CHAPTER 5

Sensory Issues

ANATOMIC POINTERS: EYES

The eyeball has three major layers. The external layer consists of the sclera and cornea. The sclera is also known as "the white of the eye." The cornea is the transparent, avascular, most anterior portion of the eyeball; it is the main refracting surface, which bends the light rays that enter the eye and helps focus them on the retina. To keep it healthy, the cornea obtains oxygen from the air dissolved in the tears.

The middle, vascular layer of the eye is the uvea, which consists of the iris, ciliary body, and choroid. The iris is the colored part of the eye. Its small round center is the pupil, through which light enters the eye. The pupil constricts when it is used for near vision or when bright light enters the eye; it dilates for far vision or in a dim environment. Behind the pupil and iris is the biconvex, transparent lens; it can change its shape to better focus light rays on the retina. (This kind of "accommodation" is controlled by the ciliary body.)

The third inner layer of the eye is the retina, which lines the inside of the eyeball, and extends and forms the optic nerve. The retina converts an image perceived by the eye into a form that the brain can process as vision. The macula, an area of the retina, receives light from the center of the visual field and provides the greatest visual acuity.

The aqueous humor is produced by the ciliary body. This watery fluid, which provides nutrients and oxygen to this area,

is constantly formed and drained to maintain a relatively constant intraocular pressure (IOP). Increased IOP often results from inadequate drainage or absorption of the aqueous humor, potentially causing ischemia of the neurons of the eye and damage to the optic nerve.

The conjunctiva is a transparent mucous membrane that lines the inner surface of the eyelids and also covers the sclera. Thus, it forms a "pocket" under each eyelid.

DISORDERS AND CONDITIONS OF THE EYE

CATARACTS

An opacity or cloudiness of the lens of the eye is referred to as a cataract. Cataracts are one of the common causes of vision loss. The development of cataracts is mostly age related, with this condition being more prevalent in older adults.

Cataracts usually develop bilaterally at varied rates. The exception is traumatic or congenital cataracts, which may remain unilateral or stationary.

Main Symptoms

- Painless, progressively decreased or blurred vision
- Sensitivity to glare in bright lights, which worsens at night when pupils dilate
- In severe cases, the black pupil becoming milky white

Selected Nursing Tips

1. Suggest palliative measures, including using visual aids or driving only in daytime, until surgery is indicated to correct functional visual impairment.
2. After a cataract is surgically removed, some patients may be prescribed an eye shield to be worn at night for protection, along with certain activity restrictions, such as avoiding bending or stooping, which may increase IOP.

Point to Consider

Cataracts can also arise secondary to exposure to chemicals, ultraviolet (UV) light, or radiation. In addition, they may stem from other conditions or trauma to the eyes. Certain drugs, including corticosteroids (even long-term topical use), are associated with the development of cataracts.

Precautions

1. After surgery, patients should avoid coughing or straining, if possible. Take measures to prevent constipation in these individuals.
2. One of the potential complications of cataract surgery is retinal detachment; advise them to immediately report symptoms such as seeing new floaters and flashes of light, which may potentially signal the development of retinal detachment.

CONJUNCTIVITIS

The conjunctiva is a transparent mucous membrane that covers the inner surface of the eyelids and extends over the sclera (the "white" of the eye). In conjunctivitis, commonly described as "pink eye," there is an infection or inflammation of the conjunctiva. Conjunctivitis can be caused by bacteria, viruses, allergy, or other irritants.

Main Symptoms

Patients with bacterial conjunctivitis may experience purulent drainage, redness (due to subconjunctival blood vessel congestion), irritation, or tearing of their eyes.

Patients with viral conjunctivitis may report tearing, foreign body sensation, or redness. Viral conjunctivitis is usually self-limiting, and antiviral eye-drops are largely ineffective in treating this condition.

Selected Nursing Tips

1. Advise the patient to avoid or remove the source of eye irritation or infection, and emphasize the importance of handwashing after touching the eyes and nasal secretions.
2. Avoid contaminating the tip of the bottle when instilling antibiotic eye drops. Use individual towels or disposable tissues to contain the condition.
3. Remind people working near chemical irritants to wear safety glasses as a precaution.

Points to Consider

1. Conjunctivitis is highly contagious. Sharing the patient's personal items, such as towels or reading glasses, should be avoided.
2. Chronic conjunctivitis may be caused by degenerative changes to the eyelids.

Precaution

Thorough handwashing is essential before and after having contact with a patient with conjunctivitis, so as to prevent the spread of any infectious agents.

