EYE DISORDERS

Beena Davis, RN, MSN
N243

Objectives

• Describe the pathophysiology, etiology, incidence, symptoms, and therapeutic management for: Glaucoma, Cataract, Macular degeneration, Retinal detachment
• Documentation of observations for a patient with eye disorders
• Geriatric considerations
• Structural and functional changes

Objectives...

• Myotic and mydriatic medications: actions/indications/side effects
• Cataract surgery: postoperative care
• Cataract extraction: discharge plan
• Psychological adaptations to decreased vision
• Assistive devices: use/care/pt education
• Chronic glaucoma: teaching plan
Required Reading

Med Surg Textbook
p# 368-377 Chapter 21
p# 393-401 Chapter 22

Study Guide
p# 75-79 Chapter 21
p# 80-84 Chapter 22

Pharmacology Textbook
p# 710-722, 725-726

Review

• Assessment of visual system
  – Refer p# 371-377, table 21-4
• Focused assessment
  – Refer p# 370
• Gerontologic differences in assessment
  – Refer p# 371, table 21-1
Glaucoma

- A group of disorders characterized by ↑ IOP and the consequences of elevated pressure, optic nerve atrophy, and peripheral visual field loss
- Normal IOP: 10-21 mmHg

Epidemiology

- Second leading cause of permanent blindness in the U.S.
- Leading cause of blindness in African Americans
- Incidence increase with age
- Prevention: early detection & treatment

Etiology and Pathophysiology

- When the rate of aqueous production (inflow) is greater than the rate of aqueous reabsorption (outflow), IOP rise above the normal limits.
Major categories of glaucoma

• Primary open-angle glaucoma (POAG)
• Primary angle-closure glaucoma (PACG)

Primary open-angle glaucoma

• Most common type
• Outflow of aqueous humor is decreased in the trabecular meshwork
• Drainage channels become clogged and damage to the optic nerve can then result

C/M:
• Develop slowly without symptoms
• Tunnel vision
• IOP: 22-32 mm Hg

Normal outflow
Open-angle glaucoma

Tunnel vision

Primary angle-closure Glaucoma

- Reduction in the outflow of aqueous humor that results from angle closure
- Lens bulging forward due to aging process
Angle-closure Glaucoma

Acute angle-closure glaucoma

**Causes:**
- Drug induced mydriasis, emotional excitement, or darkness

**C/M:**
- Sudden, excruciating pain in or around the eye, N/V
- IOP: \( \geq 50 \) mm Hg
- Colored halos around lights, blurred vision, ocular redness

Subacute/chronic angle-closure glaucoma

- Appear gradually
- May report a h/o colored halos around lights, blurred vision, ocular redness or eye or brow pain
Diagnostic studies

- H&P
- Visual acuity
- Tonometry
- Ophthalmoscopy
- Slit lamp microscopy
- Gonioscopy
- Visual field perimetry

Slit lamp

A slit lamp is used to view the interior of the eye.

Gonioscopy

- Allows better visualization of the anterior chamber angle.
Optic disc cupping

- Normal
- Typical thinning of inferior neuroretinal rim, forming a “notch”

Collaborative care

**Chronic Open-angle glaucoma**

**Drug therapy** (refer p#400 table 22-7)

- Beta adrenergic blockers
  - timolol (Timoptic)
- Alpha adrenergic agonists
  - epinephrine (Eppy)
- Cholinergic agents (Miotics)
  - pilocarpine (Pilocar)
- Carbonic anhydrase inhibitors (CAI)
  - acetazolamide (Diamox)

Collaborative care...

**Chronic Open-angle glaucoma**

**Surgical & Non surgical therapy**

- Argon laser trabeculoplasty (ALT)
- Trabeculectomy/filtration surgery
Non-surgical treatment

Argon laser trabeculoplasty (ALT)
- Used when medications are not successful or patient is not using drug therapy
- Outpatient procedure
- The laser stimulates scarring and contraction of the trabecular meshwork, which opens the outflow channels
- Reduces IOP approx 75%

Surgical treatment

Trabeculectomy
- Removes part of the iris and trabecular meshwork and closes the scleral flaps loosely
- Success rate 75% - 85%
Collaborative care...

