

OXYGEN-ASSOCIATED RETINOPATHY AND ROP



These distinct clinical entities require tailored management strategies.

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Retinal vascular disorders in neonates, particularly oxygen-associated retinopathy (OAR) and retinopathy of prematurity (ROP), represent significant causes of preventable childhood blindness worldwide.¹ While these conditions share some pathological features, they differ fundamentally in their etiology, clinical presentation, and management approaches.² This article provides a comprehensive comparison of OAR and ROP based on current evidence, with particular emphasis on their distinctive clinical features and management strategies.

CLINICAL AND ANGIOGRAPHIC DIFFERENTIATION

OAR and ROP demonstrate distinct clinical presentations that enable differentiation through careful examination.³ OAR typically manifests with dichotomous branching of the retinal vessels and prominent peripapillary involvement, reflecting its pathogenesis from oxygen toxicity in both preterm and full-term infants; in contrast, ROP exhibits the characteristic menorah pattern of vascular growth, consistent with its developmental origin in premature infants with incomplete retinal vascularization (Figure 1).^{4,5}

Fluorescein angiography sheds light on further diagnostic differences between OAR and ROP.⁶ OAR demonstrates delayed arterial filling and patchy choroidal perfusion patterns, while ROP shows a clear demarcation between the vascular and avascular retina.⁷ These angiographic features not only aid in diagnosis, but also provide prognostic information regarding disease progression.⁸

DIVERGENT EARLY-STAGE MANAGEMENT

The most critical distinction between OAR and ROP lies in their differential response to early intervention.⁹ In OAR cases identified during the vaso-obliteration phase, carefully titrated oxygen therapy at 88% to 95% FiO₂ concentration can induce disease regression (Figure 2).¹⁰ This therapeutic window promotes vascular reperfusion and facilitates physiological growth of previously obliterated vessels.¹¹

In contrast, early-stage ROP typically requires only careful

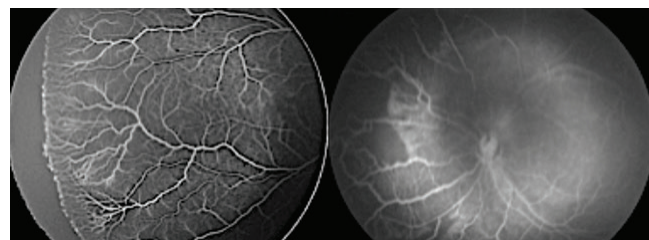


Figure 1. Vascular patterns in OAR and ROP. OAR shows dichotomous branching with peripapillary involvement, while ROP exhibits the classic menorah pattern of abnormal vascular growth.

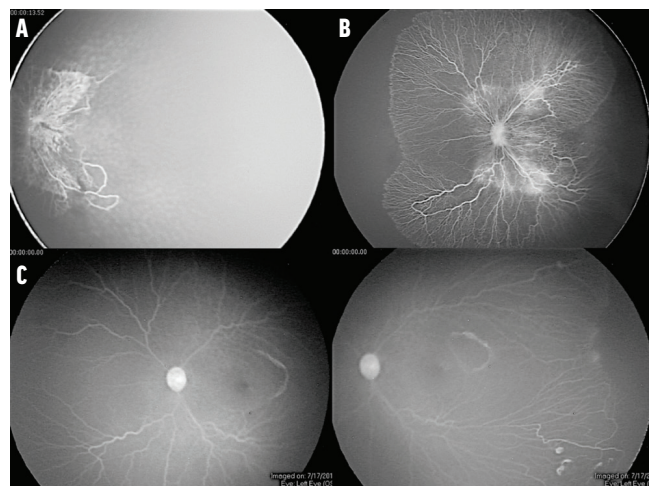


Figure 2. In OAR, carefully titrated oxygen therapy during the vaso-obliteration phase can promote regression and reperfusion of retinal vessels. A patient with aggressive vaso-obliteration before treatment (A) and 3 months (B) and 6 months (C) after regulated oxygen therapy has vascular reperfusion and physiological growth.

observation, as oxygen modulation does not provide therapeutic benefit in this condition.¹² This fundamental difference underscores the importance of accurate differentiation between these entities.¹³

ADVANCED DISEASE MANAGEMENT

If either condition progresses to neovascularization, their management converges, requiring antiangiogenic therapy

ACCURATE DIFFERENTIATION BETWEEN OAR AND ROP IS ESSENTIAL FOR PROPER MANAGEMENT AND CARE.

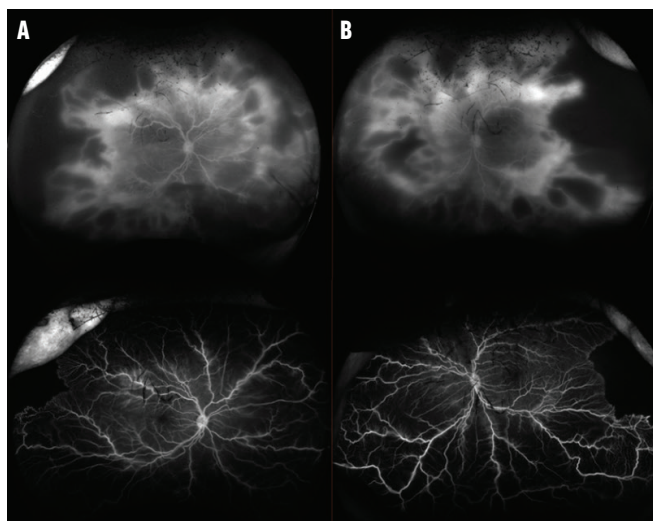


Figure 3. Before treatment with anti-VEGF therapy (A), capillary closure, ischemia, and aggressive neovascularization are obvious. Two weeks after anti-VEGF therapy (B), regression of neovascular changes is evident.



Figure 4. This child with stage 5 OAR is using a translucent prosthesis, which preserves residual light perception while supporting orbital growth during the postoperative rehabilitation.

with an anti-VEGF agent (Figure 3) or laser photocoagulation.⁶ For retinal detachment (stages 4 and 5), vitrectomy becomes necessary regardless of etiology.¹⁴ Stage 5 disease represents the most common indication for surgical intervention, although outcomes remain suboptimal.¹⁵

REHABILITATION AND GLOBAL HEALTH PERSPECTIVES

Postoperative rehabilitation is crucial for children with advanced disease.¹⁶ Translucent prostheses offer particular benefits for OAR patients by preserving residual light perception while maintaining orbital growth (Figure 4).

The disproportionate burden of these conditions on children and families in low-income countries highlights

health care disparities and the need for improved access to basic neonatal ophthalmic care.¹⁷

FIRST, DIFFERENTIATE

Accurate differentiation between OAR and ROP is essential for proper management and care.¹⁸ The unique responsiveness of OAR to oxygen modulation represents a critical window for vision preservation, while advanced cases of both conditions require similar interventions. Global efforts should focus more on implementing preventive strategies and improving access to care. ■

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