Case Scenario Links

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!
Taking the history

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
Visual Milestones

- **Social Smile:** 2 months
- **Fixing & Following:** 3 months
- **Depth perception:** 6 months
Normal Visual Development

- At birth: VA = 3/60, no fixation, variable XT
- VA = 6/12 by 6-12 months
- Infants usually hyperopic (long sighted)
- 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
Initial Observation

• Examination begins on entering the room

• “The parent is always right”

• Observe while questioning the parent
  o Head position
  o Eye alignment
  o Visual behavior
  o 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
Abnormal Red Reflex
Leukocoria (White Pupil)

• Any opacity in the visual axis

• **Corneal** glaucoma, metabolic, trauma

• **Aqueous and vitreous** uveitis

• **Lens** cataract

• **Retinal** retinoblastoma, retinopathy of prematurity, retinal inflammatory disease
Retinoblastoma

- Malignant eye tumour of childhood - 1 in 20,000
- Mutation of RB1
- 2/3 unilateral, 1/3 bilateral;
- 2/3 sporadic, 1/3 heritable, 10% inherited with FHx
- Rx gives high survival
- Risk of other malignancies with heritable forms
Congenital Cataract

• 1 in 2000

• 65% sporadic

  20% inherited

  15% systemic or ocular problems

    e.g.: Down syndrome, Peter anomaly etc.

• Detected by abnormal red reflex
Congenital Cataract

- Surgery ideally performed by 4-6 weeks of age
- Vision traditionally corrected with contact lenses
- Intraocular lens (IOL) implants possible down to 6 months
Congenital Glaucoma

• 1 in 10,000. Congenitally abnormal drainage angle
• +/- Systemic associations
• Photophobia, tearing, hazy corneas and buphthalmos (enlargement of the eye)
• The management is generally surgical
Retinopathy of Prematurity

Early gestation

Low birth weight
Ocular manifestations of systemic disease

Neurofibromatosis

- Lisch Nodules
- Iris harmatomas
Lisch Nodules

Increase with age

Images property of Andrea Vincent
Abusive head trauma

Multiple haemorrhages,
too numerous to count (TNTC),
involving all layers of the retina,
often extending to the periphery…
Abusive head trauma

RH do not exist in isolation

In the context of
  absence of external ocular injury,
  SDH /brain injury
  History inconsistent with degree of injury

Ophthalmologists do not exist in isolation

Part of multidisciplinary team
Ocular manifestations of systemic disease

Lens subluxation

Connective tissue
  - Marfan Syndrome

Metabolic
  - Homocystinuria
Ocular Manifestations
Ocular manifestations

Osteogenesis imperfecta

Deficiency of Type-I collagen
Strabismus/ Squint

- Approximately 5% of the population!
- Higher proportion in children with other problems
  - Down Syndrome
  - Cerebral Palsy
  - Prematurity
Strabismus = squint = misaligned eyes

Classification
Phoria vs Tropia

Phoria
• Only present when eyes disassociated
• Usually controlled with two eyes open
Classification

Tropia

Present under binocular viewing
Strabismus classification

Horizontal
- **Esotropia** = ET = convergent squint
- **Exotropia** = XT = divergent squint

Vertical
- **Hypertropia** = Eye is deviated up
- **Hypotropia** = Eye is deviated down
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 treatment 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, over-patching
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
Examination

- 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
Anisometropia

• 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 and just nasal to visual axis

- Reflex displaced temporally = Esotropia
- Reflex displaced nasally = Exotropia
Corneal Reflex Test

Hirschberg’s Test
Assessing Strabismus

Cover Test

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

Cover - look at other eye
- does it move to take up fixation

Uncover - look at eye under occluder
- does it move to take up fixation
Cover–uncover test

**Cover test** - looks for manifest (apparent) deviations.

One eye is covered with an opaque occluder
the other eye is observed.
If the uncovered eye moves to take up fixation = manifest deviation

**Uncover test** - looks for latent (hidden) deviations.

One eye is covered
same eye observed as the cover is removed for any corrective movement.
Cover-Uncover L esotropia
**Alternate cover**

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

Dissociates fusion of any sort
Left Esotropia alternate cover
Right exotropia alternate cover
Prism Cover Testing

• To measure angle of deviation
• 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: ET = BO (base out), XT = BI (base in)
Pseudoesotropia

- Broad epicanthic folds
- Medial sclera is buried with lateral gaze so the eyes look esotropic / convergent
- Corneal light reflex - symmetrical
- Cover test – no movement
- 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

Management

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
Refractive Esotropia

- Onset 18 months to 5 years
- Hyperopia and accommodative response stimulating convergence
- Give “full” hyperopic correction
- Many straighten with glasses alone,
- Some with residual ET also require muscle surgery
Intermittent Exotropia

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

- Congenital, may break down later in life
- Acquired – trauma/ lesion
- SO underaction, IO overaction, ipsilateral hypertropia worse on contralateral gaze and ipsilateral tilt
- Surgery often IO weakening or SO tuck
Basic principles of Strabismus Surgery

• Muscles can be
  o weakened (recession, myotomy, myectomy)
  o strengthened (resection, tuck)
  o 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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