Ear and Hearing Disorders
Figure 52-1

Physiology of Hearing

• Perception and interpretation of sound depend on a complex series of steps
• A malfunction at any step can result in some type of hearing impairment
Figure 52-3

- Sound waves
- External canal
- Tympanic membrane
- Malleus, incus, and stapes
- Oval window
- Sensory receptors in inner ear
- Acoustic nerve
- Brain

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Age-Related Changes

- Skin of the auricle may become dry and wrinkled
- Cerumen production declines; protective wax is drier
- Hairs in canal coarser/longer, especially in men
- Eardrum thickens; bony joints in middle ear degenerate
- Degenerative changes: atrophy of the cochlea, the cochlear nerve cells, and the organ of Corti
- Type of hearing loss associated with age: presbycusis
Assessment of the External Ear, Hearing, and Balance
Health History

• History of present illness
  • Changes in hearing acuity, pain, tinnitus, dizziness, vertigo, nausea, vomiting, and problems with balance

• Past medical history
  • Acute or chronic problems
  • It should be noted whether female patients have had rubella or have been immunized for the infection
  • Medication history identifies drugs taken that might be ototoxic
Health History

• Functional assessment
  • Exposure to excessively loud noise, such as amplified music, firearms, or noisy machinery
  • The use of any assistive hearing devices
Physical Examination

• Observe how patient responds to a normal voice
• Note presence of a visible hearing aid
• Patient’s posture and balance while walking and sitting alert the examiner to possible inner ear problems
Physical Examination

• External ear
  • Position of the auricles is significant
  • Auricles examined for shape, lesions, nodules
  • Palpate auricles and mastoid process for tenderness
  • Palpation in front of, below, and behind the ear may locate enlarged lymph nodes
Physical Examination

- External auditory canal
  - Inspect outer portion of the external auditory canal for any obvious obstructions or drainage
  - If drainage, the color, amount, and odor recorded
  - Inspect the external canal and the tympanic membrane
Diagnostic Tests and Procedures

• Otoscopic examination
• Audiometry
• Caloric test
• Electronystagmography
• Tuning fork tests
  • Rinne’s test
  • Weber’s test
• Other auditory tests
  • Auditory evoked potential, auditory brainstem response, and electrocochleography
Therapeutic Measures

- Ear drops
- Irrigation
- Hearing aids
- Cochlear implants
- Temporal bone stimulators
- Surgery
Care of the Patient Having Ear Surgery

• Assessment
  • In postoperative period, pain, nausea, dizziness, fever
  • Inspect the wound dressing for drainage
  • Drainage color, odor, and amount

• Interventions
  • Acute Pain
  • Risk for Injury
  • Risk for Infection
  • Disturbed Sensory Perception
Types of Hearing Loss

- **Conductive hearing loss**
  - Interference with the transmission of sound waves from the external or middle ear to the inner ear

- **Sensorineural hearing loss**
  - Disturbance of the neural structures in the inner ear or the nerve pathways to the brain

- **Mixed hearing loss**
  - A combination of conductive and sensorineural losses

- **Central hearing loss**
  - Problem in the central nervous system
Signs and Symptoms

- Complaints that their hearing is good but others mumble
- Leaning or turning one ear toward the speaker
- May fail to follow directions, speak while others are speaking, or turn the radio/TV up very loud
- Irritability and even hostility not unusual
- Some become very suspicious of others because they cannot hear what is being said
- Otalgia (ear pain), dizziness, and tinnitus with certain types of disorders
The Impact of Hearing Impairment

• Those who had impairments in early childhood usually have speech difficulties.
• When a person refuses to admit to a hearing loss, family members and others may stop trying to communicate.
• Hearing-impaired person may alienate those who would like to be close and supportive.
• People with severe hearing impairment probably suffer the most severe social isolation of those with sensory disorders.
Adaptations to Hearing Loss

• Hearing aids—some improvement in hearing
• Many patients read lips and observe body language
• Sign language uses a universal set of hand signals
• Telephones can be adapted to send and receive written messages
• Earphones for radios, stereos, and televisions
• Some television channels provide closed-captioned programming
• Handheld computers print out messages typed by the user
• Dogs are taught to recognize common sounds (doorbell, telephone, smoke alarm, crying baby) and to get the attention of the owner
Care of the Patient with Impaired Hearing

• Nursing diagnoses
  • Impaired Verbal Communication
  • Social Isolation
  • Ineffective Coping
  • Deficient Knowledge
Foreign Bodies and Cerumen

