

Guidelines for Pediatric Ophthalmology Service Delivery in Nepal

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NOTES FROM DR. MIHIR KOTHARI

The role of Pediatric Ophthalmologists

INTRODUCTION

Objective

To guide effective service delivery of pediatric eye care to eliminate avoidable childhood blindness in the republic of Nepal by 2020AD.

The role of Pediatric Ophthalmologists

A pediatric ophthalmologist has the most important role to play in the crusade against childhood blindness.

A pediatric ophthalmologist will have to involve different people in his/her team to achieve that objective.

The team should include

1. Pediatric Ophthalmologists
2. Other ophthalmologists
3. Optometrists / orthoptists
4. Low Vision Specialists
5. Anesthetists
6. Nursing staff
7. Counselors
8. Community Health Workers
9. Pediatricians
10. Geneticists
11. Parents
12. School Teachers
13. Hospital administration
14. Government and Nongovernment organizations

The Department of Pediatric Ophthalmology should have

- 1) Dedicated child-friendly space - spacious, clean, bright, painted for kids
- 2) Play area with lots of toys
- 3) Well equipped to provide comprehensive pediatric ophthalmic care
- 4) Child friendly staff
- 5) Breast feeding area
 - a) (Breast feeding provide good analgesia before ROP screening/lacrimal massage)
- 6) Child friendly toilets and water drinking area
- 7) Area for sedation of non-cooperative / young kids

Clinical Dictum

- 1) Patient \leq 16 years has to report to pediatric ophthalmology department
- 2) The onus of good visual outcome/vision rehabilitation rests with pediatric ophthalmologist (PO)
- 3) The PO will decide when, how and whose help is needed in the co-management of the patient

GUIDELINES FOR CORNEAL DISEASES

History

History of onset, history of injury, family history, history of infections, history of any systemic diseases.

Examinations

Visual acuity

Retinoscopy and Refraction

Slitlamp examination

Pachymetry, Keratometry (optional)

Corneal ulcers

Management

- 1) Follow the corneal ulcer treatment protocol including vitamin A supplements.
- 2) Neighborhood screening and supplementation
- 3) Inform the concerned pediatricians of the area and make available Oral Vitamin A
- 4) Dosage: 100000 IU at 9 months with measles immunization, 200000 IU at 16-18 months, with DPT booster, 200000 IU every 6 months, up to the age of 5 years. Thus a total of 9 mega doses are to be given from 9 months of age up to 5 years.
 - a) Create Vitamin A angels: Make one of the parents of the child who suffer from Vitamin A deficiency a Vitamin A angel. Educate them regarding the supplementation dosage. Give him oral Vitamin A for use in his/her own family, neighborhood and nearby school.
 - b) DO NOT OVERDOSE any child.
- 5) Pediatrician consultation if any systemic abnormalities are associated and/or treatment of malnutrition.

Corneal injury

Prevention of injury

- 1) Community awareness: Posters, Pamphlets radio programs before and during the festival times {photos, dos and don'ts}
- 2) Make the parents ambassador and inform other parents
- 3) Protective goggles. (Plastic glasses)
- 4) Parents and school teachers' education on the prevention of ocular injuries.
- 5) Home and school should be injury protected.

Management

- 1) Counseling about the nature of the injury and possible outcome
- 2) Repair to be done under general anesthesia.
- 3) Primary repair done by pediatric ophthalmologist with or without the help of a senior surgeon /corneal specialist
- 4) Significant opacity:
 - a) Consider PK/DSEK/ALK/PRK (refer to corneal surgeon proficient in the technique)
 - b) Optical iridectomy if clear cornea in inferior quadrant (preferred over mydriasis)
 - c) Long term pupillary dilatation may be necessary in rare situations.
- 5) Suture removal after 6 weeks- 2 months of surgery
- 6) Optical correction
- 7) Amblyopia management
- 8) Regular follow up as required.

Corneal FB and abrasion

- 1) Removal of FB, patching with ointment and cycloplegic agents, in older children.
- 2) Follow up next day.

