Retinopathy of Prematurity – Diode Laser Treatment

Referrals for Laser Treatment – admission and treatment will be organised directly by Mr. Hussain

Refer directly to Mr. Kafil-Hussain by phone or email (please do not give identifiable patient details by email)
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Pre-procedure

• Written informed parental consent
• Intravenous access secured
• Both pupils dilated with phenylephrine 2.5% and cyclopentolate 0.5% eye drops administered 60 and 30 minutes before the procedure
• Sedation with Chloral hydrate (50 mg / kg), given orally 60 mins before the procedure.
• Analgesia with oral paracetamol (24mg/kg) and/or oral morphine (200 micrograms per kg) depending on severity and duration of laser treatment. If morphine is used, ensure that naloxone is available in case of respiratory depression.
• Sucrose is not sufficient analgesia, but may be offered for comfort
• Monitoring of respiratory rate, heart rate, transcutaneous oxygen saturation (pulse oximetry)
• Neonatal nurse to be present throughout procedure.
• Immobilise baby by swaddling the arms and body in a sheet, and the head will be stabilised by an assistant.
• The fellow eye will be taped shut.

Procedure

• Instil proxymetacaine 0.5% drops in both eyes
• Instil 5% iodine drops in both eyes
• Insert of neonatal lid speculum
• Incision of the conjunctiva and tenon's capsule in the inferonasal quadrant, 2-4 mm posterior the limbus.
• Inject lignocaine 1% (5 mg / kg), no more than 0.5 ml into subtenon's space.
• Peripheral retinal laser photocoagulation will be performed using the binocular indirect diode laser with a 28 dioptre lens and scleral indenter.
• Photograph of both retinae, if possible, using Retcam.

Follow up

• Weekly follow-up examination until regression of severe ROP is confirmed.
• Information leaflet for parents
The guideline below is taken directly from the consensus guideline published (below).

UK retinopathy of prematurity guideline (Early Human Development (2008) 84, 71–74)

Screening criteria

- All babies less than 32 weeks gestational age (up to 31 weeks and 6 days) or less than 1501 g birthweight should be screened for ROP
- All babies less than 31 weeks gestational age (up to 30 weeks and 6 days) or less than 1251 g birthweight must be screened for ROP

Screening protocol

- Babies born before 27 weeks gestational age (i.e. up to 26 weeks and 6 days) — the first ROP screening examination should be undertaken at 30 to 31 weeks postmenstrual age.
- Babies born between 27 and 32 weeks gestational age (i.e. up to 31 weeks and 6 days) — the first ROP screening exam should be undertaken between 4 to 5 weeks (i.e. 28–35 days) postnatal age.
- Babies N32 weeks gestational age but with birthweight b1501 grams — the first ROP screening examination should be undertaken between 4 to 5 weeks (i.e. 28–35 days) postnatal age.
- Minimum frequencies of screening should be weekly when
  - the vessels end in zone I or posterior zone II; or
  - there is any plus or pre-plus disease or
  - there is any stage 3 disease in any zone
- Minimum frequencies of screening should be every 2 weeks:
  - in all other circumstances until the criteria for termination have been reached
- All babies <32 weeks gestational age or birthweight <1501 g should have their first ROP screening examination prior to discharge.

Although screening for all babies at risk should follow the above protocol, it is acknowledged that there may be clinical or organisational circumstances which prevent this. In these circumstances the following is recommended as good practice to ensure that subsequent screening examinations are not missed.

Where a decision is made not to screen a baby, the reasons for doing so should be clearly stated in the baby's medical record and the examination should be rescheduled within one week of the intended examination.

Screening examination

The screening examination can be stressful for both babies and parents. The full guideline gives recommendations on preparation and care of the baby. The examination requires a well-dilated pupil so the peripheral retina can be fully visualised. The following are key recommendations and good practice points for this area.

In addition to oral communication, parents should be given written information about the screening process prior to the first examination of their baby.

It is important that the periphery of the retina can be seen and this may be facilitated by the use of an eyelid speculum and scleral indenter suitable for neonatal use.

Ophthalmological notes should be made after each ROP examination, detailing zone, stage, and extent in terms of clock hours of any ROP and the presence of any pre-plus or plus disease. These notes should include a recommendation for the timing of the next examination (if any) and be kept with the baby's medical record.
Comfort care techniques (e.g. administering sucrose solution, nesting, swaddling and/or the use of a pacifier) during the screening examination may be considered.

**Termination of ROP screening**

Screening can be stopped when a baby is no longer at risk of sight-threatening ROP. In babies who never develop any ROP, the risk of sight-threatening ROP developing is minimal once the retinal vessels have entered zone III. That vessels are in zone III can be difficult to determine, but it is unlikely to occur before 37 weeks postmenstrual age and a decision to stop screening before this must be carefully evaluated.

