Visual Loss

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BLINDNESS

VISUAL IMPAIRMENT (educational term) – vision impaired sufficiently to affect school functioning.

LEGAL BLINDNESS:

a) acuity in better eye < 20/400
b) acuity in better eye > 20/400 with substantial visual field loss (widest vision diameter ≤ 10°).

PARTIALLY SIGHTED - uses criterion 20/200.

ETIOLOGY

- differs considerably around world.
- rates from 2/1000 (USA, UK) to 10/1000 (Africa, Asia).
  N.B. 80% world's blind live in developing countries.

1. **Cataract** (50% world's blindness)
2. **Glaucoma**
3. **Keratomalacia**
4. **Trachoma**
5. **Onchocerciasis**
6. *Increasing causes* (associated with aging population – 2/3 of all blinds are > 65 yrs.) – **senile macular degeneration**.
7. *Today rare causes* – smallpox, gonorrhea, syphilis, leprosy (10% of those affected were blind!), retrolental fibroplasia.
8. **Psychogenic causes** (malingering, conversion-hysteria)

Most common causes in industrialized countries – cataract, glaucoma, senile macular degeneration.

SUPPORT

- *blind children* tend to develop **blindisms** (unusual movement patterns) which potentially isolate these children even further. H: behavioral modification.
- reading aids:
  1) Braille
  2) Optacon (converts words to tactile print)
  3) talking books
- ambulation aids:
  1) laser-guided **canes**; canes used by blind are usually white and longer and thinner than ordinary canes.
  2) when walking with **sighted person**, blind person can hold onto bent elbow of sighted person, rather than use ambulation aid (sighted person should not lead blind person by hand!).
  3) **guide dogs** (instead of cane)
- sleeping aids: see p. S48 >>
  TASIMELTEON (HETLIOZ®) – FDA approved melatonin receptor agonist, to treat non-24- hour sleep-wake disorder ("non-24") in totally blind individuals.

AMBLYOPIA

- decrease of vision for which ***no cause can be found*** by PHYSICAL eye examination.

Functional amblyopia - potentially reversible by occlusion therapy.
Organic amblyopia - irreversible amblyopia.

- 2% of general population has amblyopia (N.1 cause of monocular vision loss in adults!).

PATHOPHYSIOLOGY

- nowadays term "**AMBLYOPIA**" is synonymous with term "**SUPPRESSION AMBLYOPIA**" (s. **AMBLYOPIA EX ANOPSIA**) - suppression of central vision in one eye when images from two eyes are so different that they cannot be fused into one:
  a) large difference in refraction between two eyes (**anisometropic, s. refractive** amblyopia)
  b) two eyes pointing in different directions (**strabismic** amblyopia).
  c) faulty image formation (**sensory, s. deprivation** amblyopia)

Three critical periods:

- ***development of visual acuity*** from 20/200 (birth) to 20/20 (age 3-5 years).
- period of ***highest risk of deprivation amblyopia*** - from few months to 7-8 years.
- period during which ***recovery from amblyopia can be obtained*** - up to teenage or even, sometimes, adult years.

ETIOLOGY

ANISOMETROPIC (S. REFARCTIVE) amblyopia

- one **defocused image** and one focused image - this induces sufficient difference in image size (*ANISEIKONIA*) that two images cannot be fused.
- more common in *anisohypermetropia* than *anisomyopia*.
  1-2 diopters of hyperopic anisometropia can induce amblyopia; vs. myopic anisometropia up to 3 diopters does not cause amblyopia!

STRABISMIC amblyopia

- two scenes cannot be fused into single image + patient strongly favors **fixation with one eye** (does not alternate fixation).
- more common in *esotropia* than in *exotropia*.

SENSORY (S. DEPRIVATION) amblyopia - **disuse of retina** (unilateral or bilateral): cataract, corneal opacities, ptosis, surgical lid closure.

N.B. amblyopia can superimpose on visual deficit caused by any structural abnormality!

DIAGNOSIS

- diagnosis requires ≥ 2-line difference of visual acuity between eyes (but smaller difference is common).
- testing in preverbal children:
  - if child protests with ***covering of sound eye***, amblyopia can be diagnosed if it is dense.
  - ***fixation preference*** (esp. when strabismus is present).
- ***crowding phenomenon*** - difficulty in distinguishing optotypes that are close together (i.e. acuity is better when patient is presented with single letters rather than line of letters).
- ***eccentric fixation***: some amblyopes may consistently fixate with nonfoveal area under monocular use of amblyopic eye (can be diagnosed by holding light in midline in front of patient and asking to fixate on it while normal eye is covered - light reflection will not be centered).
- **cycloplegic refraction** must be performed on all patients, using retinoscopy to obtain objective refraction.
  usually ***more hyperopic*** eye (or eye with ***more astigmatism***) will be amblyopic eye.

TREATMENT

not treating amblyopia → irreversible vision loss

1. **Treat any obstacle to vision**:
   - remove cataracts in first 2 months of life, and aphakic correction must occur quickly.
   - treatment of refractive errors must occur next.

2. Force use of amblyopic eye by **OCCLUSION therapy** (treatment mainstay since 18th century):
   - full-time or part-time.
   - avoid occlusion amblyopia in sound eye.
   - always consider lack of compliance if visual acuity is not improving.
   - close supervision is necessary to *make sure children do not peek*; various methods of preventing children from removing patches - from reward system (for older children) to arm splints and mittens (for infants).

   Endpoint of therapy is ***spontaneous alternation of fixation*** or ***equal visual acuity in both eyes*** - patching may be decreased slowly.
   N.B. amblyopia *recurs in large number* of patients!

3. **PENALIZATION therapy** - **ATROPINE** drops (or ointment) instilled into nonamblyopic eye (to blur vision).
   - reserved for whom compliance is an issue.
   - may be (and is preferably) used in conjunction with occlusion of glasses.
   - also may be used for maintenance therapy.

4. **Treatment of strabismus** generally occurs last.
   Endpoint is ***freely alternating fixation with equal vision*** (surgery is performed after this endpoint has been reached).
   N.B. strabismus surgery should occur after amblyopia is reversed.

BIBLIOGRAPHY for ch. "Ophthalmology" → follow this LINK >>