Genetic Counseling

- 1) PO should acquire skills for basic genetic counseling and take help of clinical geneticist as required.
- 2) Associated syndromes, pattern of transmission, prognosis, need for rehab / interventions

GUIDELINES FOR REFRACTIVE ERROR

- 1) Screening in schools, special schools, schools for visually impaired (permanent, periodic screening), and case detection by Pediatricians using the red reflex test
- 2) Visual acuity assessment
- 3) Retinoscopy- Dry/ Cycloplegic
- 4) Assess accommodation – Down Syndrome, Cerebral Vision Impairment, Aniridia, Ectopia lentis, 3rd N palsy

Cycloplegic refraction

- 1) Use of atropine eye ointment 1% twice a day for 3 days for all esotropes with hypermetropia, children <3 years with hypermetropia
- 2) Use of 1% cyclopentolate drop for cycloplegic refraction is an alternative for children 3 to 7 yrs. of age requiring cycloplegic refraction.
- 3) For children < 7 years or whose vision does not improve to 6/6 on subjective refraction, use homatropine 2%, 3 applications at an interval of 15 minutes starting 1 hour prior to examination
- 4) For children \geq 7 years, use tropicamide or tropicamide with phenylephrine
- 5) Post mydriatic test (PMT) is not needed if the difference in dry and wet refraction is $\leq 0.5D$ or if child is < 7 years
- 6) Prescribe the glasses
- 7) Power deduction after retinoscopy: 1.00 D if distance is 100 cm. +1.00 D for cyclopentolate in hypermetropic children
- 8) Flexible single piece plastic frames with head band and middle level frontal bridge for children <7 years are preferred.
- 9) Plastic lenses are preferred in children (CR39/Polycarbonate/Travax)
- 10) Follow-up in 3-6 months.
- 11) Cycloplegic refraction on follow-up as required only
- 12) Give treatment for amblyopia as per need.

Table 1:

Age	< 1 year	1-2 years	2-3 years	>3 years
Isometropia				

Myopia	> -5	> -4	> -3	>-1
Hyperopia – no deviation	> + 6	> +5	> +4.5	>+3
Hyperopia- with esotropia	> + 3	> +2	> +1.5	>+1.5
Astigmatism	> 3	> 2.5	> 2	>1.5
Anisometropia				
Myopia	> -2.5	> -2.5	> -2	>-1
Hyperopia	> +2.5	> + 2	> + 1.5	>+1
Astigmatism	> 2.5	> 2	> 2	>2

Special situations

- 1) Myopia with ET- Full correction/ under correction
- 2) Myopia with XT- Full correction/ under correction
- 3) Myopia with Intermittent XT- Overcorrection
- 4) Hypermetropia with ET- Full corrections
- 5) Hypermetropia with XT- Under correction

Contact lens

Extended wear (Silicone-Hydrogel) contact lenses are preferred for unilateral aphakia or anisometropia.

Bifocals should be prescribed for children >3 years who have accommodation failure associated with aphakia / pseudophakia, subluxated lens, Down syndrome, Cerebral Vision Impairment, aniridia etc.

Younger children should have +1.5D addition in the distance refractive correction for children between 11/2 to 3 years of age and +3.0D addition for younger ones.

For children > 3 years where addition is needed but practically not possible due to high power, mono vision can be given with dominant eye corrected for the distance and +3D addition for the non-dominant eye.

Follow-up

- 1) 3- 4 months till the age of 5 years
- 2) Thereafter 6 monthly – one year

Follow-up frequency and duration may vary according to strabismus and amblyopia


Preventing and arresting Myopia

- 3) Go out and play that keeps myopia at bay (can display posters)
 - a) In clinics
 - b) In schools
 - c) At home
- 4) Screen / near activity reduction
- 5) Consider atropine eye drops with photogray progressive addition lenses for progressive myopia anticipated to go beyond -6.0D

Sibling Detection

- 1) Sibling Motivation Cards / Home vision assessment chart
- 2) Letter to school authorities for diligent vision assessment of all 'poor performers'

'Vision walls' in schools and public places can be created for self-assessment of vision as described below.



VISION WALL

Site for the Self Assessment of Vision

Instructions:

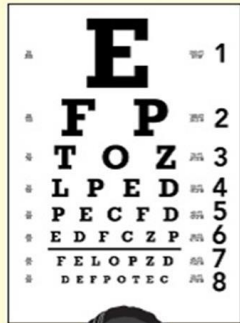
Stand at 6 meter distance (Marked in Red on the floor)

Cover the left eye with your left hand without pressing it

Read the chart from top to bottom

Repeat the same steps with the right eye

Visit an eye doctor if you are unable to read the last line



A	E	1
B	F P	2
C	T O Z	3
D	L P E D	4
E	P E C F D	5
F	E D F C Z P	6
G	F E L O P Z D	7
H	D E F F O T E C	8

GUIDELINES FOR PEDIATRIC CATARACT

- 1) Screening Strategies
- 2) Evaluation Guidelines
- 3) Pediatrician Referral
- 4) Coexistent Conditions and Special Situations
- 5) Investigations
- 6) Counseling
- 7) Anesthetic Assessment
- 8) Operative Guidelines
- 9) Post-operative Guidelines

Screening Strategies

Strategies

- 1) Train Pediatricians/General Practitioners/Physicians/Obstetricians about Red Reflex /Bruckner test.
- 2) Screening camps combined with vitamin A / Polio immunization campaign (Under 5 / preschool screening)
- 3) School screening camps
- 4) School project involving students as part of school project
- 5) Photographers
- 6) Eye care exhibitions with free screening
- 7) Other screening modalities which already exists.
- 8) Screening children with multiple disabilities.
- 9) Sibling screening / Family screening

Screening

Purpose: Early detection of Pediatric Cataract

Scope: Good visual outcome

Responsibility: Pediatricians, Ophthalmologists, Physicians, Optometrists, Orthoptists

Evaluation Guidelines

- 1) A case sheet with birth history, antenatal history and family history, treatment history, systemic history to be taken and documented.
- 2) The informant and reliability should be documented
- 3) Vision – Resistance to occlusion, Visual Behavior, CSM notation
- 4) Refraction – Dilated and undilated pupil
- 5) IOP assessment (Where possible in OPD and it may need sedation)
- 6) Unilateral / Bilateral to be noted
- 7) Anterior segment examination including slitlamp (hand held if needed)
- 8) Pupil evaluation
- 9) Presence of Nystagmus /Strabismus
- 10) Dilated slitlamp examination and identify and document morphology of cataract.
- 11) Cataract is visually significant or not
- 12) Dilated fundus examination
- 13) Dilated slitlamp examination of Parents and Siblings
- 14) B- Scan in all unilateral cataracts and in bilateral if no fundus view.
- 15) Diagnosis.
- 16) Systemic history and quick base line screening by Pediatric ophthalmologist
- 17) Any Dymorphology to be recorded
- 18) Referral to other specialty if indicated.
- 19) The consultant needs to explain the condition to the parents.
- 20) A scan and keratometry (hand held) can be performed under sedation

Pediatrician referral as a Must in following condition

- 1) All children less than 1 year
- 2) All children with suspected systemic syndrome
- 3) All children with Dymorphism

- 4) All children with microcornea other than PHPV to rule out rubella. IgM antibodies in children <1 year of age. Best time to investigate is 0-5 months of age. IgG is not helpful in young children.
- 5) Any child with systemic concerns, seizures etc.
- 6) Spontaneous Ectopia lentis + / - cataract

This would be mandatory and takes place prior to the anesthetic assessment.

Co-existent conditions and special situations guidelines

- 1) Congenital Naso-lacrimal Duct Obstruction (CNLDO) and cataract – Probing first followed by a week for cataract surgery.
- 2) ROP and cataract: Perform cataract surgery and manage ROP with LASER. Anti VEGF injections can be considered for off-label use in consultation with experienced/qualified ophthalmologists.
- 3) Conjunctivitis and cataract – 1 week treatment of conjunctivitis- swab and prove culture negative if bacterial conjunctivitis in young children. Wait for 2-3 weeks in case of viral conjunctivitis especially for the older children.
- 4) Associated anterior segment abnormalities- micro cornea, Peter's anomaly.
 - a) In microcornea, intraocular lens implantation is relatively contraindicated due to increased risk of excessive post-operative inflammation, glaucoma and corneal decompensation
 - b) In Peter's anomaly type 1, intraocular lens implantation is relatively contraindicated. But in type 2 and type 3 it is absolutely contraindicated due to increased risk of glaucoma
- 5) Unilateral cataract - Emergency
- 6) PHPV- Vitreo -retinal consult
- 7) Cataract and glaucoma –Glaucoma consult
- 8) Complicated cataract – Pre- op steroids and no activity in AC for at least 3 months
- 9) Traumatic cataract – zonule status
- 10) Subluxated cataract – Vitreo retinal consult
- 11) Bilateral cataract surgery –Avoid except in very high risk for GA patients
- 12) Unilaterally Blind children
 - a) Admit one day prior surgery
 - b) Discharge additional day following surgery
- 13) Patients to be operated by senior Ophthalmologist