In babies without ROP, there is minimal risk of developing sight threatening ROP when vascularisation has extended into zone III and eye examinations may be stopped when this happens, usually after 36 completed weeks postmenstrual age.

In babies developing ROP which does not meet the criteria for treatment, screening can be safely stopped when there are clear signs that the active progression of ROP has halted and regression has commenced.

In the presence of ROP, screening for progressive active disease may be discontinued when any of the following characteristics of regression are seen on at least 2 successive examinations:

- lack of increase in severity
- partial resolution progressing towards complete resolution
- change in colour in the ridge from salmon pink to white
- transgression of vessels through the demarcation line
- commencement of the process of replacement of active ROP lesions by scar tissue

**ROP treatment**

Timely treatment for ROP is effective at preventing severe vision impairment. Previous guidance recommended treatment when the disease reached ‘Threshold’, as defined in section 7 of the main document. Recent evidence shows benefit from earlier treatment.

Ophthalmic criteria for treatment

Treatment for ROP should be undertaken if any of the following indications are reached:

- Zone I, any ROP with plus disease,
- Zone I, stage 3 without plus disease,
- Zone II; stage 3 with plus disease.

Treatment for ROP should be seriously considered if the following indication is reached:

- Zone II, stage 2 with plus disease

Although there is no specific evidence to inform the interval between reaching treatment criteria and treatment taking place, it is the view of the GDG that, given the encouraging results for early treatment obtained by treating within 48 h, this should be the target standard.

Babies with aggressive ROP should be treated as soon as possible and within 48 h. ROP requiring treatment but which is not aggressive posterior ROP should normally be treated within 48–72 h.

Transpupillary diode laser therapy is recommended as the first line treatment for ROP.
Treatment with near-confluent (0.5–1 burn-width) laser burn spacing should be administered to the entire avascular retina.

The unavailability of diode laser equipment or the inability to transfer to another centre should not prevent or delay the treatment of ROP. In these situations, treatment with cryotherapy or argon laser may be completed by an ophthalmologist experienced in these techniques.

Severe ROP requiring treatment is relatively infrequent and treatment is a specialised procedure. Although there is no research literature on treatment outcomes according to operator expertise, it is likely that those with the greatest experience will be the most skilled practitioners in the procedure.

Babies with ROP should be treated by ophthalmologists who have the appropriate competency.

Each network should have identified individuals for ROP treatment.

**Post treatment review**

Post operative review is important to monitor disease regression and to determine if retreatment is necessary. The GDG have agreed the following GPP in the absence of good quality evidence to inform these timings.

The first examination post treatment should take place 5-7 days after treatment and should be continued at least weekly for signs of decreasing activity and regression.

Re-treatment should be performed usually 10–14 days after initial treatment when there has been a failure of the ROP to regress.

**Follow-up after screening or treatment**

After the acute phase, eyes that have reached stage 3 or have been treated should be monitored at a frequency dictated by the clinical condition to determine the risk of sequelae.

**Organisation of services**

Effective services for ROP screening and treatment must be embedded in a robust organisational structure, with individual responsibilities identified. Particular efforts must be made to ensure that the service is delivered appropriately for all those at risk, as there is evidence that babies transferred or discharged home before screening is complete are at risk of poor outcomes as a result of lack of follow-up.

All units caring for babies at risk of ROP should have a written protocol in relation to the screening for, and treatment of, ROP. This should include responsibilities for follow-up of babies transferred or discharged from the unit before screening is complete, which should be the responsibility of the named consultant Neonatologist for each baby.

If babies are transferred either before ROP screening is initiated or when it has been started but not completed, it is the responsibility of the consultant neonatologist to ensure that the neonatal team in the receiving unit is aware of the need to start or continue ROP screening.

There should be a record of all babies who require review and the arrangements for their follow-up.

For babies who meet the ROP screening criteria, screening status and the need and arrangements for further screens must be recorded in all transfer letters so that screening may be continued.
For babies discharged home before screening is complete the first follow-up out-patient appointment must be made before hospital discharge and the importance of attendance explained to the parents/carers.

**Sub-Tenon’s local anaesthesia**

Sub-Tenon’s LA has been shown to provide effective analgesia during pan retinal laser photocoagulation in adults. It dampens the oculocardiac reflex, minimising any tendency to apnoea or bradycardia during and for a few hours after treatment. An additional benefit of the Sub-Tenon’s anaesthetic is augmentation of pupillary dilatation. The pupils are often resistant to pharmacological dilatation in acute ROP. This is believed to be due to engorgement of iris vasculature, and can sometimes pose additional difficulty during treatment.

After instillation of proxymetacaine 0.5% drops and insertion of a neonatal lid speculum, the conjunctiva and Tenons capsule in the inferonasal quadrant is incised 2–4mm posterior to the limbus to enter the sub-Tenon space. A metal, 26G curved lacrimal cannula, is passed into this space for approximately 5mm before injecting no more than 0.5 ml of lignocaine 1% (5 mg/kg).
References: