Causes of Geriatric Visual Impairment and Their Long Term Care Implications - A Clinical Perspective

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ADJUDICATION!
“We Have Met the Enemy and He Is PowerPoint”
“The Awareness Test”

CONCENTRATE!
Visual Impairment in the Elderly Objectives:

- Magnitude of the Challenge, the aging population
- Four Major Causes of Vision Loss, the Most Common Impairments
- Functional Impact & Risks of Vision Loss, Adaptive Devices, Technology Assistance
U.S. POPULATION
AGE 65 AND OVER
2009: 305,000,000 and counting!

Population (millions)

Year

1900 1990 Est. 2010 Est. 2030
VISUAL LOSS ASSOCIATED WITH AGING

• 1 in 3 may face some visual loss by age 65
• Potential consequences
  – Daily activities curtailed
  – Social isolation, depression
  – Less mobility, falls and fractures
  – Loss of independent living
Visual Impairment in the Elderly (AAO)

Definitions:

- **Total blindness**: Inability to tell light from dark, total inability to see.
- **Visual impairment or low vision**: Severe reduction in vision not correctable with glasses or contact lenses, severely reducing person's ability to function at certain or all tasks.
Legal blindness (form of severe visual impairment): Best-corrected central vision of 20/200 or worse in the better eye or a visual acuity of better than 20/200 but with a visual field no greater than 20° (e.g., side vision that is so reduced that it appears as if the person is looking through a tunnel).
VISUAL IMPAIRMENT OFTEN UNTREATED

- Leading causes of blindness in the aging eye (Baltimore Study):
  - Age-related macular degeneration
  - Primary open-angle glaucoma
  - Lack of surgical intervention for cataract
  - 1/3 of new blindness is avoidable
Visual Impairment in the Elderly: Some Sobering Statistics (SSS)

- 2008 NEI: 25.2 million answered “having trouble seeing” or “totally blind” even with glasses or contact lenses
- At present level of technology and access to appropriate ophthalmic care, visual impairment in this group will grow from 3.4 to 5.5 million in 2010
Visual Impairment in the Elderly: SSS (cont):

- NEI: Annual cost of this disability is $68 billion,
- This cost does not fully quantify direct healthcare costs, lost productivity, reduced independence, diminished quality of life, increased psychiatric stress and even accelerated mortality. (NAEVR, 2005)
CARE OF THE AGING EYE

- Decreased vision with age
- Common eye conditions affect people > 50
- Many conditions are preventable or treatable
- Improve or maintain visual function
- Coordination between PCP and Ophthalmologist ensures best care
PCP EVALUATION FREQUENCY:

- Asymptomatic patients 65+: Every 1–2 yrs
- Symptomatic patients: Evaluate and refer on presentation
- Decreased visual acuity: Routinely refer
- Treatment goal: Optimize visual function
The Four Major Causes of Vision Loss in the Elderly Population:

1. Age-Related Macular Degeneration (ARMD)
2. Glaucoma
3. Cataracts
4. Diabetic Retinopathy (DR)
1. **Age-Related Macular Degeneration (ARMD)**

- Leading cause of severe and irreversible visual acuity (VA) loss in older adults in the developed world
- Loss of central vision
- Risk factors: age, genetic load, smoking, cardiovascular disease, UV exposure, malnutrition
- Specific factors contributing to pathogenesis and progression are not completely understood
ARMD: Pathogenesis and Progression

- Primarily involves the retinal pigment epithelium
- Role of vitreo-macular adhesion?
ARMD: CENTRAL VISION LOSS IN ADVANCED STAGES

- **“Dry” ARMD**
  - Atrophy of photoreceptors and choriocapillaris
  - Gradual vision loss
- **“Wet” ARMD**
  - Neovascularization between retina and choroid
  - Disc edema, disciform scar
  - More sudden severe visual loss
ARMD: SYMPTOMS

• Intermediate stage
  - No symptoms or slight difficulty with reading, driving, etc, due to atrophy not yet involving center of macula
  - Straight lines may appear crooked

• Advanced stage
  - Central blind spot
  - Peripheral vision usually remains intact
ARMD: RISK OF PROGRESSION

- Early ARMD
  - May not have any increased risk of advanced ARMD compared to people without drusen
- 1 eye intermediate ARMD, 1 eye without ARMD
  - 5% risk of progression to advanced ARMD within 5 years
- Both eyes intermediate ARMD
  - 25% risk of progression to advanced ARMD within 5 years
- 1 eye advanced ARMD
  - 50% risk of advanced ARMD in second eye within 5 years
ARMD: Recent Diagnostic Advances

- Ultrasound
- Time domain Ocular Coherence Tomography (OCT)
- Scanning laser ophthalmoscopy (SLO)
- Spectral domain OCT
TREATMENT FOR ARMD

• Aim to reduce risk of progression in intermediate to advanced stage
  – Dietary supplements such as used in the Aged-Related Eye Disease Study (vitamin C 500 mg, vitamin E 400 IU, beta carotene 15 mg, and zinc oxide 80 mg)

