROP is a leading cause of childhood blindness**
- **ROP is a disease of the preterm and sick LBW neonates**
- **Untreated ROP can lead to retinal detachment and blindness**

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

1.2: Script

Clinical course of ROP

This script shall help you to understand the concept of clinical course of ROP

About 16 to 48% of extremely low birth weight infants (ELBW), 27 to 35% of very low birth weight (VLBW) infants and 32% of low birth weight (LBW) infants more than 1500 gram are affected by some degree of ROP

- It is important to understand the need for timely screening for ROP to prevent irreversible loss of vision
- Prematurity and low birth weight are the most important risk factors for the development of ROP
- Injudicious use of oxygen is another important risk factor
- Other risk factors include blood transfusions and sepsis

Therefore, the sick and LBW babies have higher chance of developing ROP

ROP is characterized by development of new abnormal blood vessels in the eyes of preterm infants. It begins at 31- 32 weeks of postmenstrual age (PMA) and progresses over the next 2 to 5 weeks into severe forms. However, ROP does not manifest before 2-3 weeks of postnatal age.

ROP can either spontaneously regress or progress to retinal detachment, leading to blindness. Therefore, timely screening will detect ROP requiring treatment earlier and avoid progression to severe forms, at which time treatment will produce favourable outcomes

1.3: Key messages

- Prematurity and Low birth weight (LBW) are the most important risk factors
- Sick LBW child has higher chance of developing ROP
- Oxygen and blood should be used judiciously
- Untreated ROP can lead to retinal detachment and blindness
- Timely screening and treatment are mandatory

1.4: Webinar

You will view and listen to webinar on classification and severe forms of ROP along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

Classification and severe forms of ROP

DR. J. KUMUTHA
MD, DCH
Professor & Head
Department of Neonatology
Saveetha Medical College
Thandalam, Chennai

Objectives

In this webinar we will learn:

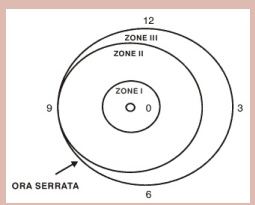
- How to classify ROP?
- To learn about severe forms of ROP
- Consequences

Classification of ROP

- International Classification of ROP (ICROP) is used for classifying ROP
- ROP is categorised based on
  - -The severity into stages (1-5)
  - -Location into 3 zones (Zone 1-3)
  - - The presence of plus disease

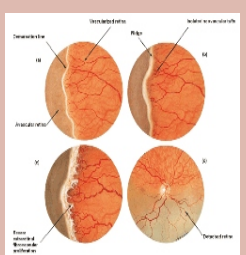
Location

- *Zone1:* a circle whose radius is twice the distance from the centre of the optic disc to the centre of macula
- *Zone 2:* a circle whose radius is the distance from the centre of the optic disc to the nasal margin of the retina
- *Zone 3:* The remainder of the retina, from Zone II to ora-serrata on nasal side and equator on temporal side



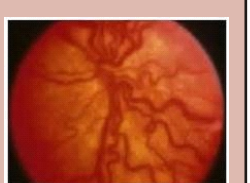
Severity

- *Stage 1*-Thin white line of demarcations
- *Stage 2*-Addition of depth and width to the demarcation line (Ridge)
- *Stage 3*-Presence of extra retinal fibro vascular proliferation
- *Stage 4*-Partial retinal detachment beginning at the ridge, not involving macula (4A) and involving macula (4B)
- *Stage 5* Complete retinal detachment



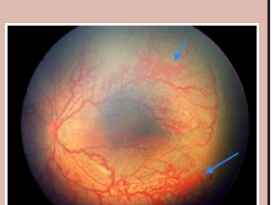
Plus disease

- Increased venous dilation
- Arteriolar tortuosity of the posterior retinal vessels
- If there is poor pupillary dilatation (rigid pupil), you should suspect plus disease



Aggressive posterior ROP (AP-ROP)

- Rapidly progressing, severe form of ROP in the smallest and most immature infants
- Prominence of plus disease
- There is risk of very early retinal detachment



Consequences of ROP

- Refractiveerrors
- Squint
- Unilateral or bilateral Blindness
- Late retinal detachment (6 months31 years)
- Glaucoma

Key messages

- ROP is classified based on the severity, location and extent of the disease
- The presence of plus disease and APROP needs urgent intervention in the form of laser or surgery
- Screening and timely intervention will reducedire consequences of ROP

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

1.5: Script

Classification of ROP and its severe forms

This script shall help you to understand the classification of ROP and its severe forms

Classification of ROP

- International Classification of ROP (ICROP) is used for classifying ROP
- ROP is categorized based on the severity of the disease into stages (1-5), location of the disease into 3 zones (Zone 1-3) and the presence of plus disease

How to define location of ROP?

- Zone1: A circle whose radius is twice the distance from the centre of the optic disc to the centre of macula
- Zone 2: A circle whose radius is the distance from the centre of the optic disc to the nasal margin of the retina
- Zone 3: The remainder of the retina, from Zone II to ora-serrata on nasal side and equator on temporal side

For defining severity of ROP, following stages are used:

- **Stage 1-** Thin white line of demarcation
- **Stage 2-** Addition of depth and width to the demarcation line thus forming a ridge
- **Stage 3-** Presence of extra retinal fibro vascular proliferation
- **Stage 4-** Partial retinal detachment beginning at the ridge, not involving macula(4A) and involving macula (4B)
- **Stage 5-** Complete retinal detachment

Plus disease

It is one of the severe form of ROP which is characterised by significant level of venous dilatation and arteriolar tortuosity of the posterior retinal vessels. One important point which should be remembered is that if there is **poor pupillary dilatation** (rigid pupil), you should suspect plus disease

Aggressive posterior ROP (AP-ROP)

- It is a rapidly progressing, severe form of ROP in the smallest and most immature infants with prominence of plus disease
- Ill-defined, mild appearing and easily over looked retinopathy
  There is a risk of very early retinal detachment in AP-ROP

Long term consequences of ROP

- Refractory errors
- Squint
- Unilateral or bilateral blindness
- Late retinal detachment (6 months-3 years)
- Glaucoma

1.6: Key messages

- ROP is classified based on the severity, location and extent of the disease
- The presence of plus disease and AP-ROP needs urgent intervention in the form of laser or surgery laser or surgery
- Screening and timely intervention will reduce dire consequences of ROP

1.7: Webinar

You will view and listen to webinar on concept of legal issues and follow up pertaining to ROP along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

Legal issues and follow up

DR. J. KUMUTHA
MD, DCH
Professor & Head
Department of Neonatology
Saveetha Medical College
Thandalam, Chennai

Objectives

- To know about the legal issues that can arise
- How to prevent legal problems?
- Importance of follow up

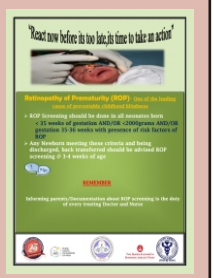
Legal implications

Legal issues could arise due to –

- **Poor communication**
- **Poor documentation**
- **Complications of the procedure**
- **Lack of follow up**

Proper communication

- The need and timing of ROP screening must be communicated to the parentby:
  1. Doctor
  2. Nurse
  3. Ophthalmologist
- Parents language
- Check their understanding
- Phonecall reminders/linking with local doctor /healthworker are also importantsteps



Consent Form

- A consent form should include:

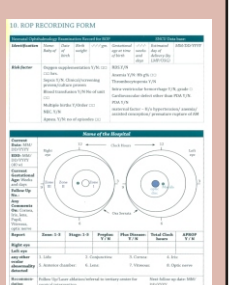
1. the details of nature of disease
2. possible side-effects
3. complications of the treatment

- It must be prepared in at least two languages (simple understandable terms)
- The same must be communicated verbally to the parents

Proper documentation

The discharge summary must contain:

- The findings of the first screening and the date and place for follow up/firstscreening
- Advice regarding ROP screening preferably in the local language
- The case record must contain the details of thescreening and treatment



Checklists

- Legal problems can be reduced by a considerable extent only through a system of multiple levels of checks
- Assigning roles and responsibility to each personnel (screening line list, screening, treatment and follow up)

Importance of follow-up

- Follow up examination should be individualized
- It depends on the severity, treatment received and regression of findings
- It is absolutely necessary that the neonate undergoes serial examinations till the retina is fully mature
- Assessment for visual acuity and squint is continued into childhood

Support system

- SNCU/RBSK team-Paediatrician/Follow - up nurse/Optometrist/DEO
- Trained Ophthalmologist
- Community level–ANM/ASHA/AWW
- Screening facility should made available at all SNCUs
- Treatment facility at select SNCUs
- Availability of early access to treatment
- Social and educational support

Key Messages

- Screening for ROP has to be done at the right time to prevent progression to severe forms
- Multiple levels of checks and parents education will ensure follow-up thus avoiding complications and legal issues
- Linking with various health functionaries is very crucial for the success of the ROP programme

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

1.8: Script

Legal issues and follow up of ROP

This script shall help you to understand the legal issues and follow up of ROP

Legal issues could arise due to

- Poor communication, poor documentation, complications arising out of the procedure or lack of follow up

Proper communication:

- The need and timing of ROP screening must be communicated to the parent by the doctor, nurse and ophthalmologist. It should be explained in parent's language in easy, understandable terms and their understanding should also be checked. They should be provided with the parent information leaflet.
- Phone call reminders/ linking with local doctor /health worker are also important steps to improve follow up rates

Consent form

- A consent form before any procedure should include the details of nature of disease, the possible side-effects, the complications of the treatment
- It must be prepared in at least two languages (simple understandable terms)

Proper documentation

The discharge summary must contain:

- The findings of the first screening and the date and place for follow-up/first screening
- Advice regarding ROP screening preferably in the local language
- The case record must contain the details of the screening and treatment

Check lists

- Legal problems can be reduced by a considerable extent only through a system of multiple levels of checks.
- Assign roles and responsibility to each person (screening line list, screening, treatment and follow up)

Importance of follow up

- Follow up depends on the severity of ROP, the treatment received and regression of findings
- It is absolutely necessary that the neonate undergoes serial examinations till the retina is fully mature
- Assessment for visual acuity and squint is continued into childhood

Support system should include

- SNCU/RBSK team- Paediatrician/Follow -up nurse/Optometrist/DEO
- Trained Ophthalmologist
- Community level ANM/ASHA/AWW

A screening facility should be made available at all SNCUs with treatment facility at select SNCUs

1.9:Key messages

- Screening for ROP has to be done at the right time to prevent progression to severe forms
- Multiple levels of checks and parents' education will ensure follow-up thus avoiding complications and legal issues
- Linking with various health functionaries is very crucial for the success of the ROP programme

1.10:Self-check MCQ's

1. All preterm babies below this gestational age should be screened for ROP (National guidelines)
   a. 34 weeks
   b. 35 weeks
   c. 36 weeks
   d. 32 weeks

2. All preterm babies below this birth weight should be screened for ROP if gestation age is not known
   a. 1750 grams
   b. 1800 grams
   c. 1500 grams
   d. 2000 grams

3. All the following are risk factors for developing ROP **'EXCEPT'**
   a. Hemodynamic instability
   b. Prolonged oxygen therapy
   c. Blood transfusions
   d. Surfactant therapy

4. All the following are risk factors for developing ROP **'EXCEPT'**
   a. Sepsis
   b. Repeated episodes of apnea
   c. Poor weight gain
   d. Expressed breast milk

5. At which age ROP screening should be done?
   a. 14 days
   b. 21 days
   c. 28 days
   D. 35 days

Learning Objective 2

Planning and conducting follow-up for ROP screening, growth monitoring, vaccination and neurological assessment

This objective covers the planning and conducting follow-up for ROP screening, growth monitoring, vaccination and neurological assessment and is delivered as:

- Webinar
- Script
- Key messages
- Video
- Role play
- Poster
- Skill check
- Self-check MCQ's

After viewing the videos, posters, role play and reading the script and the key messages you shall undergo a self- evaluation based on what you have already learnt.

2.1:Webinar

You will view and listen to webinar on treatment of retinopathy of prematurity along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

ROP Treatment

DR. Parijat Chandra
MD, DNB
Additional Professor (Ophthalmology)
R.P Centre, AIIMS, New Delhi

Indications of laser treatment

- Early Treatment of ROP (ETROP) guidelines
- Type I ROP - Treatment
  - Zone I, any stage with plus
  - Zone I, stage 3 without plus
  - Zone II, stage 2-3 with plus

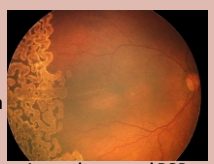
  (Including APROP)

Mechanism of laser

- Laser destroys avascular retina
- Removes ischemic stimulus
- Decrease neovascularization, fibrovascular proliferation
- Regression of ROP

Laser procedure

- Informed parental consent necessary
- Monitoring by neonatologist
- Laser photocoagulation of avascular retina within 48 Hours when indicated
- Both eyes - 1 sitting under topical anesthesia by trained expert using Indirect laser ophthalmoscope



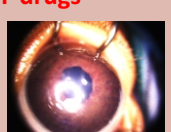
Lasered regressed ROP

Post laser follow up

- Antibiotic/steroid + tears eye drops TDS - 5 days
- Follow up 1 weekly to observe ROP progression/regression
- Review for laser augmentation in skip areas
- Long term follow up 4 monthly for retinal status and refraction

Current usage: Anti VEGF drugs

- Significant benefit in Zone 1 ROP (APROP) regression - adjunct to laser treatment
- Helps reduce iris neovessels - pupillary dilation in rigid pupils with plus disease, allowing laser treatment
- Promote vascularization towards into periphery - improving visual field (unlike laser)



Iris neovessels with rigid pupil

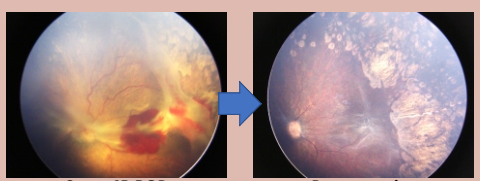
APROP with severe plus disease

Limitations of Anti VEGF drugs

- No clarity on dose / number of injections
- No clarity on which antiVEGF drug is better
- Risk of systemic absorption and side effects
- No study on long term outcomes
- Delayed recurrences common

ROP surgery

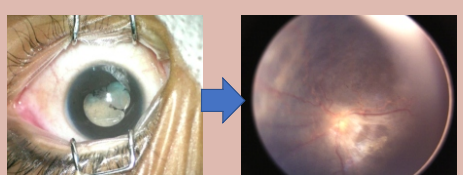
- Stage 4 ROP - Subtotal Retinal Detachment
- 25G/27G lens sparing vitreoretinal surgery - good outcomes



Stage 4B ROP | Postoperative

ROP surgery

- Stage 5 ROP - Total retinal detachment - Poor prognosis
- Surgical trial in hope of restoring navigable vision in bilateral cases



Stage 5 ROP | Postoperative

Key messages

- Laser treatment for ROP is effective and has good outcomes
- AntiVEGF drugs useful adjunct to laser in selected cases, but long term safety data not available
- Surgery for ROP useful in selected advanced cases, but prognosis is poor in stage 5 ROP
- Timely ROP screening and treatment is key to prevent ROP blindness

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

2.2: Script

Treatment of ROP

This script shall help you to understand the treatment of ROP

The indications for laser treatment of ROP (ETROP guidelines):

- Treat all cases of Type I ROP within 48 hours. Type I ROP includes firstly, Zone I, any stage with plus or Zone I, stage 3 without plus or Zone II, stage 2-3 with plus. This also includes all cases of Aggressive posterior ROP

How does laser act?

- Laser photocoagulation destroys avascular retina, removes the ischemic stimulus, and thereby decreases neovascularization and fibrovascular proliferation, thereby leading to regression of ROP
- Before starting laser treatment, informed parental consent is necessary. The procedure is done under monitoring by a neonatologist. Laser photocoagulation of avascular retina must be done within 48 hours when indicated. Both eyes are lasered in one sitting under topical anesthesia by trained experts using indirect laser ophthalmoscope.
- After laser treatment, antibiotic/steroid combination eye drops and tears eye drops are prescribed three times a day for 3-4 days
- The follow up is done one weekly to observe ROP progression or regression. Review is done for laser augmentation in skip areas. A long term follow up is done 4 monthly for retinal status and to detect refractive errors

What is the current usage of Anti VEGF drugs in ROP?

- Studies have observed significant benefit of Anti-VEGF drugs like Bevacizumab to cause regression in Zone 1 ROP (and APROP) and therefore they are a useful adjunct to laser treatment
- These drugs also reduce iris neovascularization and help in pupillary dilation in rigid pupils with severe plus disease, thereby allowing laser treatment to be done in the next sitting.
- A major benefit is that these drugs promote vascularization towards the retinal periphery, thereby improving visual field (unlike laser which destroys the retinal periphery). Therefore, they are also useful to increase vascularized retinal area especially in very small zone 1 ROP where even the macula is avascular
- They have many limitations; no clarity on dose or the number of injections, no clarity on which drug is better, a possible risk of systemic absorption of the drug and subsequent side effects and finally no studies on long term safety outcomes

ROP surgery is required is cases of advanced ROP

- For stage 4 ROP with subtotal retinal detachment, a 25G or 27G small gauge lens sparing vitreoretinal surgery has good outcomes
- In Stage 5 ROP with total retinal detachment, the prognosis is poor. Yet, in bilateral cases, surgical trial is done in hope of restoring navigable vision

2.3: Key messages

- Laser treatment for ROP is effective modality and has good outcomes
- Anti-VEGF drugs are a useful adjunct to laser in selected cases, but long term safety data is not available
- Surgery is useful in selected advanced ROP cases, but prognosis is poor in stage 5 ROP
- Timely ROP screening and treatment is key to prevent ROP blindness in these premature babies

2.4: Webinar

You will view and listen to webinar on screening and follow up of retinopathy of prematurity along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

ROP: Screening and follow up

DR. J. KUMUTHA
MD (Pediatrics) DM Neonatology
AIIMS, New Delhi

Objectives

- Whom to screen?
- When to screen?
- Who will screen ?
- How to prepare a baby for screening?
- How to plan follow up?

Whom to screen?