Investigations

Other than the above mentioned clinical evaluation,

- 1) Biometry
 - a) Can be done under sedation or under GA before starting the surgery (in small children)
 - b) Biometry of Both Eyes
 - c) A-scan
 - d) K- Reading – Hand Held Keratometer – 3 readings of each eye
 - e) Use other eye k- reading if corneal scar precludes keratometry.
- 2) IOP assessment- For those children where IOP has not been assessed earlier
- 3) IOL Power calculation
 - a) Use theoretical formula with a preference for Hoffer Q which has the lowest prediction error
 - b) Small under correction (upto 3D lesser power of IOL) to avoid severe amblyopia in cases of non-compliance to spectacles and simultaneously compensate for significant myopic shift
- 4) Age of Implantation: Older than 6 months, corneal diameter > 11mm, Axial length > 19 mm.

Counseling

- 1) Prognosis
- 2) Importance of surgery and more importantly – follow up
- 3) All aspects as explained by the Ophthalmologist
- 4) Eye to be operated
- 5) Duration of stay
- 6) Cost of Procedure (recognize any difficulty from family) and inform management for subsidy.
- 7) Pre-opocular medications- Dosage and frequency.
- 8) No systemic antibiotics unless indicated.

Anesthetic Assessment

Pre-operative anesthetic screening guidelines for Pediatric ophthalmic surgeries: (Plan for fitness for general anesthesia and surgery)

Chief complaints / History:

Birth history

Information related to the surgical case:

Systemic inquiry:

Developmental milestones

H/O motion sickness and current illness, if any

Respiratory system, CVS, hepatic and renal function,

Medical history: Hospital admission history, systemic drugs and ophthalmic drugs

History of Past Illness: Neurological / hepatic / renal system/seizures

Physical Examination:

General examination: J A L C C O and hydration, weight, heart rate, SpO2

Systemic examination: Respiratory, CVS and abdomen

Airway examination and peripheral venous access

Investigation: As per clinical guidelines

Complete blood count, Random blood sugar, X ray chest PA view

For children <1 year – 2D echo, serum electrolytes

Additional investigations as per the clinical requirement

Anesthetic Plan: GA / RA / Combined; Airway management plan,

Counseling and Consent:

Fluid management, Analgesia, Post-Operative Nausea and Vomiting (PONV), and others if any,

Fasting guidelines

Reporting time to Operation Room

Informed Consent: A clearly informed written consent (patient's own language) obtained prior procedure one day before surgery, from guardian if needed.

Time out in OT prior to Surgery

All surgeries in children and adults under GA must be performed only by a qualified anesthetist.

Operative

Surgical techniques

- 1) According to the age group

- 2) ECCE with Primary Posterior Capsulotomy (PPC) and anterior vitrectomy upto the age of 8years with or without the IOL.
- 3) For older children (>8 years of age) YAG capsulotomy should be done within a month after cataract surgery
- 4) However, primary vitrectomy can be done even in older children if the surgeon is confident or the patient has nystagmus, calcified or adherent posterior capsular plaque or is uncooperative patient.
- 5) Can use limbal approach retropseudophakic vitrectorrhesis.

