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Children's Hospital Colorado

THE RELATIONSHIP BETWEEN THE FINDINGS OF FIRST RETINOPATHY OF PREMATURITY EXAM AND DEVELOPMENT OF TYPE 1 ROP.

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INTRODUCTION

Several perinatal events have been described as risk factors for ROP such as lower extreme of gestational age, low birth weight, high or fluctuating oxygen level in the postpartum period, and slow postnatal weight gain.[1]

One area of research that has not been addressed is the use of the first ROP exam findings to predict eventual type 1 ROP.

PURPOSE

The purpose of this research was to examine the relationship between the observation of any ROP at first ROP exam, or the requirement for a one-week follow-up following the first ROP exam, and the development of type 1 ROP.

METHODS

A retrospective cohort study was conducted using records from an ROP registry developed by the Department of Ophthalmology at the University of Colorado School of Medicine.

The study period was between January 2013 and December 2022 and included all infants born at both UCHealth University of Colorado Hospital and Children's Hospital Colorado.

All infants in the registry fulfilled the American Academy of Pediatrics 2013 screening criteria for ROP.[2] ROP examinations followed standard guidelines, defined by the International Classification of ROP.

Statistical analysis: Logistic regression using generalized estimating equations was used to estimate odds ratios (OR) and 95% confidence intervals (CI) of developing type 1 ROP following the observation of any ROP at initial exam, or for infants who required a one-week follow-up exam following initial exam with and without adjusting for gestational age at birth.

RESULTS

1. Infants (n=1,582) observed with ROP at initial examination were significantly more likely to have both lower gestational age and a lower birth weight at delivery (Table 1).
2. Infants with any ROP noted at initial exam had an increased odds of developing type 1 ROP compared to infants without any ROP noted at initial exam (OR=3.64, 95%CI (1.93, 6.88), p<0.001) (Table 2).
3. Infants who required a one-week follow-up exam following initial ROP exam had increased odds of developing type 1 ROP (OR=9.31, 95%CI (5.63, 15.4), p<0.001) (Table 2).
4. The association between requirement for one-week follow-up exam and type 1 ROP was attenuated but remained significant following adjustment for gestational age at delivery (OR=2.31, 95%CI (1.24, 4.28), p=0.008).

Table 1. Characteristics of the Preterm Cohort Stratified by Observation of ROP at Initial Examination (n=1582)

		ROP at initial examination		
Infant Characteristics	Overall, n = 1,582	No, n = 1,493	Yes, n = 89	p-value[1]
Gestational age at delivery (weeks) Mean (SD)	28.8 (2.5)	29.0 (2.5)	26.3 (2.3)	<0.001
Range	22.1, 36.9	22.3, 36.9	22.1, 31.9	
Birth weight (grams) Mean (SD)	1,110.6 (341.6)	1,123.5 (339.5)	896.5 (304.8)	<0.001
Range	365.0, 2,560.0	365.0, 2,560.0	440.0, 1,925.0	
Sex n (%)				
Female	748 (47%)	703 (47%)	45 (51%)	0.585
Male	834 (53%)	790 (53%)	44 (49%)	
Race/Ethnicity				
Non -Hispanic White	806 (51%)	777 (52%)	29 (33%)	0.004
Hispanic	455 (29%)	416 (28%)	39 (44%)	
African American	172 (11%)	160 (11%)	12 (13%)	
Asian	42 (2.7%)	41 (2.7%)	1 (1.1%)	
Other	107 (6.8%)	99 (6.6%)	8 (9.0%)	

[1]Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates); Welch Two Sample t-test; Fisher's exact test

Table 2. Type 1 ROP after ROP at Initial Exam or at the One-week Follow-up Subsequent to Initial Exam

	Type 1 ROP Following Initial Visit			Logistic Regression[1]	
	Overall n = 1582	No n = 1502	Yes n = 80	OR (95% CI)	P Value
ROP at Initial Exam, n (%)	89 (5.6%)	76 (5.1%)	13 (16%)	3.64 (1.93 to 6.88)	<0.001
One Week Follow up Exam, n (%)	171 (11%)	133 (8.9%)	38 (48%)	9.31 (5.63 to 15.4)	<0.001

Abbreviations OR = Odds Ratio, CI = Confidence Interval
[1]Generalized Estimating Equations

LIMITATIONS

The main limitation of this study is that the results were based on data from an academic center in Colorado and may not be representative of other cohorts with different underlying demographics.

CONCLUSIONS

When signs of ROP or concern for ROP are noted by the ophthalmologist at the first ROP exam, there is a significant increase in the likelihood of developing type 1 ROP.

The findings from this study will help ophthalmologists inform families and neonatologists of the risk of ROP from the onset of ROP exams.

DISCLOSURES: None of the authors have commercial relationships to disclose.

REFERENCES:

[1]Hartnett ME, Penn JS. Mechanisms and management of retinopathy of prematurity. N Engl J Med. 2012.

[2] Good WV. Final results of the Early Treatment for Retinopathy of Prematurity (ETROP) randomized trial. Transactions of the American Ophthalmological Society. 2004

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