

THE AGING EYE

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INTRODUCTION & EVALUATION(8 minutes)

U.S. POPULATION 65 & OLDER

1900	3.1 Million
1990	32.0 Million
2010	40.0 Million
2030	70.0 Million (Projected)

EFFECTS OF AGING ON VISION

- Decreasing visual acuity
- Increasing visual impairment
- Increasing legal blindness

VISUAL LOSS IN THE ELDERLY

- 1 in 3 have some loss by age 65
 - Consequences
 - Daily activities curtailed
 - Social isolation
 - Depression
 - Less mobility
 - Falls
 - Fractures
 - Loss of independent living

PROBLEMS OF SENIORS

- Multiple chronic illnesses
- 85 % have 1 or more chronic illnesses
- Multiple medications
- Adverse drug effects
- Drug interactions
- Physiologic changes
- Altered illness presentations
- Cognitive/functional limitations
- Increased importance of social/familial support

GOALS OF GERIATRIC CARE

- Maintain or improve functional abilities
- Prevent health problems
- Avoid iatrogenic illness
- Cooperate with multidisciplinary team
- Incorporate family into care

OLDER PATIENT ASSESSMENT

- Medical
 - Effect of glaucoma meds on heart & respiratory system
 - Effect of steroids on IOP, cataracts, retinal problems
- Cognitive
- Affective
- Environmental
- Economic
- Social
- Functional
- Overall quality of life

FUNCTIONAL STATUS

- Complete functional tasks & fulfill social roles
- Activities of daily living (ADLs)
- Personal care tasks
- Home management tasks

PRESCRIBING FOR OLDER PATIENTS

Consider nonpharmacologic measures

Ask about medication use

Use lowest effective dose

Increase dose slowly

Consider functional status

AGING AND THE LENS

- Loss of accommodation
- Presbyopia
- Lens yellows
- Color discrimination decreases
- Lens hardens
- Nuclear sclerosis
- Lens opacifies
- Cataract

SYSTEMIC DISEASES & THE ELDERLY EYE

- Hypertension
- Glaucoma
- Atherosclerosis
- Retinal vascular occlusions
- Diabetes
- Cataracts
- Diabetic retinopathy
- Neovascular glaucoma

VISUAL IMPAIRMENT OFTEN UNTREATED

- Unoperated cataracts
- Primary open angle glaucoma
- ARMD
- 1/3 of new blindness is avoidable

HISTORY & EVALUATION

- Problems with vision?
- Was decrease in VA sudden or gradual?
- Any pain with vision loss?
- Using any eyedrops?
- Any eye operations?

EVALUATION & EXAMINATION

- Visual acuity
- Lids & orbit
- Pupils
- Motility
- Anterior segment
- Posterior segment
- IOP
- Visual fields

LID PROBLEMS (5 Minutes)

- Blepharitis
- Burning
- Itching
- Tearing
- Crusting
- Seborrheic
- Staph aureus

- Rosacea
- Lid scrubs

ENTROPION

- Lids & lashes turn inward
- Can lead to trichiasis
- Lashes rub on cornea
- Epithelium breaks down
- Subject to infection

ECTROPION

- Lids & lashes turn outward
- Epiphora
- Tears run down cheeks
- Corneal exposure
- Drying
- Epithelial damage
- Protect eye with lubricants
- Surgery

PTOSIS

- Mechanical
- After eye surgery
- Contact lens?
- Neurological
- 3rd Nerve palsy
- Horner's Syndrome
- Myasthenia gravis
- Check EOMs & pupils

DERMATOCHALASIS

- Skin over lids loses elasticity
 - Time
 - Age
- Droops over lids & lashes
- Remove excess skin surgically if VF is affected

BASAL CELL LID CARCINOMA

- 90% of lid malignancies
- More common on lower lids

- Firm, raised, pearly, nodular
- Biopsy if in question
- Surgical resection
- Cosmetic reconstruction
- Cryo & radiation have higher recurrence rates
- Tumors near medial canthus can be deeply infiltrative

CORNEA & EXTERNAL EYE PROBLEMS (8 minutes)

DRY EYES

- Most common condition affecting cornea in elderly
- Tears maintain corneal integrity
 - Lubricate
 - Protect vs. disease
- When tear production falls significantly
 - Keratitis sicca
 - Burning
 - Scratchiness
 - Redness
 - Tearing
- Markedly dry eyes can lead to corneal damage & vision loss
 - Manage with:
 - Artificial tears
 - Punctal plugs
 - Anti-inflammatories
 - Restasis
 - Secretagogues
 - Nutritional supplements
- Dry eyes in the contact lens wearer

SJÖGREN'S SYNDROME

- Associated with:
 - Dry mouth & other mucus membranes
 - Rheumatoid arthritis
 - Other collagen diseases

HERPES ZOSTER

(Shingles)

- Reactivated chickenpox virus
- Cranial nerve V
- Dendrite keratopathy
- If skin at tip of nose is involved:
 - Uveitis

- Marked pain
- Visual loss

MACULAR DEGENERATION (8 minutes)