Conditions for IOL Implantation

- 1) No IOL to be implanted in children less than 6 months or with microcornea (<9.5mm)/active uveitis/band shaped keratopathy.
- 2) The age limit can be reduced to less than 18 month to 2 years in bilateral cases and younger (upto 6 months) in unilateral cases.
- 3) Foldable IOLs- Preferably Hydrophobic IOL will be implanted. Hydrophilic IOLs can also be used.
- 4) Intra operative antibiotics: Subconjunctival Antibiotics with Steroid
- 5) Secondary IOL 4 years – essentially 3 piece IOL if implanted in the sulcus.
- 6) Early secondary IOL for unilateral cases not tolerating the Spectra ASAP (> 1 year age, K diameter > 10mm, AXL >19.5mm).

Target post op refraction

For children < 10 years of age it is best to implant +2 to +3.0D under correction that would result in +1.0D to +1.5D spectacle plane refractive error post operatively which can help compensate for myopic shift at the same time it will not produce severe visual blur causing significant amblyopia.

Post-Operative

Procedure

Day 1- Examination by hand-held slitlamp

- a) Gross visual assessment
- b) Conjunctiva
- c) Cornea
- d) A/C
- e) Pupil
- f) IOL position

Treatment

Antibiotic+ Steroid combination eye drop hourly and mydiatics

Day 2 - Same as day 1 and Discharge

Day 7- Same as day 2 and taper the medicine 2 hourly+

Day 14- Taper the medicine q.i.d.

6 weeks- Refraction+ Dilated fundus examination+ IOP measurement as needed+ Stop medication

3 months- Amblyopia therapy and every 3 months as per need

Other medication

Oral corticosteroid, Tropicamide and Timolol as needed

GUIDELINES FOR CONGENITAL & DEVELOPMENTAL GLAUCOMA

- 1) Screening
- 2) History
- 3) Vision
- 4) Refraction
- 5) Counseling
- 6) EUA or EUS
- 7) Refraction and Amblyopia management
- 8) Surgery
 - Who will do?
 - Unilateral / Bilateral sitting
 - Training needed

General Guidelines

- 1) Goniotomy, trabeculotomy-ectomy & valve implant procedures should be part of pediatric glaucoma management.
- 2) Pediatric glaucoma surgeries should be done by a designated glaucoma surgeon and/or pediatric ophthalmologist with experience in congenital glaucoma surgical management.
- 3) A pediatric ophthalmologist must be fully involved in the care of a child with glaucoma.

Suggestions

- 1) Based on the training need assessment in pediatric glaucoma, Hospital-based Programs(HBPs) and short trainings in pediatric glaucoma may be arranged and to be incorporated within the program purview.
- 2) Regional specialized pediatric glaucoma management centers will be initiated.
- 3) Pediatric glaucoma should essentially be taken care of by a trained pediatric ophthalmologist. If a pediatric ophthalmologist is not trained/confident of performing the surgery; glaucoma surgeon must train him/her to do so. A pediatric ophthalmologist should take help of glaucoma specialist whenever needed. The primary responsibility of getting the best vision in a child with eye disorders rests with PO.

In the pursuit to benefit the child, PO should be very open about taking help of subspecialists from the same hospital or from outside the hospital, including a glaucoma specialist not by referring the patients to them but involve them in the co-management like a team. Learning new skills from different subspecialist is a lifelong pursuit for a pediatric ophthalmologist.

Guidelines for Cross referral between Glaucoma Department and Pediatric Ophthalmology Department

General principle—management of an eye disease in a child will always be the responsibility of a pediatric ophthalmologist. A glaucoma specialist and any other subspecialist can be called for help in management whenever needed in the best interest of the patient.

- 1) Tonometry (necessary) and gonioscopy (optional) would be done by both Pediatric Ophthalmologist (PO) and Glaucoma Ophthalmologist (GO)
- 2) HFA could be ordered by both PO and GO.
- 3) Nd: YAG PI can be done by both PO and GO.
- 4) Diode Cyclophotocoagulation (CPC) could be done by both GO or PO depending on availability.
- 5) Children with co-existent cataract and glaucoma would be operated for cataract by PO.
- 6) Examination under Anaesthesia (EUA) or preferably under sedation would be done by PO and if needed a take help of a GO. If surgery is planned, would be done by PO or the GO.
- 7) Trabeculotomy -Trabeculectomy would be done by the PO with or without a help from Glaucomatologist.
- 8) All children operated by either surgeon would be seen by both PO and GO in post-operative rounds and follow-up visits.
- 9) Cataract surgery would be done by PO in a post trabeculectomy patient.
- 10) Any case report or publication involving glaucoma and pediatric department will include the consultants of both departments.

