Chapter 17: Special Considerations in Managing Geriatric Patients

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The social and economic significance of the "graying of America" has received a great deal of attention. Specialists in geriatric medicine are defining a general system of care that can keep elderly adults more healthy, more functional, and more independent. At the same time, otolaryngologists have taken the lead in describing and treating senescent ear, nose, and throat problems, especially those causing disorders in communication. In our role as communication specialists, otolaryngologists are a key resource in helping the elderly to avoid isolation.

Basic Principles of Geriatric Medicine

Irvine (1990) defined six useful basic principles in the care of elderly patient. Clinical decisions in this patient group tend to be complex and these fundamentals are worthy of review and emphasis.

Coexistence of multiple diseases. The unitary disease hypothesis usually does not apply: signs and symptoms are more likely to be the result of several medical problems.

Unique spectrum of illness. In addition to many of the diseases seen in their younger counterparts, the elderly tend to suffer certain diseases that occur only in old age. This includes a wide range of degenerative disorders and certain cancers.

Unusual presentation of illness. Typical symptoms, such as fever and pain, are often absent, and nonspecific symptoms, such as anorexia or falling, may herald a serious underlying disorder.

Proper role of the aging process. Differentiating treatable disease from the natural aging process may be difficult, particularly in the area of degenerative diseases. Most geriatric specialists believe that patients and families have a tendency to overrate the role of aging. As a result, they experience unnecessary suffering and dysfunction, specific disease processes should be sought and treated whenever possible.

Underreporting of health problems. Patients and families often fail to report symptoms commonly relegated to "old age".

Function-based treatment goals. At some point, adding "life to years" becomes more important than adding "years to life". Therapeutic goals shift toward maximizing function and independence, possibly at the expense of potential for cure.

Access to Medical Care

A decreased level of strength and confidence may limit the ability of the elderly to visit a physician's office or the hospital, particularly in the absence of strong family support. Social support systems often function better for acute and more serious problems so that the well-known benefits of early detection and treatment may be lost. The high cost of modern

health care may also create a relative barrier.

Society and physicians share a responsibility for providing care to all segments of the population, and a case can be made for making allowances for the elderly. Physicians remains the most effective patient advocates despite the increasing role of other parties.

Diagnostic Testing

Because of the general principles mentioned previously, diagnosis may be the most challenging aspect of medical care in the elderly population. The focus should be on identifying treatable disease. A good deal of judgment is required to separate specific illness from the adverse but natural effects of aging, and it is usually not appropriate to attribute symptoms to aging unless other causes have been ruled out.

Invasive diagnostic procedures are relatively contraindicated when functional reserve is poor. Fortunately, modern diagnostic techniques, especially in imaging, have limited the need for invasive procedures.

Treatment

Medical therapy

The proper use of medications is particularly important in the elderly. Indeed, one study showed that adverse effects of medications were the most common cause of symptoms confused with senile dementia (Larson et al, 1987). Adverse effects of medication are also among the most common causes of hospital admissions in the elderly. According to Avon and Gurwitz (1990), "Any symptom in an elderly patient may be a drug side effect until proved otherwise".

It is well known that sensitivity to drugs increases with advancing age, but the reasons are not completely clear. There is some evidence that drug metabolism by the liver and clearance by the kidney both decline as one ages, but this does not explain the entire phenomenon. Drug receptors at the cellular level actually seem to increase in sensitivity.

Drug interactions can be prevented by carefully evaluating existing drug therapy before starting any new medicines.

Finally, use of some medications by the elderly should be completely avoided because of the known high incidence of side effects. A good example is sympathomimetic decongestants in elderly men, which frequently cause urinary retention.

Surgery

The decision to operate is never made lightly and this is particularly true for the elderly patient. Santos and Gelperin (1975) reported an overall mortality rate of 4.9% (8% for major surgery and 0.9% for minor procedures) in 1286 operations performed on patients above the age of 70 years. Similarly, Seymor and Pringle (1983) encountered life-threatening complications in 18.6% of 258 elderly surgical patients, of whom 5.8% died. Complications

and mortality were more common after emergency procedures. Inactive patients (those who left their home less than twice weekly in the month before surgery) fared poorly and had a particularly high incidence of respiratory and cardiac complications.

