

Title: Vision in Retinoblastoma: Practical Outcomes and Predictors of Visual Prognosis

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Purpose:

Parents of children with retinoblastoma (RB) frequently ask, “Will my child go blind?” This study characterizes real-world visual outcomes and identifies predictors of functional vision after RB treatment, providing practical, data-driven guidance for families and clinicians.

Methods:

We conducted a retrospective chart review of 79 children treated for RB at a single academic institution (2008–2024). Data collected included demographics, laterality, macular involvement, treatments (chemotherapy, enucleation, focal therapy), tumor control timing, and amblyopia therapy initiation. Final best-corrected visual acuity (BCVA) was categorized per World Health Organization (WHO) criteria: normal ($\geq 20/40$), functional (20/50–20/150), ambulatory (20/200–counting fingers [CF]), and blind (hand motion [HM], light perception [LP], or no light perception [NLP]). Visual outcomes were stratified by laterality, macular involvement, and treatment type.

Results:

Among 79 children (53 unilateral, 26 bilateral), the majority retained functional vision in at least one eye. In unilateral RB, all children had at least functional vision in the fellow eye, though 27/53 affected eyes were enucleated; 4/53 affected eyes met WHO blindness criteria. In bilateral RB, 80% of children retained excellent or functional vision in the better-seeing eye; one child’s worse-seeing eye was blind (HM/LP/NLP). Across all treated eyes ($n = 105$), 28% achieved normal vision ($\geq 20/40$), 10% functional (20/50–20/150), 17% ambulatory (20/200–CF), and 6% blind (HM–NLP). Enucleation occurred in 38% of eyes, most commonly in eyes with advanced disease or macular involvement. Eyes without macular involvement were more likely to achieve normal vision (85% vs. 26%), though missing data limit precision. Amblyopia therapy was typically initiated within one month of tumor control.

Conclusions:

Bilateral blindness in RB is largely avoidable. Functional vision depends on early tumor control, timely initiation of amblyopia therapy, and active family engagement in visual rehabilitation. These findings underscore the importance of integrating low-vision and amblyopia management into routine RB care to optimize whole-child visual outcomes.

Layman Abstract:

Retinoblastoma is a rare eye cancer in children, and families often worry it will cause blindness. We reviewed the long-term vision of 79 children treated at our center and found that most kept good or functional vision in at least one eye. Complete blindness was uncommon, even for children with cancer in both eyes. Vision was best protected when treatment began early and the center of the eye - responsible for sharp, detailed sight - was not severely damaged. Starting amblyopia ("lazy eye") therapy soon after treatment also helped children reach their best possible vision. Overall, these findings are encouraging: with modern care, most children with retinoblastoma grow up able to see well.