Paediatric Ophthalmology and Strabismus

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Paediatric Ophthalmology and Strabismus

- Diplopia (Oph06)
- Infant with an altered light reflex (Oph12)
- Infant with strabismus (Oph09)
- Pupil abnormality (Oph08)
- Watery eye in an infant (Oph03)
Paediatric Ophthalmology

- Key issues in Paediatric Ophthalmology
- Assessing vision in children
- Assessing strabismus
- Types of strabismus
- Management of strabismus
The Paediatric Eye Examination

Different

- History not from the patient
- Conventional tests need to be modified
- Ophthalmic routine
- Variable cooperation
- Patience and talent
- PARENTS!
Ask to state problem precipitating the visit and elaborate

- Visual problem - school, TV, computers
- Alignment - when, how long, which eye etc.
- Routine - Family hx, Sibs
- Amblyopia, Strabismus in the family

Development

- Ante, post natal History
- Milestones
Initial Observation

- Examination begins on entering the room
- “The parent is always right”
- Observe while questioning the parent
  - Head position
  - Eye alignment
  - Visual behavior
  - Appearance
Nasolacrimal Duct Obstruction

- Common, congenital, failure to canalize
- Recurrent tearing and infections
- 95% resolve by 12/12. If not, unlikely to
- Surgery to probe duct and open
No Red Reflex
Leukocoria (White Pupil)

- Any opacity in the visual axis
  - Corneal e.g.: glaucoma, metabolic, trauma
  - Aqueous and vitreous e.g.: uveitis
  - Lens e.g.: cataract
  - Retinal e.g.: retinoblastoma, retinopathy of prematurity, retinal inflammatory disease
Retinoblastoma

- Malignant. 1 in 20,000
- Mutation of tumour suppressor gene at 13q14.1
- 65% sporadic, 25% heritable, 10% inherited with FHx
- 1/3 bilateral
- Rx gives high survival
- Risk of other malignancies with heritable forms
Congenital Cataract

- Occurs in about 1 in 2000
- 65% sporadic
- 20% inherited
- 15% systemic or ocular problems e.g.: Down’s, Peter’s
- Detected by absent red reflex
Surgery ideally performed by 4-6 weeks
Vision corrected with contact lenses
Implants possible down to 6 months
1 in 10,000. Congenitally abnormal drainage angle
May be associated with systemic conditions
Photophobia, tearing, hazy corneas and buphthalmos (enlargement of the eye)
The management is generally surgical
Ocular manifestations of systemic disease
Ocular manifestations

- Osteogenesis imperfecta

deficiency of Type-I collagen
Ocular manifestations

Lisch nodule, iris hamartomas
Strabismus / squint

- Approx 5% population
- Higher proportion in children with other problems
  - Down’s syndrome
  - cerebral palsy
  - prematurity
Strabismus = squint = misaligned eyes

- **Esotropia = ET =** convergent squint
- **Exotropia = XT =** divergent squint
- **Hypertropia =** Eye is deviated up
- **Hypotropia =** Eye is deviated down
Visual Milestones

- Social Smile: 2 months
- Fixing and Following: 3 months
- Depth perception: 6 months
At birth: VA = 3/60, no fixation, variable XT
VA = 6/12 by 6-12 months
Infants usually hyperopic
Eyes should be straight by 2 months with good fixation
Any strabismus at 3 months needs assessment
Measuring Visual Acuity

- Infant: fix and follow, preferential looking tests, asymmetrical objection to occlusion, fixation preference, optokinetic nystagmus
- 2 yrs: Kay’s Pictures
- 2 ½ yrs: Tumbling E’s
- 3 yrs: Sheridan-Gardner
- 4-5 yrs: Snellen Acuity
Amblyopia

- Poor development of the visual cortex due to a blurred visual input. Not an eye problem but a brain one.
- The younger the child the greater the risk but also a greater the likelihood of successful Rx.
- System fixed and no Rx possible by 7-8 years.
Causes of Amblyopia