GLAUCOMA

Glaucoma is characterized by a slow loss of retinal neurons, often related to increased intraocular pressure resulting from an imbalance in the formation and absorption/drainage of the aqueous humor (fluid) in the structures of the eyes. Some patients with glaucoma may have normal IOP. Glaucoma is largely a disease of aging, but often has a strong genetic component.

If untreated, glaucoma may cause optic nerve damage, leading to peripheral vision loss or blindness. The decreased blood supply to the neurons of the eyes can also contribute to optic nerve deterioration.

In open-angle glaucoma, which accounts for the majority of the cases, the patient has neuronal degeneration, but open

drainage angles. In closed-angle glaucoma, the elevated eye pressure commonly results from a defect (impaired aqueous outflow) in the drainage mechanism. An acute closure event in these patients is an ophthalmic emergency, and often has a rapid onset. It may also be triggered by situations in which the pupil stays in a partially dilated state long enough to cause an acute rise in IOP, resulting from factors including drug-induced mydriasis (abnormal pupil dilation from topical eye preparations or systemic drugs), emotional upset, or darkness.

Secondary glaucoma may result from the conditions that block the drainage channel in some way, including trauma or an inflammatory process.

Main Symptoms

There are no early symptoms of open-angle glaucoma. When the patient begins to notice peripheral vision loss, the disease is already at an advanced stage. (The intraocular pressure tends to be above the normal range or high for the individual.) Initially, this type of glaucoma affects peripheral vision, leading to painless, progressive narrowing of the visual field.

During an angle-closure event, the patient may report colored haloes around lights, blurred or foggy vision, or occasionally severe eye pain.

Selected Nursing Tips

1. Teach the patient to report eye pain and have regular eye-pressure checks. Seriously increased intraocular pressure is an ophthalmic emergency, which should be treated as soon as possible to prevent nerve damage.
2. Instill the prescribed eye-drops, such as latanoprost (Xalatan) or bimatoprost (Lumigan), exactly as prescribed. If a patient has more than one kind of eye-drops, allow some time (at least 10– 15 minutes) between the administrations of different medications

to prevent one drug from being diluted by another. To prevent the drug from being systemically absorbed, slightly apply pressure over the corner of the eye near the nose (medial canthus) immediately after the eye-drops administration.

3. The desired effect of therapy for glaucoma is to control intraocular pressure, often by facilitating the clearing or draining of fluid from the eyes.
4. Advocate glaucoma screening for early detection and encourage prevention for people over 35 years of age or who have a family history of glaucoma.

Points to Consider

1. With early detection and appropriate treatment, including long-term medication therapy to maintain IOP within normal limits, blindness from glaucoma is largely preventable.
2. Patients with angle-closure glaucoma should be advised to avoid darkness, emotional stress, use of anticholinergic medications, and other factors that cause the pupils to dilate and IOP to increase.

Precaution

If IOP is not properly controlled, blindness may result from optic nerve damage related to high IOP compressing the nerve.

MACULAR DEGENERATION

Degeneration of the macula (an area of the retina) is often associated with aging and can result in irreversible central vision loss. The dry, or atrophic, form is characterized by a slow and progressive painless vision loss. The wet, or exudative, form is often more severe, with a rapid onset of acute visual impairment. Contributing factors may include genetic predisposition, long-term exposure to UV light, cigarette smoking, and other eye conditions. Nutrition may play a role in slowing the progression of this condition.

Main Symptoms

Patients may have distorted vision or blind spots in central visual field. Initially, straight lines become wavy or bent, possibly in one eye. Over time, progressive central vision decline may result in functional blindness.

Selected Nursing Tips

1. Advise patients to use optical visual aids, such as magnifying glasses or large-print reading material. Better lighting may help patients with macular degeneration to cope with their gradual vision loss.
2. Educate patients to have routine eye exams, and to monitor and report vision changes. The ophthalmologist may recommend using Amsler grids (or other tests) to detect sudden onset of distortion of vision.
3. Refer patients to low-vision service counseling to help them adjust to the inevitable lifestyle changes.

Points to Consider

1. Patients with age-related macular degeneration may experience serious vision loss, but do not always progress to total blindness.
2. Some nutrients or vitamins, such as beta-carotene and certain vitamins, have been studied for their possible effect in lowering the risk of developing this condition. Consultation with a healthcare provider is recommended.

Precaution

Ensure environmental safety through means such as open walkways or other forms of assistance.

RETINAL DETACHMENT

Retinal detachment (RD) refers to the separation of the retina—the sensory portion of the eye, which is the innermost

layer of the eye and extends to form the optic nerve—from the underlying epithelium, which causes fluid to collect between the two layers. The detached area may rapidly expand, unless contact between the two layers is reestablished promptly. The neurons of the retina may die because of a lack of blood supply, resulting in permanent vision loss.

