



Telemedicine in Retinopathy of Prematurity

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Keywords

- Retinopathy of prematurity (ROP) • Telemedicine • Tele-ROP • Screening • Rural
- Infant blindness

Key points

- Binocular indirect ophthalmoscopy performed on site by trained specialists for retinopathy of prematurity (ROP) screening is losing its status as the gold standard.
- Wide-field digital retinal imaging for ROP screening has brought objectivity and the ability to process, store, analyze, report, and archive images, thereby enhancing the clinical and medicolegal potential.
- Telemedicine in ROP (tele-ROP) has the ability to provide this standard of care to the most remote and outreach centers, especially in middle-income countries with a large burden and few specialists.
- A few large tele-ROP programs in the United States and India have led to the current understanding of this topic.

INTRODUCTION

Retinopathy of prematurity (ROP) is one of the leading causes of preventable infant blindness in the world. In the past few decades, developed and high-income countries have shown a reducing trend in the incidence of ROP, owing to an overall improvement of neonatal health care. However, in middle-income countries, because of several factors, including higher birth rates, improved survival of pre-term infants, lack of universal ROP screening programs, and lack of trained specialists to manage the disease even if detected, a large unmet burden of ROP blindness exists [1].

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On-site, bedside, binocular indirect ophthalmoscopy (BIO) performed by a trained specialist has been the accepted gold standard in diagnosing and monitoring ROP. However, there are several limitations in providing ideal ROP care with BIO, including the scarcity of trained specialists, lack of objectivity and photodocumentation, medicolegal concerns, low or no reimbursement, remote or poorly accessible location of neonatal care centers, and ergonomic and logistic difficulties [2].

Evidence suggests that most ROP blindness is caused by screening failure and not treatment failure [3]. Hence strategies to improve screening programs are needed. Technological improvements in wide-field digital imaging, coupled with the ability to transmit these images through the Internet or electronically, allow the images to be read, reported, archived, and accessed for clinical, medicolegal, and research activities. This telemedicine approach for ROP (tele-ROP) screening has been in practice in different parts of the world. Although these programs have regional, technical, and logistic differences, the fundamental principle and tenets remain the same.

Although in some programs tele-ROP provides only an adjunct ROP role to the existing model (ie, the ROP specialist performs on-site examinations either to confirm the diagnosis or discharge the baby from screening), the true potential of tele-ROP is for there to be few or no ROP specialists to perform any confirmatory on-site examinations, and for remotely read images to be the only source of providing a continuity of care for these premature infants.

This article reviews these principles, highlights the unique features of the erstwhile programs, summarizes practical strategies that could help in setting up and promoting best-case practices, and introduces future research areas that have a potential to be exploited for tele-ROP.”

SIGNIFICANCE

The scarcity of specialists to screen for ROP is a universal phenomenon. In the United States, a survey of 600 pediatric ophthalmologists/retina specialists showed that only 76% were willing to continue to screen for ROP [4], despite there being a 33% increase in the at-risk population of infants during the same period [5,6]. In middle-income countries like India, where more than 3.5 million infants are born premature, there are less than 100 specialists nationwide to provide ROP care [7,8]. On the other end of the spectrum, low-income countries, including those in the African continent, which hitherto did not report the disease because of poor preterm survival, are now reporting significant disease in the setting of a lack of trained specialists to screen or treat [9,10]. Another commonly occurring scenario both in developed and developing nations is the decentralization of neonatal care to community or remote hospitals that offer better pediatric care to premature infants than before. These hospitals require the services of specialists to screen in 1 or more facilities with a small number of infants in each center, making the logistics of travel for the specialist and the baby, follow-up, transfer to other centers, and continuity of care a major challenge [11]. The difficulty in following up rural infants from outreach centers is also an increasing challenge [8].

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