Newborn Clinical Network

In collaboration with the Paediatric Ophthalmology Interest Group

Consensus statement for Screening for Retinopathy of Prematurity

Prepared by:
Name Nicola Austin and Shuan Dai
On behalf of
Newborn Clinical Network Clinical Reference Group, and the Paediatric Ophthalmology Interest Group

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Acknowledgements

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Disclaimer

The content of this consensus statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

Public Domain Notice

This practice recommendation is intended for use by secondary care practitioners involved in the care of newborns at risk of retinopathy of prematurity. It provides the best evidence currently available to assist informed decision making by parents/caregivers and their health care providers to improve their health outcomes.

Glossary

ACNM Associate Clinical Nurse Specialist
ANZNN Australia and New Zealand Newborn Network
BIO Binocular indirect ophthalmoscope
DHB District Health Board
IVH Intraventricular Haemorrhage
PPHN Persistent pulmonary hypertension of the newborn
PMA Post menstrual age
ROP Retinopathy of Prematurity
WFDRI Wide field digital retinal imaging

Introduction

Screening for ROP should be consistent with national and international guidelines. The rates of ROP are highest at lowest gestation. The presence is extremely uncommon over 30 weeks gestation. Certain clinical risk factors lead to higher rates at higher gestation and these need to reflect which babies from 30 weeks should also have an ROP screening examination.

Retinopathy of prematurity (ROP) is one of the leading causes of preventable childhood blindness in developed countries including New Zealand (NZ). Lower grade ROP can develop and resolve spontaneously in many preterm babies with extreme low birth weight and /or gestational age. A small proportion of the preterm babies will develop severe ROP, which may result in permanent visual impairment if untreated. Therefore all babies at risk of developing ROP should be screened.

A national prospective audit of ROP in New Zealand was undertaken in 1986, with efforts made to see that every infant of <32 weeks gestation or <1500 gram birthweight was examined by indirect ophthalmoscopy at an appropriate time (Darlow BA. *Arch Dis Child* 1988; 63: 1083-6).

As a result of this audit it was recommended that screening criteria to detect ROP in NZ should be set at **<31 weeks gestation or <1250gram** (only one criterion needs to be met) plus other infants who have an unstable course or prolonged oxygen requirements at the discretion of the responsible neonatologist (Darlow BA, Clemett RS *Aus NZ J Ophthalmol* 1990; 18: 41-6).

Data from the Australian and New Zealand Neonatal Network (ANZNN) have been reviewed for NZ infants recorded as having stage 3 or more ROP. The ANZNN dataset is from 1995 to 2011 and includes data from level III registered infants who are either <32 weeks gestation or <1500g birthweight. Level II NICUs in NZ joined the ANZNN from 1998.

In considering whether NZ as a whole should change the screening criteria to **<30 weeks gestation or <1250gram**, problem areas include ensuring that:

- every infant who does qualify for screening (whatever the criteria) is screened on time and the results recorded;
- infants continue to be examined until the eye is either fully or nearly fully vascularized or treatment occurs
- infants who are transferred between centers continue to be screened on time;
- accurate records are kept of each screening examination;
- infants who need treatment have this within 48 hours of the decision to treat being made (even if this requires transfer to another center)

Purpose of this consensus statement

Establish ROP screening criteria and ensure consistency at all DHB's which is important due to the movement of babies from level 3 to level 2 units prior to the time that development of ROP signs may occur.

Criteria for ROP screening

ROP screening should be arranged for all infants born with a gestation age at birth of **less than 30 weeks or birth weight less than 1250 grams.**

For infants from 30 and over 1250 grams the Neonatologist can request ROP screening. **The conditions / treatment to consider screening**:

Inutero hydrops,
Grade 3 / 4 IVH, or Post haemorrhagic hydrocephalus
Severe sepsis
Treatment with Nitric oxide for PPHN,
Affected twin to twin transfusion infants,
Prolonged period in high inspired oxygen.

Assessment / ROP screening

Table 1: First ROP examination Schedule

Gestational age at birth(weeks)	First ROP screening examination (weeks)
<26 weeks	30 -31 weeks PMA*
26 – 29 weeks	4 weeks postnatal
≥30 weeks	4 weeks postnatal

Table 2: ROP follow up examination Schedules

Timing of follow up (weeks)	Retinal findings
< 1week	Early features of possible AP-ROP
1 week	Any ROP in zone 1, regressing ROP zone1, immature vascularization in zone1, stage 3 in zone 2, pre-plus disease in any zone, hazy view of retina
2 weeks	Any stage ROP except stage 3 in zone 2, regressing ROP zone 2, Stage 1 or 2 ROP in zone 3, regressing ROP zone 3

Less than 1 week follow-up is recommended for babies with retinal features indicative of early signs of Aggressive Posterior ROP (AP-ROP): posterior location of ROP, increased dilatation and tortuosity of retinal vessels in all 4 quadrant out of proportion to the peripheral retinopathy, development of shunting vessels within the vascularized retina.