The Aging Ear

Presbyacusis

Auditory dysfunction associated with the aging process includes several identifiable forms of degeneration of hearing. This common disorder may have a devastating effect on the older individual by reducing the ability to communicate, jeopardizing autonomy and limiting the opportunity to participate in society.

The effects of sensory deprivation include changes in perception, changes in personality (especially introversion), social disengagement, and lost income (Gacek and Schuknecht, 1969).

Prevalence of presbycusis

Accurate estimates of the prevalence of presbycusis in particular and sensorineural hearing loss in general are not available. However, a recent survey demonstrated that 20.7 million Americans (approximately 8.8%) are hearing-impaired (Havlik, 1986); the actual number may be somewhat higher, because hearing-impaired people have a tendency to underreport their disability. Presbycusis is the most common cause of hearing loss in this population.

Pathophysiology

The specific causes of presbycusis are speculative at this time but probably represent a combination of the effects of years of use; exposure to noise, chemicals, and so on; along with genetically programmed biologic degeneration.

There is direct evidence that a gradual loss of cells occurs in most organ systems as a result of the aging process. A decrease in normal weight, cell count, and other cellular components is found in all aging organisms. Remaining cells may be larger, and total body mass is only slightly changed during aging, because of a coincident increase in adipose tissue (Hoeffding and Feldman, 1987).

Physiologic changes include decreased oxygen use, reduced circulation, intracellular accumulation of lipofuscin and other substances, and extracellular deposition of cholesterol lipids.

Aging may also be looked at as a degenerating genetic cellular system. Genetic damage may result from random deterioration as well as programmed deterioration. In the former, somatic cell genes undergo inactivation of deoxyribonucleic acid (DNA), which accumulates throughout life at an irregular rate. In the latter, there is a selective activation and repression of genes during the ontogeny of the cell (Strehler, 1971).

It is clear that morphologic change in human beings, as well as in animal models, consistently demonstrates age-related loss of inner and outer hair cells and supporting cells, primarily from the basal turns of the cochlea. Outer hair cells decrease more than do inner hair cells. Age-related loss of eight nerve fibers has been reported to be as high as 20% in old rats (Hoeffding and Feldman, 1987). Age-related histologic changes may be followed to the level of the superior olivary complex in the brainstem.

Nixon and Glorig in 1962 and Glorig and Davis in 1961 identified the occurrence of high-frequency conductive hearing losses attributed to stiffness and laxity of the joints in the aging middle ear. They also proposed the concept of inner ear conductive hearing loss caused by stiffness of the cochlear partition.

Histopathologic types

Gacek and Schuknecht (1969) defined four histopathologic types of presbycusis:

1. Sensory: characterized by hair cell loss.

2. Neural: associated with loss of spiral ganglion cells and axons.

3. Metabolic: characterized by strial atrophy.

4. Mechanical or conductive.

Sensory presbycusis. The audiometric findings in sensory presbycusis include an abrupt high-frequency sensorineural loss with slow, symmetric progression, usually beginning in middle age. Pathologic lesions are limited to the first few millimeters of the basal turn of the cochlea. Flattening and atrophy of Corti's organ result from loss of hair cells and supporting cells. Lipofuscin, the aging pigment, also accumulates.

Neural presbycusis. Audiometric findings include gradual hearing loss with a moderate slope toward the high frequencies and a disproportionately severe decrease in speech discrimination. This difficulty with speech discrimination makes hearing loss refractory to amplification in many cases. Atrophy of the spiral ganglion and nerves of the osseous spiral lamina occurs mainly in the basal turn of the cochlea. Corti's organ is largely intact, as opposed to the condition in sensory presbycusis.