Acute angle-closure glaucoma -
An ocular emergency
• Topical cholinergic agent (Miotics)
  – Pilocarpine (Pilocar)
• Oral or IV hyperosmotic agents
  – mannitol (Osmotrol)
• Long-term treatment
  – Laser peripheral iridotomy
  – Surgical iridectomy

Nursing management

Assessment
• Assess the pt’s ability & psychologic reaction
• Determine visual acuity, visual fields, IOP, and fundus changes

Diagnoses
• Risk for injury r/t visual acuity deficits
• Self-care deficits r/t visual acuity deficits
• Noncompliance r/t the inconvenience and s/e of medications

Nursing management...

Implementation
• Health promotion
• Acute intervention
• Ambulatory and home care

Teaching plan
• Avoid any activity that increase IOP
• Eye drops instillation
• Compliance & wear ID bracelet
• Avoid self-treatment
Gerontologic considerations

• Additive effect of beta adrenergic blocking (BAB) glaucoma agents
• BAB contraindications
• Problems with hyperosmolar agents
• Aspirin & CAI
• Problems with alpha adrenergic agonists
• Eye drops & systemic absorption

Cataract

Definition: Opacity within the lens

Etiology & pathophysiology:
• Age related (senile cataracts)
• Other factors:
  — Blunt or penetrating trauma
  — Congenital factors
  — Radiation
  — Drugs
  — Ocular inflammation
  — DM

Cataract...
Cataract...

**C/M:**
- Decreased vision
- Abnormal color perception
- Glare

**Diagnostic studies:**
- H&P, visual acuity, visual field perimetry
- Ophthalmoscopy, slit lamp
- Glare testing
- Keratometry & A-scan ultrasound

---

Collaborative care

**Nonsurgical therapy**
- Change prescription of glasses
- Strong reading glasses or magnifiers
- Increased lighting
- Lifestyle adjustment
Surgical therapy

**Cataract extraction**

- Extracapsular (ECCE): anterior capsule is opened and the lens nucleus and the cortex are removed, leaving the remaining capsular bag intact
  - Phacoemulsification: nucleus is fragmented by ultrasonic vibration and aspirated from inside the capsular bag

---

**ECCE & Phacoemulsification**

- A.

---

Nursing management

**Assessment**
- Visual acuity
- Psychosocial impact of visual disability
- Level of knowledge

**Diagnosis**
- Anxiety r/t lack of knowledge about the surgical and postoperative experience
- Self-care deficit r/t visual deficit
Nursing management

**Intervention**
- Health promotion
- Acute intervention
  - Pre and post operative care
  - Discharge teaching
- Ambulatory and home care

---

**Preoperative care**
- H & P
- Eyedrops
  - Antibiotics
  - NSAID
  - Mydriatics - phenylephrine
  - Cycloplegics - tropicamide, atropine
- No food or fluids 6 to 8 hrs before surgery
- Antianxiety medication

---

**Postoperative care**
- Eye drops
  - Antibiotic & Corticosteroid
- Activity restrictions
- Night time eye shielding

**Discharge teaching**
- Eye hygiene & eye drops administration
- S/S of infection
- Activity restriction
- Follow up
Ambulatory and home care

- Modify lifestyle to accommodate the visual deficit
- Long-term eye care
- Verbal & written instructions
- Involvement of the caregiver

Gerontologic considerations

- Loss of independence
- Lack of control over life
- Changes in self-perception
- Societal devaluation
- Emotional support and encouragement
- Specific suggestions to allow maximum level of independent function
- Outpatient surgery

Age-related macular degeneration (AMD)

Degenerative disease of the central portion of retina (macula) results in loss of central vision.

