



A retrospective study of visual outcome in children treated for retinoblastoma between 2000 and 2021



Dr Emilia Cirillo Laaksonen MD¹, Dr Stephanie Kletke MD¹, Dr Brenda Gallie MD¹, Dr Helen Dimaras PhD¹, Dr Ashwin Mallipatna MD¹

¹ Department of Ophthalmology and Vision Sciences, Faculty of Medicine, University of Toronto and The Hospital for Sick Children Toronto, Ontario, Canada

Introduction



- Retinoblastoma (RB) is the most common intraocular malignancy tumor of childhood (1 in 15,000-20,000 live births.)^{1,2}
- Saving the child's life is the primary goal of RB treatment, with the secondary goal being salvaging the globe and restoration of vision if possible. (4,5)
- Survival rate is greater than 95% in high-income countries, with timely diagnosis and treatment. (3)
- With current treatment options, up to 47-100% eyes are being salvaged. (6,7) We are now turning our attention to visual outcomes.



About 25 children are diagnosed annually with RB, (3) and approximately 80% of these (~20 children) are managed at The Hospital for Sick Children (HSC).

Objectives

- Primary Objective: to define specific clinical features that can predict visual impairment (VI) is pivotal in establishing long term visual prognosis in RB patients
- Secondary objective: to review if age of diagnosis, treatment for amblyopia and features on visual field are associated to the final visual outcome

Methods

Study Design: retrospective Chart Review.



Included: RB diagnosed between 2000-2021 at HSC.



Excluded: Treated elsewhere, visual acuity (VA) not recorded or insufficiently assessed.

Data Collected:

- International Intraocular Retinoblastoma Classification (IIRC) (8)
- Laterality
- BCVA (best corrected visual acuity) and age at last visit

Data Evaluation:

- Descriptive statistics were used for total number of patients, laterality, age at follow up and affected eyes.
- Multivariate regression analysis will be used to assess associations.
- BCVA was converted to logMAR for all patients, if not recorded as such in the chart.

- BCVA was then classified in groups according to VI categorization as per Modified WHO criteria (2006). (9)
- We looked at BCVA logMAR for the salvaged affected eyes for each IIRC group, results are shown in Table 1.
- VI classification per patient is pending.

Results

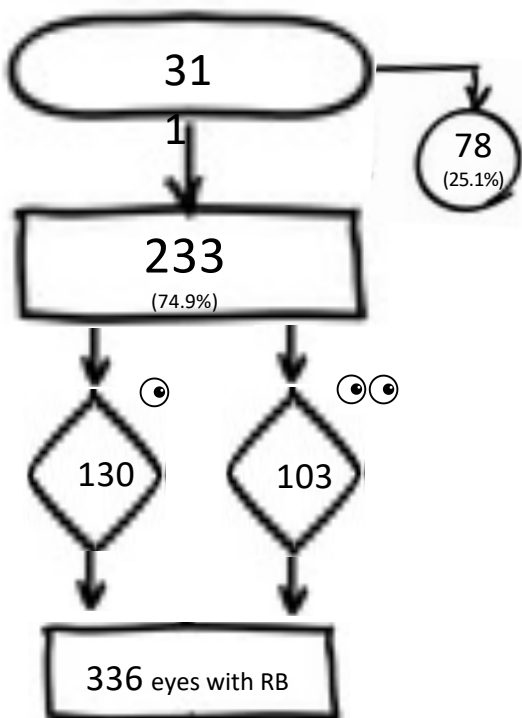


Figure 1. Patient flow chart.

We identified 311 charts, of which 233 (74.9%) were eligible and 78 (25.1%) were excluded for the following reasons: care received elsewhere (18/78), unreliable or insufficient VA (60/78; including blink response, fixation response and grating VA tests).

130 were unilateral and 103 bilateral. Total of affected eyes with RB is 336, of which 199 were enucleated and 137 salvaged.

- Mean age at last follow up was 10.1yrs (median=8.7, SD=5.9).
- Of the 233 children eligible, **0% of unilateral** (0/130) and **28% of bilateral** (29/103) children were moderately or severely visually impaired.

- Among the salvaged eyes:**
 - 83/137 (60.6%) had logMAR BCVA <0.48.
 - 27/32 (84.4%) in IIRC A and 33/51 (64.7%) IIRC B had good vision.
 - 20/32 (62.5%) in IIRC D had a VA of 0.48-1.
 - 1/2 in IIRC E had good visual outcome and 1/2 had VA of 1.78-2.8.