Metabolic or strial presbycusis. The hearing loss associated with strial presbycusis is a flat sensory loss that begins in the third through sixth decades and progresses slowly. Speech discrimination is generally good and no recruitment occurs. This condition is often familial. Patients do well with amplification. The characteristic pathologic findings are atrophy of the stria vascularis, which may be either patchy in the basal and apical turns or diffuse. Corti's organ and the spiral ganglion cells are usually unaffected.

Inner ear mechanical or conductive presbycusis. Both inner ear conductive presbycusis and atrophy of the spiral ligament cause bilateral symmetric sensorineural loss with an upward slope toward the high frequencies and preserved speech discrimination. The anatomic correlate to conductive sensorineural hearing loss is not completely understood, but

it is hypothesized that the functional loss is due to stiffness of the basilar membrane, which correlates with its anatomic shape. The histopathologic pattern of atrophy of the spiral ligament includes different degrees of pathologic changes progressive throughout the patient's life. It is most noticeable in the apical turn and least in the basal turn. Cystic degeneration may cause detachment of Corti's organ from the lateral cochlear wall, resulting in hearing loss.

Proposed etiologies

Vascular

Circulatory disorders have long been proposed as the cause of hearing loss in the elderly. However, histopathologic evidence is insufficient to confirm this hypothesis. The relationship between high-frequency sensorineural hearing loss and the degree of cerebral atherosclerosis has been used to support this theory. Unfortunately, both may be independent but age-related. Atherosclerotic disease of renal vessels and that of inner ear vessels have also been correlated. Johnson and Hawkins (1972) demonstrated the progressive involution of the human cochlear vasculature from the fetus and newborn through the aged. They noted that during the first decade of life, the radiating arterioles and outer spiral vessels in the basal coil attain adult size. Devascularization of capillaries and arterioles was subsequently found in the spiral ligament in association with aging. They found a similarity between degeneration of inner ear vessels and microangiopathy in the retina. Gussan (1969) demonstrated that plugging of vascular canals by bony tissue is a generalized phenomenon related to aging and concluded that this was one of the major causes of presbycusis.

Diabetic

Diabetic angiopathy is thought to be a specific entity. In this disorder, disseminated proliferation and hypertrophy of the intimal endothelium of arterioles, capillaries, and venules occur, causing significant narrowing of the lumen. Precipitation of lipids and other substances in the vascular wall is also seen. In addition, arteriolosclerosis is thought to be more common and more extensive in patients with diabetes. However, studies correlating audiologic data and pathologic findings in diabetic patients with presbycusis have produced contradictory results. The great variability in incidence of hearing loss in diabetics is thought to be due to poor study design. In well-controlled studies, no correlation between sensorineural hearing loss and diabetes was found.

Noise-induced

Noise is thought to be a common cause of presbycusis. It is clear that a direct correlation exists between noise-induced inner ear damage and frequency, intensity, and duration of noise exposure. However, some may effectively argue that noise exposure causes hearing loss at any age and does not constitute true presbycusis.

Noise-induced hearing loss may arise from mechanical damage, metabolic exhaustion, or vascular changes. Mechanical damage is seen in cochleas exposed to high-intensity or impulse noise of short duration. There may be detachment of Corti's organ from the basal membrane. Metabolic exhaustion is characterized by changes in cellular ultrastructure

indicating a depletion of enzymes and metabolites in overstimulated sensory cells. Noise has clearly been shown to cause ischemic changes in the inner ear. Capillaries below the basilar membrane undergo spasm. In addition, edema of endothelial cells impairs blood flow to the spiral ligament and stria vascularis. Sludging and aggregation of red blood cells with increased blood viscosity caused by decreased capillary flow also occur.

Metabolic

In Rosen and Olin's (1965) studies of Finnish patients on long-term controlled diets, reduction of saturated fats resulted in significant lowering of serum cholesterol and improvement of auditory threshold testing. Subsequent studies demonstrated that hypolipoproteinemia is the correlate to Rosen's clinical epidemiologic findings and is related to presbycusis as well as obesity, atherosclerosis, and coronary artery disease.

