



British and Éire Association of Medical Retina Specialists

Retinopathy of Prematurity (ROP) is an eye condition that affects premature infants, particularly those born before 31 weeks of gestation. It occurs when abnormal blood vessels grow in the retina, the light sensitive tissue at the back of the eye that is crucial for vision. These abnormal blood vessels can cause scarring and retinal detachment, leading to potential vision impairment or blindness if not detected and treated early.

Causes and Risk Factors of Retinopathy of Prematurity (ROP)

ROP develops due to the underdevelopment of retinal blood vessels in premature infants. During the last trimester of pregnancy, the retinal blood vessels usually grow and mature. In preterm infants, the retinal blood vessels may not develop properly. When the baby is exposed to oxygen therapy, it can interfere with the normal growth of these blood vessels, leading to abnormal vessel formation.

The key risk factors for ROP include:

1. Prematurity:

Gestational age: The earlier a baby is born, the greater the risk of developing ROP. Babies born before 31 weeks of gestation are at the highest risk.

Low birth weight: Babies weighing less than 2.75 pounds (1250 grams) at birth are more likely to develop ROP.

2. Oxygen Therapy:

Premature infants often require oxygen therapy to help with breathing, especially if they have immature lungs. Excessive or fluctuating oxygen levels can increase the risk of abnormal blood vessel growth in the retina.

3. Poor Growth or Health Problems:

Babies with other health complications, such as infections, respiratory distress, or low birth weight, have an increased risk of ROP.

4. Multiple Births:

Infants born as part of a multiple birth (twins, triplets, etc.) are more likely to be premature, which increases the risk of ROP.

5. Other factors:

Male sex: Premature male infants are at higher risk than females.

Blood transfusions: Premature babies who receive multiple blood transfusions may have a higher risk of developing ROP.

Family history: A family history of eye problems may increase the risk of ROP.

Stages of Retinopathy of Prematurity

ROP is classified into different stages based on the severity of the condition. The stages of ROP are:

1. Stage 1 (Mild):

Involves a small amount of abnormal blood vessel growth, with no significant threat to vision. This stage often resolves without treatment.

2. Stage 2 (Moderate):

More abnormal blood vessel growth occurs, but the retina is still attached. At this stage, intervention may be required to prevent further damage.

3. Stage 3 (Severe):

The abnormal blood vessels grow more aggressively and may cause scarring in the retina. The retina can become detached at this stage, leading to permanent vision loss without treatment.

4. Stage 4 (Retinal Detachment):

Partial retinal detachment occurs in stage 4. The retina is pulled away from its normal position, causing significant vision loss. Stage 4 may require surgery to attempt to reattach the retina.

5. Stage 5 (Total Retinal Detachment):

This is the most severe stage of ROP, where the retina is completely detached from the back of the eye. Stage 5 ROP typically results in blindness.

Symptoms of Retinopathy of Prematurity

In its early stages, ROP does not typically cause symptoms that can be seen by the infant or parents. As ROP progresses, the following signs may become evident:

Visual impairment: Babies may experience vision loss, which can range from mild to severe. However, most parents do not notice visual problems early on.

Abnormal eye movements: Babies with ROP may exhibit unusual eye movements, such as strabismus (crossed eyes) or nystagmus (involuntary eye movement).

Leukocoria: This is a condition where the eye appears white or cloudy when light is shone into it, which may indicate retinal detachment or severe disease.

Diagnosis of Retinopathy of Prematurity

ROP is diagnosed through a comprehensive eye exam performed by a paediatric ophthalmologist. This typically happens around 46 weeks after birth in premature infants, as this is when ROP is most likely to develop. The eye exam involves the following:

1. Dilated Eye Exam:

The ophthalmologist uses eye drops to dilate the infant's pupils, allowing a clear view of the retina. This is crucial for detecting early signs of ROP.

2. Fundus Examination:

A special instrument called a fundus camera is used to take pictures of the retina and assess the stage and extent of the disease.

3. Retinal Imaging:

In some cases, more advanced imaging techniques, such as widefield retinal photography, may be used to monitor the condition.

Treatment for Retinopathy of Prematurity

The treatment for ROP depends on the stage and severity of the condition. The primary goal of treatment is to stop the abnormal blood vessel growth and prevent retinal detachment. Common treatment options include:

1. Laser Therapy:

Laser photocoagulation is a common treatment for ROP. It uses a laser to create small burns in the peripheral retina to stop the growth of abnormal blood vessels. This procedure is effective in preventing the progression of ROP to more severe stages.

2. Cryotherapy:

In some cases, cryotherapy (freezing therapy) may be used to treat ROP. This involves freezing the peripheral retina to stop the abnormal blood vessel growth.

3. Anti-VEGF Injections:

Anti-vascular endothelial growth factor (VEGF) therapy involves injecting medications like Lucentis (ranibizumab) or Avastin (bevacizumab) into the eye. These drugs block the growth of abnormal blood vessels and are often used when laser treatment is not effective or suitable.

4. Surgical Intervention:

In cases where retinal detachment occurs, surgery may be needed to reattach the retina. This can include vitrectomy (removal of the vitreous gel) or scleral buckle surgery to help reattach the retina.

5. Close Monitoring:

Infants at risk for ROP require regular eye exams to monitor the condition's progression. Depending on the findings, treatment may be initiated or adjusted.

Prevention of Retinopathy of Prematurity

While ROP cannot always be prevented, several strategies can help reduce the risk of its development:

1. Optimal Oxygen Management:

The careful management of oxygen levels in premature infants is crucial. Excessive or fluctuating oxygen levels can increase the risk of abnormal blood vessel growth. Oxygen therapy should be carefully monitored to ensure it is within safe limits.

2. Reducing Prematurity:

Efforts to prevent premature birth, such as better prenatal care and managing risk factors for preterm labour, can help reduce the incidence of ROP. In some cases, interventions like cervical cerclage or progesterone supplementation may help prevent premature delivery.

3. Early Screening:

Premature infants, especially those born before 32 weeks of gestation or weighing less than 1500 grams, should undergo regular screening for ROP starting at 46 weeks of age. Early detection is key to preventing serious visual impairment.

Prognosis of Retinopathy of Prematurity

The prognosis for infants with ROP depends on the stage and severity of the disease at the time of diagnosis, as well as the response to treatment. In many cases, ROP resolves without treatment, particularly in mild cases (Stage 1 or Stage 2). However, if left untreated or if detected too late, ROP can lead to severe vision impairment or blindness.

Early detection and intervention: With early screening and appropriate treatment (such as laser therapy or anti-VEGF injections), the risk of blindness can be significantly reduced. Most babies who receive timely treatment have good outcomes, though some may have long-term visual challenges, such as reduced visual acuity or strabismus.

Severe cases: In more severe cases, particularly those involving retinal detachment (Stage 4 or Stage 5), the prognosis is poorer, and some children may experience permanent vision loss despite surgery or other interventions.

Long-term FollowUp

Babies who have been treated for ROP should have regular eye exams throughout childhood to monitor for any long-term complications. These may include:

- Near-sightedness (myopia)
- Strabismus (crossed eyes)
- Amblyopia (lazy eye)
- Glaucoma
- Retinal scarring or macular problems

Conclusion

Retinopathy of Prematurity (ROP) is a potentially sight threatening condition that affects premature infants, particularly those born at very low birth weights or early gestational ages. Early detection through screening and timely treatment with laser therapy, cryotherapy, or anti-VEGF injections can help prevent serious vision impairment and blindness. However, ROP requires careful management and long-term follow-up to ensure the best possible visual outcomes for affected infants.