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 ≤ 10º).

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. Ophthalmitis
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 blindingisms (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:
  a) ASIMELTEON
  b) ANISEIKONIA

AMBLYOPIA

- decrease of vision for which no cause can be found by PHYSICAL 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 ANOPHIA) — 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. REFRACTIVE) amblyopia

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

STRABIC amblyopia

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

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

Visual Loss

Last updated: May 9, 2019
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**

1. **Treat any obstacle to vision**
   - remove cataracts in first 2 months of life, and aphakic correction must occur quickly.
   - treatment of refractive error must occur next.
2. Force use of amblyopic eye by **occlusion therapy** (treatment mainstay since 18th century):
   - full-time or part-time.
   - avoid exclusion 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 peel; 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] >>