

The Public Health Approach for Retinopathy of Prematurity

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Prematurity by itself is a public health concern. These infants born too soon experience substantial morbidity and mortality in the neonatal period, which translate into significant medical costs. In early childhood, those who survive are characterized by a diversity of health problems, including motor delay and/or cerebral palsy, lower IQs, behavior problems, respiratory illness, and vision impairment. Many experience difficulty with school work, lower health-related quality of life, and family/societal stress. Evolving information in adolescence and young adulthood shows a more optimistic picture, with persistence of many problems but with better adaptation and more positive expectations by the young adults. Few to no opportunities for prevention have been identified; therefore, public health approaches to prematurity are vast and must be initiated early in the child's life.

Retinopathy of prematurity (ROP) is one of the priority diseases of Vision 2020. Just like congenital cataract, it affects visual function in the very early ages and can be treated or avoided. ROP ranks fifth among all other causes of childhood blindness in the world. What do we know of the disease? It has a well established classification system, the natural history of the disease is known, signs develop within 3-4 weeks after birth with rapid progression. In around 70% of these infants, the condition resolves without treatment. It is those who progress that need treatment. Lastly, clinical trials show that ROP treatment once it reaches a critical stage is highly effective at preventing progression to blinding retinal detachment.

Two epidemics of ROP have been described in industrialized countries. It was during the 1940s and

1950s in these countries where ROP was first noticed as a significant cause of blindness among infants. At that time, the survival rate of premature babies increased due to the use of supplemental oxygen. This also caused blindness secondary to hyperoxia, a consequence of unrestricted oxygen use. That era was known as the "first epidemic." Thereafter, blindness from ROP diminished with the restriction of oxygen, and an increase in mortality rates and cerebral palsy among premature babies noted.

The "second epidemic" (of acute ROP) started in the 1970s as neonatal care improved over time with better modalities of monitoring oxygen supplementation and improved control of neonatal and perinatal complications. Smaller and less mature babies survived and blindness from ROP re-emerged.

Over the last 10-15 years, it has become clear that ROP is making its mark again as a major cause of blindness among the newborn in middle income countries like Latin America, Eastern Europe, and Southeast Asia (i.e. Vietnam, China, and India). These countries are expanding their neonatal care but have insufficient knowledge on ROP, setting the stage for a "third epidemic."

The unnecessary blindness from ROP can be controlled through 2 broad approaches: a) reducing the incidence through excellent neonatal care, and b) detecting and treating infants who develop the severe stages of the disease. The World Health Organization estimates that there are 15 million preterm births per year (born at <37 weeks). Infants born preterm contribute disproportionately to the under 5 mortality

rates (40% overall). Those most at risk of ROP are those born at <32 weeks gestational age; babies 32-37 weeks are at less risk. Only preterm babies cared for in neonatal intensive care units develop ROP.

Ministries of Health are highly likely to expand neonatal intensive care; as a consequence, this will lead to increased survival of preterm babies, putting them at risk of ROP.

There are factors known to increase the risk of ROP, such as preterm birth, too much oxygen, sepsis, chronic lung disease, and poor nutrition. Therefore, what are the strategies for controlling them? Retinopathy of prematurity must be approached with an all-inclusiveness. Foremost is primary prevention of preterm births, the causes of which are multifactorial. It has been shown that reducing teenage pregnancies, preventing multiple births (i.e. in vitro fertilization), and avoiding unnecessary caesarian sections may reduce premature births. Improvement of neonatal care is another. Though a challenge, specific interventions that decrease infection and use oxygen more judiciously can reduce the risk. Current modalities, such as the use of 1) blenders (systems that deliver oxygen in varying amounts); and 2) probes/monitors (measure blood oxygen levels) account for better oxygen monitoring. Well-trained staff who understand the importance of controlling oxygen levels cannot be underestimated.

Secondary prevention of ROP involves early identification and treatment to prevent the consequences of the disease. This can be done in the following ways: 1) The neonatologist identifies infants to be examined according to gestation age, birth weight, or other criteria; 2) the ophthalmologist visits the neonatal unit on a fixed day and time each week to examine the infants using an indirect ophthalmoscope. For each infant, the neonatologist and ophthalmologist will have to decide on the following details: a) when is it safe to discharge, or b) scheduled follow-up consultations; or c) is treatment needed at any point in time. Alternatively, a RetCam (wide field digital camera) can be used to document the retinal findings. The advantages of a RetCam are the following: it can take images to track change over time and is useful for educating staff and counselling parents. The camera is portable and can be used in more than one unit. Yet, the device does not provide a substitute for a trained ROP screener. It is a form of documentation that still needs interpretation by an ophthalmologist. The challenge of its use is that the report MUST be fed

back to the screener within 48 hours in case treatment is needed. This requires a 24/7 access to remote experts.

Infants can still develop the stages of ROP needing treatment after they have been discharged. And this poses an even greater challenge. These babies also need to be examined and any system of detection has to be able to respond to this situation as well. It is recommended to do proactive screening among blind schools, special education schools, and nursery schools.

Indications and timing of treatment must be emphasized in all ophthalmology residency programs. These knowledge should be sustained for all ROP screeners. A list of ophthalmologists willing to screen and treat ROP cases must be provided to all pediatricians. Treatment methods available include cryotherapy, intravitreal injection of anti-VEGF, laser retinal photocoagulation, under sedation or general anesthesia. Timing of treatment MUST be given within 48 hours as it can progress very rapidly to untreatable retinal detachment. A follow-up schedule is laid out for parents and pediatricians are guided accordingly.

Infants with ROP may have an increased risk for other pathologies, such as high myopia, squint, and cortical brain damage. They need regular follow up so these problems can be detected and managed. Hence, a good relationship among parents, pediatricians, and other caregivers have to be instituted.

Tertiary prevention involves rehabilitation in order to restore function, with special education so that these children will integrate soonest with the regular education system and be able to mix with normally sighted children. Moreover, support services must be made accessible to families afflicted with a visually disabled child. Thus, there is a need to develop and strengthen eye facilities, specifically for low vision care.

As with most public health interventions, evidenced-based health information through population researches would help in better planning of public health approach, policy development, and rehabilitative services for visually disabled children due to retinopathy of prematurity. Hence, any ROP program must be comprehensive in nature: 1) it needs to have good coverage (not only for cities but more so in rural areas), 2) needs good management

information system since a registry is vital, 3) coordination of screening and management that are monitored judiciously, 4) financial support mainly from the government as hospital care entails equipment and training of midlevel ophthalmic personnel, and 5) most imperatively, the cooperation among medical specialties and the knowledge, support, and involvement of parents which can spell the success of any multispecialty physician-patient relationship.

The Philippine Academy of Ophthalmology, with the creation of the ROP Working Group, has recently updated the guidelines for screening and referral of premature babies in the country, with the hope that these guidelines will contribute to the decrease, if not the total avoidance, of childhood blindness caused by retinopathy of prematurity.