JOHNS HOPKINS ALL CHILDREN'S HOSPITAL

Screening Examination for Retinopathy of Prematurity Clinical Pathway

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All Children's Hospital

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Updated: December 2021
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This pathway is intended as a guide for physicians, physician assistants, nurse practitioners and other healthcare providers. It should be adapted to the care of specific patient based on the patient's individualized circumstances and the practitioner's professional judgment.

Johns Hopkins All Children's Hospital

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SCOPE

This Clinical Practice Guideline (CPG) applies to:

All Children’s Hospital, Inc., and

All Children’s Health System, Inc.

- West Coast Neonatology, Inc.

Guideline Panel

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Executive Summary

Retinopathy of prematurity (ROP) is a serious disorder of the developing retinal blood vessels in the low birth weight preterm infant and is a leading cause of childhood preventable blindness.

The pathophysiology of ROP is characterized by two phases. Phase I ROP is due to vaso-obliteration beginning immediately after birth secondary to a marked decrease in vascular endothelial growth factor (VEGF) and insulin-like growth factor-1 (IGF-1). Phase II begins around 33 weeks' postmenstrual age at which time VEGF levels increase, especially if there is retinal hypoxia with increasing retinal metabolism and demand for oxygen leading to abnormal vasoproliferation.

A. Preterm infants with low birth weight neonates are considered high risk for ROP

B. ROP progression is sequential in nature, it is imperative that at-risk infants receive their initial retinal exam at the appropriate post-menstrual age and have timely follow-up exams. This will ensure detection of early changes of ROP and allow indicated intervention before irreversible retinal damage occurs.

C. Timely initial screening and follow-up examinations and prompt treatment of at-risk neonates has proven benefits of reducing unfavorable structural and visual outcomes.

Published Data and Levels of Evidence

A. Preterm and low birth weight infants are born with an immature retina and retinal vasculature. Lower gestational age at birth and lower birth weight directly correlate with increased immaturity of the retina and retinal vasculature

B. Neonates born with gestational age (GA) at birth of 30 weeks and less or birth weight (BW) of 1500g or less have immature retinal tissue at high risk of developing in a pathologic manner and progressing to ROP, retinal detachment and blindness

C. Hyperoxia and oxygen saturations consistently outside the target range of 90%-95% at less than 36 weeks GA are known risk factors

D. Several large multi-center trials have demonstrated a significantly decreased incidence of poor visual outcomes with early ROP detection and treatment

E. The 2018 revised Consensus Statement of American Academy of Pediatrics, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus, and American Association of Certified Orthoptists has proposed the schedule for the timing of retinal examinations in this patient population and is intended to permit early detection of ROP before it progresses to permanent disease while minimizing the number of potentially traumatic examinations.

F. A small number of case reports have raised the possibility of ROP occurrence in newborns of older GA and larger BW. The cases presented were very few and had a common denominator of fetal distress and stormy neonatal course

Clinical Practice Guideline

A. All preterm infants with gestational age (GA) at birth of 30 weeks and less or birth weight (BW) of 1500g and less are considered at risk for ROP and should undergo retinal screening examinations. *(Evidence level 1A; Strong recommendation, high quality evidence)*

B. The onset of serious ROP correlates better with ***postmenstrual age*** (gestational age at birth plus chronologic age) than postnatal age. That is the more preterm an infant is at birth, the longer the time to develop serious ROP. Thus, the initiation of acute-phase ROP screening should be based on the infant's POSTMENSTRUAL AGE, and should be performed between 31 and 34 weeks. *(Evidence level 1A; Strong recommendation, high quality evidence)*

ROP Screening Initiation

	Age at initial examination, weeks	Age at initial examination, weeks
GA at Birth (weeks)	*Postmenstrual*	*Chronologic*
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
Older GA with high risk (consider based on severity of comorbidities)		4

C. The proposed schedule provides for the detection of ROP that is potentially damaging to the retina with 99% confidence, usually before any required treatment.

D. For infants born at 22 and 23 weeks, the schedule should be considered tentative rather than evidence-based because of the small number of survivors in these postmenstrual-age categories.

