

# Newborn Critical Care Center (NCCC) Clinical Guidelines

## Retinopathy of Prematurity Screening & Follow-up Guidelines

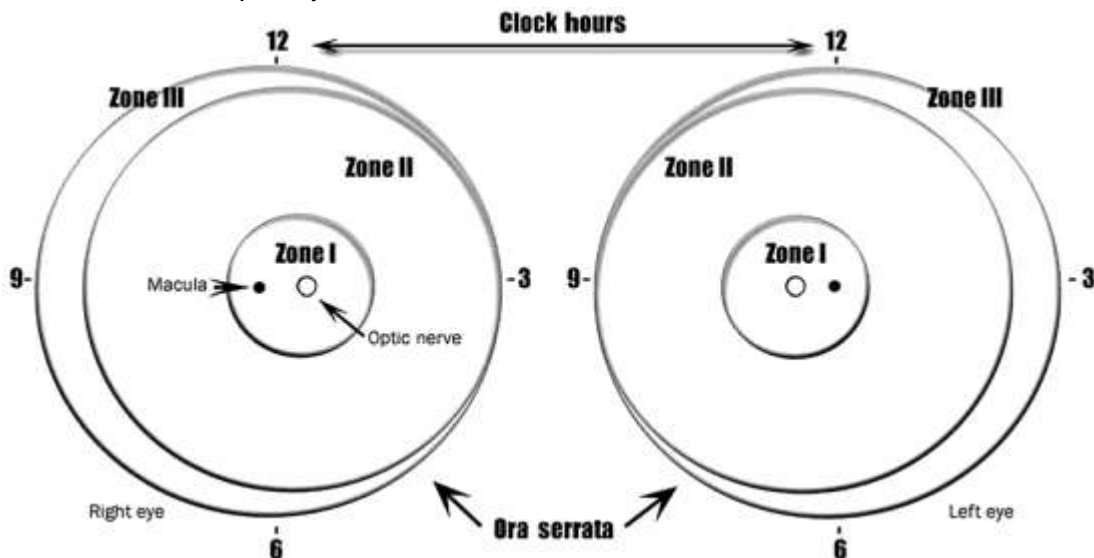
**Retinopathy of Prematurity (ROP):** Vasoproliferative retinopathy with abnormal growth of immature retinal vessels of premature infants, which can lead to retinal detachment and visual loss.

**Risk factors of ROP:** low gestational age, low birth weight, poor rate of weight gain, excessive supplemental oxygen in the first few weeks of life

### CLASSIFICATION OF ROP

#### **Location:**

- **Zone I** - An imaginary circle with the optic nerve at the center and a radius of twice the distance from the optic nerve to the macula
- **Zone II** - Extends from the edge of Zone I to the equator on the nasal side of the eye and about half the distance to the ora serrata on the temporal side
- **Zone III** - Consists of the outer crescent shaped area extending from Zone II to the ora serrata temporally



#### **Severity:**

- **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 form on the ridge of Stage 2 and extend into the vitreous
- **Stage 4** – Partial retinal detachment
- **Stage 5** – Complete retinal detachment

#### **Plus Disease:**

- Presence of vascular dilatation and tortuosity of the posterior retinal vessels

#### **Extent:**

- Refers to circumferential location of disease and is reported as clock hours in the appropriate zone

**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

*\*If the infant is unstable, an abbreviated exam may be done, rather than canceling the exam. Please do not cancel any exams without discussing with ophthalmology and the NCCC attending.*

**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.

<b>Gestational Age at Birth (weeks)</b>	<b>Postmenstrual Age (weeks)</b>	<b>Chronologic Age (weeks)</b>	<b>Add to EPIC list (Postmenstrual Age)</b>
22	31	9	27
23	31	8	28
24	31	7	29
25	31	6	30
26	31	5	30
27	31	4	30
28	32	4	31
29	33	4	32
30	34	4	33
>30		4	

**IMPORTANT POINTS**

- To schedule an eye exam, enter patient's name on **NICU ROP** List in EPIC
- Initial exam may be done at 3 weeks of age if discharge is anticipated within one week

**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*
- Consider pretreatment with oral sucrose or a topical anesthetic agent 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:

- Immature vascularization: Zone I, no ROP
- Immature retina extends into posterior Zone II, near boundary of Zone I

- Stage 1 or 2 ROP: Zone I
- Stage 3 ROP: Zone II
- Presence or suspected presence of aggressive posterior ROP

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

- Immature vascularization: posterior Zone II
- Stage 2 ROP: Zone II
- Regressing ROP: Zone I

Follow-up in **TWO** weeks:

- Stage 1 ROP: Zone II
- Immature vascularization: Zone II, no ROP
- Regressing ROP: Zone II

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

- Stage 1 or 2 ROP: Zone III
- Regressing ROP: Zone III

Screening can likely stop if:

- Zone III retinal vascularization attained without previous zone I or II ROP
- Full retinal vascularization in close proximity to the ora serrata for 360°
- Postmenstrual age of 50 weeks and no prethreshold disease (stage 3 ROP in zone II, any ROP in zone I) or worse ROP is present; or 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)** – More direct approach to counteracting VEGF and most recent treatment. Avastin showed significant benefit for Zone I but not Zone II disease.

### Advantages:

- Ease of administration
- Rapid response
- Can be used when laser therapy is not feasible (ex. opaque corneas or lens, vitreous haziness, poor papillary dilation)

### Disadvantages:

- Unknown long term side effects
- Systemic effects of suppressing VEGF
- Long term follow up

3. **Cryotherapy** – First widely used treatment which is ablation of non-vascularized retina. Now replaced by laser photocoagulation.
  - 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, when possible, 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
- Consider intravitreal bevacizumab monotherapy (Avastin<sup>d</sup>) for:
  1. Zone I, Stage 3+ ROP

<sup>d</sup> Avastin is not approved by the FDA for treatment of ROP. Infants who have received Avastin should be monitored weekly until retinal vascularization is complete.

**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 NCCC is indicated.

**References:**

1. AAP Policy Statement. [Screening Examination of Premature Infants for Retinopathy of Prematurity](#). *Pediatrics*. 2013; 131:189-195.
2. Hapsari, D. & Sitorus, R.S. (2014). Intravitreal Bevacizumab in Retinopathy of prematurity; Inject or Not? *Asia Pacific Journal of Ophthalmology*, 3, 368-378.
3. Leskov, I. & Mukai, Shizuo. (2015). Laser therapy versus anti-VEGF agents for treatment of retinopathy of prematurity. *International Ophthalmology Clinics*, 55, 81-90.
4. Mintz-Hittner HA, et al. (2011) Efficacy of intravitreal bevacizumab for stage 3+ retinopathy of prematurity. *New England Journal of Medicine*, 364(7), 603-615

## Appendix A: Follow-up Examination Appointments

EXAM FINDINGS	FOLLOW-UP EXAM	PHYSICIAN
<b>Incomplete vascularization (no ROP)</b> Zone I Zone II Zone III	1 week 2 weeks 2-3 weeks*	Dr. Ulrich
<b>Any ROP besides pre-threshold or threshold ROP</b>	2 weeks	Dr. Ulrich
<b>Pre-threshold ROP (type II)</b>	≤ 1 week	Dr. Ulrich
<b>Pre-threshold ROP (type I)</b>	Laser treatment or Avastin within 72 hours	Dr. Ulrich
<b>Fully vascularized</b>	6 months	Dr. Ulrich

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