Examination under sedation is a SAFE AND EFFECTIVE option for evaluation of children with glaucoma (or any other ocular pathology) at first visit as well as for follow-up visits. Except gonioscopy, all other tests viz, refraction, IOP (more reliable and realistic than under anesthesia), optic disc evaluation, corneal diameter / pachymetry and axial length measurement.

- For the purpose of sedation – Syrup Triclofos (brand name – Pedicloryl – Dr Reddy's Lab) can be given orally @ 50-75mg/kg single dose. It does not depress the respiratory system and has no hangover.

The onset of action may take anything between 20 minutes to 3 hours. Advise your patients to come in the morning OPD, let the child sleep late previous night and wake them up early. Let the baby be well fed before giving the syrup. Nothing should be given orally when the child is asleep. No fasting is needed.

Although American anesthesiologist's associations advise pulse and SpO₂ monitoring of the child when triclofos is administered, it is an extremely safe drug. No side effects are reported at this dose.

Mandatory examination of the patient with glaucoma at every visit:

- 1) Check the IOP, corneal diameter, refraction, visual functions and optic disc evaluation.
- 2) Baseline examinations that are needed only initially – pachymetry, axial length, gonioscopy (optional).

GUIDELINES FOR STRABISMUS

- 1) Screening
- 2) Squint evaluation
- 3) Counseling
- 4) Consent
- 5) Surgery
- 6) Follow-up

Screening as discussed earlier in pediatric cataract

Evaluation

- 1) History
- 2) Old Photographs
- 3) Vision
- 4) Refraction
- 5) Orthoptic evaluation
- 6) Anterior segment examination
- 7) Pupil
- 8) Dilated fundus examination / Cycloplegic refraction
- 9) Diagnosis
- 10) Explain regarding the condition and line of management
- 11) Glasses / Amblyopia/ Surgical Management
- 12) Follow-up as described in protocol

Timing of surgery

- 1) Infantile XT: 6 months to 1½ years
- 2) Infantile ET: 6 months to 1½ years.

- 3) Intermittent XT: 4 years and above or earlier if there is a clinical indication (decompensated)

Follow- up

- 1) 1 day, 1 month, 3 months, 6 months, 1 year, every year
- 2) Timing of re-surgery – 3-6 months

Amblyopia management as recommended by PEDIG studies

Nystagmus

- 1) Recognize Neurological Nystagmus – sea saw nystagmus, uniplanar vertical nystagmus, disjugate nystagmus, spasmus nutans like nystagmus, associated neurological signs and make referral for urgent Neuro-Imaging and Neurologist consult.
- 2) Recognize Associated Retinal abnormality - foveal hypoplasia, cone-rod dystrophy, Leber's congenital amaurosis. Perform ERG / OCT / VEP if needed – proceed with Genetic Counselling and/or Low Vision Aids

Refractive correction and surgery

When indicated for abnormal head posture, associated squint or to induce convergence dampening.

Anesthesia

- 1) GA with retro bulbar block /peribulbar block
- 2) Local anesthesia for adults
- 3) Adjustable suture strabismus surgery under topical anesthesia in adults

GUIDELINES FOR RETINOPATHY OF PREMATURETY

Screening

ROP screening and management is a joint responsibility of pediatricians (neonatologist), pediatric ophthalmologist and retina specialists.

Which babies to screen?

- 1) Birth weight <1750 gms / Gestational age <34weeks / Exposed to O₂ for>30Days
- 2) Other premature babies (< 37 weeks &/or < 2000gms) with any one of the following

Respiratory distress	Sepsis	Blood transfusion / Anemia
Multiple births	Apnoeic episodes	Intraventricular haemorrhage

When to screen?

- 1) 31 weeks PCA (post conceptional age) or 3 weeks after birth (whichever is earlier)
- 2) Infants < 1200 grams at birth or 24-30 weeks gestational age are screened 2 weeks after birth
- 3) Complete one screening session definitely before 'Day 21' of the infant's life

How to screen?

