

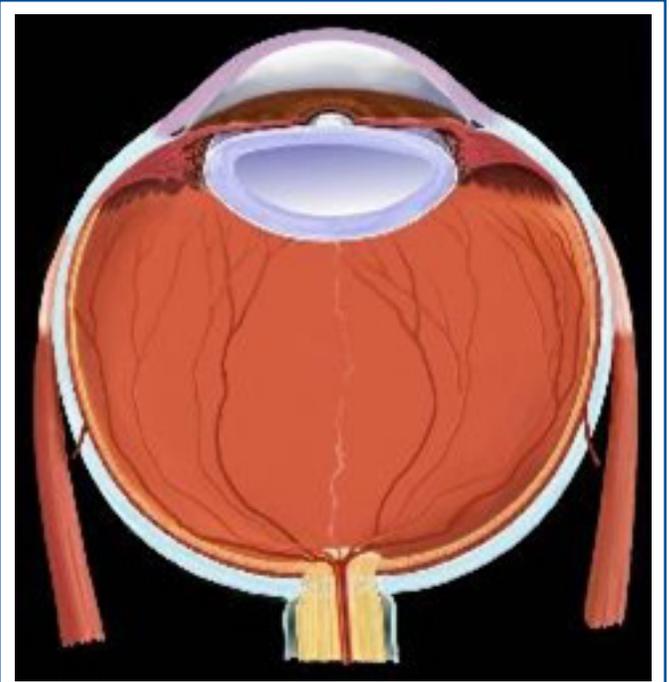
Retinopathy of Prematurity

Retinopathy of prematurity (ROP) is a potentially blinding eye disorder, caused by an abnormal development of retinal blood vessels. ROP primarily affects premature infants, with risk and incidence increasing as gestational age and birth weight decrease. Infants at highest risk are those born before 31 weeks gestation and weighing less than 1,250 g, those who experience intrauterine growth restriction, males, and those who experience prolonged exposure to supplemental oxygen.

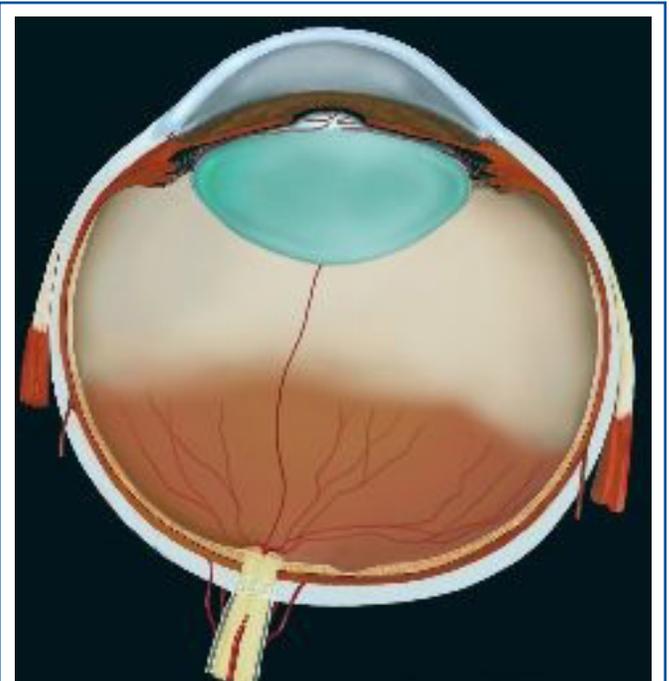
Several complex factors impact the development of ROP. The eye starts to develop at about 16 weeks of pregnancy, when the blood vessels of the retina begin to form the macula at the optic nerve in the back of the eye. The blood vessels grow gradually toward the edges of the developing retina, supplying oxygen and nutrients. During the last 12 weeks of a pregnancy, the eye develops rapidly. At term gestation, the retinal vessel growth is near complete. (The retina is usually fully vascularized within a few months after birth.) When an infant is born prematurely, the normal pattern of vascularization is disrupted and may be halted. The peripheral edges of the retina are at risk for oxygen deprivation.

As these abnormal blood vessels grow, they become fragile and can leak, scarring the retina and pulling it away from its position on the back of the orbit, causing retinal detachment. Retinal detachment is the main cause of visual impairment and blindness in ROP. Infants with ROP are considered to be at a higher risk for developing certain eye problems later in life, such as retinal detachment, myopia (nearsightedness), strabismus (crossed eyes), amblyopia (lazy eye), and glaucoma.

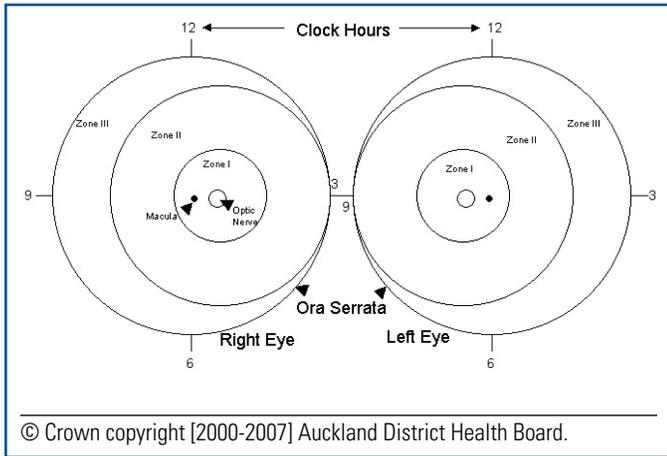
For premature infants, titrating oxygen saturations within acceptable targets can be challenging at best. There have been differing opinions as to maintaining saturations lower (85%–89%) or higher (91%–95%). In the SUPPORT trial, the rates of severe retinopathy or death did not differ significantly between the groups. Death before discharge was higher in the lower-oxygen-saturation



Normal blood vessels in the eye. Courtesy of the Vision Research ROPARD Foundation.