• Reducing risk of vision loss in selected cases of neovascular ARMD
  – Laser photocoagulation
  – Photodynamic therapy with verteporfin
  – Intraocular injection therapy with anti-VEGF drugs (some may increase chance of improving vision)
ARMD:
Impact on ADL’s and IADL’s

• Usually minimal impact on ADL’s in early, moderate and even advanced stages
• Significant impact on IADL (managing money, taking medications, reading manuals, telephone use, etc.
• Patients with advanced ARMD frequently arrive unaccompanied to my practice, with appropriate appearance and self care
ARMD: DEALING WITH VISION LOSS

- Low vision aids
- Treatment of depression and anxiety when indicated
ARMD
End Stage Disease:

“You will never go blind from this condition”
2. GLAUCOMA

- Second most common cause of visual loss in older people
- Affects
  - 10% African-Americans ≥ 70
  - 2% Caucasians ≥ 70
- Early detection and treatment can prevent blindness
- 3 million individuals with glaucoma
- 1 million unaware they have glaucoma
- 80,000 blind from glaucoma
- Leading cause of blindness among African Americans
GLAUCOMA: RISK FACTORS

- IOP (Intra-ocular pressure) may be high
- African racial heritage
- Advanced age
- Family history of glaucoma
- Hypertension, diabetes, myopia
TYPES OF GLAUCOMA

- Primary open-angle glaucoma (POAG)
  - Most common type in people over age 50
- Angle-closure glaucoma
- Congenital
- Childhood
- Secondary
GLAUCOMA: OPTIC NERVE HEAD CHANGES

- Increased size of the cup
- Thinning of disc rim
- Progressive loss of neural rim tissue
- Disc hemorrhages
- Loss of nerve fibers
Primary Open-Angle Glaucoma

Groove or wedge defect in nerve fiber layer

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Types of Glaucoma
Types of Glaucoma

Primary Open-Angle Glaucoma
POAG: PROGRESSION

- Asymptomatic in early stages
- Often marked visual loss has occurred when patient presents with vision symptoms
- Can result in blindness
- “Mrs. Jones, you are really flirting with disaster, if you don’t use your drops you will go totally blind!”
“Flirting with Disaster”

“Don’t Get Too Cocky!”
THE “SILENT” BLINDER

- Primary Open-Angle Glaucoma

Visual field test results over time: progressive scotoma

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Primary Open-Angle Glaucoma

PROGRESSIVE NEURAL TISSUE LOSS

Year 1                     Year 12
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Primary Open-Angle Glaucoma

Extensive glaucomatous damage
The Four Major Causes of Vision Loss in the Elderly Population:

1. Age-Related Macular Degeneration (ARMD)
2. Glaucoma
3. Cataracts
4. Diabetic Retinopathy (DR)
3. AGE-RELATED CATARACT

Third most common cause of visual loss in older people

- Leading cause of blindness worldwide
- Leading cause of vision loss in USA
- 20.5 million American over the age of 40 have cataracts in one or both eyes
- 5.1% (6.1 million) have had cataract surgery
- Decreased vision (Framingham Eye Study)
  65-74 years = 18%, 75-85- years = 46%
Dense cataract causing pupil to appear gray rather than black
CATARACT

SYMPTOMS & TREATMENT:

• Disturbance of near or distance vision initially
• Progresses to diminution of vision
• Cataract severity and location determine impairment
• Glare is bothersome
• Surgery indicated if
  – Significant visual impairment
  – Daily activities curtailed (e.g., problems driving, reading, etc.)
• No current medical treatment
Implantation of an artificial intraocular lens within the capsular bag
CATARACT PROGNOSIS & SURGICAL FOLLOW-UP:

- 90% achieve 20/40 vision or better
- Infrequent complications
  - Infection
  - Glaucoma
  - Retinal swelling or detachment
- Capsular bag opacifies, requiring Nd:YAG laser capsulotomy in 15%
4. DIABETIC RETINOPATHY (DR)

- Fourth most common cause of visual loss in people over age 55
- Type II diabetes more likely in people > age 55
- Macular edema more common with Type I
- Retinal complications of diabetes
- Leading cause of blindness in working-age Americans
Diabetic Retinopathy (DR): 12,000 to 24,000 new cases of blindness yearly = number one cause of new cases of blindness in 20-70 yo in USA

- 4.1 million Americans have DR, 25% vision threatening

- Early detection and treatment proven effective

- 50% of diabetics do not undergo routine eye exams or diagnosed too late
MINIMIZING EFFECTS:

- PCP and Ophthalmologist work together
  - Type I: Annual eye exam beginning 5 years after diagnosis
  - Type II: Eye exam at time of diagnosis, and then annually
- Good glycemic control
  - Type I: Insulin
  - Type II: Diet, exercise, weight loss
Pathogenesis