• Foreign bodies can get into the external ear canal
  • Most small objects can be flushed by gentle irrigation
  • Insects can be killed by instilling a small amount of mineral oil; they can then be flushed from the canal
    • Alternative is to hold a flashlight near the auricle
    • Because insects are often attracted to light, they may move out of the canal
Foreign Bodies and Cerumen

• Impacted cerumen is one of the most common causes of obstruction
  • Physician may order ear drops to soften the cerumen before irrigation
  • Physician can use ear forceps or a cerumen spoon to remove it
Foreign Bodies and Cerumen

• Nursing care
  • Inspect ear canal for impacted cerumen
  • The primary nursing diagnosis is Disturbed Sensory Perception related to obstruction of the external auditory canal
  • Educate patients to avoid trying to remove cerumen with cotton-tipped applicators or other tools such as hair pins
External Otitis or Swimmer’s Ear

• Infection/inflammation of lining of external canal
• Signs and symptoms
  • Pain that increases when the auricle is pulled
  • Dizziness, fever, and drainage
• Medical treatment
  • Topical antibacterial or antifungal drugs
  • Corticosteroid drops
• Interventions
  • Acute Pain
  • Deficient Knowledge
Furuncle

• An inflamed area in the external auditory canal caused by infection of a hair follicle
• The area is very painful to the touch
• Hearing may be impaired if swelling blocks canal
• Ruptured furuncle releases fluid that may drain
• Treatment includes systemic and topical antibiotics (with an ear wick if needed)
• If condition does not improve, physician may incise and drain it
Acute Otitis Media

• Middle ear infection; usually develops with colds
• Edema: blockage of the eustachian tubes
• Fluid accumulates in the middle ear, causing painful pressure on tympanic membrane
  • Membrane may rupture, resulting in scarring and subsequent hearing loss
• Patient often has a fever and headache
• More common in children than in adults
Acute Otitis Media

- Medical treatment
  - Oral antibiotics
  - Topical ear drops
  - Antihistamines
  - Myringotomy
Chronic Otitis Media

• Hearing loss and continuous or intermittent drainage
• Eardrum usually perforated (ruptured) or shows signs of a healed perforation
• Possible complications of chronic otitis media include mastoiditis, meningitis, labyrinthitis, cholesteatoma, and hearing impairment
Chronic Otitis Media

• Medical treatment
  • Systemic antibiotics and, if the eardrum is intact, irrigations to remove debris
  • Tympanoplasty if tympanic membrane does not heal
  • Mastoidectomy if the infection has extended to the mastoid bone
Care of the Patient Having a Mastoidectomy

• After surgery on the middle ear: comfort, safety, prevention of infection, and prevention of pressure on the tympanic membrane
• Nausea common
• Inspect the dressing and describe drainage but do not disturb or remove the dressing
• Assist patient first time out of bed, in case of dizziness
• Patient should avoid activity that creates pressure on the tympanic membrane (blowing the nose, coughing, sneezing, straining)
Otosclerosis

• A hereditary condition in which an abnormal growth causes the footplate of the stapes to become fixed
• Fixed stapes cannot vibrate, so sound waves cannot be transmitted to inner ear
• Effect is a conductive hearing loss
• Most common in young white women
Otosclerosis

• **Signs and symptoms**
  • Slowly progressive hearing loss in the absence of infection
  • In the early stages, patient may report tinnitus
  • Rinne’s test reveals bone conduction to be greater than air conduction

• **Medical treatment**
  • Stapedectomy
Care of the Patient Having a Stapedectomy

- After surgery, pain relief, safety, prevention of infection, and avoidance of pressure in the ear
- Especially important that the patient not do anything that increases pressure in the ear
- Nausea, vomiting, and vertigo are common
- The packing in the ear should not be disturbed
Care of the Patient Having a Stapedectomy

• After dressing and packing removed, patient advised to keep the ear dry for at least 2 weeks
• Swimming and showering not permitted for 6 weeks
• The patient should avoid contact with people who have colds. A balanced diet and adequate rest are needed for tissue healing and resistance to infection
Labyrinthitis

- Inflammation of the labyrinth
- Acute labyrinthitis usually follows an acute upper respiratory infection, acute otitis media, pneumonia, or influenza
- Also can be an adverse effect of drugs
- One type is suppurative labyrinthitis
  - Inner ear infection that usually follows an upper respiratory infection, ear infection, or ear surgery
  - The effects can destroy the labyrinth and cochlea, causing permanent deafness
Labyrinthitis