- **Refractive**
  - anisometropia > astigmatism > hyperopia > myopia

- Strabismus - treating amblyopia prior to surgery improves stability of outcome

- Stimulus deprivation e.g.: cataract, overpatching
Amblyopia Treatment

- Patching: Good eye is occluded (patched)
  - part-time vs full-time occlusion
  - full time max 1 week per year of age
  - recent studies suggest 2 hrs = 6 hrs per day
  - compliance is the key

- Penalization: Good eye is blurred with Atropine. Beware of cycloplegic toxicity: facial flushing, rapid heart rate, confusion, irritability, seizures
Management Issues

- Cycloplegic refraction is vital
  - allow 40 mins for cycloplegia
- Strabismus is assessed with prism cover tests in 9 cardinal gaze positions depending on concerns
- Motility is assessed, versions and ductions
- The media and fundi are examined
Prescribing for Children

- Hyperopia – full correction only if esotropic
- Myopia – full correction
- Anisometropia
  - keep difference between eyes constant. e.g.: net ret = +3.50, + 5.00
  - Rx : +2.50, +4.00
  - can tolerate large anisometropic corrections
4 yr old with

Right eye: - 8.00 - 4.00 x 180

Left eye: + 3.00 - 3.50 x 180

Couldn’t tolerate a CL

Wore glasses without a patch

Final VA : 6/12 RE , 6/7.5 LE
Assessing Strabismus- Corneal Reflex Test
Assessing Strabismus

- **Corneal Light Reflex Test**
  - Reflexes should be symmetrical just nasal to visual axis
  - Reflex displaced temporally = Esotropia
  - Reflex displaced nasally = Exotropia
Corneal Reflex Test

Hirschberg’s Test

normal

left esotropia

right hypertropia
Assessing Strabismus

- **Cover Test**
  - cover straight eye
  - if other eye moves it was deviated
  - if it moves in = exotropia / divergence
  - if it moves out = esotropia / convergence
Cover – uncover test

- **Cover test** - looks for manifest (apparent) deviations. One eye is covered with an opaque occluder and the other eye is observed. If the uncovered eye moves to take up fixation – a manifest deviation is present in that eye.

- **Uncover test** - looks for latent (hidden) deviations. One eye is covered and then the same eye observed as the cover is removed for any corrective movement.

- **Alternate cover test** - tests the size of the deviation (squint)
Prism Cover Testing

- Allows angle of deviation to be measured
- Cover test performed with prism over deviating eye
- Prism adjusted until any movement is negated
- Performed at near and distance and in different gaze positions
- Tables and experience used to calculate amount of surgery for deviation measured
- Prism orientation:
  - $\text{ET} = \text{BO}$,  $\text{XT} = \text{BI}$
Pseudoesotropia

- Broad epicanthic folds
- Medial sclera is buried with lateral gaze so the eyes look esotropic / convergent
- Corneal light reflex and cover test confirms straight
- The only “Strabismus” a child will “grow out of”
Infantile Esotropia

- Onset from birth to 2 months of age
- Due to poor fusion
- Usually large angle, other motility issues: IOOA, DVD, latent nystagmus
- Need to treat amblyopia before surgery
- Surgery for fusion (stability) and 3D
- Ideal time to operate is 6 - 12 months
- Results poor if operate > 2 years
- 50% require further surgery
Onset 18 mths to 5 years

Due to hyperopia and accommodative response stimulating convergence

Many straighten with glasses alone, if given full hyperopic correction

Some with residual ET also require surgery
Onset 2 - 5 years
Usually worse at distance
May close eye in bright light
60% progress to constant XT, 35% stable, 15% improve
Surgery to preserve depth perception or for cosmesis
Control & proportion of time XT important
Superior Oblique Palsy

- Often congenital, may break down later in life. May be acquired. e.g.: trauma

- SO underaction, IO overaction, ipsilateral hypertropia worse on contralateral gaze and ipsilateral tilt

- Surgery often IO weakening or SO tuck
Muscles can be
- weakened (recession, myotony, myectomy)
- strengthened (resection, tuck)
- repositioned (transposition, Faden)

Surgery on paralyzed muscles is poorly effective

Amount of surgery depends on size of squint
Recession / Weakening
Resection / Strengthening
The End

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