Risk factors for retinal detachment include the following conditions:

- Older age
- Severe myopia (nearsightedness)
- Eye injury
- Diabetic retinopathy
- Family history, often associated with myopia

Main Symptoms

Retinal detachment is painless. Some patients may experience the following symptoms:

- Seeing floaters, dark spots, or bright flashing lights in the visual field
- Feeling the sensation of having a shadow, ring, or curtain in the vision

Selected Nursing Tips

1. Arrange for the patient to be seen by an ophthalmologist right away.
2. Preoperatively, instruct patients to refrain from strenuous activities and head movements that increase the risk of further detachment. Presurgery teaching should also include possible postoperative positions and prevention of complications.
3. Postoperatively, the patient may be required to assume a position that brings the retina in contact with the underlying layer to reestablish the blood supply to the retina—for instance, sleep on the abdomen—for a period of time as instructed by the surgeon.

Point to Consider

If not treated in time, the retinal tear, although often localized, can extend to involve the entire retina.

Precaution

Any patient with suspected retinal detachment should be seen by an ophthalmologist without delay.

ANATOMIC POINTERS: EARS

The ear is a sensory organ that has two primary functions: hearing and balance (equilibrium). The main structures of the ear include the external ear, the middle ear, and the inner ear.

The external ear consists mainly of the auricle (pinna) and external auditory canal. The auricle collects sound waves and sends the vibrations into the external auditory canal. The tympanic membrane (eardrum) separates the external ear and the middle ear. The function of the external and middle portions of the ear is to conduct and amplify sound waves received from the environment. Air conduction refers to sound conducted over the air-filled external and middle ear by vibration of the tympanic membrane and auditory ossicles. Hearing problems associated with these two areas may result in conductive hearing loss, affecting the patient's perception of or sensitivity to sounds.

The auditory (or eustachian) tube connects the middle ear with the nasopharynx; the mucous membrane lining the middle ear extends from the nasal pharynx via the auditory tube. The inner ear is partially responsible for hearing and balance, which rely on very complex mechanisms.

DISORDERS AND CONDITIONS OF THE EAR

HEARING LOSS

Hearing impairment is a prevalent form of disability, which can directly affect individuals' quality of life. Conductive hearing

loss commonly results from impaired transmission of sounds through the air in conditions such as external ear disorders (e.g., impacted cerumen) and middle ear disease (e.g., otitis media).

Sensorineural hearing loss often results from impaired function of the inner ear or the acoustic nerve (the eighth cranial nerve). Causative factors may include aging, ototoxicity, Ménière's disease, or other serious systemic diseases, such as bacterial meningitis. In this condition, the ability to hear high-pitched sounds or to understand speech may be affected. Exposure to intense loud sounds or prolonged environment noise can cause sensorineural hearing loss. Such hearing loss is common and becomes permanent after the initial repair or restoration period is complete, owing to possible structural damage to hair cells in the organ of Corti, a structure of the cochlea in the inner ear that turns mechanical energy into neural activity and differentiates sounds into various frequencies.

Hearing loss resulting from impairment within the central auditory system, (the pathway from the inner ear to the brain) may cause individuals to have difficulty in understanding the meaning of words that are heard.

Functional hearing loss may be psychogenic and nonorganic without detectable structural changes. It is also possible for people to have mixed types of hearing loss.

Main Symptoms

Early signs of hearing loss may include the following:

- Tinnitus
- Preference for higher sound volume and cupping the hand around the ear
- Speech that is uncharacteristically loud (in some types of hearing loss) or soft (often in conductive hearing loss because patients hear their own voice)
- Personality change, such as being uninterested and inattentive in group activities

Often, the person with hearing impairment is not sufficiently aware of the gradually developing hearing problem and may not seek hearing assistance.

Selected Nursing Tips

1. Many people refuse to wear hearing aids for various reasons, including self-consciousness. Take patients' attitude and behavior into consideration when counseling individuals with hearing impairment to ensure a more effective conversation or better persuasion.
2. Educate patients about avoiding loud noises to prevent noise-induced hearing impairment and acoustic trauma. Warn about the danger of using foreign objects, such as Q-tips, to clean the ear canal to prevent impacted cerumen from damaging the eardrum.
3. Advocate wearing protective ear devices, such as foam ear inserts or earphones in a dangerously noisy environment as a preventive measure.
4. Be aware of and watch for the side effects of ototoxic medications.
5. Employ strategies to enhance communication with hearing-impaired individuals, such as talking into a less affected ear and using helpful gestures or visual aids; identify patient-specific methods to ensure more effective communication.
6. When conversing with an elderly individual with hearing difficulty, speak distinctly in a relatively low tone.