• Signs and symptoms
  • Vertigo, nausea, vomiting, headache, anorexia, nystagmus, and sensorineural hearing loss on the affected side

• Medical treatment
  • Antiemetics and supportive care until it resolves
  • Antibiotics if infection is present
Labyrinthitis

• Nursing care
  • Assess symptoms
  • Monitor intake and output, daily weights if possible, and food intake if persistent vomiting
  • Assist/supervise the patient when out of bed
  • Give antiemetics as prescribed
Ménière’s Disease

- A disorder of the labyrinth
- The cause is unknown
- Symptoms related to an accumulation of fluid in the inner ear
- Attack triggers: alcohol, nicotine, stress, and certain stimuli such as bright lights and sudden movements of the head
Ménière’s Disease

• Signs and symptoms
  • Hearing loss and vertigo accompanied by pallor, sweating, nausea, and vomiting
  • Hearing loss is unilateral
  • Tinnitus accompanies acute attacks
  • Patients who have had many attacks may eventually have permanent sensorineural hearing loss
  • A feeling of fullness and pressure in the ear often precedes a vertigo attack
Ménière’s Disease

• Medical diagnosis
  • Diagnosed by ruling out other conditions that can cause similar symptoms
  • Physician likely to order a number of radiographs and other tests to detect any neurologic, allergic, or endocrine disorders
Ménière’s Disease

• Medical treatment
  • Drugs: atropine, epinephrine, benzodiazepines such as diazepam (Valium), antihistamines, antiemetics, anticholinergics, vasodilators, and diuretics
  • Low-sodium diet
  • Vestibular rehabilitation
Ménière’s Disease

• Surgical treatment
  • Surgical procedures work by draining excess fluid from the inner ear (endolymphatic shunt) or by cutting the part of the acoustic nerve that controls balance (vestibular nerve section)
  • More destructive surgical procedures are labyrinthotomy and labyrinthectomy
Ménière’s Disease

• Assessment
  • Document pattern of acute attacks
  • Note substances/stimuli that trigger episodes
  • Specific symptoms including nausea, vomiting, vertigo, and tinnitus
  • Determine how the condition affects the patient’s life, what the patient knows about the disease, and coping mechanisms
Ménière’s Disease

• Interventions
  • Risk for Injury
  • Risk for Deficient Fluid Volume
  • Anxiety
  • Ineffective Therapeutic Regimen Management
Ménière’s Disease

• Postoperative care
  • Carefully check physician’s orders for position and activity limitations
  • Safety, comfort, and detection of complications
  • Antiemetics to control nausea and vomiting
  • No nonessential care until patient tolerates movement
  • Assist patients when getting up and walking
  • Call button should always be within reach; patients may be dizzy for several days, unsteady for several weeks
  • Assess for facial nerve damage
Presbycusis

• Hearing loss associated with aging
• Result of changes in one or more parts of the cochlea
• Signs and symptoms
  • May hear well in quiet surroundings but poorly in noisy places
Presbycusis

• Medical diagnosis and treatment
  • Hearing evaluation for the older person whose hearing seems to be declining
  • Many with presbycusis benefit from hearing aids
  • Devices available to improve hearing: phone amplifiers and personal earphones for radios and televisions
Presbycusis

• Nursing care
  • Educate about hearing loss and aging
  • Work to overcome the resistance that many people have to admitting hearing loss
  • Once problem diagnosed, nurses can help the patient adapt and learn to use supportive devices
Ototoxicity

- Damage to the ear or eighth cranial nerve caused by specific chemicals, including some drugs
- Common ototoxic drugs are salicylates (aspirin) and aminoglycoside antibiotics
- From reversible tinnitus to permanent hearing loss
- The primary symptom of ototoxicity with salicylates is tinnitus, which disappears when the drug is discontinued
  - Extent depends on dosage and how long it was given
- Patients who have poor renal function are at special risk for ototoxicity because drugs are excreted more slowly
Ototoxicity

• Nursing care
  • Primary are early detection and prevention of progressive hearing loss caused by ototoxic drugs
  • To reduce risk of ototoxicity, be familiar with these drugs. Instruct patients to report hearing loss, tinnitus, or problems with balance
  • Promptly report such symptoms to the physician
  • Teach patients that aspirin is not a harmless drug
  • Monitor urine output of patients on ototoxic drugs: low output may mean the drug is excreted slowly, increasing risk of toxicity
  • Report low urine output to the physician
  • Care plan should alert all staff to potential for ototoxicity