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Screening for retinopathy of prematurity

Michael O'Keefe *, Caitriona Kirwan

The Childrens University Hospital, Temple Street, Dublin, University College Dublin, Ireland

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Nesting;
Telemedicine

Abstract

The CRYO-ROP study confirmed the success of treatment for ROP and made screening mandatory. National based screening has been influenced by the varied incidence of disease in developed and developing countries. Most ophthalmologists in developed countries screen infants born between 1000 and 1500 g and between 28 and 31 weeks gestation post menstrual age. The 1984 classification has been updated to highlight the importance of plus disease. The ETROP study findings have resulted in earlier treatment and elevated the importance of screening. Measures such as nesting may help to reduce infant distress during examination. It is important for neonatal units to have an agreed policy on screening and both neonatologist and neonatal nurses have an invaluable role.

Diagnostic retinal imaging and telemedicine may have an increasing role in future screening. Timely and accurate screening is the most important first step as earlier treatment results in improved visual prognosis.

The 1984 Classification of Retinopathy of Prematurity [1] and the 1988 CRYO-ROP Study [2] made screening for ROP imperative and subsequently improved the visual prognosis of this condition. The aim of the screening is to detect infants with ROP who require treatment and where possible allows a window of opportunity for treatment. CRYO-ROP defined threshold disease as the stage at which treatment was required with threshold defined as stage 3 ROP in 5 consecutive or 8 cumulative clock hours in zone 1 or zone 11 of the retina. The ETROP [3] study has shown the benefit of earlier treatment of high-risk prethreshold disease compared to treatment at threshold. This is called type 1 disease (zone 1 any stage ROP with plus disease, zone 1 stage 3 without plus, zone 11 stage 2 or 3 with plus disease).

Improved survival of premature infants has resulted in an increased incidence of ROP and an increase in blindness. Treatment is now effective in altering the course of ROP and can prevent blindness. This means that screening infants at risk is a fundamental first step. The increasing survival rates of premature infants of gestational age less than 25 weeks gestation and very low birth weight have contributed along with the publication of the ETROP study to significantly increase the importance of screening. Many developed countries have adopted guidelines on weight and gestational age and these are modified according to population based and consecutive studies on the incidence of ROP. The importance of national based criteria has been highlighted by the varied incidences of the disease in developed compared to developing countries [4]. In the latter the incidence is far higher with greater prevalence in heavier and older premature infants[5].

The American Academy of Ophthalmology, the American Academy of Paediatrics [6] and the American Association of Pediatric Ophthalmology and Strabismus have recommended

* Corresponding author. Suite 5, Mater Private Hospital, Eccles Street, Dublin 7, Ireland. Tel.: 00 353 1 8858626.
E-mail address: mokeefe@materprivate.ie (M. O'Keefe).

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ETROP classification

Type 1 ROP should be treated

Zone 1 any stage of ROP with plus disease

Zone 1 Stage 3 ROP with or without plus disease

Zone 11 Stage 2 or 3 ROP with plus disease

Type 2 should be observed, and only undergo treatment if it progress to type 1 or threshold disease

Zone 11 Stage 1 or 2 ROP without plus disease

Zone 11 Stage 3 ROP without plus disease

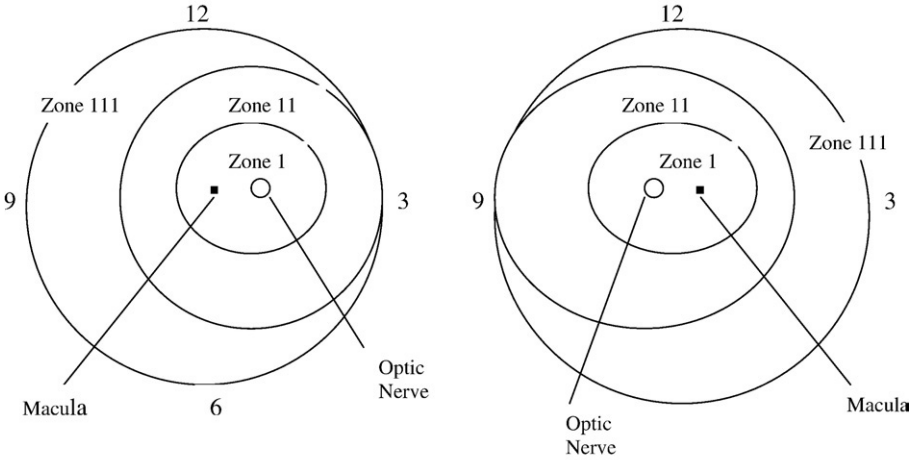
Figure 1.

screening infants with birth weights under 1500 g or gestational age of 30 weeks or less and selected infants with a birth weight between 1500 and 2000 g or a gestational age greater than 30 weeks with an unstable clinical course who are considered at high risk by their attending paediatrician or neonatologist. The updated United Kingdom national guidelines recommend ROP screening for babies of birth weight less than 1501 g and/ or gestational age less than 32 weeks (up to 31 weeks and six days) [7]. These guidelines were drawn up after an extensive review of the literature which suggested that setting the birth weight or gestational age criteria below these levels could result in some babies with sight threatening ROP not being screened, for example Hutchinson et al. identified stage 3 disease in 7 infants of gestational age up to 32 weeks and birth weight up to 1874 g [8].

Screening for ROP must be safe, cost effective and target those most at risk. It should eliminate unnecessary examinations and free up resources. Screening for ROP requires experience and skill and the ability to recognise severe disease is crucial. The UK guidelines recommend that in babies born before 27 weeks gestational age (i.e. up to 26 weeks and six days) the first ROP screen should be performed at 30 to 31 weeks postmenstrual age. Babies born at 27 to 31 weeks + 6 days gestational age should have their first screen undertaken between four to five weeks after birth. Repeat examinations should take place weekly when the vessels end in zone 1 or posterior zone 2, there is any plus or pre plus disease or there is any stage 3 disease in any zone, otherwise screening should be undertaken every two weeks. These guidelines are very similar to the American timing which advises that all babies up to 27 weeks gestation should be screened at 31 weeks post menstrual age with those of 28 weeks gestation and older being screened at 4 weeks after birth. The examination at about 34 weeks post menstrual age is particularly important as at this age the risk of severe disease is considered to be greatest. Recognition of this fact is of particular importance in countries where resources are scarce and personnel are lacking and it may be the only examination performed. It has been referred to as the one stop examination. The presence of threshold disease signals the need for treatment. However, the ETROP study has highlighted the importance of prethreshold disease and the need for earlier treatment in some babies (Fig. 1).

The early onset of threshold disease, which has been referred to by some ophthalmologists as 'rush disease', has been reported at 31 to 32 weeks gestational age [9] hence the updated UK guidelines screening recommend that the more premature infants undergo their first screening examination at 30 to 31 weeks post menstrual age. Babies screened prior to 30 weeks gestation have hazy corneas and funduscopy is more difficult which makes earlier screening or potential laser treatment almost impossible. Screening should continue until there is no risk of sight threatening disease. In the UK this is advised as occurring when vascularisation has extended into zone 3 or at 37 weeks in infants in whom no ROP has developed or in infants who have developed ROP, screening may cease once regression of disease has been seen on two successive examinations. The America advice is to cease screening when zone 111 or the entire retina is vascularised, the infant is 45 weeks post menstrual age or the ROP has regressed.

It is important for Neonatal Units to have an agreed policy on screening. It must include the ophthalmologist, neonatologist and neonatal nurses. The latter play a major role and are



Zones of the Retina and Clock Hours

Figure 2 Zones of the retina and clock hours.