Infants with either of the following:

1. Birth weight less than 2000 grams

OR

2. Gestation age less than 35 weeks

OR

3. Any preterm infant with risk factors:
   - i. Cardio-respiratory instability
   - ii. Prolonged oxygen therapy
   - iii. Repeated episodes of apnea of prematurity,
   - iv. Blood transfusion
   - v. Sepsis
   - vi. Poor postnatal weight gain

When to screen?

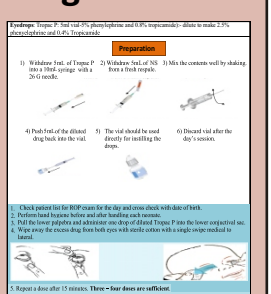
- First screening at 4 weeks of age
- For infants between 24-30 weeks GA /Birth weight < 1200 gram:
  - 2-3 weeks after delivery (Not later than 3 weeks)

ROP Screening: Place, person and equipment

Who?	• Trained eye specialist
How?	• Indirect ophthalmoscope
Where ?	• SNCU/ NICU if the baby is still admitted • Defined area in SNCU, if baby is discharged

Preparation of babies prior to screening

- Keep NPO for 2hours
- Tropicamide 0.5-1%: 1° q 15mins 3-4 times
- Phenylephrine 2.5% (available 10%) : 1° once
- Topical anaesthetic drops: Paracaine (0.5%)
- Sucrose 25% if available: 2mL 2 minutes before the procedure
- Post procedure antibiotics eye drops for 3 - 4 days



How to follow up after first ROP evaluation?

If no signs of ROP:

1. **Retina vascularized**: Visual follow up at 4 and 9 months of age
2. **Retina avascular (Zone 2 and 3}** Every 2-3 weeks till fully vascular
3. **Retina avascular (Zone 1):** Every 1-2 weeks

If ROP is present:

Zone of retinal finding	Stage	Follow up interval
Zone 1	Stage 1 or 2 ROP without plus disease	1 week
	Regressing ROP	1-2 weeks
Zone 2	Stage1	2 weeks
	Stage 2	1-2 weeks
	Stage 3	1 week or less
	Regressing ROP	1-2 weeks
Zone 3	Stage 1 or 2	2-3 weeks
	Regressing ROP	2-3 weeks

Linking with RBSK

- Improve coordination and financial support
- Provision of equipment to screen and treat
- Long term follow up can be streamlined by involvement of frontline health workers
- Improvement of rehabilitation/referral services

Key messages

- ROP screening should be done at 4 weeks after birth
- However in babies born earlier than 30 weeks of GA or BW < 1200 grams, it should be done at 2-3 weeks after birth
- The screening should be done by trained ophthalmologists using indirect ophthalmoscope
- The frequency of follow up depends upon the zone and stage of ROP

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

2.5: Script

Screening and follow op for ROP

This script shall help you to understand the screening and follow up for retinopathy of prematurity

Infants with either of the following:

a. Birth weight less than 2000 grams
b. Gestation age less than 35 weeks
c. Any preterm infant with risk factors:
    i. Cardio-respiratory instability
    ii. Prolonged oxygen therapy
    iii. Repeated episodes of apnea of prematurity,
    iv. History of blood transfusion
    v. Sepsis
    vi. Poor postnatal weight gain

Time when this screening has to be done:

- First screening should be done no later than 4 weeks of age
- But for infants between 24-30 week gestational age or birth weight < 1200 grams:

It should be done earlier that is 2-3 weeks after delivery (Keep in mind that it should not be later than 3 weeks)

Retinopathy of prematurity screening should be done by a trained eye specialist using:

- Indirect ophthalmoscope in NICU/SCNU, if the baby is still admitted. If baby is discharged, then screening can be done in a defined area in SCNU on an outpatient basis

For preparation of babies prior to screening,

- They should be kept NPO for 2 hours
- For dilating pupils, 1drop of 0.5-1% Tropicamide should be instilled in both the eyes every 15 mins for 3-4 times. After that 1 drop of 2.5% Phenylephrine should be instilled once, 10 minutes before the screening procedure
- Next step is to instill Topical anesthetic drops: Paracaine
- For pain control during the procedure, 2ml of 25% sucrose should be given orally, 2 minutes before the procedure. Antibiotic eye drops should be instilled for 3 days post procedure

How to plan for follow up?

- If during ROP screening, no signs of retinopathy of prematurity are present and retina is fully vascularized, then babies should have a visual follow up at 4 and 9 months of age
- If retina is avascular in Zone 2 and 3 then frequency of screening should be every 2-3 weeks till retina is fully vascularized. If retina is avascular in Zone 1, then these babies should be followed more frequently that is every 1-2 weeks
- **If ROP is present:** then subsequent follow up, depends upon the zone and stage of ROP
- In Zone 1, stage 1 or 2 ROP without plus disease the follow up interval is every 1 week and if there is regressing ROP: follow up interval is 1-2 weeks
- In Zone 2 ROP if there is Stage 1 follow up interval is 2 weeks,

- If there is Stage 2 follow up interval is 1-2 weeks,
- If there is Stage 3 then follow up interval is 1 week or less,
- If there is regressing ROP then follow up interval is 2 weeks
- In Zone 3 ROP if there is Stage 1 or 2 and regressing ROP follow up interval is 2-3 weeks

Having learnt about retinopathy of prematurity screening process, it is important to know that how linking with Rashtriya Bal Swasthya Karyakram that is RBSK, will help us to improve ROP screening programme

- Linking with RBSK will lead to improve coordination and financial support
- There will be adequate provision of equipment to screen and treat ROP
- Long term follow up along with rehabilitation and referral services can be streamlined by involvement of frontline health workers like ASHA

2.6: Key messages

- ROP screening should be done at 4 weeks after birth
- However, in babies born earlier than 28 - 30 weeks gestation or birth weight less than 1200 grams, it should be done at 2-3 weeks after birth
- The screening should be done by trained ophthalmologists using indirect ophthalmoscope
- The frequency of follow up depends upon the zone and stage of ROP

2.7: Webinar

You will view and listen to webinar on the follow up and care of preterm babies after discharge from NICU along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

Follow up of preterm babies

DR. Naveen Jain
Senior Consultant
Kerala institute of Medical Sciences, Trivandrum

Minimizing disability in preterm babies

- Some of the preterm babies are at risk of neurodisability
- Screening of these at-risk babies and timely referral and intervention will decrease disabilities

Objectives of the webinar

Comprehensive care of preterm babies after discharge from the hospital

A. Discharge planning
B. Medical care
   1. Growth monitoring
   2. Recommendations on nutrition after discharge
   3. Recommendations on vaccination
C. Neurodevelopment assessment
   1. Recommendations on screening (for prevention of neurodevelopment disability, NDD)
   2. Suggested follow up schedule for development assessment

Discharge planning

- Each unit should have place dedicated to follow up services that include all / most of the services under one roof
- Dedicated personnel must coordinate the screening of at-risk babies
- The unit may plan one or more days of the week dedicated to follow up

Discharge summary

- The discharge summary must include baby's gestation, birth weight and risk factors for neurodevelopment - e.g
  - Antenatal steroids given? / evidence of fetal growth restriction / fetal distress / chorioamnionitis
  - Need for resuscitation at birth
  - Need for oxygen / ventilation
  - Shock
  - Need for blood transfusion
  - Sepsis / meningitis
  - Adequacy of growth
  - Hypoglycemia/ jaundice …

Discharge planning - check list

Medical care

- Weight tracking on preterm growth chart
- Head circumference tracking
- Nutrition advice
- Immunization advice

Neurodevelopment assessment

- ROP screening done / scheduled
- Vision evaluation educated
- Hearing screen done / scheduled
- Neuro sonogram done / scheduled
- KMC
- Parent readiness for discharge

Medical care

Growth targets

Once preterm babies regain their birth weight (BW), expected growth targets are:

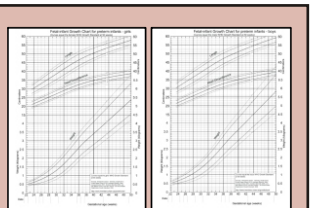
- **Weight - 15 to 20 g/kg per day**
- **Head circumference - 0.5 to 1 cm /week**
- **Length - 1 cm/week till 40 weeks**

Preterm growth charts

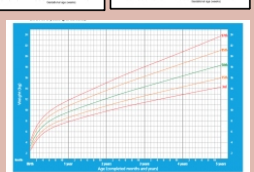
- **Weight, length and head circumference should be measured even when baby is in NICU and continued after discharge**
- **1-2 weekly (after discharge from hospital) for a few weeks, then at each health care visit for vaccination**
- **The growth parameters must be plotted and growth tracked on growth charts for preterm babies (example: Fentons growth chart)**

Growth charts

Fenton's growth chart



WHO growth chart



Complementary feeding

- **Exclusive breast milk must be continued till 6 months age corrected for prematurity**
- **Complementary feeding with semisolid foods should be started at 6 months age**
- **There is no change in age of starting complementary feeding for preterm babies**

Immunization - no change for preterm babies

The immunization schedule remains unchanged for preterm babies (chronological age: counted from the date the baby was born)

"Medically stable PT and low birth weight (LBW) infants should receive full doses of diphtheria, tetanus, acellular pertussis, Haemophilus Influenzae type b, hepatitis B, poliovirus, and pneumococcal conjugate vaccines at a chronologic age consistent with the schedule recommended for full-term infants"

