Newborn Critical Care Center (NCCC) Clinical Guidelines

Retinopathy of Prematurity Screening & Follow-up Guidelines

Retinopathy of Prematurity (ROP): Vasoproliferative retinopathy with abnormal growth of immature retinal vessels in premature infants, which can lead to retinal detachment and visual loss.

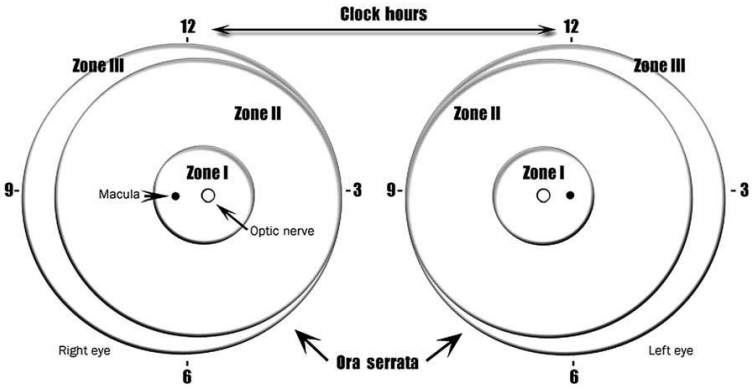
Risk factors for ROP: GA at birth ≤ 30 weeks, Birth Weight < 1500 g, poor rate of weight gain, hypotension requiring inotropic support, excessive supplemental oxygen in the first few weeks of life

Screen infants* if any of the following apply:
• Less than or equal to 30 Weeks gestation • Less than 1500 grams birth weight • Birth weight 1500 to 2000 grams with an unstable neonatal course (prolonged and/or fluctuating need for oxygen therapy, BPD, PDA, late-onset sepsis etc.)

CLASSIFICATION OF ROP

Location *(definition of 3 concentric circular retinal zones centered on the optic nerve and extending to ora serrata; provides an indication of infant maturity and risk of ROP developing)*

- **Zone I** - Circle with radius twice the estimated distance from the optic disc center to the foveal center
- **Zone II** - Extends nasally from the outer limit of Zone I to the nasal ora serrata with a similar distance temporally, superiorly, and inferiorly. A region of 2-disc diameters peripheral to the Zone I border is **posterior Zone II** (indicates potentially more worrisome disease than ROP in the more peripheral Zone II)
- **Notch** - describes an incursion by the ROP lesion of 1 to 2 clock hours along the horizontal meridian into a more posterior zone than the remainder of the ROP; the zone for such eyes should be noted by the most posterior zone of retinal vascularization with the qualifier “notch” (e.g., “Zone I secondary to notch”)
- **Zone III** - Consists of the outer crescent shaped area extending from Zone II to the ora serrata temporally



Severity:

Acute Disease (Stages 1-3)

- **Stage 1** – Thin line of demarcation separating the normal retina from the undeveloped avascular retina
- **Stage 2** – A ridge of scar tissue (with height and width) replaces the line of Stage 1
- **Stage 3** – Abnormal blood vessels and fibrous tissue forming on the ridge of Stage 2 and extending into the vitreous

Retinal Detachment (Stages 4 and 5)

- **Stage 4** – Partial retinal detachment (4A: with fovea attached, 4B with fovea detached)
- **Stage 5** – Complete retinal detachment Stage 5A (optic disc is visible by ophthalmoscopy; Stage 5B (optic disc not visible), Stage 5C (5B+ anterior segment changes)

Plus Disease:

- Presence of vascular dilatation and tortuosity of the retinal vessels

Preplus Disease:

- Abnormal vascular dilation and/or tortuosity that is insufficient for plus disease

P-score:

- Method of grading vascular dilation and tortuosity (grades range from p=1 to p=9)
- Scores of 4, 5 and 6 are generally considered consistent with preplus disease
- Scores of 7, 8, and 9 are generally considered consistent with plus disease

Aggressive ROP:

- A severe, rapidly progressive form of ROP (not necessarily restricted to the posterior retina)

Regression:

- ROP regression and its sequelae, whether spontaneous or after anti-VEGF treatment; can be complete or incomplete

Reactivation:

- New ROP lesions and vascular changes occurring after treatment; seen more frequently after anti-VEGF treatment than after spontaneous regression (rarely if ever occurs after complete laser photocoagulation)

Long-Term Sequelae:

- Including late retinal detachments, persistent avascular retina, macular anomalies, retinal vascular changes, and glaucoma

TIMING OF FIRST EYE EXAMINATION BASED ON GESTATIONAL AGE AT BIRTH

Shown is a schedule for detecting pre-threshold ROP with 99% confidence, usually well before any required treatment.