Recommended Drops to facilitate eye examination: (microdrops Counties)
local preferences e.g. 0.5% cyclopentolate and 2.5% phenylephrine x2 at 5 min intervals, 30-60 mins pre-exam.
Pain control: local anaesthetic e.g. 0.5-1% -Amethocaine 1% (Tetracaine 1%)

Oral sucrose immediately prior to examination.

Treatment criteria

Treatment for ROP should be undertaken if any of the following retinal features are present

- Zone 1 any ROP with plus
- Zone 1 stage 3 without plus
- Zone 2 stage 2 or 3 with plus

Treatment should generally be completed when possible, within 48-72 hours of diagnosis of treatable disease.

Babies with Aggressive Posterior ROP should be treated as soon as possible and preferably within 24 hours, not later than 48 hours from the diagnosis.

Referrals

ROP treatment occurs in 5 of the level 3 neonatal intensive care units: Auckland, Counties, Hamilton, Wellington and Christchurch.

Severe ROP requiring laser treatment is relatively rare and should only be carried out by appropriately trained practitioners. It is recommended that laser treatment should be restricted to centers where such expertise is available to ensure optimum treatment outcomes.

Termination of ROP screening

Examinations should not stop prior to 36 weeks.
Expect to go to PMA 38/39 weeks for infants (< 28 weeks).

ROP screening can be discontinued if

- Retinal vascularization reached zone 3 without previous ROP
- ROP regressed, either spontaneously or after treatment, indicated by development of dry white ridges/line from active pink ridges, development of laser induced scar tissue and transgression of vessels across the demarcation line.
- Infant reached PMA 45 weeks and there is no prethreshold ROP present (any zone 1 disease, or stage 3 in zone 2)

If Bevacizumab (Avastin) is used ROP screening should continue to 54 weeks corrected age.

Documentation of ROP screening

Binocular indirect ophthalmoscope (BIO) retinal examination has been traditionally the gold standard ROP screening method. Wide field digital retinal imaging (WFDRI), captured using Retcam and images graded by an experience ophthalmologist, has been proven to be at least as accurate as BIO in the diagnosis of ROP, in addition it has advantage over BIO in providing objective photographic documentation of ROP, accurate monitoring of ROP progression and easy access of expert opinion remotely when needed.(Chiang 2012, Trese 2008). Both BIO and Retcam WFDRI are standard ROP screening tools and Retcam WFDRI should be used in ROP screening where available.

Retcam images are standard of care in 4 level 3 units. Other centres should work towards using and storing retcam images.

Standard clinical record should be stored electronically on hospital information systems.
International Committee for the Classification of Retinopathy of Prematurity 2005 should be used.

Parents' involvement in ROP screening

ROP screening examinations can be stressful for both the infants and parents. Consistent communication with the parents by members of the staff is very important and is aided by written information sheets. Parents should be informed about the possible risk of ROP in the unit admission booklet and reminded about the need for eye examinations nearer the due date. Parents should be kept informed about the outcome of each ROP examination, especially when there is a progression of ROP. The risks and benefits of treatment, especially the adverse visual outcome associated with advanced ROP, should be discussed thoroughly at time of proposed ROP treatment. Clear documentation of such communication in the infant's medical notes is recommended.

Follow up post discharge from NICU

Long term clinical follow up for babies at risk of ROP:
Premature babies who qualified for ROP screening, irrespective of having ROP are at higher risk of developing other ocular morbidities such as strabismus, amblyopia.

- For infants without ROP treatment, a 6 months' outpatient review after discharge from acute ROP screening should be offered and future follow up can be discontinued if there is no ocular abnormality seen.
- For infants who have had ROP laser treatment, a 3 months outpatient review should be offered and thereafter 9-12 monthly until ophthalmologist transfers to a community optometrist.

Infants who have had ROP requiring treatment are at higher risk of neurodevelopmental delay and long-term follow-up by a Paediatrician should occur.

ROP screening service organization & responsibility

An effective ROP screening service requires each NICU to have a unit specific screening protocol with clear defined responsibilities for each of the medical personal involved.

It is suggested that each NICU should have a ROP nurse coordinator, or neonatal associate clinical nurse manager (ACNM) responsible for ROP screening.

A record system must be established to automatically trigger and schedule the initial ROP examination for those infants at risk. One method to ensure eligible infants are examined on time is to enter their details into a ROP book or electronic dataset, at the time of admission to the NICU, and book the date of their first examination at that time. This will occur electronically when the Neonatal Clinical Information System is available throughout NZ.

It is the responsibility of neonatologist to ensure that infants who are eligible for screening are scheduled on time for initial and follow up ROP eye examinations.

It is the responsibility of the screening ophthalmologist to ensure the initial ROP examination takes place at the time mutually agreed between the neonatologist and ophthalmologist.

The examining ophthalmologist must record a follow up screening plan in the infant's medical record and communicate this to the neonatology service coordinator on the day, as well as the outcome of the current examination.

For babies transferred from a level 3 to a level 2 unit it is the responsibility of the transferring NICU neonatologist to inform the neonatologist/paediatrician in the receiving DHB the requirement and timing of initial or follow up ROP examination.

Each unit should have a system follow up ROP examination booking for those babies discharged home before completion of their ROP screening examination.

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