Normal Diabetic Retinopathy

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Clinical Stages of Retinopathy

DIABETIC MACULAR EDEMA

- Diabetes $\leq 5$ yrs = 5% prevalence
- Diabetes $\geq 15$ yrs = 15% prevalence

Healthy macula

Edematous macula

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Clinical Stages of Retinopathy

Vitreous hemorrhage

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Clinical Stages of Retinopathy

New vessel growth
Treatment
GOALS FOR SUCCESS:

- Timely screening reduces risk of blindness from 50% to 5%
- 100% screening estimated to save $167 million annually
- Systemic control
- Team approach: Primary Care Physician, Ophthalmologist, Nutritionist, Endocrinologist, Nephrologist, etc.
Teamwork

or “Lending a Helping Hand”
Differential Characteristics of Visual Impairment

• ARMD: Education, “peri-genetic” and psych counseling, access to competent ophthalmic specialist and other supportive care-Not truly a “preventable” condition

• Glaucoma: Education of at risk populations and PCP’s, screening, early assessment and treatment-highly preventable
Differential Characteristics of Visual Impairment

- Cataracts: Usually mild to moderate and highly reversible-manage expectations and cost-effectiveness
- Diabetic Retinopathy: Profound, complex visual impairment, frequently linked to other co-morbidities, including other eye disorders, ischemic heart disease, renal failure, etc.
Prevention of Visual Impairment

• ARMD: Avoidance of excess UV exposure, smoking, nutritional supplementation
• Glaucoma: Appropriate monitoring of ocular pressure and visual fields, especially in high risk populations
• Cataracts: Access to competent surgical specialist
• Diabetic retinopathy: Education, life-long, multi-disciplinary team approach with frequent visits and monitoring
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- Functional Impact & Risks of Vision Loss, Adaptive Devices, Technology Assistance
Functional Impact & Risks of Vision Loss, Adaptive Devices, Technology Assistance: Definitions

- Good visual acuity: greater than or equal to 20/25
- Moderate visual acuity: 20/32 - 20/40
- Reduced visual acuity: 20/50 - 20/63
- Visual impairment: less than or equal to 20/80
Visual Impairment Has a Substantial Impact on the Quality of Life Compared with other Chronic Conditions

Impact of Visual Impairment on QOL Compared to Chronic Conditions, Greater Than:

- Diabetes II
- Coronary Syndrome
- Hearing Impairment

Ophthal. Epidem., 14: 119-126, '07

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Impact of Visual Impairment on QOL Compared to Chronic Conditions, Less than:

- Stroke
- Multiple Sclerosis
- Chronic Fatigue Syndrome
- Major Depressive Disorders
- Severe Mental Illness

Major Affects of Visual Loss in Activities of Daily Living:

- Distance visual acuity
- Mental health
Reduced Visual Acuity (VA < 20/40)

- Two-fold increase in likelihood of ADL and IADL limitations
- Adjusted for some socio-demographic factors and chronic diseases
- Controversial with several contradictory studies due to differences in definitions, classifications, etc.
Visual Impairment (less than 20/80)

- At least one ADL disability 4x more likely than those with better vision than 20/80
- IADL disabilities and performance-based mobility limitations 5x more likely vs. those with good VA (banking and shopping)
- Reported mobility limitations 3x more likely vs. good VA.
Conclusions

• Visual Acuity (VA) level exerts a strong, independent influence on functional ability
• Visual impairment (<20/80) increased odds for ADL, IADL, and mobility limitations three-to-fivefold
• VA has a strong, independent influence on physical functioning in persons aged 55 and above.
• Even slight decrease in VA is associated with limitations ADL, ADL and mobility task
Visual Rehabilitation (VR) for the Visually Impaired

- Traditionally VR directed to the blind or severely impaired
- Increasing evidence that less severe vision loss associated with increased risks and co-morbidities in an ever increasing elderly population
- 2003 AAO SmartSight project outlined a graduated Low Vision intervention model
High Tech Visual Aides

• Video magnifiers: enlarge and enhance contrast ($1,600-$5,000)
• Hand-held magnifiers will capture and generate enlarged digital photos ($800-$1,700)
• Word processing and Web surfing enhancing programs: ZoomText and MAGic ($595) magnifies print
• Screen and book readers: JAWS and Window-Eyes and OpenBook ($895)
• Talking Walk signs and Humanware’s GPS-based Trekker ($1,695)
• Ultracane (Sonar-based object detector) ($995)
Video Magnifier
“Seeing Machine”
Reduce avoidable blindness and severe visual impairment.

HELP LINE / INFORMATION AND PATIENT REFERRAL
800-391-EYES  800-391-3937
“I’ve had a perfectly wonderful morning!

BUT THIS WASN’T IT!”

- GROUCHO MARX
SOME OF MY FAVORITE THINGS!
NEVER FORGET THEIR SACRIFICE
AJ and Diana
Communication is the Key!

“SPEAK THE SAME LANGUAGE”
Questions?