Gestational Age at Birth *(weeks)*	**Postmenstrual Age** *(weeks)*	**Chronologic Age** *(weeks)*
22	31	9
23	31	8
24	31	7
25	31	6
26	31	5
27	31	4
28	32	4
29	33	4
30	34	4
>30		4

IMPORTANT POINTS

- To schedule an eye exam, enter patient's name on **NICU ROP** List in EPIC
- Please add patients to list in EPIC upon identification of baby at risk for ROP, be sure to add babies to the list well before they are due for examination
- Ophthalmology team will determine date of examination
- Initial exam may be done at 3 weeks of age if discharge is anticipated within one week
- Do not discharge a baby home or to an outside facility without clear electronic health record documentation and clear communication with caretakers about the importance and logistics of ROP follow up
- **Please do not cancel any exams without discussing with ophthalmology and the NCCC attending. ** If the infant is unstable, an abbreviated exam may be done, rather than canceling the exam.***

EXAM

- Ophthalmology will order eye drops to be administered on the morning of the exam (30 minutes prior to exam):
    - *Cyclomydril 1 - 2 drops in each eye every 5 minutes X 3*
    - Cyclopentolate 0.5% and phenylephrine 2.5% 1 drop each eye every 5 minutes x 2 as alternatives for babies who do not dilate well or when there is a cyclomydril shortage
- Ophthalmology will administer a topical anesthetic agent to minimize discomfort
- Consider pretreatment with oral sucrose to minimize discomfort

FOLLOW-UP *(See Appendix A also)*

Repeat exam will be scheduled by Ophthalmology according to these general guidelines:

Follow-up in **ONE** week or less:

- Zone I: immature vascularization, no ROP
- Zone I: stage 1 or stage 2 ROP
- Immature retina extending into posterior Zone II, near boundary of Zone I-Zone II

Follow-up in **ONE** to **TWO** weeks:

- Posterior Zone II: immature vascularization
- Zone II: stage 2 ROP
- Zone I: unequivocally regressing ROP

Follow-up in **TWO** weeks:

- Zone II: stage 1 ROP
- Zone II: no ROP, immature vascularization
- Zone II: unequivocally regressing ROP

Follow-up in **TWO** to **THREE** weeks:

- Zone III: stage 1 or 2 ROP
- Zone III: regressing ROP

Screening can likely stop if:

- Full retinal vascularization in close proximity to the ora serrata for 360°
- Zone III retinal vascularization attained without previous zone I or II ROP
- Postmenstrual age of 45 weeks and no type 1 ROP or worse present
- If anti-VEGF injectable medications used, postmenstrual age of at least 65 weeks
- Regression of ROP

TREATMENT OPTIONS

1. ***Laser Photocoagulation*** (standard treatment) – Destruction of cells in the avascular retina that produce vasoactive compounds such as VEGF
2. ***Intravitreal Bevacizumab Monotherapy (Avastin[d])*** – Pharmacologically counteracts VEGF molecule (anti-VEGF).

   Advantages:

   - Rapid administration and rapid response
   - Can be used when laser therapy is not feasible (ex. opaque cornea or lens, vitreous haze, poor dilation, contraindication for general anesthesia)

   Disadvantages:

   - Not FDA approved for treatment of ROP
   - Unknown long term side effects due to systemic absorption of medication
   - Late ROP reactivation is more common and occurs later than with laser, requiring prolonged follow-up, often through >65 weeks PMA. Therefore, infants require more screening exams when treated with Avastin.

Treatment should be initiated for the following retinal findings:

1. Zone I ROP: any stage with plus disease
2. Zone I ROP: Stage 3, no plus disease
3. Zone II: Stage 2 or 3 with plus disease

- Treatment should be accomplished as soon as possible, at least within 72 hours of determination of treatable disease to minimize the risk of retinal detachment
- Follow-up is recommended in 3 to 7 days after treatment

***IMPORTANT NOTE**:*

Infants who have had ROP, regardless of whether they require treatment, may be at risk of other seemingly unrelated visual disorders such as strabismus, amblyopia, glaucoma, late retinal detachment, cataract, etc. Ophthalmologic follow-up for these potential problems after discharge from the intensive care unit is indicated.

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Appendix A: Follow-up Examination Appointments

EXAM FINDINS	FOLLOW-UP EXAM
Incomplete vascularization (no ROP)	
Zone I	1 week
Zone II	2 weeks
Zone III	2-3 weeks*
Any ROP besides pre-threshold or threshold ROP	2 weeks
Pre-threshold ROP (type II)	≤ 1 week
Pre-threshold ROP (type I)	Laser treatment or Avastin within 72 hours
Fully vascularized	
Poor visual response, strabismus, or nystagmus	3-6 months
History ROP more severe than Stage 1	6 months
History ROP never more severe than Stage 1	1 year

** Unless infant has been stable and is over 40 weeks corrected age*