Birth doses of BCG / Hep B and 3OPV at discharge

- The birth doses of BCG, OPV may be given once the preterm baby is medically stable and ready for discharge

Neurodevelopment assessment

Education of parents on follow up

- Parents should be educated regarding
  - The need to test
  - Follow up schedules
  - Possible interventions if a deviation from normal is detected

Screening of preterm babies - to prevent NDD

- ROP screening
- Vision assessment at 9-12 months
- Hearing screening and diagnostic tests before 6 months age
- Multi-domain development tests at 4, 8, 12 months
- Neurosonogram at 1-2 weeks and 36-40 weeks

ROP screening

- Often the preterm babies are discharged before the ROP screening is complete
- The families must be educated on the need to follow up till ophthalmologist informs that screening is complete / treatment of ROP is required

Eye check at 9-12 months

- Preterm babies are at increased risk of strabismus, myopia and late retinal detachment
- They should undergo examination by an ophthalmologist at 9 to 12 months of age

Hearing screen

- Preterm sick babies are at increased risk for sensorineural hearing loss, so automated auditory brainstem response (AABR) should be done
- It is best to complete AABR before discharge from hospital at birth admission
  - Otoacoustic emissions (OAE) will fail to detect sensorineural hearing loss
- In baby fails screening tests, confirmation of hearing loss and intervention must be initiated before 6 months age

Neurodevelopment assessment

- ❑ Assess neurologic abnormalities (tone)
- ❑ Do multi-domain development screening including motor, cognition, hearing and vision, and language (e.g. CDC grade, Denver II, Bayley screener)
- ❑ Time: 3 , 6 and 9-12 and 18-24 months age corrected for prematurity*
- ❑ Recognize, refer for early intervention

Opportunity to reduce disability

- Appropriate follow up is an opportunity to detect early and correct deviations in development
- Neonatologist must explain to parents the tests and the treatments
- Visits to the specialists may befacilitated by dedicated staff
  - They are involved in parent education, managing appointments and guiding parents to intervention programs.

Intact outcomes

- The goal to save preterm babies without disability can be achieved by timely screening and appropriate interventions

Follow up checklist: what to do and when?

S No.	Area	Frequency	Details
A	Anthropometry	Every Visit	HC, weight at every visit, length at every 3 months
B	Breastfeeding	Every Visit	Observe the breastfeeding session if possible
C	Counseling	Every Visit	Feeding , hygiene, KMC, Innocuous issues Ask mother about her concerns
D	Development Screening	4, 8, 12 months	CDC grading/ Denver II/ Bayley screen Fill up the chart and refer where needed for detailed developmental evaluation
E	Eye	After initial ROP evaluation, detailed examination at 9-12 months of age	Emphasize on getting a ROP screening from a skilled ophthalmologist
F	Neuro sonogram	1-2 weeks and 36- 40 weeks	To rule out PVL and other abnormalities
G	Growth Monitoring	Every visit	Plot the growth of the baby on the WHO growth charts
H	Hearing	Ideal before discharge , complete diagnosis by 6 months	AABR is preferred
I	Immunizations	As per schedule	BCG, Hep B and OPV at discharge
O	Others	Language/speech at 1,2,3 years Behavior at/after 1 year IQ testing at 3 years of age.	Any delay detected should prompt early intervention

What did you learn from this webinar?

1. .....
2. .....
3. .....

What are the queries which come to your mind?

1. .....
2. .....
3. .....

2.8: Script

The follow up and care of preterm babies after discharge from NICU

This script shall help you to understand the the follow up and care of preterm babies after discharge from NICU

- Each unit should have a place dedicated to follow up services that include all / most of the services under one roof
- Dedicated personnel must coordinate the screening of at-risk babies, the unit may plan one or more days of the week dedicated to follow up

Some issues specific to preterm babies

- Preterm babies take little longer (about 2 weeks) than term babies to regain birth weight. After that, they must gain about 15-20 grams / day. Head growth may be faster (0.5-1.0 cm / week) than term babies, in the first few weeks
- Baby's weight, length and head circumference must be plotted on growth charts for preterm babies, weekly in the first few weeks of life. Fenton's growth chart is a favored preterm growth chart. Tracking of weight and OFC on growth charts is more informative than the numbers
- Fenton's growth chart allows plotting till 50 weeks PMA. One can change to WHO growth charts thereafter
- Preterm babies must be fed breast milk alone till 6 months corrected age, and complementary feeding started after that, like in term born babies
- Preterm babies are at higher risk of infections and timely immunization is even more important. There is no change in the schedule of immunization from term born babies. The babies must be vaccinated as per their chronological age

- BCG and OPV can be given at or after 34 weeks gestation, once the baby is medically stable and ready to go home
- Hepatitis B may be given after 30 days or at discharge (if the mother is protected / or negative for Hep B)

Essential points for a follow up program:

- The parent's knowledge of need for screening and benefits of timely intervention
- They must be educated at regular intervals, while the baby is in NICU and later, about the need for such testing, schedules and anticipated interventions e.g. laser photocoagulation, hearing aid etc
- ROP screening must be completed as discussed and vision assessed at 9-12 months for refraction and squint
- Hearing screen and diagnostic testing must be completed before the baby is 6 months old
- Development assessment must be done periodically (suggest 4, 8 and 12 months)
- A neurosonogram should be done at 1-2 weeks and repeated at 36- 40 weeks of life
- The universal screening for hearing impairment using OAE will miss sensori-neural hearing loss. Hence, preterm babies must have an AABR screen before discharge from hospital. An abnormal hearing screening must be followed by diagnostic evaluation and decision to intervene made before the baby is 6 months old. Delay in treatment can adversely affect language development
- Neurodevelopment assessment includes assessment of tone and motor mile stones to detect cerebral palsy early. Multi – domain development tests must evaluate cognition, vision, hearing and language as well. Some of these tools are CDC grade, Denver II, Bayley scale etc. Periodic checks at 4, 8 and 12 months of age corrected for prematurity are suggested. At each visit, baby may be initiated on interventions, if deviation in development is noted
- Appropriate follow up is an opportunity to detect early and correct deviations in development. This will minimize disability in preterm survivors
- The neonatologist is the nodal person to explain to the family the findings of the screening tests and treatments planned for NDD. Coordination of the specialists' visits may be facilitated by dedicated staff. They are involved in parent education, managing appointments and guiding parents to intervention programs. The goal of saving preterm babies, intact, i.e. without neurodisability can be achieved by timely screening as discussed and appropriate interventions.

2.9: Key messages

- Discharge planning including discharge summary and a checklist to be used before discharge
- Medical care including; monitoring of growth, nutrition advice and immunizations of preterm baby and neurodevelopment assessment is important

2.10: Video

There will be video demonstration by your facilitator on:

- Counseling of parents for infants with ROP screening

The video demonstration will be followed by discussion

1. The following aspects of counseling of parents for infants with ROP screening were shown:
   i. ……..
   ii. ……..
   iii. …….

Comments on video:

Good aspect	Need improvement
……	……
……	……
……	……

2.11: Role Play

Role Play 1: You will observe role play being conducted by facilitators in the situation where infant needs follow up for ROP, but is getting discharged or transferred. Write your comments for discussion at the end of the role play

Objective: To demonstrate a situation where infant needs follow up for ROP, but is getting discharged or transferred

Requirements: Doll with cap and socks, sheet as a binder

Ms A is the mother and Ms B is the nurse. Ms A has a premature baby now 15 day old male infant is ready for discharge from the special newborn care unit. The neonate was born at 30 weeks with weight of 1700 grams and is currently gaining weight and mother is confident of taking care of the infant. The infant is on predominant expressed breast milk and taking breast feeds as well. You are the nurse/ doctor managing the newborn and you have to do counseling of these parents regarding the necessity of screening for ROP

- **All the participants will record the feedback in ALPAC format**
  A: Ask
  L: Listen (and accept mother's concern)
  P: Praise the mother for her right practices, concern or enthusiasm for the baby
  A: Give a few practical advices that she can understand and follow easily
  C: Confirm whether she has understood

Nurse: Hello Anita, how are you?
Mother: I am fine, thank you.
Nurse: Your baby is ready for discharge Anita, your doctor would have informed you.
Mother: Yes Sister, he looks much better now. His breathing problem has now settled and he is gaining weight and I am also more confident now.
Nurse: That is a good thing**.** Anita, I wish to share that your baby needs screening for evaluation of retinopathy of prematurity.
Mother: Yes, but I am not sure what does that mean sister.
Nurse: You don't have to get scared. ROP is a condition characterized by the development of abnormal blood vessels in the eyes of the preterm neonate. The presence of these abnormal vessels can be detected only by regular screening of the eyes of these small babies who are born before their expected time of delivery
Mother: So, when should this screen happen and where does this happen?
Nurse: This screening of both the eyes is normally done when the baby is at least one month old and this screening takes place in the premises our special newborn care unit only.
Mother: OK sister, but my baby is just 15 days old, and you are discharging my baby. So do I have to come back for this screening?
Nurse: Yes Anita, this is a very good question. You have to bring back the baby once he/ she is one month old. This is important because if screening is missed, then this disease can go undetected and your baby can also turn blind. I am not trying to scare you but I am trying to tell you the importance of timely screening.
Mother: Sure sister, I shall come but why are babies born before their due date at risk of this disease?
Nurse: Anita, the blood vessels of these babies are not developed just like other organs when they are born and they gradually develop after birth. During this time they receive oxygen, may require blood and may have infection or poor weight gain. All these factors can lead to abnormal development of these vessels and may cause problem later.
Anita, your baby's discharge summary has the date when you need to come to the newborn unit for regular screening.
Mother: Thank you sister
Nurse: Ok, Anita. Can you now tell me what you have understood?
Mother: Yes, I understood that my baby is at risk of developing retinopathy of prematurity because of being born before the expected date of delivery. This is a serious problem and if my baby is not screened at the intervals told by the doctor, my baby can become blind. I should come for follow up as and when advised by my doctor which I shall remember and come accordingly

Comments on role play:

.....