Abnormal blood vessels in the eye with a ridge of scar tissue from ROP. Courtesy of the Vision Research ROPARD Foundation.



group even though this lower saturation group had a lower occurrence of severe retinopathy.

Eye exams for infants at risk should be performed at 31 weeks postconceptual age or 4 weeks chronological age, whichever is later. Remember, ROP disease is diagnosed based on the zone of the eye where it is identified and assigned a stage based on severity of the disease (see figure).

Treatment

The most common treatments for ROP are laser therapy or Avastin®. Laser therapy burns away the periphery of the retina, which has no normal blood vessels. With cryotherapy, the surface of the eye that overlies the periphery of the retina is “frozen” to stop the abnormal growth of blood vessels. Both laser treatment and cryotherapy destroy the peripheral areas of the retina, slowing or reversing the abnormal growth of blood vessels. The side effect of these therapies is that the peripheral vision is lost in an effort to preserve the most important part of vision near the macula. A relatively new therapy for ROP is Avastin (bevacizumab). Avastin is an

angiogenesis inhibitor, slowing the growth of new blood vessels. First used in cancer patients, this antivasculature endothelial growth factor drug is injected into the posterior chamber of the eye into the vitreous. In the BEAT-ROP clinical trial, Avastin was found to be superior to laser treatment in Zone 1, Stage III plus disease, but not in Zone 2. The role of anti-VEGF medications is still unclear but initial research is promising. Both therapies are performed on infants with advanced ROP, usually Stage III with “plus disease.”

Bibliography

- American Academy of Pediatrics Section on Ophthalmology American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus. (2013). Screening examination of premature infants for retinopathy of prematurity. *Pediatrics*, 131(1), 189–195.
- Geloneck, M. M., Chuang, A. Z., Clark, W. L., Hunt, M. G., Norman, A. A., Packwood, E. A., . . . Mintz-Hittner, H. A. (2014). Refractive outcomes following bevacizumab monotherapy compared with conventional laser treatment: A randomized clinical trial. *JAMA Ophthalmology*, 132(11), 1327–1333.
- Gilbert, C. (2008). Retinopathy of prematurity: A global perspective of the epidemics, population of babies at risk and implications for control. *Early Human Development*, 84(2), 77–82.
- International Committee for the Classification of Retinopathy of Prematurity. (2005). The international classification of retinopathy of prematurity revisited. *Archives of Ophthalmology*, 123, 991–999.
- Mintz-Hittner, H. A., Kennedy, K. A., & Chuang, A. Z. (2011). BEAT-ROP cooperative group: Efficacy of intravitreal bevacizumab for stage 3+ retinopathy of prematurity. *The New England Journal of Medicine*, 364, 603–615.
- SUPPORT Study Group of the Eunice Kennedy Shriver NICHD Neonatal Research Network, Carlo, W. A., Finer, N. N., Walsh, M. C., Rich, W., Gantz, M. G., . . . Higgins, R. D. (2010). Target ranges of oxygen saturation in extremely preterm infants. *New England Journal of Medicine*, 362, 1959–1969.



Retinopathy of Prematurity: Information for Parents

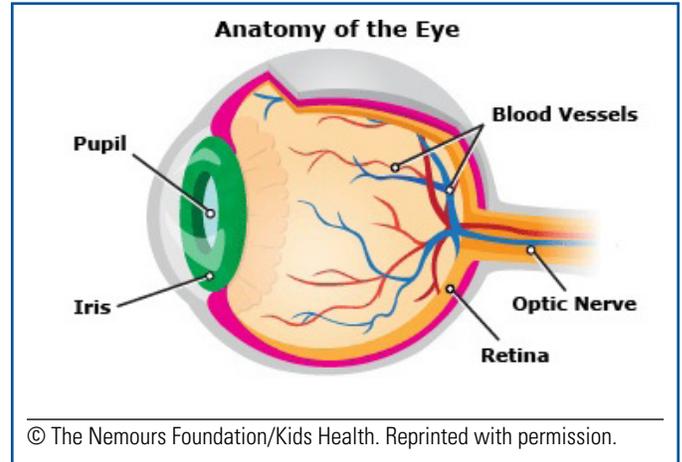
Retinopathy of prematurity (ROP) is an eye disease found in some premature babies. When a baby is born early, the blood vessels in the retina (the inner lining of the back of the eye) may not be fully developed. After birth, the blood vessels begin to grow abnormally. This is called ROP. Researchers do not know all of the reasons why ROP happens, but premature birth and exposure to high amounts of oxygen are two risk factors. Many times, this is a balancing act because sick babies may die without oxygen. It is very difficult to tightly control oxygen levels in sick babies.

Although most babies with ROP will heal over time, in some babies, the blood vessels continue to grow abnormally. This can cause the retina to separate from the back of the eye. Severe ROP can lead to loss of vision and even blindness.

ROP can be treated with a laser or medicine injected into the eye. Both treatments can slow down or even reverse the abnormal growth of the blood vessels in the eye.

While in the hospital, an eye doctor will check your baby's eyes on a regular basis until the retina is fully developed. When your baby goes home, you will have an appointment with an outside eye doctor for your baby.

Please be sure you know the time and location of this appointment.



Because ROP is a serious disease that can get worse very quickly, you should not change or reschedule this appointment unless it is absolutely necessary. Waiting too long for ROP check-ups and treatment can lead to blindness for your baby. An eye doctor (called an ophthalmologist) must do the exam, because ROP can only be seen using special equipment. Your baby's eyes may look normal to you even when there is severe ROP.