- Most common cause of vision loss in elderly
- Loss of central vision

RISK FACTORS

- Advanced age
- Fair skin
- Family history of ARMD
- Smoking
- Cardiovascular disease

DEGENERATIVE CHANGES IN PIGMENT EPITHELIUM

- Drusen
- Hyaline nodules
- Colloid bodies
- Yellow deposits
- Subretinal neo

PRESENTATION OF MACULAR DEGENERATION

- Vision may be normal initially
- Gradual vision loss
- Significant loss of VA if central macula becomes involved
- Only central vision lost
- Peripheral vision remains intact
- Early symptoms
 - Difficulty reading, driving
 - Straight lines may be crooked
 - Advanced
 - Central blind spot
 - Won't be able to read, watch TV
 - Will not need assistance of cane or seeing eye dog
- Refer to low vision specialist for optical aids

TYPES OF MACULAR DEGENERATION

- Atrophic (dry)
 - Drusen
- Exudative (wet)
 - Sudden vision loss

- Subretinal neovascularization
- Accumulation of fluid & blood
- Diagnosed by:
 - Fluorescein angiogram
 - Amsler grid

MACULAR DEGENERATION TREATMENT

- Laser photocoagulation
 - Cannot restore lost vision
 - Slows loss of vision
 - Causes scotoma
- Visudyne, Lucentis, Avastin

MINIMIZING EFFECTS

- Monitor vision with Amsler grid
- Stop smoking
- Control cardiovascular disease
- Antioxidant dietary supplements
- Diet high in fruits & vegetables
 - Spinach
 - Kale

GLAUCOMA (5 minutes)

- 2ND most common cause of visual loss in elderly
- Affects:
 - 10% Afro-Americans \geq age 70
 - 2% Caucasians \geq age 70
- Prevent blindness with early detection & treatment

RISK FACTORS

- Elevated IOP
- African racial heritage
- Advanced age
- Family history of glaucoma
- Hypertension
- Diabetes
- Myopia

GLAUCOMA RESULTS IN:

- Optic neuropathy
- Optic nervehead changes

- Visual field changes

PRIMARY OPEN ANGLE GLAUCOMA

- Normal drainage network of eye has increased resistance
 - Leads to elevated IOP
- 60%-70% of all glaucoma in U.S. is POAG
 - 0.1% age 40-54
 - 2%-7% over age 70
- Asymptomatic in early stages
- Advanced by time patient notices visual loss

GLAUCOMA TREATMENT GOALS

- Halt visual field loss
- Prevent further optic nerve damage
- Use meds to lower IOP
- Assess fields at least yearly

GLAUCOMA MEDICATIONS

- Beta blockers
- Adrenergic agents
- Cholinergic agents
- Prostaglandin analogs
- Carbonic anhydrase inhibitors

ADMINISTERING EYEDROPS

- Close eyelids
- Cover punctum
- Compress nasolacrimal ducts
- Reduce systemic absorption
- Reduce side effects

BETA BLOCKER SIDE EFFECTS

- Dry eyes
- Impotence
- Depression
- Confusion
- Bradycardia (slow heartbeat)
- Bronchospasm
- Congestive heart failure
- Worsening of myasthenia gravis

TOPICAL ADRENERGIC AGONIST SIDE EFFECTS

- Red eyes
- Headache
- Anxiety
- Tremor
- Increased blood pressure
- Tachyarrhythmias

TOPICAL CHOLINERGIC AGONIST SIDE EFFECTS

- Brow ache
- Increased bronchial secretions
- Decreased dark adaptation
- Diarrhea
- Nausea & vomiting
- Apnea

TOPICAL PROSTAGLANDIN ANALOG SIDE EFFECTS

- Ocular Irritation
- Minimal systemic effects
- Darkening of irides
- Thickening of lashes

CARBONIC ANHYDRASE INHIBITOR SIDE EFFECTS

- Malaise
- Anorexia
- Depression
- Serum electrolyte abnormalities
- Renal calculi
- Blood dyscrasias

POAG SURGICAL INTERVENTION

- When disease progresses despite maximal medical treatment
 - Laser trabeculoplasty
 - Filtering surgery
 - Cyclodestruction of ciliary body
 - Drainage devices (shunts)

ANGLE CLOSURE GLAUCOMA

- 10% of all glaucoma
- Increased incidence with age
- More common in:
 - Some Asian groups
 - Women
 - Hyperopes
- Iris blocks drainage
- Cataractous lens tends to push iris forward & block drainage

ANGLE CLOSURE GLAUCOMA SYMPTOMS

- Severe ocular pain
- Blurred vision
- Halos around lights
- Headache
- Nausea
- Vomiting

ANGLE CLOSURE GLAUCOMA SIGNS

- Conjunctival injection
- Hazy cornea
- Fixed, mid-dilated pupil

ANGLE CLOSURE GLAUCOMA SURGERY

- Laser iridotomy
- Creates hole in iris
- Provides alternate path for fluid to reach anterior chamber & drain

AGE-RELATED CATARACT (8 minutes)

- 3rd most common cause of visual loss in elderly
- Incidence causing decreased vision:
 - 65-74 years 18%
 - 75-85 years 46%