.....

.....

Role Play 2: You will observe role play being conducted by facilitators in the situation where infant getting discharged but not falling into the criteria for ROP. Write your comments for discussion at the end of the role play.

Objective: To demonstrate a situation where infant getting discharged but not falling into the criteria for ROP.

Requirements: Doll with cap and socks, sheet as a binder

Ms A is the mother and Ms B is the nurse. Ms A has a baby now 7 day old male infant is ready for discharge from the special newborn care unit. The neonate was born at 36 weeks with weight of 1700 grams and is currently gaining weight and mother is confident of taking care of the infant. The baby had symptomatic hypoglycemia and seizures but is now stable and on predominant expressed breast milk and taking breast feeds as well. You are the nurse/ doctor managing the newborn and you have to do counseling of these parents regarding follow up.

- All the participants will record the feedback in ALPAC format

  A: Ask

  L: Listen (and accept mother's concern)

  P: Praise the mother for her right practices, concern or enthusiasm for the baby

  A: Give a few practical advices that she can understand and follow easily

  C: Confirm whether she has understood

Nurse: Hello Anita, how are you?

Mother: I am fine, thank you.

Nurse: Your baby is ready for discharge Anita; your doctor would have informed you.

Mother: Yes Sister, he looks much better now. His breathing problem has now settled and he is gaining weight and I am also more confident now.

Nurse: That is a good thing**.** Anita, I wish to share that your baby needs regular follow up after discharge

Mother: Yes, but I am not sure what does that mean sister.

Nurse: You don't have to get scared. Regular follow up is required for ensuring timely immunisation, monitoring growth, ensuring appropriate nutritional intake and evaluation of the developmental progression of your baby.

Mother: So, when should this happen, how frequently do I have to come and where do I have to come?

Nurse: This is a very important question and let me answer your queries one by one.

First, when should you follow up; if the baby has any ongoing issues or illness, you should seek medical care immediately. Ideally we call all our high risk infants preferably within the first week of discharge in our follow up clinic. The location, date and time of coming is written in your discharge card. After the first visit, the next visits are every 2 weeks until a body weight of 3 kg (and then at 6, 10 and 14 week immunization visits to be covered during these visits). Further visits are at 3, 6, 9, 12, 15 and 18 months of corrected age and then every 6 months until 8 years of age. Sometimes there may be more visits if required.

Mother: OK, I am trying to understand this. What is the need to follow up my baby starting so early and till 8 years of age?

Nurse: Some abnormalities that are identified in the first year of life are transient or improve whereas findings in other children may worsen over time. The importance of long term follow up lies in the fact that minor problems may not be detected early and become apparent only with increasing age.

Mother: What is done at these follow up visits?

Nurse: We normally evaluate the growth, nutritional intake, ensure timely immunisation and evaluate the neurological development in these infants. In addition, ongoing morbidity and their management is one of the most important services a follow up clinic is meant to provide. These may relate to prolonged jaundice due to any cause, difficulty in breathing, vomiting, inadequate weight gain in a preterm infant, anemia, diagnostic evaluation and intermittent illnesses in a baby.

Mother: Ok sister, I have understood the need, time of coming and the place where I have to come for follow up

Comments on role play:

.....

.....

.....

2.12: Poster

There will be a poster demonstration on:

- Retinopathy of prematurity (ROP): whom and when to screen and how to follow up?
- Classification of ROP
- ROP staging
- Algorithm for management of ROP
- ROP screening form
- Preparation for ROP screening procedure
- Equipment required during screening procedure
- Patient information sheet
- Follow-up algorithm
- Vaccination schedule
- Indications for hearing screening
- Nutritional supplementation

RETINOPATHY OF PREMATURITY

WHOM TO SCREEN?

Gestation < 34 weeks Or Birth weight < 2000 grams

Any preterm infant with risk factors

- Cardiorespiratory support
- Chronic lung disease
- Intraventricular hemorrhage
- Prolonged oxygen requirement
- Blood transfusion
- Apnea
- Sepsis
- Poor post-natal weight gain
- Respiratory distress syndrome
- Exchange transfusion

PREVENTIVE FACTORS

- Antenatal steroids
- Restrict use of Oxygen
- If baby on Oxygen target SpO_2 between 90 to 95%
- Use CPAP when required
- Early enteral nutrition (breast milk preferred)
- Aggressive nutrition therapy
- Following aseptic precautions
- Restrictive blood transfusion policy

AGGRAVATING FACTORS

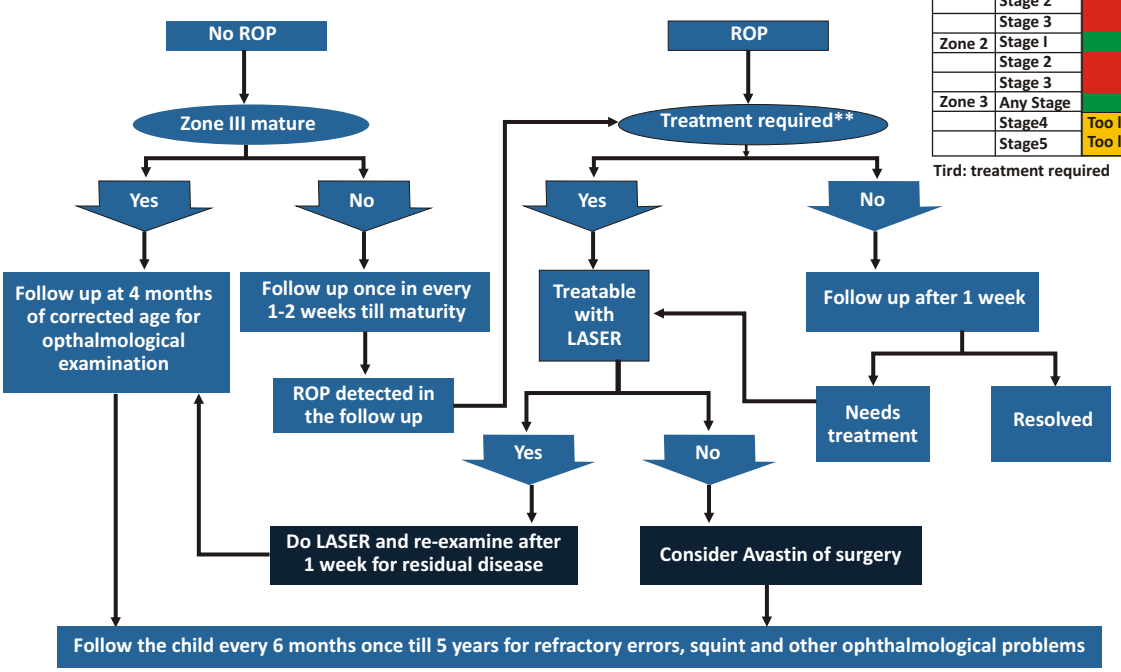
- Small for gestational age
- Uncontrolled Use of Oxygen
- Patent ductus arteriosus
- Sepsis
- Inadequate weight gain
- Prolonged ventilation
- Transfusion of blood products

SCREEN AT 30 DAYS OF LIFE / AT DISCHARGE

INDICATIONS FOR TREATING ROP

Zone	Stage	Plus	Noplus
Zone I	Stage I		
	Stage 2		
	Stage 3		
Zone 2	Stage I		
	Stage 2		
	Stage 3		
Zone 3	Any Stage		
	Stage4	Too late for laser	
	Stage5	Too late for laser	

Tird: treatment required



Follow the child every 6 months once till 5 years for refractory errors, squint and other ophthalmological problems

Early screening and appropriate treatment is the key to success

Classification Of ROP

The facilitator shall conduct a demonstration session on classification of ROP

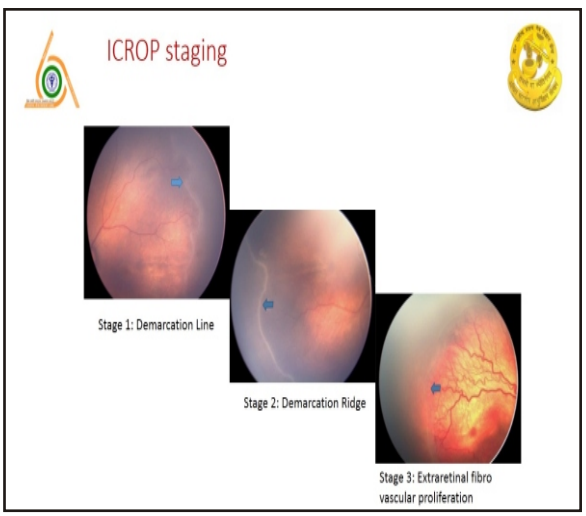
1. Location	**Zone I**	**Circle with optic nerve at centre and a radius of twice the distance from optic nerve to macula**
	Zone II	From edge of Zone I to the nasal ora-serrata nasally and equator temporally
	Zone III	Lateral most crescent shaped area from Zone II to ora-serrata temporally
2. Severity	Stage I	Presence of thin white demarcation line separating the vascular from avascular retina
	Stage II	The line becomes prominent because of lifting of retina to form a ridge having height and width
	Stage III	Presence of extra retinal fibro-vascular proliferation with abnormal vessels and fibrous tissue arising from the ridge and extending into vitreous
	Stage IV	Partial retinal detachment ; not involving macula(4A) or involving macula (4B)
	Stage V	Complete retinal detachment
3. Plus disease		Presence of dilatation and tortuosity of posterior retinal vessels. Associated with vitreous haze, papillary rigidity
4. Extent		Extent of involvement of the retina as expresses as clock hours (30 degree sectors)
5. Pre-plus disease		Vascular abnormalities of the posterior pole that are insufficient for the diagnosis of plus disease but that demonstrate more arterial tortuosity and more venous dilatation than normal.