- 1) NICU sister informs the ophthalmologist
- 2) Dilate the child's eyes with the dilating drops
- 3) Instill single drop of the dilating drops (TropicacylPlus half diluted with saline) in both the eyes three times within the interval of 10 minutes; starting 45minutes prior to the scheduled visit of the ophthalmologist.
- 4) Call the child for follow-up examination as advised by the Pediatric Ophthalmologist.

Guidelines for Neonatologist that lead to lower incidence & less severe ROP

Maintain PaO ₂ – 50-70mmHg	Avoid increase in Fi O ₂
Avoid Hypoxemia/Hyperoxia	Avoid Hypocapnia. Pa CO ₂ 50-60mmHg

SPO ₂ – 90-93% (alarms at 88-95) Babies > 1 Kg.	Judicious use of Blood Transfusion
SPO ₂ – 87-91% (alarms at 85-93) Babies < 1Kg.	Antenatal steroids and surfactant is protective
Avoid 100% O ₂ in resuscitation	Vitamin E maintenance dose 15-25U/day

Management

As per ETROP guidelines.

Avastin 1.25mg for APROP combined with laser and close follow up (monthly for 6 months)

Suggestions

Every NICU must have affiliation to a Pediatric Ophthalmologist or Pediatric Ophthalmology Department

Posters about ROP should be displayed in NICU and waiting areas

Sensitize pediatricians in their CMEs/Conferences

GUIDELINES FOR BLOCKED NASOLACRIMAL DUCT

- 1) Lacrimal Massage till 1 year of age
- 2) Universally it is 5-10 strokes, 3-4 times/day. First few strokes create adequate hydrostatic pressure to open the nasolacrimal duct and the next few would help empty the lacrimal sac to prevent infection.
- 3) The pediatric ophthalmologist must demonstrate the optimal technique and the force to be used to the parents.
- 4) For children <4 months of age, the ophthalmologist must do the massage on the child during the clinic visit.
- 5) Topical antibiotics (moxifloxacin 0.5% or tobramycin 0.35%) if infection is present.
- 6) Probing – early for amniocele / recurrent infection, primary- between 10-15 months age and late- upto 6 years of age.
- 7) The success rate of primary probing between 3 and 6 years of age is 70%. Subjecting every child > 3 years to an external DCR when the success rate of probing is still 70% is therefore not warranted.
- 8) Failed probing
 - a) Intubation- till 6 years age
 - b) Balloon DCP- for poly obstruction if patient can afford it
 - c) DCR- after 6 years of age.

NOTES FROM DR. MIHIR KOTHARI

The role of Pediatric Ophthalmologists

- 1) The practice of science based medicine:
 - a) Includes practice of evidence based medicine – metaanalyseis, randomized controlled trials, controlled trials, multicenter cohort studies. Access to the internet, relevant journals and books should be made available.
 - b) Experience (cumulative experiences) based medicine – Opinionated practice of medicine and inherited knowledge and skills from mentors. Opportunities to attend CMEs and conferences, hands-on skill transfers and telemedicine (viz. Cybersight) should be encouraged.
 - c) Logic based medicine – never read or told about the situation but ‘common sense’ guides the way ahead
 - d) Need based medicine – need of the patient / community has to be kept in mind every time service delivery is planned

- 2) Practice of academic medicine
 - a) Lifelong pursuit to update knowledge and skills
 - b) Train juniors – Run observerships and fellowship programs
 - c) Generate evidence - Publish in peer reviewed indexed journals– discard redundant practices and beliefs, add new evidence and advance science

- 3) Practice of community, preventive and social medicine
 - a) Preventive medicine
 - Advising and educating patients/parents/teachers
 - Educating colleagues – ophthalmologists, pediatricians
 - b) Large scale (social) and compassionate medicine
 - Travel to rural areas
 - Participate in campaigns, lay press/media
 - Donate resources – time, money and efforts
 - c) Rehabilitation medicine
 - Even when we can’t treat, we can still help

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- Blind school screening and referrals
- 4) Above all good camaraderie and mutual respect is necessary among everyone working for the same cause.