

# The Value of a RetCam System

Barry J. Linder, MD, MS

The RetCam System has been used for a decade as the imaging technology of choice for high quality photodocumentation of the pediatric eye. Recently the US FDA cleared an indication specific to using the RetCam for screening Retinopathy of Prematurity (ROP), and the American Academy of Ophthalmology supported the application of newly released CPT codes for 2011 that apply to remote screening of ROP. Clarity Medical Systems has RetCam devices in over 75 countries and will be installing the one-thousandth RetCam in the next few months. Clearly, the ophthalmic community has embraced the need for a high quality imaging system to document and facilitate disease management in pediatric retinal conditions. However, there are some clinicians who continue to question the value of RetCam imaging. Despite years of experience, and hundreds of articles published about use of the system, they continue to question the importance and value of this technology. Just as it took years for ophthalmology to fully embrace imaging as the best tool to assist in disease management of optic nerve assessment in glaucoma, and evaluation of retinopathy in diabetes, the community is now rapidly moving to embrace the RetCam in disease management of ROP.

## Thorough Eye Examination

A manual examination of the retina by an experienced, fellowship-trained, retinal specialist will quite likely provide consistent views of the retina to the far periphery including the ora serrata, whereas the average digital wide-field image from a RetCam may not reach fully to the ora serrata. However, <2% of clinically significant pediatric retinal disease is isolated to the region of the ora serrata, therefore the RetCam documents nearly all of the relevant posterior segment pathology. Furthermore, there is clear evidence that photodocumentation provided by a RetCam is more accurate, detailed, and consistent than drawings of pathology by an ophthalmologist doing a manual examination.

Most ophthalmologists do not perform a thorough examination of the retina to the ora serrata, which requires significant skill and a technique that is unpleasant for the pediatric patient, known as scleral depression. In addition, the light intensity of the Binocular Indirect Ophthalmoscope (BIO) is higher than that required during a RetCam examination, and adds to the infant's discomfort, ultimately making it more challenging to carefully observe the retina as the infant may be crying and moving. This population of pediatric patients is often quite ill systemically, and it is important to keep their level of discomfort to a minimum.

## Photodocumentation is the Cornerstone of Good Medicine and Disease Management

The distinction between documentation and diagnostic tool is one of semantics, since good medical practice involves documentation of the anatomy under investigation. This documentation is the fundamental element that leads to good diagnosis and disease management. Furthermore, the ability to accurately and reproducibly document the retina has been shown to be more accurate with a digital image than the drawings of an ophthalmologist performing a manual examination. For this reason, the standard of care in diabetic retinopathy and

glaucomatous optic neuropathy is photographic documentation. In retinoblastoma and ROP, RetCam imaging is used to photodocument the diseases. These images are used by physicians to evaluate and manage the progression of the disease. In these diseases, detection of interval changes is critical, and only with the accuracy of a digital image can an ophthalmologist be sure whether the disease is progressing, stable, or regressing (either spontaneously or in response to treatment).



Color fundus images created with the RetCam documenting Type 1 disease.

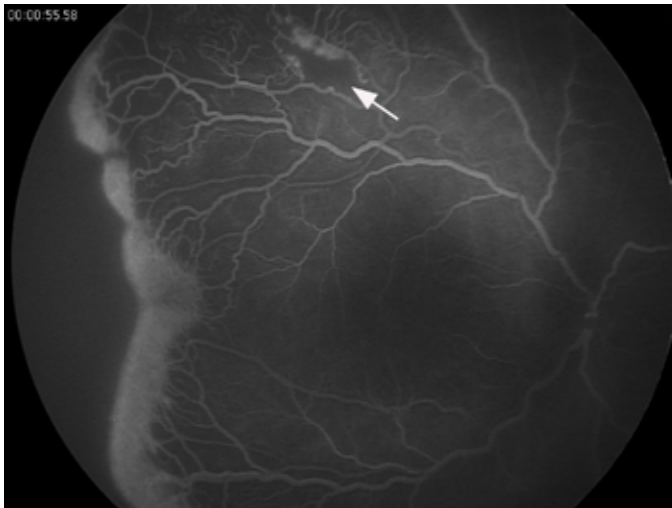
*Photo courtesy of Domenico Lepore, MD, Department of Ophthalmology, Catholic University of Sacred Heart, Rome, Italy*