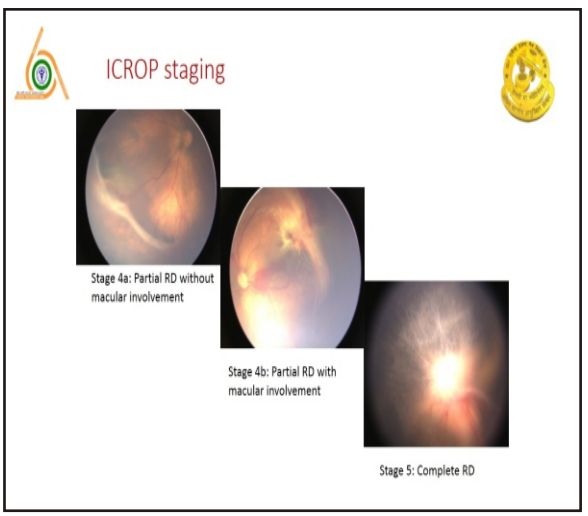
Reference

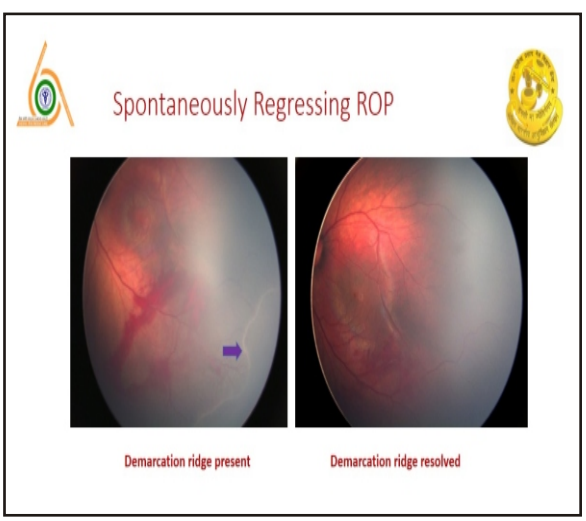
International Committee for the Classification of Retinopathy of Prematurity. The International Classification of Retinopathy of Prematurity revisited. Arch Ophthalmol. 2005 Jul;123 (7):991-9

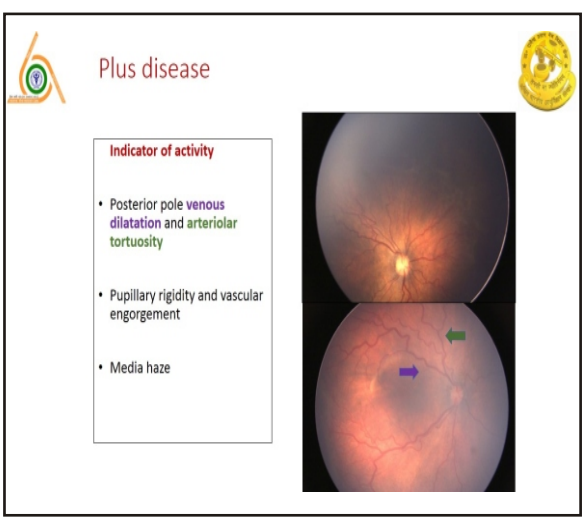
ROP staging

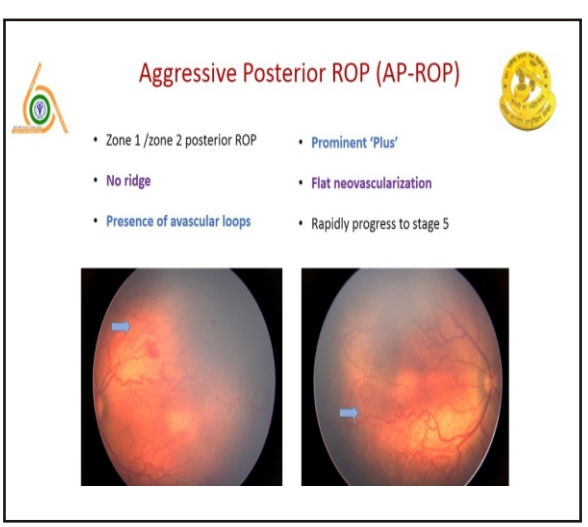
The facilitator shall conduct a demonstration session on ROP staging





