# Sensory System Disorders



# Clinical Medicine

Flashcards

Clinical Clues to DiagnosisPathophysiology

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- Acoustic Neuroma
- Acute Angle-Closure Glaucoma
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- Conductive and Sensorineural Hearing Loss
- Diabetic Retinopathy
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- Macular Degeneration
- Mastoiditis
- Ménière's Disease
- Otitis Externa
- Otitis Media

- Otosclerosis
- Primary Open-Angle Glaucoma
- Retinal Detachment

# 1 Acoustic Neuroma

- Hearing loss
  Headache (wakes the client or is worse with sneezing or coughing)
  Facial numbness
  Balance problems
- Tinnitus.

- Benign tumor of the Schwann cells of cranial nerve VIII.
- Linked with neurofibromatosis type 2.

### Acute Angle-Closure Glaucoma

- Unilateral redness and pain in the eye
- Headache, nausea, and vomiting
- Client may see halos in the visual field around lights
- Tonometry measurement may exceed 50 mm Hg



- Highest risk group is Asian or Inuit women over age 45 years or persons with nearsightedness.
- In glaucoma, the anterior chamber experiences outflow problems, with fluid and pressure increases. Because it is an enclosed fibrous capsule, the eye is unable to swell without causing pressure on important structures like the choroid retina and optic nerve.
- Causes the outflow area of the iris/corneal angle to become narrow because of bunching of the iris as the pupil dilates. Prolonged pupil dilation, can cause an episode of mild or emergent severity. A mild episode may be relieved by sleep and relaxation.
- Trauma to the eye can also produce the same type of symptoms, which create a medical and surgical emergency.

### 3 Cataracts

- Difficulty driving at night because of excessive glare.
- Opacity of the lens on ophthalmologic examination.

### S ON ti ti

In nuclear (age-related) cataract formation, the center and outer areas of the lens start

**Pathophysiology** 

to produce more protein strands that begin to aggregate in the center portion of the lens and form strata by folding. As strata forms, the center portion of the lens opacifies and yellows as the protein fibers accumulate.

• Opacity of the lens can occur at any age,

including congenitally. However, most

cataract formation occurs over age 40 years

and most commonly in the elderly. Types

- Women who take HRT are at a greater risk, and women who take HRT and consume significant amounts of alcohol are at an even greater risk.
- Exposure to UV light is another risk factor.



### Conductive and Sensorineural Hearing Loss

Acquired or congenital inability to discriminate sound, resulting in impaired hearing.
History of ototoxic drug

use.

• Weber's and Rinne's tests are abnormal.





- Hearing loss is a common problem in the elderly, but it may occur at any age.
- Efficient hearing is accomplished by appropriate conduction of sound into the inner ear. Conduction of sound is accomplished by vibration of the tympanic membrane that is connected to the malleus. The malleus, incus, and stapes transmit the vibration to the oval window of the inner ear. The oval window vibrates and causes movement of endolymph within the cochlea that stimulates sensorineural receptors within the cochlea. Transmission to the acoustic nerve sends information to the brain for interpretation.
- Conductive hearing loss can result from increased cerumen, foreign bodies in the ear canal, cysts, tumors, otosclerosis, or stiffened or scarred tympanic membrane.
- Sensorineural hearing loss occurs through damage to sensory nerves caused by complications of infections, use of ototoxic drugs, neuromas, arteriosclerosis, chronic exposure to noise, and aging.

### 5 Diabetic Retinopathy

 Those with a history of poorly controlled diabetes experience gradual central visual field changes that can progress to flashing lights and cessation of vision (retinal detachment). On ophthalmoscopic examination, cotton-wool spots and tortuous, dilated vessels are seen.

- Background retinopathy is caused by microaneurysms that form on the retinal capillaries and leak blood. The client may experience visual changes caused by inflammation.
- The preproliferative stage of retinopathy is characterized by edema of the retina with blocked and infarcted blood flow.
- The proliferative stage of retinopathy is characterized by twisting of vessels, with neovasculature growing into the optic disk and obscuring the retina. The neovasculature leaks easily. Traction may occur as a result of the twisting and leaking of these vessels and cause retinal detachment.
- Disorder has a genetic link.

### 6 Labyrinthitis

- Vertigo
- Tinnitus.
- Weber's and Rinne's tests indicate conductive or sensorineural hearing loss.
  Fever, elevation in WBCs, nausea, and vomiting may occur.

- Inflammation of the inner ear caused by bacterial or viral microorganisms that enter the inner ear from the middle ear, meninges, or bloodstream.
- Serous labyrinthitis can occur after toxic intake of alcohol or drugs.
- Diffuse suppurative labyrinthitis is caused by acute or chronic otitis media, mastoiditis, or mastoid surgery.