## Clinical Value of Advanced RetCam Photodocumentation Technology

With regard to the value of the RetCam, there is published data demonstrating that the price of acquisition of the technology is far less than the value derived. For example, manual examination can only be performed by a highly skilled and expensive ophthalmologist, whereas RetCam digital images are often acquired by a significantly less costly technician. This frees the

physician to apply his/her diagnostic skills to evaluation of the image data, rather than acquisition of the information during an exam. Instead of an ophthalmologist using valuable time traveling to Neonatal Intensive Care Units (NICU) to perform an examination with the RetCam, the ophthalmologist can better use this time evaluating other patients, and then evaluating the RetCam images acquired by a technician. There is a critical (and growing) shortage of ROP experts around the world, exacerbated by the simultaneously increasing number of premature babies that are surviving due to better care in NICUs, and a decreasing percentage of ophthalmologists willing to provide ROP care due to the litigious environment associated with this disease. With this background, it is apparent why RetCam's value in ROP disease management continues to grow.

With increased emphasis on integration of electronic medical records into physician workflow, using digital images to document and manage disease is increasingly becoming a requirement for effective and efficient practices. A number of cost effectiveness studies using imaging (RetCam) for ROP screening have demonstrated positive cost benefit ratios. There are ophthalmologists who are convinced that RetCam images provide superior data for their ROP patients and have stopped performing manual eye examinations of these babies except in unusual circumstances.



*Fluorescein angiogram of Type 1 ROP at 55 seconds post injection demonstrates capillary nonperfusion not seen during ophthalmoscopy (arrow) and a hyperfluorescent temporal ridge.*

*Photo courtesy of Domenico Lepore, MD, Department of Ophthalmology, Catholic University of Sacred Heart, Rome, Italy*

By comparison, the cost of a CT or MRI is quite high, but these instruments are ubiquitous in the hospital because the value derived through better documentation, serial comparisons, and disease management when compared to physical examinations alone far outweighs the cost. When evaluating the value of improved documentation and disease management tools such as RetCam, it is important to note that in the disease entities for which RetCam is primarily used today, retinoblastoma and

ROP, the consequence of mismanagement of these infants is potentially life threatening and/or permanently blinding. Also, the cost of the RetCam is distributed over many patients (like MRI), while the benefit of RetCam enabling detection of treatable disease may include prevention of blindness and the lifetime costs associated with blindness.

### **Medico-legal value of RetCam**

There are legal and liability arguments that also drive the value proposition of digital documentation with RetCam. For example, in a publicized malpractice case in Florida, premature twins both went blind from ROP. However, as a result of an institutional policy at Miami's Bascom Palmer Eye Institute that requires RetCam images of all referred premature infants upon admission, the court concluded based upon these RetCam images, that the full responsibility of malpractice occurred prior to the referral, and the Institute was removed from the \$38 million settlement. Therefore, not only does the physician benefit by not having to travel to one or more NICUs, but the hospital may benefit from significant reductions in liability exposure.

### **Conclusion**

As medicine as a whole moves forward with adoption of digital technology, it is imperative for ophthalmology to increase its utilization of digital imaging capabilities such as the RetCam provides. The clinical value of the RetCam system has been proven in the clinical setting, and the result is a classic example of advanced technology leading to the better practice of medicine. Parents, babies, institutions and doctors all benefit from the use of integrated optical systems like the RetCam.

### **About The Author:**

#### **Barry J. Linder, M.D., M.S.**

Barry J. Linder, M.D., M.S. is the Chief Medical Officer at Clarity Medical Systems. He is an experienced healthcare executive as well as a board-certified ophthalmologist and a specialist in medical informatics. Dr. Linder practiced for 9 years at The Permanente Medical Group, during which time he helped pioneer efforts in telemedicine. Dr. Linder later served as a senior consultant at Kaiser Permanente's Care Management Institute and Kaiser Permanente International, where he led efforts to develop the first national website for Permanente physicians and served as Director of a joint venture in Southeast Asia. After holding senior executive positions in marketing and strategic planning at Promedix, SpecialtyMD, and at Ventro Corp., Dr. Linder served as CEO of orthopedics start-ups ConforMIS and Imaging Therapeutics before joining Clarity.