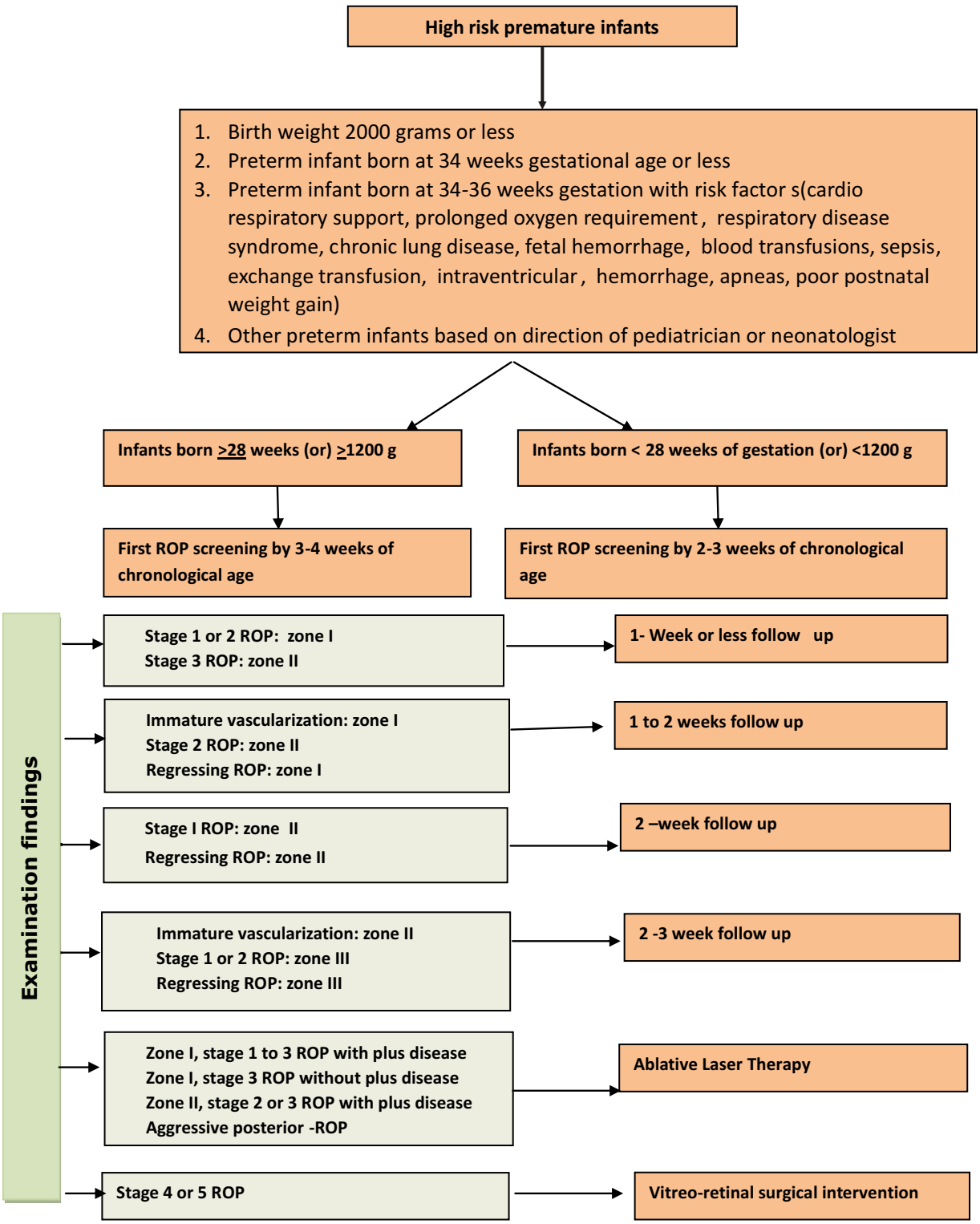






Algorithm for management of ROP

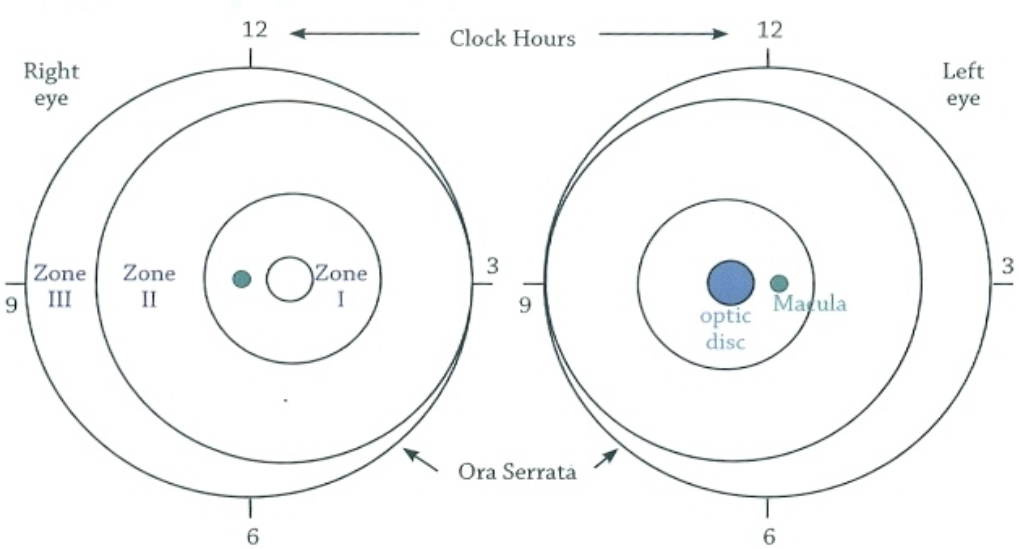
The facilitator shall conduct a demonstration session on Algorithm for management of ROP



ROP screening form

The facilitator shall conduct a demonstration session on ROP screening form

Neonatal Ophthalmology Examination Record for ROP SNCU Data base:							
Identification	Name: Baby of	Birth weight	-/-/-/-gm	Gestational age at time of birth	-/-/-/- weeks and days	Estimated day of delivery(by LMP/USG)	MM/DD/YYYY
Risk factor	Oxygen supplementation Y/N:☐☐ Hrs.☐☐ Sepsis Y/N:☐☐ Clinical/screening proven/culture proven: ☐☐ Blood transfusion Y/N: ☐☐ Number of unit: ☐☐ Multiple birth Order: ☐☐ NEC. Y/N: ☐☐ Apnea. Y/N: no of episodes: ☐☐			RDS. Y/N ☐☐ Anemia Y/N: Hb (g/dL): ☐☐ Thrombocytopenia Y/N: ☐☐ Intra-ventricular hemorrhage Y/N. grade:☐☐ Cardiovascular defect other than PDA Y/N:☐☐ PDA Y/N: ☐☐ maternal factor- H/o hypertension/anemia/assisted conception /premature rupture of AM: ☐☐			

Name of the Hospital						
Current Date : MM/DD/YYYY						
EDD: MM/DD/YYYY						
Current Gestational Age: Weeks and days						
Follow up No.						
Any Comments On: Cornea, Iris, Lens, Pupil, Vitreous, optic nerve						
Report	**Zone : 1-3**	**Stage : 1-5**	**Preplus: Y/N**	**Plus Disease: Y/N**	**Total Clock hours**	**APROP Y/N**
Right Eye						
Left Eye						
Any other ocular abnormality detected	1. Lids : 2. Conjunctiva:	3. Cornea: 4. Iris:	5. Anterior chamber: 6. Lens:	7. Vitreous: 8. Optic nerve:		
Recommendation	Follow up/Laser ablation/referral to tertiary center for surgical intervention	Next follow up date: MM/DD/YYYY				

Preparation for ROP screening procedure

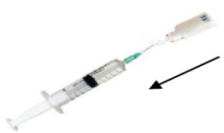
The facilitator shall conduct a demonstration session on Preparation for ROP screening procedure

ROP screening - preparation and administration of eye drops

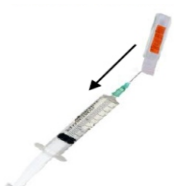
Eyedrops: Tropac P: 5ml vial-5% phenylephrine and 0.8% tropicamide):- dilute to make 2.5% phenyelephrine and 0.4% Tropicamide

Preparation

1) Withdraw 5mL of Tropac P into a 10mL syringe with a 26 G needle.



2) Withdraw 5mL of NS from a fresh respule.



3) Mix the contents well by shaking.

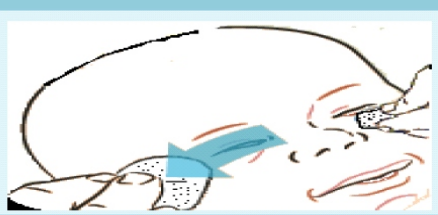
4) Push 5mL of the diluted drug back into the vial.

5) The vial should be used directly for instilling the drops.

6) Discard vial after the day's session.

Administration

1. Check patient list for ROP exam for the day and cross check with date of birth.
2. Perform hand hygiene before and after handling each neonate.
3. Pull the lower palpebra and administer one drop of diluted Tropac P into the lower conjuctival sac.
4. Wipe away the excess drug from both eyes with sterile cotton with a single swipe medical to lateral.



5. Repeat a dose after 15 minutes. **Three – four doses are sufficient**.

Equipment required during screening procedure

The facilitator shall conduct a demonstration session on equipment required during screening procedure

Equipment required during screening
Indirect ophthalmoscope (with small pupil adjustments) x1 neonatal unit
Condensing lenses 20D and 28D for indirect ophthalmoscope
Neonatal lid speculums (Aflonso) x20/unit (one/infant examined)
Scleral depressor (Schocket/wire vectis) x20/ unit (one/infant examined)
Consumables
Dilating eye drops (Tropicamide 0.5% + Phenylepherine 2.5%)
Local anesthetic eye drops (Proparacaine 0.5%)
Artificial Tear Drops- for lubrication during procedure
Antibiotic drop (Moxifloxacin/Betadine) - at end of procedure (optional)
Clean wipes/cotton swabs- at end of procedure
Surgical gloves x2- for screener and assistant
Soap/ Towel - for first wash
Coupling gel (Methylcellulose) - If Imaging Camera is used

Patient information sheet

The facilitator shall conduct a demonstration session on patient information sheet

आर ओ पी क्या है?
आर ओ पी आँखों की ऐसी अवस्था है जो सिर्फ 9 महीने से पहले जन्में बच्चों को होती है। इस बिमारी में आँखों के पिछले भाग रेटिना की रक्त वाहिकाएं पूरी तरह से विकसित नही हो पाती है। जिस वजह से ज्यादा आक्सीजन देने से यह वहिकाएं असाम्न्य तरीके से बढ़ने लगती है। जिससे रेटिना और नेत्र दृष्टि को नुक्सान पहुँच सकता है।

मुझे कैसे पता चलेगा कि मेरे बच्चे को आर ओ पी है?
आर ओ पी आँखों के पिछले भाग रेटिना को प्रभावित करती है। इसलिए सामने से देखने पर आँखें बिलकुल सामान्य लगती है। इसलिए आर ओ पी कि जाँच कराना जरूरी है

आर ओ पी की जांच कब और कैसे की जाती है?
यह 28 दिन पर की जाती है। ये जांच प्रशिक्षित रेटिना विशेषज्ञ द्वारा indirect opthalmoscope *से कि जाती है।*

जांच करते समय क्या दर्द होता है?
जांच करते समय कोई सूई या इन्जेक्शन का प्रयोग नही किया जाता है। बस पकडते समय बच्चे को हल्की से बेचेनी और दर्द होता है जिसके कारण बच्चा रोता है। इसलिए यह जांच दूध पिलाने के एक घन्टे बाद कि जाती है और 5–10 मिनट मे पूरी हो जाती है।

अगर बच्चे को आर ओ पी है तो आगे क्या करना होगा?
यदि जांच में बच्चे को आर ओ पी आता है तो रेटिना विशेषज्ञ उसकी गंभीरता का आंकलन करते है। ज्यादातर बच्चों को सौम्य किसम का आर ओ पी होता है, जो अपने आप ठीक हो जाता है। बहुत ही कम बच्चों को गंभीर तरह का आर ओ पी होता है जिसमें लेजर करना पडता है।

क्या इसकी जांच बार – बार करवानी पडती है?
इसमे आँखों की जांच बार–बार करवानी पडती है क्योंकि एक बार जांच काफी नही होती । ज्यादा तर बच्चों में एक से तीन बार आँखों की जांच की जाती है, कुछ बच्चों में ज्यादा बार भी किया जा सकता है।

