Revised criteria lead to more accurate screening for eye disease in premature infants

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A multicenter group of 41 hospitals led by researchers at Children's Hospital of Philadelphia (CHOP) has confirmed that an improved

method for predicting retinopathy of prematurity (ROP), a leading cause of blindness in children, was able to reduce the number of babies having invasive diagnostic examinations by nearly a third, while raising disease detection up to 100 percent. If implemented, this screening approach could considerably reduce both unnecessary health care costs and physically stressful retinal examinations for premature infants.

The new method described by the study team adds slow weight gain to the existing criteria for ROP screening. Slow growth is a sign of low growth hormones that are involved in the development of ROP. Because nurses routinely measure weight gain in infants, these simple measurements are readily available. The findings of the large, prospective study were published today in the journal *JAMA Ophthalmology*.

ROP is a disorder of the blood vessels of the retina that affects premature babies born with immature retinas. In general, the more premature the baby and the lower the birth weight, the greater the risk for developing ROP. Since the disease has no external signs or symptoms when it first develops, it can only be properly detected through an eye exam. Cases of ROP range in severity, with corrective laser surgery treatment sometimes required for severe cases to prevent progression and blindness.

Each year in the U.S., approximately 70,000 infants meet the existing screening criteria and receive examinations for ROP. The current criteria have relatively low specificity for predicting which infants are at risk for severe ROP, with just 5 to 10 percent of infants screened requiring treatment, and only about half developing ROP. Additionally, while sensitivity for predicting severe ROP is very high under these criteria, it is not 100 percent with current methods. Therefore, there are opportunities to improve the screening accuracy in multiple ways.

"We developed a new set of criteria that appeared to more accurately predict ROP, but before they could be used in clinical practice, we had to test them thoroughly to ensure that all high-risk infants are examined," said Gil Binenbaum, MD, an attending surgeon in the Division of Ophthalmology and the Richard Shafritz Endowed Chair of Ophthalmology Research at CHOP, Chair of the Postnatal Growth and ROP (G-ROP) Study Group that performed the research, and the first and corresponding author of the study.

In a previous study, Binenbaum and his colleagues developed the new criteria using a hybrid modeling approach that combined birth weight and gestational age criteria, weight gain comparisons to expected growth from infants without ROP, and user-friendly screening criteria. Last year, the study team published the results of a large retrospective study of 7,483 babies that they used to develop what they called the "G-ROP criteria." They found that these criteria were more sensitive than currently used criteria and would greatly reduce the number of infants requiring examinations.

In this latest study published today, the G-ROP criteria were tested prospectively among 3,981 premature infants at risk of developing ROP across 41 hospitals in the U.S. and Canada. The researchers found that the G-ROP criteria correctly predicted 219 of 219 cases of Type 1 ROP, which requires treatment, while reducing the number of infants undergoing examinations by 36 percent. When the cohorts from the two studies were combined, the G-ROP criteria correctly predicted 677 of 677 Type 1 cases, while reducing the number of infants receiving examinations by 33 percent among the 11,464 babies.

"This study successfully validated the accuracy of the G-ROP screening criteria, which now can be used clinically to reduce the number of infants receiving eye examinations for ROP," Binenbaum said. "Based upon these new findings and the findings of our previous study, we

recommend that these criteria are incorporated into national ROP screening guidelines."

  More information: Binenbaum et al, "Validation of the G-ROP Retinopathy of Prematurity Screening Criteria." *JAMA Ophthalmology*, online 14 Nov 2019. DOI: 10.1001/jamaophthalmol.2019.4517

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