Genetic considerations

Diagnosis of genetic sensorineural hearing loss, especially when it is of adult onset and is not associated with external abnormalities, is extremely difficult but must be considered. This diagnosis relies primarily on the history given by the patient and by the characteristic audiometric configuration. The typical hearing loss is represented by a basin-shaped curve with good discrimination and no recruitment. Over the years, this pattern may change to a gradual or abrupt slope. Pathologically, the most prominent feature in this order is atrophy of the stria vascularis, which is parallel to Schuknecht's strial atrophy category.

Treatment

Amplification remains the mainstay of treatment for presbycusis, but efficacy is often limited by recruitment, poor discrimination, and the sloping nature of the hearing loss relative to frequency. The use of assistive listening devices and training in effective listening strategies may also be helpful. Changes in diet may be effective in reducing the progression of hearing loss in certain aging patients, but further data are needed before this treatment modality can be fully accepted.

Presbystasis

Presbycusis, or the disequilibrium of aging, is a group of disorders affecting the mobility of a large number of elderly persons. As a result of degeneration of vestibular, proprioceptive, and visual senses, ability to walk and drive, as well as spacial orientation, can be reduced to the point of incapacitation. Loss of balance is the most common manifestation of vestibular dysfunction in elderly persons.

Although attempts at categorizing disequilibrium of aging as a single specific entity have been made, a large number of vestibular disorders are seen in elderly patients. These include vascular disease, Ménière's disease, benign positional vertigo, and adaptation deficits. Inputs from the vestibular, visual, proprioceptive, and other systems can be thought of as providing input into a common central processor, which, in turn, controls posture and eye movement. Disorders of these sensory organ systems have traditionally been taken care of by otolaryngologists, neurologists, and ophthalmologists, depending on the organ system causing

the most obvious dysfunction. However, development of the unifying discipline of neurotology has led to an integrated approach to the evaluation and care of elderly persons with disequilibrium.

Incidence

The National Health Interview Survey supplement on aging demonstrated that more than 18% of persons above age 65 and more than 25% of those above age 75 fell in 1985 (Havlik, 1986). Of those persons 15% to 23% fell because they were dizzy. Thirty-four percent of persons aged 65 to 74 years indicated that "dizziness prevents you from doing things you otherwise could do". Extrapolating these figures to the population of the USA, 12.5 million persons older than 65 years note that dizziness represents a serious impairment of their normal activities.

In a 1981 study of outpatient medical care, dizziness was the most common presenting complaint of patients older than age 75 (Keil and Smith, 1985), occurring in 38 per 1000 patient visits. In a Finnish longitudinal study on geriatric outpatients, dizziness occurred in 81% of men and 91% of women (Orma and Koskenoja, 1957).

The most significant complications of presbystasis are falls and hip fractures. More than 200.000 hip fractures occur annually among Americans over the age of 65. The direct mortality for hip fractures is greater than 15% and morbidity often includes permanent failure to ambulate (Dawson and Adams, 1987). Of course, other disorders affecting this population, including use of psychotropic medication, abnormalities in blood pressure, leg muscle weakness, and loss of coordination, play important roles. It is believed that failure of one of the previously mentioned organ systems can be compensated for, but with multisystem failure, increasingly severe deficits occur.

Pathology

Age-related degeneration has been noted in hair cells, neurons, and supporting structures of the peripheral vestibular system. Hair cell loss has been found in the semicircular canals, utricle, and sacculus. This degeneration is most often noted in the central area of the cristae, whereas macular degeneration is more diffuse. Degeneration of the saccule may be greater than that of the utricle. A decrease in the total number of peripheral vestibular neurons, as well as a decrease in the size of myelinated nerve fibers, has been described in patients above the age of 65. Degenerative changes also occur in otoconia of the human maculae, along with deformities of the vestibular end organs and degeneration of the synaptic structures of afferent dendrites (Nadol and Schuknecht, 1989). These degenerative changes are considered to be the vestibular equivalent of presbycusis. Unlike presbycusis, however, asymmetrical loss of vestibular function can produce incapacitation. Degenerative changes of the vestibular nuclei and cerebellum have also been reported.