लेजर कैसे किया जाता है?
लेज़र प्रशिशित रेटिना विशेषज्ञ के द्वारा चुनिंदा केन्द्रो मे ही किया जाता है। यह रेटिना के असामान्य श्रकत वाहिकाएं को रोकता है। यह काफी सुरक्षित प्रक्रिया है एवं यह रेटिना की बहुत सारी बिमारियों में प्रयोग किया जाता है। लेज़र पिछले 20 साल से आर ओ पी को ठीक करने के लिए किया जा रहा है। लेज़र के बाद हर 5 माह पर आँखों कि जांच करवानी जरूरी होती है।

मेरे बच्चे को यह रोग न हो इसके लिए क्या किया जा सकता है?
जैसे की आपको बताया गया है कि आर ओ पी समय से पहले जन्में बच्चों को होता है इसलिए इसे पुरी तरह से बचाया नही जा सकता पर माता–पिता के तौर पर आय यह कर सकते है:

- *बच्चों को संक्रमण न हो इसके लिए आप स्वयं स्वच्छ रहें और हर बार बच्चे को हाथ लगाने से पहले हाथ धोयें।*
- *बच्चे को माँ का ही दूध दें।*
- *ज्यादा से ज्यादा देर बच्चे को के एम सी करें हर बार बच्चे को आर ओ पी जांच के लिए लाए।*

Follow-up algorithm

The facilitator shall conduct a demonstration session on follow-up algorithm

Assessment	Age in months								
	1	2	3	6	9	12	15	18	24...8 yrs
Assessment of feeding and dietary counselling	All visits								
Growth monitoring	All visits								
Immunization	As per schedule (based on postnatal age)								
Ongoing morbidities	All visits and as and when required								
Neurological examination			*	*	*	*	-	*	*
Developmental screening	All visits								
Formal developmental assessment			*	¶	¶	*	-	*	*
Hearing (BERA)			*	¶	¶	¶	-	¶	¶
Ophthalmic evaluation	ROP screening				*	¶	-	¶	¶
USG/MRI brain	As indicated								
¶if previous test abnormal									

Vaccination schedule (universal immunisation program)

Vaccination is to be done as per actual age after birth

- **BCG (Bacillus Calmette Guerin)** 1 dose at Birth (upto 1 year if not given earlier)
- **DPT (Diphtheria, Pertussis and Tetanus Toxoid)** 5 doses; Three primary doses at 6,10,14 weeks and two booster doses at 16-24 months and 5 Years of age
- **OPV (Oral Polio Vaccine)** 5 doses; 0 dose at birth, three primary doses at 6,10 and 14 weeks and one booster dose at 16-24 months of age
- **Hepatitis B vaccine** 4 doses; 0 dose within 24 hours of birth and three doses at 6, 10 and 14 weeks of age
- **MMR** 2 doses; first dose at 9-12 months and second dose at 16-24 months of age
- **TT (**Tetanus Toxoid) 2 doses at 10 years and 16 years of age
- **Pentavalent Vaccine** (Diphtheria, Pertussis, Tetanus (DPT), Hepatitis B and Haemophilus influenzae type b). To be started for any child aged more than 6 weeks and can be given up to 1 year of age. Three doses of pentavalent vaccine are included in UIP. Doses: 6, 10 & 14 week of age

Indications for hearing screening

	High risk criteria
1.	Caregiver concern regarding hearing, speech, language, or developmental delay
2.	Family history of permanent childhood hearing loss
3.	Admission in special newborn care unit for more than 5 days or history of any of the following irrespective duration of stay: Ventilation, ototoxic medications (gentamycin and tobramycin) or diuretics (furosemide), or jaundice requiring exchange transfusion
4.	Intra uterine infections, such as CMV, herpes, rubella, syphilis, and toxoplasmosis.
5.	Craniofacial anomalies, particularly that involve the pinna, ear canal, ear tags, ear pits, and temporal bone anomalies
6.	History of culture-positive postnatal infections particularly with meningitis (including confirmed bacterial and viral)

* Hearing screening to be done in all high risk infants with automated brain stem evoked response audiometry
* Repeat screening is required if anyone of the above conditions is noticed on readmission
* Hearing screening should ideally be done after they reach 34 wks postmenstrual age

NUTRITIONAL SUPPLEMENTATION

This job-aid shall be discussed while the participant undergoes the module on Good Nutrition

2.13:Self-check MCQ's

1. According to International Classification of ROP, zone 1 is defined by a circle whose radius is
   a. Twice the distance from the centre of the optic disc to the centre of macula (Fovea)
   b. Equal to the distance from the centre of the optic disc to the centre of macula (Fovea)
   c. Half of the distance from the centre of the optic disc to the centre of macula (Fovea)
   d. One and half times the distance from the centre of the optic disc to the centre of macula (Fovea)

2. Which of the following statements is **'NOT TRUE'**?
   a. Stage 1 ROP is presence of thin white line of demarcation separating vascular from avascular retina
   b. Stage 3 ROP is presence of extra retinal fibro vascular proliferation with abnormal vessels and fibrous tissue extending from ridge to vitreous
   c. Stage 2 ROP is addition of depth and width to the demarcation line of stage 1, so as the line becomes a ridge
   d. Stage 4 ROP is complete retinal detachment

3. Which of the following two statements are **'TRUE'**?
   1. ROP begins at 31 weeks and progresses for next few weeks
   2. Spontaneous regression can occur in all stages of the disease
   3. ROP screening done once is sufficient
   4. Serial screening till retina is mature is required
      a. Statements 1& 2 are TRUE
      b. Statements 1& 3 are TRUE
      c. Statements 1& 4 are TRUE
      d. Statement 2 & 4 are TRUE

4. Which of the following about Aggressive posterior ROP (AP-ROP) is **'NOT TRUE'**? It is
      a. Rapidly progressing, severe form of ROP
      b. Posterior location
      c. Prominence of plus disease
      d. Well-defined nature of the retinopathy

5. Posterior pole tortuosity and dilatation those are abnormal but not enough to reach the criteria of plus disease is called
      a. Aggressive posterior ROP
      b. Plus disease stage I
      c. Pre-plus disease
      d. none of the above

Skill Check

After you have read through the scripts, seen the videos and the webniars, you shall be asked to undergo a skill check on task trainers. The facilitator shall assess you and provide feedback. This shall include assessment of skills:

S. No.	OSCE
1.	Pupillary dilatation during ROP screening procedure
2.	Pre-discharge counselling regarding ROP screening
3.	Counselling of parents for infant with severe ROP requiring immediate laser therapy

1. Pupillary dilatation during ROP screening procedure

A baby boy born at 32 weeks of gestation with a birth weight of 1400 grams with respiratory distress since birth. Baby received CPAP for 3 days. He is undergoing ROP screening today at 4 weeks of postnatal age. How will you ensure adequate dilatation of the pupil?

S.No	Correct Action	Yes	No
1.	Inform the parents about the screening procedure		
2.	Ensure the baby is nil per oral for at least 2 hour		
3.	Collect the material and check list		
4.	Perform hand hygiene		
5.	Dilute the phenylephrine to the desired concentration		
6.	Refer to the job-aid and check list		
7.	Instill the following eye drops in order: **a.** Tropicamide-3-4 times at 15 minutes interval **b.** Phenylephrine - once, 10 minutes before the screening and **c.** Paracaine just before the procedure		
8.	Check for pupillary dilatation periodically		
9.	Monitor vital signs		
	Total Score:		

Score: (Maximum Score 9): _____

2. Pre-discharge counseling regarding ROP screening

A baby born at 30 weeks of gestation with birth weight of 1.2 kg is getting discharged after the first ROP screening. He has been advised follow-up after 2 weeks. How will you counsel the parents regarding need for further ROP screening? The screening finding is zone 2 stage 2.

S.No	Correct Action	Yes	No
1.	Provides the parents with the patient information leaflet		
2.	Explains in simple language regarding the need of repeated ROP screening		
3. a.	Informs them the following about the repeat screening: Date, Time and Place		
4.	Check the discharge summary for the following are mentioned: a. Findings of the first screening b. Date for repeat screening c. Place for repeat screening		
5.	Check the ROP **exam** recording form to see if the details of the first screening are entered		
6.	Provide counselling about remaining aspects like: a. Breast feeding b. Immunization c. Care of new born		
7.	Ask parents to repeat what has been explained to ensure they have understood well		
	Total Score		

Score: (Maximum Score 7): _____

3. Counseling of parents for infant with severe ROP requiring immediate laser therapy

A baby born at 28 weeks of gestation with a birth weight of 980 grams with respiratory distress since birth. Baby received surfactant therapy and mechanical ventilation and antibiotics for 14 days for Klebsiella sepsis. He underwent ROP screening at 3weeks of postnatal age and was found to have aggressive posterior ROP (AP-ROP) and advised immediate laser therapy by the ophthalmologist. How will you counsel the parents?

S.No	Correct Action	Yes	No
1.	Explain the nature and the severity of the disease in simple language		
2.	Explain possible risk factors in their baby that predisposed for developing severe ROP		
3.	Show the information leaflet to explain the need for Laser therapy		
4.	Explain in detail the nature of Laser therapy		
5.	Explains the possible complications		
6.	Explains the outcomes in a guarded manner		
7.	Explains the procedure also		
8.	Explains how the neonatology team will provide cover		
9.	Explains about the post-procedure care		
10.	Explains about the follow up examinations		
	Total Score:		

Score: (Maximum Score 10): _____