Influence of Remote Digital Fundus Imaging on Binocular Indirect Ophthalmoscopy Screening in Retinopathy of Prematurity

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Introduction

- Retinopathy of Prematurity (ROP) remains a significant cause of visual morbidity worldwide.
- Current ROP screening recommendations have allowed for earlier intervention and improved patient outcomes.
- However, traditional screening involves binocular indirect ophthalmoscopy (BIO) both in the hospital and clinic, which requires personnel, time, and limited financial support.

Aims and Objectives

- The aim is to evaluate the role of inpatient remote digital fundus imaging (RDFI) on ROP screening throughout the entirety of patients' ROP screening.
- The objective is to compare screening that utilizes both RDFI and BIO to traditional screening using BIO only. A two armed screening model is used to facilitate this comparison.

Methods

- A retrospective review (1/1/2017-12/31/2022) of inpatient and outpatient electronic health records of infants (n=193) with stage 0 ROP who were screened through 45 weeks postmenstrual age was performed.
- Demographics and screening sessions (RDFI + BIO) were tabulated.
- A two armed screening model representing a conservative (weekly), less conservative (biweekly), and real world screening protocol was developed.
- We compared our hybrid RDFI/BIO screening experience to that of the BIO predictive model to determine if RDFI reduced in person BIO examinations.

Results

Table 1: Patient demographics

Demographics	%
Gender	
Females	49.7
Males	50.3
Ethnicity	
African American	37.1
Asian	3.9
Other	4.9
White	57.1

Table 2: Average gestational age (weeks) and birth weight (grams)

Birth demographics	n
Average gestational age (weeks)	28±2
Average birth weight (grams)	1,050±281

Table 3: Predicted number of BIO examinations using the screening model

Predicted BIO screening examinations	n
Average number of weekly screenings	14.5±2.7
Average number of biweekly screenings	7.4±1.5
Average number of weekly screenings until 40 weeks, followed by biweekly screenings until 45 weeks*	9.9±2.9

Table 4: Actual screening examinations performed in cohort

Screening examinations performed in cohort	n
RDFI	5.7±3.0
BIO	4.3±1.9
Total (RDFI+BIO)	10.1±3.1

Table 5: Calculations for % reduction in BIO examinations

Screening schedule	Calculation	% Reduction BIO Examinations
Weekly BIO	(14.5-4.3)/14.5	70.3
Biweekly BIO	(7.4-4.3)/7.4	42.4
Weekly until 40 weeks, then biweekly to 45 weeks	(9.9-4.3)/9.9	56.5

Conclusions

- The predictive real world model shows that the predicted total number of screening examinations is similar to the actual number of total screenings using both RDFI and BIO performed in this cohort. There is no statistically significant difference (p=0.48).
- A strength of this study is that we often do not capture outpatient exams as part of the screening burden. Therefore, a wide view of the entire screening process is a major advantage.
- Effective screening for ROP is of paramount importance.
- Embracing validated RDFI technology significantly reduces the number of BIO examinations while maintaining current screening guidelines.
- Our successful experience using RDFI at a tertiary referral center to screen for ROP is a launching point for the incorporation of telescreening into the current screening protocol.
- This study serves as a call to industry to develop imaging systems that can be used on an outpatient basis for ROP screening.

References

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