Points to Consider

1. Recommend audiometric hearing screening and medical assistance to at-risk individuals, including older patients. For patients with sensorineural hearing loss, hearing aids may be ineffective in correcting their deficits.
2. Many occupational or recreational pursuits may increase the risk for hearing impairment, such as carpentry or loud music.

3. A quiet environment is in general more conducive to rest and peace of mind, especially to patients who are acutely ill; keep the noise level to a minimum for patients at rest. Loud, persistent noise may cause increased adrenalin secretion, leading to increased blood pressure.

Precaution

Some medications, such as aminoglycosides and aspirin, are ototoxic, especially when ineffective renal excretion causes patients to have increased serum drug levels. Furosemide (Lasix) is a diuretic that may potentially cause ototoxicity (e.g., tinnitus, vertigo, or deafness), particularly in patients with renal disease; make sure not to administer it at a rate exceeding the specified limit.

MÉNIÈRE'S DISEASE

Ménière's disease (endolymphatic hydrops) manifests with symptoms caused by an inner ear disorder possibly associated with an abnormal accumulation of inner ear fluid (endolymph), which distorts the system. The exact cause of this disorder remains unknown. Although not life-threatening in nature, the sudden episodic vertigo can be disabling, causing falls or injury.

Main Symptoms

Patients may experience recurrent attacks of vertigo with an incapacitating rotational sensation, dizziness with tinnitus (a subjective ear ringing) or a roaring sound, and painless fluctuating hearing loss. The onset of vertigo is often sudden, causing immobility or loss of balance, accompanied by symptoms such as nausea, vomiting, nystagmus (rapid involuntary eye movements), or headache.

Selected Nursing Tips

1. Patients should be advised to get up slowly to maintain their balance, avoid sudden position changes, and turn the entire body to turn the head so as to prevent vertigo.

2. Help patients minimize environmental stimuli, stress, and fall-related risks.
3. Reassure patients that Ménière's disease is not life threatening when safety measures are in place.

Points to Consider

1. If an antihistamine drug, such as meclizine (Antivert) or hydroxyzine (Atarax), is prescribed for vertigo, warn the patient of its potential side effects, including drowsiness and dry mouth.
2. The exact cause of Ménière's disease remains unknown, but it often occurs secondary to infection, fluid imbalances, or major stressors. Smoking and excessive intake of caffeine-containing fluids and salty foods should be avoided.

Precaution

Patient safety is a priority; keep the bed in a low position and provide a safe living environment.

OTITIS MEDIA (MIDDLE EAR INFECTION)

Otitis media (OM) refers to an infection of the middle ear, often secondary to an upper respiratory infection or other inflammatory process (possibly related to obstruction or dysfunction of the eustachian tube). When treated early, acute OM usually has a good prognosis. Prolonged fluid accumulation in the middle ear cavity may result in chronic otitis media and serious complications, potentially including conductive hearing loss.

Main Symptoms

The manifestations of OM vary with the severity of the condition, but may include the following signs and symptoms:

- Pain unrelated to the movement of the external ear
- Fever or flu-like symptoms, such as sneezing or coughing
- Headache (more likely in an acute case) and dizziness
- Vomiting

- Purulent discharge from the ear when the eardrum ruptures spontaneously in severe cases
- Diminished hearing

Selected Nursing Tips

1. Instruct the patient to complete the full course of the prescribed antibiotic therapy to reduce the risk of developing drug resistance.
2. Suggest appropriate intermittent use of warm compresses to alleviate pain. Warmth may dilate the blood vessels in the ear, and promote the reabsorption of fluid.
3. Stress the importance of not getting fluid in the ears.
4. Otitis media often results from an upper respiratory infection or occlusion of the auditory tube; prevent chronic ear infection by promptly treating a respiratory infection or acute OM.

Point to Consider

Given that the mucous lining of the middle ear is anatomically connected to the pharynx via the auditory (eustachian) tube, infectious organisms can enter the middle ear from the nose and throat, and migrate internally. Infants and young children are more susceptible to OM, because the eustachian tube is shorter and straighter in children than in adults.

Precautions

1. Patients with OM should be advised to temporarily avoid airplane trips or diving due to the rapid pressure changes associated with those activities.
2. Patient teaching should include reporting an abrupt relief of pain or pressure, which may indicate perforation of the tympanic membrane; this membrane protects the middle ear from the external environment. Repeated eardrum perforations with extensive scarring can cause hearing loss.