Retinopathy of prematurity (ROP)

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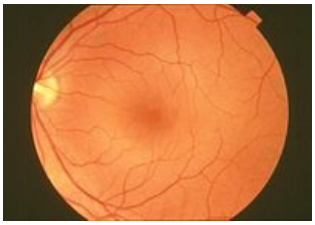


Retinopathy of prematurity (ROP) is a vasoproliferative disease of the immature retina caused by the disruption of the normal development of the forming retinal vessels. It is especially dangerous for severely premature newborns. ROP is the **most common cause of blindness** in childhood in developed countries.[1]

Etiology

ROP is a **multifactorial disease**. Risk factors include:

- severe prematurity and low birth weight,
- hyperoxia,
- sepsis and other factors.[2]

Prevention is the controlled administration of oxygen in premature babies under the 32nd gestational week, with the aim of avoiding hyperoxia. Regular checks by an ophthalmologist (ROP screening) are necessary for all premature babies.[3]

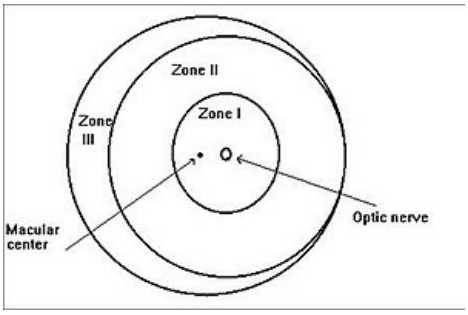
Embryology and pathogenesis

Until the 16th week of pregnancy there are no blood vessels in the retina, oxygen diffuses into the retina from the choroidal circulation. Around the 16th week of pregnancy, retinal vascularization begins. Retinal vessels grow from the optic disc towards the edge of the retina. Precursors of the vascular system of the retina, cells of mesenchymal origin, travel from the optic nerve through the nerve cell layer. This is followed by the proliferation of endothelial cells and the formation of retinal capillaries. The nasal part of the retina is completely vascularized at the end of the 32nd week of pregnancy, the temporal part is vascularized at the time of delivery.[4]

In the first phase of ROP, **vasoconstriction** and irreversible destruction of the capillary endothelium occur as a result of hyperoxia. As a result of the resulting **ischemia**, new blood vessels are formed in the next phase, but not all are mature and are not subject to normal regulation.[5] Cévy vrůstají do sklivce a trakcí odchlipují sítnici. Kvůli synechii s frontální dislokací čočky vzniká sekundární glaukom.[3]

Stages

There are **5 stages of ROP**. The first two stages subside spontaneously, the third is risky, the fourth and fifth are prognostically serious.



- **ROP I + II** - new blood vessel formation is mild or transient; a demarcation line is formed between the vascularized and avascular part of the retina; in 90% of cases, the condition spontaneously regresses; [1] there is a higher risk of strabismus, amblyopia and myopia in the future.
- **ROP III** - vessels and ligaments grow outside the retina into the vitreous; surgery is indicated to prevent progression to the next stage; spontaneous regression occurs in 50% of cases.[1]
- **ROP IV –** vessels and ligaments growing into the vitreous scar and cause partial retinal detachment; if the macula is also affected, vision is poor – the child can only distinguish light and shadow.
- **ROP V** - complete retinal detachment → total blindness.

Treatment

- Laser photocoagulation treatment;
- Cryotherapy.

Both methods destroy the peripheral parts of the retina and slow or prevent the growth of abnormal blood vessels.[3]

- Intravitreal administration of anti-VEGF preparations (bevacizumab - Avastin; ranibizumab - Lucentis).[6]
- ROP IV and V – pars plana vitrectomy (removal of the vitreous, release of the retina from the fibrous membranes and reattachment of the retina to the correct place; instead of the vitreous, silicone oil is injected into the eye).

References

Related Articles

- Eye (biophysics)
- Retina
- Visual pathway
- Newborn Screening

References

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