### 7 Macular Degeneration

 Most commonly, a gradual, age-related loss of central, near, or color vision.



- The central fovea of the retina is rich in cones (color vision) and is responsible for clear central vision.
- Risk factors include being an older (75 years) female, white, a smoker; having hyperlipidemia; and consuming little antioxidant-containing foods.
- Dry or atrophic age-related macular degeneration causes pigmental changes in the fovea, which can be visualized on examination. Drusen (pale yellow spots) appear on the macula, showing areas that no longer function. This is the most common type.
- Wet or exudative age-related macular degeneration occurs when vitreous fluid and/or blood leak under the macula. The onset of this type is sudden, and it may be treated with an argon laser, as in retinal detachment.

### 8 Mastoiditis

- Pain behind the ear, with
- Fever and chills,
- Usually after ear or sinus infection.

- Inflammation of the mastoid sinuses, usually as a result of the spread of infection from acute otitis media.
- Occurs rarely because of the availability of antibiotics for otitis media.
- Causative organisms usually are the same as those causing otitis media (e.g., Streptococcus species, Haemophilus influenzae, Staphylococcus aureus), although on some occasions, mycobacteria or fungi may cause the disease.
- Chronic infection of the frontal sinuses may cause this secondary infection.

# 9 Ménière's Disease

- Ear fullness
- Tinnitus
- Vertigo
- Sweating, nausea, and vomiting may occur.
  Movement of the head makes symptoms worse.

- Excessive endolymph in the compartment of the inner ear, possibly from a blockage of endolymph reabsorption.
- Recurring episodes of hearing loss, tinnitus, vertigo, and aural fullness, often resulting in gradually progressive hearing loss.
- Exacerbations may occur suddenly and last for as long as 24 hours.
- When one ear is affected, the other ear will become involved in approximately 50% of cases.
- Injury, infections, endocrine disorders, and vascular disorders may be causative.

# 10 Otitis Externa

- Pain in the external auditory canal.
- The canal may swell shut.
  Pain is elicited by pressure on the tragus.
  Often called "swimmer's ear."

- Infection or inflammation of the external auditory canal caused by a contact allergy, an acute bacterial infection, or a fungal infection.
- Diabetics and immunosuppressed clients may experience invasion of the infection into the base of the skull, resulting in deep bone infection.

# 11 Otitis Media

- Fever and pain in the ear.
- Otoscopic examination reveals a reddened and swollen tympanic membrane.
- Usually associated with colds and allergies.

- Otitis media is common in infants and children and results in accumulation of fluid in the middle ear because their short, horizontal eustachian tubes allow exudates from colds and allergens access to the inner ear.
- Causative microorganisms are viruses and bacteria.
- Other risks include respiratory infections, daycare attendance, lower socioeconomic status, exposure to secondhand smoke or wood-burning stoves, allergies, excessive use of a pacifier, and feeding with a propped bottle.

## 12 Otosclerosis

- Progressive hearing loss, especially with low or soft tones.
- Rinne's test for bone conduction is normal, but Weber's test shows lateralization to the most affected ear.
- Tinnitus may be evident.

- The cause of this condition is unknown, and is more common in women (worsens in pregnancy).
- The condition may begin in the adolescent years and occurs bilaterally.
- Due to chronic inflammation in the inner ear, bone remodeling by the osteoclasts and osteoblasts occurs, causing excessive spongy bone growth around the stapes and the oval window, resulting in ankylosis and conductive hearing loss.

### 13 Primary Open-Angle Glaucoma

- Bilateral, usually painless loss of vision.
- May see halos around objects
- Experience mild aching in the eyes or headaches.
- Tonometry measurement ≥20 mm Hg.





- This is the most common type of glaucoma, with insidious onset in persons older than 35 years of age. The only risk factors are black race, trauma to the eye, and chronic use of corticosteroids by any route.
- In glaucoma, the anterior chamber experiences outflow problems, with fluid and pressure increases on the choroid layer, the retina, and optic nerve.
- In the darkly pigmented eye, iris pigment may flake off and occlude the iridocorneal angle.

## 14 Retinal Detachment

- Visual abnormalities of seeing flashing lights or sparks, floaters
- Loss of peripheral vision, & eventually nothing, like a curtain falling over the visual field.

- Disorders in vision, like myopia, may predispose the peripheral retina to come away (traction) from the choroid layer.
- Rhegmatogenous detachment can occur during intraocular surgery if traction is applied to the retina, causing vitreous fluid to flow into a hole between the retina and choroid layer, resulting in detachment. Trauma to the head and eyes may cause this type of detachment.
- Exudative or serous detachment occurs in persons with hypertension or intraocular tumors in which serous fluid leaks between the retina and choroid.