Diagnostic methods

Use of objective tests to identify the cause of presbystasis is essential. Vestibular function studies described elsewhere in this text are applicable in the elderly. Avoidance of a wastebasket diagnosis of presbystasis and continuing clinical research into etiologic

diagnosis are essential.

A wide variety of findings are noted in presbystasis, suggesting both peripheral and central vestibular abnormalities. Studies of age-related normal values for electronystagmography (ENG), platform posturography, and sinusoidal harmonic acceleration in the elderly are ongoing.

In cases of presbystasis arising in the peripheral labyrinth, generalized hypofunction is often found. Symmetric maximum slow phase velocity responses to warm and cool caloric stimulation of less than 10 degrees/sec per irrigation are used empirically by the authors to identify this condition.

In cases of peripheral hypofunction, the use of vestibular nerve suppressants may be contraindicated. Such treatment further reduces the already reduced vestibular input, producing additional incapacitation.

Treatment

Nonvestibular causes of presbystasis need to be identified and treated superficially. Examples include postural hypotension associated with use of antihypertensive medications, endocrine imbalances, malnutrition, visual disturbances, lower extremity dysfunction, and cardiovascular insufficiency.

Because of the adaptive control feedback mechanism of this complex system, treatment modalities have been developed to allow compensation. This adaptive control system alters afferent signals from the various receptors at visual-vestibular interfaces as well as proprioceptive-vestibular interfaces. Control circuits are affected by disturbances in the general condition of the patient, availability of the neurotransmitter, and specific pathologic disorders (Honrubia, 1989). Other feedback loops help control visual tracking and postural adjustment in response to motion. Cognitive controls also exist and contribute primarily in the areas of spatial orientation, hallucination of motion, and development of athletic skills.

Vestibular habituation training offers promise for the symptomatic treatment of presbystasis. These "exercises" are based on feedback control initiated by the habituation effect. Mechanisms of adaptation and compensation are stimulated through repeated elicitation of minor degrees of vertigo.

Other goals of vestibular exercise programs include improvement of visual following when the head is stationary, gaze stability during head movement, visual-vestibular interactions during head movement, and general balance. These exercises are designed to incorporate visual and proprioceptive experiences along with vestibular cues.

The twin goals of these exercises are reestablishment of balance and reduction of the symptoms of dizziness and disorientation. In many cases, consultation and therapy with a physical or occupational therapist trained in vestibular compensation exercises can be extremely helpful.

Another important consideration, prevention of falls, must be stressed to the patient. This includes the use of night lights, especially on the route to the bathroom; removal of throw rugs; avoidance of stairs; and use of ambulatory assistance devised when necessary.

The Aging Nose

Nasal obstruction is a common concern of elderly patients, usually caused by a combination of factors. Atrophy of the mucosa leads to dryness, mucous crusting, and frequently "ropy" postnasal drainage. Degeneration of connective tissue causes loss of cartilage support in the region of the nasal valve. Obstructive symptoms are generally worse at night when the patient is in the recumbent position and may interrupt sleep.

Treatment is often frustrating. Topical and systemic decongestants should be avoided because they may aggravate dryness and mucosal atrophy. Humidification is generally helpful. Topical steroid sprays may provide symptomatic relief, especially when allergy is a factor.

Surgical reconstruction is aimed at reconstituting support for the upper lateral cartilage and nasal tip (Patterson, 1980). Performed under local anesthesia, this procedure is well tolerated and often rewarding in terms of restoration of function. Removal of turbinate mucosa is to be avoided, especially when excessive dryness is already a factor.

The Aging Vocal Tract

Generally accepted characteristics of the senescent voice include weakness, hoarseness, tremulousness, and altered pitch. However, changes in voice and speech are more closely related to physiologic age than chronologic age and a change in vocal quality may herald significant local or systemic disease. Specific disease entities, such as cancer, neurologic illness, and endocrine dysfunction must be excluded before a diagnosis of senile dysphonia can be made.

