

# Reducing the Deficit in Screening and Treatment for Infants at Risk for ROP

BY THOMAS C. LEE, MD

**D**isparities exist between the need for medical professionals for retinopathy of prematurity (ROP) screening and treatment and their availability. Geography plays a major role in this, with some areas simply too remote or inconvenient to attract experienced screeners. Fortunately, more pre-term infants are surviving today than in the past due to advances in technology and care within neonatal intensive care units (NICUs); however, this leaves more neonates in need of screening for disease.

The demand for experienced ROP screeners is significant and growing, but access to their services does not always match the need. How do we address the needs of children in NICUs in a way that is safe, effective, and allows patients and their families to have access to the necessary medical professionals? Given the fragility of the patients in question, the ideal solution would be less dependent on geography and more focused on the availability of quality management and care.

Remote screening via RetCam (Clarity Medical Systems) imaging provides the most viable and proven option to date. This widefield fundus camera enables nurses, doctors, and other experienced technicians to take images of the retina and electronically send them to an expert ROP screener. This convenience enables screeners to provide an assessment based on retinal images without physically traveling to the NICU to perform a live, bedside examination, and to provide this assessment in a timely manner for a disease for which earlier diagnosis can greatly improve treatment outcomes.

## USE OF THE RETCAM FOR TELEMEDICINE

Telemedicine has improved access to ROP screening and treatment, and it has allowed our institution to start

addressing the scarcity of experienced medical personnel in the United States and elsewhere. Being able to diagnose pathologies remotely is a significant advantage. The hospitals that engage us as ROP screening experts are usually 50 to 100 miles away from our campus, so remote ROP screening maintains these fragile infants in their local NICUs, sparing the considerable risks and costs of transportation while maintaining a high standard of diagnostic care for ROP.

The RetCam has been a pivotal asset to facilities that need access to an experienced screener. I have utilized telemedicine in my own practice, reviewing images from hospitals in Las Vegas, Nevada; Bakersfield, California; and several other locations too far removed from my home base to allow me to visit on a timely or frequent basis. The telemedicine approach also allows me to collaborate with other physicians at home and abroad when necessary.

Using the RetCam as the hub of a telemedicine network has been instrumental in breaking down access barriers. With remote access to these widefield images, doctors from all over the world are able to instantly get collaborating opinions on cases, and these at-risk children have potential access to a host of worldwide experts, no matter the NICU's physical location or available local resources.

## A REVOLUTIONARY TRAINING TOOL

The telemedicine platform is also a remarkable tool for training doctors around the world in a supervised setting. My first foray using the RetCam for remote diagnoses was actually not to deliver patient care, but to train doctors managing ROP in other countries who had RetCam access but no experience in diagnosing or treating this sight-threatening disease.

Through the Armenian Eye Care Project (AECF) headed by Roger V. Ohanesian, MD, I, along with a group of others including R.V. Paul Chan, MD, of Weill Cornell Medical Center and Michael F. Chiang, MD, of Oregon Health Sciences University, focused on training physicians at a newly established NICU in Armenia to screen and diagnose ROP using electronically delivered RetCam images. Our trainee doctors in Armenia would look into the eye with an indirect ophthalmoscope, write down what they saw, and then take a photograph with the RetCam; the doctors would then e-mail us their diagnosis along with the RetCam image. As a group, we reviewed the images and continued to educate the Armenian physicians based on their responses. Over the course of a year we screened about 300 babies through about 1500 examinations and identified 30 to 35 children who needed laser treatment. By the end of the first year, we were able to train the physicians to diagnose and treat the disease at a level of proficiency equivalent to that of experts in the United States.

Four years into the Armenia project brought about an interesting development. We were able to socialize the learning process via a private Facebook chat room. Remote physicians can upload retinal images from the RetCam to the site, and I and other experts from around the world are able to comment on each image. In essence, it gives each patient a team of world-class experts who are able to weigh in on the patient's care. By crowdsourcing the assessment to experienced doctors across the world, our colleagues in Armenia have created a platform that is an extremely convenient and effective training tool.

### **THE APPLE OF MY EYE CAMPAIGN**

Due to the success of the Armenia project, I was approached by the Campaign for Filipino Children and Apl.de.ap of the musical group The Black Eyed Peas to initiate a similar training program in the Philippines. The project, called Apple of My Eye, is a campaign founded by Apl.de.ap, who has been visually impaired since childhood, to address childhood blindness. The Philippines is an ideal location to initiate a program such as the one undertaken in Armenia. Because it is an archipelago, the Philippines has NICUs scattered across many different islands, and there is a shortage of qualified ROP experts.

We have partnered with the Philippine Academy of Ophthalmology and its ROP Working Group to purchase RetCams so that expert ROP screeners in Manila can train ophthalmologists outside of the capital to diagnose and screen for ROP. The idea is to deploy a series of RetCams throughout the Philippines that will allow them to establish a training network. Use of the RetCam as a training tool is not often mentioned; however, it can be immensely helpful. In my experience, this has been a phenomenal approach.

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### **RETCAM AND ANTI-VEGF THERAPY**

Widefield fluorescein angiography (FA) with the RetCam is extremely useful in providing a better understanding of complex retinal conditions that do not have the vascular patterns seen in typical ROP. The use of intravitreal bevacizumab (Avastin, Genentech) monotherapy for treatment of ROP has, in some ways, created a different disease; it causes ROP regression in a way that alters the subsequent behavior of the retinal vessels. This can make follow-up particularly challenging. There is a 5% to 11% recurrence rate in children who have been treated with bevacizumab for zone 1 stage 3 or zone 1+ ROP. This recurrence generally does not occur within the standard time frame immediately following treatment. Instead, it may not happen until 4 months after the injection. Angiography will often give insight beyond what is seen in a standard clinical examination. In these instances, a RetCam FA can be very helpful and can determine whether or not there is additional ischemia inside the normally vascularized retina or if there is early stage 3 disease. This might not have been detected through a clinical examination and historically would most likely have never occurred in laser-treated ROP.

### **CONCLUSION**

As this technology for remote telescreening becomes more globally distributed, providing expert care for ROP will become more efficient. Overcoming heretofore unavoidable disparities is an exciting endeavor, something to strive toward. The advent of telemedicine and the ability to train new screeners, independent of geographic location, are developments that will go a great way toward eliminating existing disparities in care. ■

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