Visual Impairment in Elderly

Background

1. Definition
    - Vision loss not corrected with glasses or contact lenses alone[3]
    - General information
        - **Legal Blindness** - visual acuity 20/200 or worse in best eye or visual field <20° in widest meridian in best eye
        - **Low Vision** - significant reduction in visual function that cannot be corrected by conventional glasses
            - May be improved with special aids or devices [7]

Pathophysiology

1. Pathology of disease
    - Systemic disease (diabetes, hypertension, vascular disease)
    - Intrinsic (glaucoma, cataract, macular degeneration)
    - Structural (visual pathway, eyelids, musculature)
    - Functional (accommodation, glare recovery, color vision)
2. Incidence, prevalence
    - 98.6% of people over age 70 report provider visit for vision loss
    - Visual impairment projected to affect 15 million Americans over age 65 by year 2030
    - For Americans aged 65 and older, diabetic retinopathy expected to increase from 2.5 million to 9.9 million overall, and from 0.5 million to 1.9 million for Vision Threatening Diabetic Retinopathy by 2050
    - Glaucoma among Hispanics with diabetes aged 65 and above expected to increase 12 fold by 2050
3. Risk factors [3,8, 11, 16]
    - Age
    - Predisposing Disease i.e. hypertension, atherosclerotic disease
    - Tobacco Abuse
    - Family History (macular degeneration, glaucoma, race)
    - Excessive UV exposure. Children and adolescents most vulnerable regardless of skin type
4. Morbidity, mortality [3,12]
    - Inability to perform ADLs
    - Loss of independence
    - Driving Accidents
    - Depression
    - Falls
        - Hip fractures
        - Compression fractures

Diagnostics

1. History
    - Onset and progression
        - Acute painless
        - Acute painful
        - Chronic progressive
        - Transient
        - Flashes and floaters
        - Diplopia
            - Monocular
            - Binocular
2. Physical exam
    - External exam
        - Proptosis or exophthalmos
        - Conjunctiva
        - Eyelids
        - Motility
    - Visual Fields
    - Pupils
    - Funduscopic
        - Diminished red reflex may indicate corneal or lens opacities
        - Optic nerve head
            - Edema present if disc margins are not clear or crossing vessels do not appear sharp
            - Asymmetry or cupping may be present in glaucoma
            - Pallor may be present in neuropathy or ischemia
        - Macula
            - Location confirmed by absence of retinal vessels
            - Foveal light reflex located centrally
        - Retinal vessels
            - Microvascular disease indicated by hemorrhage, exudate, and edema
            - Localized findings may indicate vascular occlusion; symmetric findings indicate systemic disease
        - USPSTF found insufficient evidence for or against ophthalmoscopy screening in asymptomatic elderly patient (SOR: C) [9]
    - Fluorescein Staining
        - History may include trauma, foreign body sensation, photophobia
        - Exam may reveal conjunctival injection or involuntary lid closure
    - Slit Lamp (if available)
        - Macular pigment in Plaquenil treatment for SLE [17]
    - May aid in evaluation for foreign body, uveitis or iritis, vitreous hemorrhage
3. Diagnostic tests
    - Visual Acuity[12]
        - Offer objective vision testing for adults age 65 and older [10]

- Insufficient evidence for improvement outcome in elderly [11]Intraocular Pressure: 22 mmHg is upper limit of normal
- Laboratory data: necessary only for systemic disease
- Imaging
  - CT to evaluate suspicion of mass or hemorrhage
  - MRI to evaluate possibility of acute infarct

Differential Diagnosis

1. Key diagnoses[3,13]
   - Age-related macular degeneration (ARMD)
   - Cataract
   - Diabetic retinopathy
   - Glaucoma
2. Other Diagnoses
   - Acute painless onset
     - Vitreous hemorrhage
     - Retinal detachment
     - Retinal artery/ vein occlusion
     - Temporal arteritis (will have headache)
     - Cerebral infarct
   - Acute painful onset
     - Corneal ulcer
     - Uveitis
   - Progressive
     - Tumor or mass
   - Transient
     - Orthostasis
     - TIA
     - Papilledema

Therapeutics

1. Acute Tx
   - Angle- closure glaucoma
     - Urgent referral to ophthalmologist during acute attack (SOR: C)[18]
     - Acetazolamide 500 mg orally once followed by
     - One droe each one minute apart and repeated three times at 5-minute intervals
       - Timolol Maleate).5% (Timoptic)
       - Apraclonidine 1% (Iopidine)
       - Pilocarpine 2% (Isopto Carpine)
   - Central retinal artery occlusion [18]
     - Urgent referral to ophthalmologist for anterior chamber paracentesis
     - Lower intraocular pressure
       - Mannitol (Osmitrol) 0.25 to 2.0 g/ kg IV once
       - Acetazolamide (Diamox) 500 mg IV or orally

        - Inhaled O2/ CO2 mixture for vasodilation and increased pO2 at retinal surface
        - Oral nitrates
        - Lay patient on their back
        - Ocular digital massage
        - Irreversible damage occurs within 90 min of onset
2. Long- term management
    - Disease management for systemic disease
    - Referral to low- vision specialist
    - Vision rehabilitation, mobility instruction, and occupational therapy
    - Optical, non-optical, and electronic devices
    - Magnifying glasses, telescopic lenses, reading stands, talking devices

Follow-Up

1. Referral to ophthalmologist or retinal specialist when indicated

Prevention

1. Cataract
    - Avoid sunlight exposure, smoking, diabetes, hyperlipidemia, ocular trauma
    - Use sunglasses with side panels that provide 99-100% UV-A and UV-B protection [17]
2. ARMD
    - Laser photocoagulation helps curb neovascularization; only 20% show continued benefit after 5 years
    - High-dose regimen of zinc and antioxidants decreases progression of some forms of intermittent and advanced age-related macular degeneration. (SOR:B)[14]
3. Glaucoma
    - High-risk individuals should have yearly tonometry and direct ophthalmoscopy
        - Family history in 1st degree relatives
        - African Americans > 40y/o
        - Long-term use of oral steroids
        - All persons > 60y/o
    - Screening for Glaucoma does not show sufficient evidence in reducing impairment from vision related function loss (SOR:C)[14, 15]
4. Diabetic Retinopathy
    - Optimal diabetes control (SOR:A)[14]
    - Annual ophthalmic exam to detect macular edema and proliferative retinopathy from onset of diagnosis (SOR:C)[14]
5. General care
    - An elderly person should be advised not to wear multifocal lenses while walking, particularly on stairs. (SOR:C)[12]

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