CATARACT CAUSES

- Damage to lens proteins
- Chronic exposure to sunlight
- Age
- Diabetes

- Steroid use
- Smoking
- Trauma
- Previous surgery

CATARACT SYMPTOMS

- Decrease in VA
 - Slow
 - Painless
 - Progressive
 - Related to size & location of opacity

CATARACT TREATMENT

- Surgery
 - Local or topical anesthesia
 - May use IV sedation
 - Assess pulmonary function prior to surgery
 - Phacoemulsification
 - Leave capsular bag
 - Implant IOL in bag
 - Reduces retinal detachment
 - Reduces macular edema

CATARACT PROGNOSIS & FOLLOWUP

- 90% achieve 20/40 or better
- Capsule opacifies in 15%
- Laser capsulotomy
- Infrequent complications
 - Infection
 - Glaucoma
 - Macula edema
 - Retinal detachment

DIABETIC RETINOPATHY (8 minutes)

- Leading cause of blindness among Americans of working age
- 4th most common cause of visual loss in elderly
- Macular edema more common in Type II diabetics

MACULAR EDEMA

- Leakage from microaneurysms & other vasculature
- Yellowish, hard exudate
- Lipid & other serum precipitates
- Usually thought of as causing mild visual loss
- Can cause blindness
- Laser surgery can prevent moderate visual loss

PROLIFERATIVE DIABETIC RETINOPATHY

- Characterized by neovascularization
- Response to ischemia caused by capillary dropout
- Type I more severe

DIABETIC RETINOPATHY

- Minimizing Effects
 - Good glycemic control
 - PCP & ophthalmologist work together
 - Diet, exercise, weight loss
 - Insulin, if necessary

RETINAL PROBLEMS (5 minutes)

CRA OCCLUSION

- Sudden visual loss
 - Caused by embolus
 - Entire retina edematous except fovea, where retina is thin
 - Cherry red spot
- Transient or permanent VA loss
- Work with PCP

BRANCH RETINAL ARTERY OCCLUSION

- Sudden loss of part of VF
 - Caused by embolus
 - Affected area edematous
 - Try to move embolus further downstream
- Work with PCP to prevent more emboli in eye & elsewhere

CRV OCCLUSION

- Caused by thrombus occluding vein draining eye at optic nerve

- Multiple areas of intraretinal & nerve-fiber-layer hemorrhages & exudates
- Often seen with hypertension, diabetes, atherosclerosis, glaucoma

BRANCH RETINAL VEIN OCCLUSION

- Looks like CRV occlusion
- Hemorrhages & exudates only in area drained by occluded vein
- Primary etiology is hypertension
- Laser for unresolved macular edema & neo

POSTERIOR VITREOUS DETACHMENT

- Vitreous shrinks with age
- Pulls back from retina
- Physiologic process of aging
- Flashes & floaters

FLASHES & FLOATERS

- Can be associated with retinal tears
- Need dilated fundus exam
- 10%-15% of vitreous detachments lead to retinal tear
- Treat tears with laser or cryo to prevent detachment

RETINAL DETACHMENT

- Scotoma in affected area
- Usually progressive
- Loss of VA if macula is detached
- Treat with:
 - Gas bubble
 - Scleral buckle
 - Vitrectomy

CRANIAL NERVE PALSIES (3 minutes)

- Causes
 - Systemic ischemic diseases
 - Hypertension
 - Diabetes
 - Generalized atherosclerosis
- EOMs controlled by cranial nerves III, IV, VI
- Manage patient with PCP

3RD NERVE PALSY

- Attempt to gaze up
- Double vision
- Differential Dx:
- Compressive lesion
- Ischemia
- Pupils react to light

6TH NERVE PALSY

- Attempt to gaze right
- Double vision
- Usually ischemic
- Other causes:
 - Elevated intracranial pressure
 - Papilledema
- If no resolution after 3 months -imaging of cranial cavity for space-occupying lesions

CRANIAL NERVE PALSIES

- Caused by closure of ciliary vessels that supply optic nerve
- Can lead to visual loss
- May be severe
- Central scotoma
- May only appear on VF testing
- Color vision affected

TEMPORAL ARTERITIS (2 minutes)

- Vasculitis
- Affects medium-sized vessels
- May cause:
 - Ischemic optic neuropathy
 - Cranial nerve palsies
 - Retinal vascular occlusions

TEMPORAL ARTERITIS SYMPTOMS

- Headaches
- Malaise
- Night sweats
- Weight loss

- Jaw claudication
- Associated with polymyalgia rheumatica

TEMPORAL ARTERITIS DIAGNOSIS

- Made clinically by eye care practitioner
- Sed rate not sensitive or specific
- May be elevated
- Temporal artery biopsy
- Confirmed by giant-cell infiltration (not always present)
- Possible vision loss if untreated

TEMPORAL ARTERITIS TREATMENT

- Oral corticosteroids
- Start treatment on diagnosis
- Prevent ischemic optic neuropathy in contralateral eye
- Treatment will not affect biopsy results if biopsy done within 1st week