International Classification of Retinopathy of Prematurity, Third Edition

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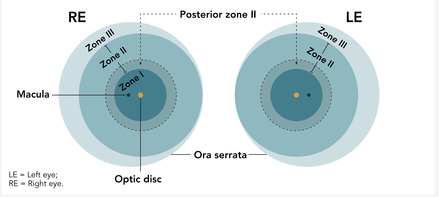
The International Classification of Retinopathy of Prematurity is a consensus statement that creates a standard nomenclature for classification of retinopathy of prematurity (ROP). It was initially published in 1984, expanded in 1987, and revisited in 2005. This article presents a third revision, the International Classification of Retinopathy of Prematurity, Third Edition (ICROP3), which is now required because of challenges such as: (1) concerns about subjectivity in critical elements of disease classification; (2) innovations in ophthalmic imaging; (3) novel pharmacologic therapies (eg, anti-vascular endothelial growth factor [anti-VEGF] agents) with unique regression and reactivation features after treatment compared with ablative therapies; and (4) recognition that patterns of ROP in some regions of the world do not fit neatly into the current classification system.

The key components of the international classification of retinopathy of prematurity, 3rd edition classification, are summarized

1. Zone



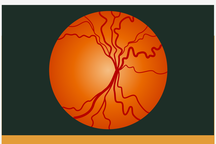
Definition of **3 retinal zones** centered on the optic disc. The location of the most posterior retinal vascularization or ROP lesion denotes the zone for the eye (solid circles represent borders of zones I through III).

Definition of a **posterior zone II** region that begins at the margin between zone I and zone II and extends into zone II for 2 disc diameters (dotted circles represent borders of posterior zone II).*

The term **notch** is used to describe an incursion by the ROP lesion of 1–2 clock hours into a more posterior zone. The ROP zone for such eyes should be noted by the most posterior zone of retinal vascularization with the qualifier "notch" (eg, "zone I secondary to notch").*

*Key changes compared with previous ICROP publications.

2. Plus and Preplus Disease



Plus disease is defined by the appearance of dilation and tortuosity of retinal vessels.

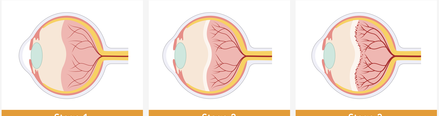
Preplus disease is defined by abnormal vascular dilation, tortuosity insufficient for plus disease, or both.

Recognition that retinal vascular changes in ROP represent a continuous spectrum from normal to preplus to plus disease, with sample images demonstrating this range.* These changes should be assessed by vessels within zone I, rather than from only vessels within the field of narrow-angle photographs and rather than from the number of quadrants of abnormality.*

*Key changes compared with previous ICROP publications.

3. Stage of Acute Disease (Stages 1–3)

Stage of acute disease is defined by the appearance of a structure at the vascular–avascular juncture as:



Stage 1 (demarcation line)

Stage 2 (ridge)

Stage 3 (extraretinal neovascular proliferation or flat neovascularization)

If more than 1 ROP stage is present, the eye is classified by the most severe stage.

4. Aggressive ROP

The term aggressive-posterior ROP was used previously to describe a severe, rapidly progressive form of ROP located in posterior zones I or II. Because of increasing recognition that this may occur beyond the posterior retina and in larger preterm infants, particularly in regions of the world with limited resources, the Committee recommends the new term aggressive ROP.*

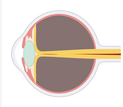
*Key changes compared with previous ICROP publications.

5. Retinal Detachment (Stages 4 and 5)

Stages of retinal detachment are defined as:

Stage 4 (partial)

Definition of stage 4 subcategories:
Stage 4A: With fovea attached
Stage 4B: With fovea detached



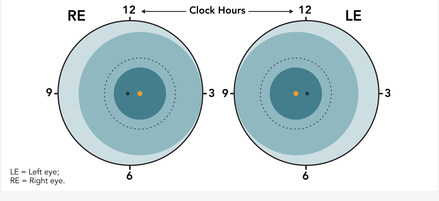
Stage 5 (total)

Definition of stage 5 subcategories:
Stage 5A: The optic disc is visible by ophthalmoscopy (suggesting open-funnel detachment).
Stage 5B: The optic disc is not visible because of retrolental fibrovascular tissue or closed-funnel detachment.
Stage 5C: Stage 5B is accompanied by anterior segment changes (eg, marked anterior chamber shallowing, iridocorneolenticular adhesions, corneal opacification), suggesting closed-funnel configuration.*
Additional descriptors of funnel configuration (eg, open-closed) may be applied if clinically useful.

*Key changes compared with previous ICROP publications.

6. Extent of Disease

Defined as 12 sectors in using clock-hour designations.



7. Regression

Definition of ROP regression and its sequelae, whether spontaneous or after laser or anti-VEGF treatment. Regression can be complete or incomplete. Location and extent of peripheral avascular retina (PAR) should be documented.*

*Key changes compared with previous ICROP publications.

8. Reactivation

Definition and description of nomenclature representing ROP reactivation after treatment, which may include new ROP lesions and vascular changes. When reactivation of ROP stages occurs, the modifier reactivated (eg, "reactivated stage 2") is recommended.*

*Key changes compared with previous ICROP publications.

9. Long-Term Sequelae

Emphasized beyond previous versions of the ICROP, including sequelae such as late retinal detachments, peripheral avascular retina (PAR), macular anomalies, retinal vascular changes, and glaucoma.

Each eye should be classified based on zone, plus disease, stage, and extent. If aggressive ROP is present, it should be noted.

Conclusions

Understanding of disease pathophysiologic features and clinical management of ROP have evolved with advances in science, technology, and the art of medicine. Since the ICROP publication in 2005, some specific advances have involved neonatal care, anti-VEGF therapy, ophthalmic imaging, machine learning, and pediatric vitreoretinal surgery. This article updates ROP classification in response to those advances by integrating review of evidence-based literature with expert consensus opinion.