Sunberg (1987) divides the phonatory system into the compressors (lungs), the resonator (larynx), and the articulators (supraglottic structures). It is useful to consider the age-related changes in each segment to develop the overall effect on voice and speech.

Larynx

The appearance of the larynx changes with age. Atrophy of the vocal folds occurs in 67% of men and 27% of women (Honjo and Isshiki, 1980). This results in bowing of the membranous vocal cords and prominence of the vocal processes of the arytenoid cartilages, which has been called the "arrowhead configuration". Incomplete glottis closure is seen in two thirds of men and just over one half of women. Edema and discoloration (yellow or dark gray) of the vocal folds are also commonly seen.

Histologic examination suggests that discoloration of the vocal folds may be produced by fatty degeneration or keratosis. The laryngeal muscles are thinned as a result of decreased fiber density and fatty degeneration (Kahane, 1987). Decreased fiber density is also seen in laryngeal ligaments and conus elasticus. The mucous membrane is thin and keratotic, and a decrease in the number of mucous glands results in deficient lubrication. Calcification of the

laryngeal cartilages begins in the early twenties and is progressive through the eighth decade, though this is quite variable among individuals and occurs later and to a lesser extent in women (Kahane, 1983). The changes in laryngeal structure described previously result in altered voice formation. Jitter (frequency variability) is greater in elderly adults, particularly elderly males. Fundamental frequency increases in males from age 60 years through age 80 (Benjamin, 1984; Hollien and Shipp, 1972). On the other hand, a woman's fundamental frequency decreases after age 60 (Benjamin, 1984; Linvell and Fisher, 1985).

Surgical procedures have been devised to adjust vocal pitch as well as strengthen the voice of patients with flaccid or bowed vocal folds. Isshiki et al (1974) advocate a type IV thyroplasty for reconstruction. Others have advocated advancements of the anterior commissure through an anterior commissure laryngoplasty to adjust vocal fold tension (LeJeeune et al, 1983; Tucker, 1988). The short-term success of these procedures in achieving improved loudness and clarity and decreased breathiness and air escape has been encouraging.

Supraglottic structures

The aging process results in significant changes within the mucosa of the oral cavity, salivary glands, teeth, mandible, maxilla, temporomandibular joint (TMJ), and taste buds. Acoustic characteristics of women's voices with advancing age show a significant lowering of the frequency of the first formant (f1) with advancing age, which suggests age-related changes in vocal tract dimensions or positions of speech structures. In combination or individually, any increased dryness of the mouth, increased soft tissue atrophy, or decreased mandibular excursion can significantly affect voice by altering resonance characteristics.

The epithelium of the mouth becomes atrophic, especially in the prickle-cell layer. Parakeratosis and hyperkeratosis may be present, particularly in areas of denture use. Histologically, thinning of the tunica propria and blunting of the rete pegs; decrease in capillaries; decrease in water, hyaluronic acid, and collagen content; and increase in ground substance occur. In combination with small vessel disease such as arteriosclerosis, these changes make intraoral tissues more prone to injury, prolonging wound healing and contributing to the shiny, smooth appearance of the senescent oral mucosa (Nedelman and Bernick, 1978). Guarding, secondary to pain from oral trauma, may adversely affect voice by modifying articulation and projection of speech sounds.

Normal age-related changes in the salivary glands are the principal cause of dry mouth syndrome, a common complaint in the elderly (Makila, 1977). Submandibular gland parenchymal volume decreases as a result of a reduction in acinar tissue. Salivary ducts develop adhesions and become obstructed. The result is replacement of gland substance by connective tissue and fat (Scott, 1977). Secretory rates diminish and viscosity increases. Because adequate lubrication is essential to production of sound from the phonatory apparatus, the presence of dry mouth degrades the quality of speech.

