

Retinal swelling in premature infants tied to poorer neuro-development

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Using a portable, non-invasive imaging device, a team of Duke Medicine doctors have identified swelling in the back of the eyes of premature infants that correlates with poorer neurodevelopment as the babies grow.

The Duke team, which pioneered the use of the hand-held tool in [infants](#), determined that almost half of the [premature babies](#) screened had [swelling](#) in the macula region of the retina, which is responsible for central vision.

After two years of follow-up study, the researchers found that the infants with retinal swelling shortly after birth later had significantly lower language and motor scores on a standard developmental test.

The findings, published in the March, 2015, issue of the journal *Ophthalmology*, suggest that the screening tool could flag potential neuro-developmental issues early, providing opportunities to intervene.

"The eyes are a direct window into the brain," said senior author Cynthia Toth, M.D., a pediatric retinal specialist at the Duke Eye Center. "For the first time, we can identify microscopic swelling of the retina through a simple examination at the bedside. Because the retina is actually an extension of brain tissue, we wondered if this swelling might reflect events in ongoing brain development."

Toth and colleagues used a portable cart with a handheld tool called a spectral-domain [optical coherence tomography](#), which was originally

adapted for pediatric use through research at Duke supported by the National Institutes of Health and by The Hartwell Foundation.

The hand-held "camera head" is similar in size to a small hair dryer, and is aimed into but does not touch the infant's eyes. It uses infrared light that does not cause discomfort. The device enables the ophthalmologists to clearly see the cell layers at the back of the eye.

Of 77 [premature infants](#) born at Duke University Hospital and screened with the device, 53 were later evaluated by Kathryn Gustafson, Ph.D., at between 18 and 24 months using the Bayley Scales of Infant and Toddler Development, which measures cognitive, language and motor function.

Twenty-two of the children who were followed over time did not have the retinal swelling as infants, while 31 did.

At the 24-month evaluation, the mean score for children who had swelling was about 14 points lower on the language scale, and 11.5 points lower on the motor scale. Although infants with retinal swelling also scored lower on the cognitive scale, the difference was not significant.

Differences were maintained after adjusting for gestational age and birth weight. Severity of retinal swelling correlated with poorer motor development.

"No one knows the cause of this swelling in infants," said first author Adam L. Rothman. "Now that we have this pilot data, it suggests that a mechanism related to poorer neurologic health may cause the retinal finding. The hope is that in the future we will be able to go into a nursery, image these babies' eyes, and identify red flags for poor neurologic health and development. Clearly, further studies are needed to verify these findings and develop methods to use these data to improve infant care."

Toth and Rothman said the current study would continue to monitor the children over time, and in future studies they will look with greater detail at eye and brain development.

Provided by Duke University

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