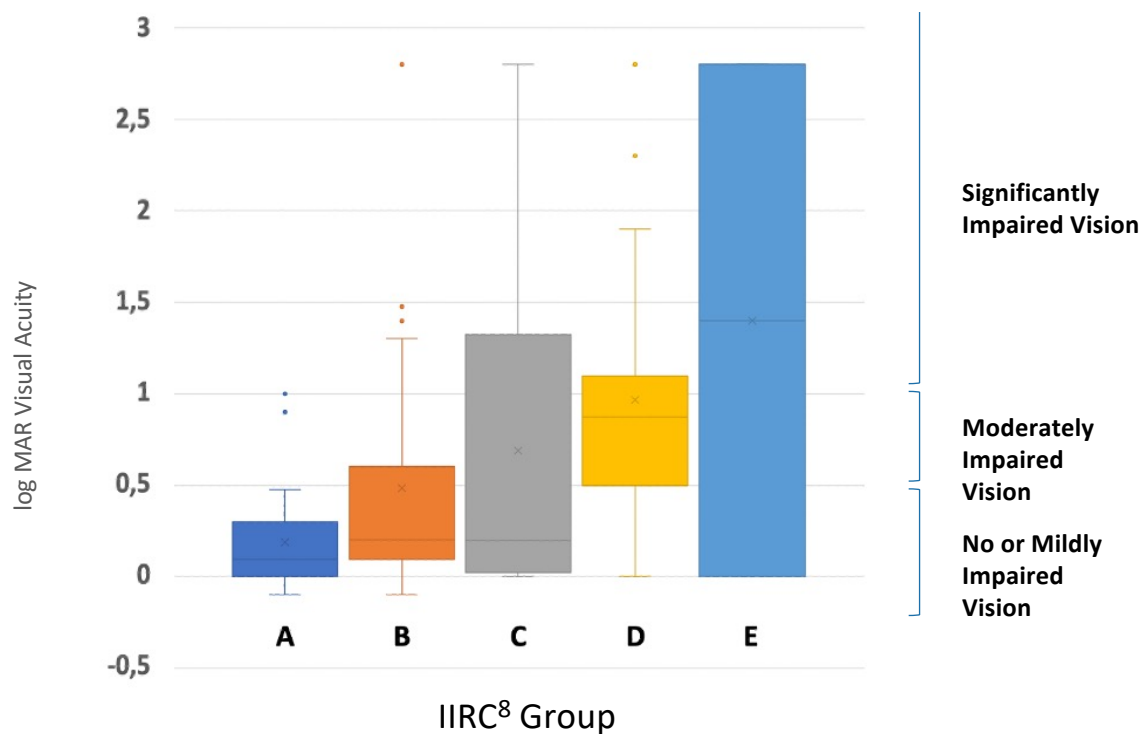
Table 1. log MAR BCVA per each IIRC group.

The 336 affected eyes were divided into each corresponding IIRC and then classified according to logMAR BCVA, the groups were made following the VI classification from 0-6. Both salvaged and enucleated eyes are represented.

IIRC Group	Overall (Enucleated)	Best Corrected Visual Acuity (BCVA) of Affected Eyes (logMAR)						
		<0.3	<0.3-0.48	<0.48-1	<1-1.3	<1.3-1.78	<1.78-2.8	NLP
A	32	27	3	2	0	0	0	0
B	51 (6)	33	2	9	2	2	3	0 (6)
C	12 (14)	7	0	1	1	2	1	0 (14)
D	40 (119)	7	3	20	0	3	5	2 (119)
E	2 (60)	1	0	0	0	0	1	0 (60)
Total	137 (199)	75	8	32	3	7	10	2 (199)

Figure 2. Best Corrected Vision in Salvaged Eyes (n=137).

Box plot of logMAR BCVA for each IIRC group. We found that for Group A and B most of the eyes have good visual outcome. The median logMAR BCVA was 0.10 for Group A, 0.20 for Group B and C, and 0.90 for Group D eyes.



Conclusions

- A majority of eyes salvaged have good vision after treatment.
- Eyes with group A and B IIRC have better visual outcome.
- Future steps: vision outcomes per salvaged eye are presented here, however further study of associations with tumor location and foveal involvement is ongoing in order to find clinical predictors of visual impairment in RB patients. Multivariate regression analysis is pending.
- Knowing the predictors may guide the treatment course towards the best possible visual outcome.

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