Digital photography has changed the practice of ophthalmology, particularly in pediatric retina. In recent years, it has improved the ophthalmologic care of infants with a variety of pathologies. The RetCam (Clarity Medical Systems, Pleasanton, CA) fundus widefield imaging camera was first used in neonatal intensive care units (NICUs) in the 1990s. At that time it showed potential value in screening for retinopathy of prematurity (ROP), and studies proved its reliability in the diagnosis of plus disease in ROP. Several studies have demonstrated the RetCam’s ability to aid the physician in screening, diagnosis and treatment.1-4 It has also become a tool for telemedicine in ROP as proven by the Stanford University Network for Diagnosis of Retinopathy of Prematurity (SUNDROP) program headed by Darius M. Moshfeghi, MD, at Stanford University in Palo Alto, CA, and the future of computerized reading as being developed by Michael

BY AUDINA M. BERROCAL, MD

Digital Imaging for Screening, Diagnosis, and Treatment

The RetCam enables clinicians to improve care in pediatric ophthalmology.

Figure 1. Montage photograph of retinal detachment in ROP 6 months after laser treatment.

Figure 2. Status post surgical repair of ROP detachment.
F. Chiang, MD, at Columbia University in New York. We have also found the RetCam invaluable for resident training, parent education, and documentation of disease. It appears that digital imaging will become the standard of care in NICUs around the country and a key element in telemedicine.

**IMAGING IN THE NICU**

In the NICU, digital imaging has become essential. Digital imaging helps the clinician as diagnostician, aids documentation, and allows us to monitor in the post-laser period, which is of utmost importance in the aggressive Type 1 ROP that micro-preemies develop (Figures 1 and 2). Using the RetCam Shuttle (Clarity Medical Systems), we can continue this process of monitoring the post-laser period in the clinic with fundus photography (Figure 3). With an experienced photographer and video capability, every child can be photographed quickly and safely. The images bring the disease process to life for the nurses, residents, and fellows, and allow the parents to understand and participate in their children’s care. Once parents are able to see the image, they understand the disease and become the child’s most important advocate when it comes to vision.

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**Figure 3.** Images taken in clinic with shuttle system showing regression of ROP after treatment.

**Figure 4.** 360˚ tear of the retina prior to surgery.

**Figure 5.** Retinal reattachment after repair.
Figure 6. Anterior chamber photograph of scarred down Baerveldt tube.

Figure 7. RetCam used as Koeppe lens depicting the angle.

Figure 8. Corneal photograph taken in the NICU of corneal ulcer due to *Pseudomonas aeruginosa*.

Figure 9. Abnormal cornea in a newborn.

Figure 10. Abnormal cornea of the newborn seen with transillumination.
IMAGING IN THE CLINIC

With the creation of the RetCam Shuttle camera, we are able to utilize fundus photography in the clinic. Fundus photography in the clinic permits parents to see and understand the pertinent findings in their babies. We can develop a common language and a better, more objective way to communicate with our patients.

IMAGING IN THE OR

We use the RetCam Shuttle in the OR to document the fundus image in every child who undergoes an examination under anesthesia (Figures 4 and 5). We use it for fundus photography through permanent keratoprosthesis or as a Koepp lens to document angle pathology (Figures 6 and 7) and optic nerve changes. The RetCam can document corneal findings as well (Figures 8-10). It is important that all children who undergo examination under anesthesia should have documentation with digital images; the RetCam facilitates this for almost all ocular findings.

The intravenous fluorescein angiography (IVFA) feature of the camera is particularly useful in the diagnosis of peripheral pathology (Figures 11 and 12). It is capable of documenting peripheral changes that we cannot capture on the upright camera in clinic. It is also an excellent tool for documenting changes in macular pathology in patients with permanent keratoprosthesis when optical coherence tomography and IVFA are not feasible in clinic.

SUMMARY

In summary, it is my opinion that digital imaging should become the standard of care in NICUs where diagnosis and treatment of ROP occurs and should be available to document and follow disease states. The Retcam and the RetCam Shuttle provide us with unique opportunities to diagnose, train our next generation of professionals, and educate the families of our patients.

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