As one ages, resorption of mandibular and maxillary alveolar bone occurs, leading to a loss in the vertical dimension of the face and giving a "purse-string" appearance to the mouth. Histologically, the aging mandible displays signs of the coarse trabeculation pattern. Osteoporosis is also common in the edentulous maxilla, especially in women. With regard to the teeth, secondary dentin replaces most of the dental pulp. Apical migration of gingival

tissue leads to gradual exposure of the root, which tends to cause periapical infection and periodontal disease (Nedelman and Bernick, 1978). Any changes in the bony architecture of the maxilla or mandible may adversely affect voice by altering the resonance characteristics of speech sounds. The absence of teeth, use of ill-fitting dentures, oral or dental pain, and paresthesias may further alter certain speech sounds, particularly those affecting tongue to lip, palate, or tooth apposition. The ability to produce clear plosive (p, t, k, b, d, g, etc) and fricative (s, z, f, v, sh, ph, etc) sounds may therefore be affected (Ramig and Ringel, 1983).

Lungs

Changes in the respiratory system that adversely affect speech include (1) loss of pulmonary compliance, (2) atrophy of respiratory muscles, resulting in reduced forced expiration; and (3) reduction in vital capacity, leading to loss of subglottal air pressure.

A reduction in vital capacity, decreased elasticity in chest support, and reduced abdominal tone can all result in inadequate breath support and excessively harsh glottal closure. Over time this can produce dysphonia secondary to muscular tension and fatigue.

Head and Neck Oncology

More than half of all cancer patients are older than 65 years at the time of original diagnosis (Wolf, 1989); the mean age of patients who have squamous cell carcinoma of the upper aerodigestive tract is 60 years. Indeed, aging seems to be a primary cause of cancer.

Etiology

Environmental exposure to carcinogens, most notably tobacco and alcohol, is an important cause of these cancers. The occurrence in advanced age is probably related to duration of carcinogen exposure and to immune senescence. Immune dysfunction associated with aging is complex, involving several components of the immune system. Wolf (1989) suggests that the most important deficit may be in antigen-specific T-cell cytotoxic function. Interestingly, autoimmune diseases also are more common with advancing age and may facilitate tumor progression.

Treatment

Elderly patients tolerate the treatment of early localized cancer well, but age becomes a significant factor in the management of advanced cancer. Combined treatment with surgery and irradiation therapy has improved local control rates in patients with advanced cancer, but elderly patients tolerate multimodality therapy poorly and may never fully recover.

Elderly patients generally tolerate major head and neck cancer surgery well. Morgan et al (1982) reviewed 1773 patients undergoing major head and neck operations under general anesthesia. Of the 810 patients between the ages of 65 and 95 years, 29 (3.5%) dies and 32% suffered nonlethal complications. In comparison, only 8 of 863 patients aged 35 to 65 years died (0.8%) and the complication rate was 21%. The differences in mortality and complication rate are both significant, yet a mortality rate of 3.5% in those above age 65 years does not seem prohibitive. Johnson et al (1977) studied patients undergoing composite resection,

comparing several factors in patients more than 65 years old with those in a younger cohort. The older patients fared at least as well with regard to complications, mortality, and rehabilitation. Nevertheless, our clinical experience suggests that rehabilitation of speech and swallowing dysfunction after such surgery is more challenging with increasing age. We have found percutaneous endoscopic gastrostomy particularly valuable in elderly patients undergoing resection of large portions of the tongue and pharynx without laryngectomy.

Thyroid cancer behaves more aggressively in older patients (Simpson, 1982). Undifferentiated carcinoma is more common, and recurrence and metastasis occur more frequently in the elderly, even with well-differentiated thyroid cancer. The mainstay of treatment for well-differentiated thyroid cancer is surgery, but multimodality therapy that includes radioactive iodine is commonly advised in older patients, especially those who have follicular cancer.

Before advising a major surgical procedure, careful consideration is given to the patient's motivation evidenced by his or her current level of function. An active 80-year-old with good muscle tone may be a better surgical candidate than a sedentary 65-year-old with poor functional residual capacity.

Preoperative teaching is important for all patients, and selected patients may benefit from a 2-week course of nutritional and physical therapy aimed primarily at improving cardiorespiratory function. Patients must understand that they will need to participate in the recovery process.