**Two forms**
- **Dry (nonexudative)**-macular cells start to atrophy, leading to a slowly progressive and painless vision loss
  - Close vision tasks becoming more difficult
- **Wet (exudative)**-more severe; rapid onset; development of abnormal blood vessels in or near the macula
Etiology

- Aging
- Genetic
- Long term exposure to UV light
- Hyperopia
- Cigarette smoking
- Light-colored eyes
- Nutritional

Pathophysiology

- Dry AMD—abnormal accumulation of *drusen* in the retinal pigment epithelium>>atrophy and degeneration of macular cells
- Wet AMD—growth of new blood vessels from their normal location in the choroids to an abnormal location in the retinal epithelium>>new blood vessels leak>>scar tissue forms>>acute vision loss with bleeding

Macular degeneration

- New vessels bleeding
- Drusen

[Images of macular degeneration]
Clinical manifestations

• Blurred vision
• Darkened vision
• Scotomas
• Metamorphopsia

Macular degeneration

Diagnostic studies

• Visual acuity
• Ophthalmoscopy
• Amsler grid test
• Fundus photography
• IV angiography with fluorescein and/or indocyanine green dyes
Amsler grid test

Fluorescein angiography

Treatment
- Photodynamic therapy (PDT)-destroys abnormal blood vessels without permanent damage to retinal pigment epithelium and photoreceptor cells
- ranibizumab (Lucentis)
- bevacizumab (Avastin)
- pegaptanib (Macugen)
- Vitamins and minerals supplements
- Smoking cessation
Retinal detachment

Separation of the sensory retina and the underlying pigment epithelium, with fluid accumulation between the two layers

**Risk factors**
- Increasing age
- Severe myopia
- Eye trauma
- Retinopathy (diabetic)
- Cataract surgery
- Family or personal history

**Etiology and Pathophysiology**

*Rhegmatogenous*—most common type
- Retinal break—most common cause; interruption in the full thickness of retinal tissue
  - Retinal holes—atrophic retinal breaks that occur spontaneously
  - Retinal tears—vitreous humor shrinks during aging and pulls on the retina
Clinical manifestations

• Photopsia (light flashes)
• Floaters
• Cobweb or hairnet
• Ring in the field of vision
• Painless loss of peripheral or central vision-“like a curtain” coming across the field of vision
• The area of visual loss corresponds to area of detachment

Retinal detachment

Diagnostic studies

• Visual acuity
• Ophthalmoscopy
• Slit lamp microscopy
• Ultrasound
Treatment

- Goal is to seal any retinal breaks and relieve inward traction on the retina
- Surgical Therapy
  - Laser Photocoagulation
  - Cryopexy
  - Scleral Buckling
  - Vitrectomy
  - Pneumatic Retinopexy

Laser photocoagulation

- Using an intense, precisely focused light beam, such as argon laser, to create an inflammatory reaction.

Cryopexy

- Using extreme cold to create the inflammatory reaction that produces the sealing scar.
Scleral buckling

- Involves indenting the globe so that the pigment epithelium, choroid, and sclera move toward the detached retina.

Vitrectomy

- Surgical removal of the vitreous to relieve traction on the retina.

Pneumatic Retinopexy

- Gas bubble injected
- Detached retina reattaches
Postoperative care

- Topical agents
  - Antibiotics
  - Corticosteroids/Anti-inflammatory agents
  - Dilating agents
  - Analgesics
- Positioning
- Activity restriction
- Teaching

Assistive devices for eye problems

- Optical devices for vision enhancement
  - Telescopic lenses & magnifiers
  - Closed circuit TV
- Nonoptical devices for vision enhancement
  - Approach magnification
  - Contrast enhancement
  - Increased lighting

Assistance in psychological adaptation to decreased vision

- Encourage to express feelings
- Promote independence
- Assist in locating resources
- Face the person when speaking
- Avoid glare & use bright colors
- Use large prints
- Place items within the visual field
References

1. Kee, J. L., Hayes, E. R. & McCuistion, L. E (2014). *Pharmacology: A Nursing Process Approach*. (8th ed.). St. Louis: Elsevier.

2. Lewis, S.L., Heitkemper, M.M., Dirksen, S.R., Camera, I.M., & Bucher. L. (2014). Visual and auditory problems. In *Medical Surgical Nursing: Assessment and Management of Clinical Problems*. (9th ed.). St. Louis: Elsevier.