E. For those infants ≤ 24 weeks GA at birth, may consider an earlier timing at 6 weeks chronological age, based on severity of comorbidities, likelihood of a meaningful examination and tolerance to an eye exam. Those infants are at higher risk for developing a posterior ROP, a usually more aggressive form of ROP. *(Evidence level 1C; Strong recommendation, moderate quality evidence)*

F. It is important to note that despite appropriate timing of examinations and treatment, a small number of infants at risk progress to poor outcomes.

G. It is recommended to minimize the discomfort and systemic effects of an eye exam by considering the use of pacifiers, oral sucrose when applicable and so forth.

H. Using multiple dilating drops SHOULD BE AVOIDED because poor pupillary dilation can occur in advanced ROP, and administering multiple doses of dilating drops can adversely affect the systemic status of the infant.

I. Additional infants with GA at birth between 31 and 34 weeks or BW between 1500 Grams and 2000 Grams with a prolonged unstable, critically ill clinical course as determined by the treating team / Neonatologist may be considered high risk for ROP and should undergo screening ROP exam. *(Evidence level 2C; Weak recommendation, low quality evidence)*

J. For infants deemed clinically unfit for initial retinal exam (as determined by the neonatologist), the exam may be rescheduled within the next week (7 days). However, documentation of the instability of the patient and the postponing of the eye exam is paramount and should be entered daily until the next eye exam is successfully performed.

Follow-Up Exams during the NICU stay

a) Timing of NICU follow-up exams will be recommended by the examining ophthalmologist in accordance with retinal findings classified according to the “International classification of retinopathy of prematurity revisited” and the 2018 American Academy of Pediatrics Policy statement. (see figure)

Follow-Up Exams after discharge home

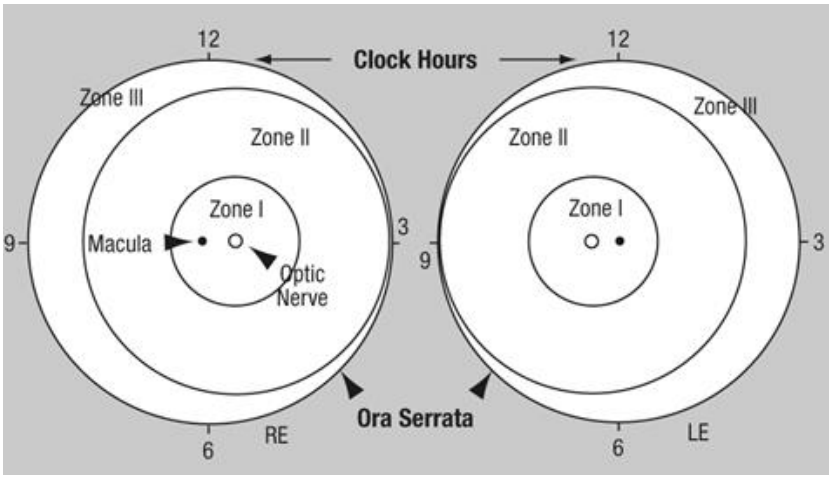
a) Infants discharged from the NICU who require on-going retinal exams will continue to follow-up with ophthalmology on an outpatient basis. Prior to discharge, the schedule will be recommended by the examining ophthalmologist according to the retinal exam findings. Parents and Primary care providers for these infants must be made aware of, and agree to strictly follow, this outpatient schedule.

b) All infants who developed ROP (regardless of need for treatment), are at high risk of other visual disorders including but not limited to amblyopia, strabismus, cataract, and high refractive errors. Pediatricians / outpatient physicians who care for these infants should be made aware of these potential risks. Additionally, despite resolution of ROP, these infants should have follow-up with ophthalmology within 4-6 months of discharge from the NICU.

Glossary

BW - Birth Weight
GA - Gestational Age
NICU - Neonatal Intensive Care Unit
PMA - Post Menstrual Age
ROP - Retinopathy of Prematurity

Figure



PEDIATRICS Volume 142, number 6, December 2018

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Clinical Pathway

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Date Approved by JHACH Clinical Practice Council:

Date Available on Webpage: 2/24/2022

Last Revised: 09/06/21

Last Formatted: 09/07/21

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