Geriatrics: Nutrition, Hearing and Vision, Falls

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Aging is associated with a progressive decline in the functioning of the various organs. Predominant amongst these are hearing and visual loss which contribute indirectly to imbalance and ultimately lead to falls and fractures. Amongst other causes of falls is malnutrition. Most of the diseases in the elderly can be traced to poor dietary intake, weakness, and deficiencies. This article will discuss all these interrelated problems faced by the elderly.

Nutrition of the Elderly

Epidemiology

Aging leads to a change in the body composition with a **decrease in lean body mass and an increase in the fat mass**. This is more marked after the age of 60 years. With the slowing of the metabolism, energy requirements decline by approximately 100 kcal/day per decade.

Pathophysiology of malnutrition

While the requirement for certain nutrients decreases, the need for some essential nutrients increases. Most seniors find it **difficult to adjust to this change** and fail to comply with the daily micronutrient requirements necessary for maintaining good health.

At the same time, unintentional, idiopathic weight loss occurs in 15–20% of adults and

other causes of weight loss in this age group include malignancies, medication side effects, social factors (e.g., loneliness), cognitive (onset of dementia) and psychiatric (depression) problems.

Diagnosis of malnutrition

Several of these **factors are interrelated**, e.g., nutritional deficiency is associated with cognitive impairment (vitamin B12, B6, and folate deficiency), while diets rich in fats are associated with cancers of the colon, pancreas, and prostate, as well as with atherosclerotic cardiovascular disease and diabetes.

Osteoarthritis and osteoporosis can alter energy requirements and are also related to **dietary intake**. Alternations in dentition, taste, and smell influence the foods consumed by the elderly. In addition, the cost of the essential and organic foods can be **beyond the purchasing power of the elderly**.

Unexplained rapid loss of more than 5% body weight in 30 days or more than 5% decline over three years should be investigated, as it is associated with an increased risk of morbidity and mortality. The following **tests** should be carried out in such cases:

- Complete blood count (CBC)
- Erythrocyte sedimentation rate (ESR)
- Complete metabolic profile (CMP)
- Urine analysis (UA)
- Thyroid-stimulating hormone levels
- Vitamin B12, vitamin D
- Serum calcium levels
- Screen for malignancies with at least an ultrasound abdomen

Hearing of the elderly

Epidemiology

Presbyacusis or hearing loss affects **one-third of the population above 60 years of age** and approximately 90% of the elderly over the age of 85 years. The onset of hearing loss is **earlier in males than in females**. After hypertension and arthritis, hearing loss is the most common chronic condition in the elderly.

Pathophysiology of hearing loss

In a majority of the cases, the **onset is insidious and therefore unrecognized** and ignored, but it causes severe cognitive and communication problems. It has been recognized that hearing and communication enable the brain neuronal connections to grow and remain functional. Hearing loss **contributes to cognitive decline**. The inability to communicate leads to social isolation and eventually to loneliness and depression which can spell doom for the elderly.

Although hearing loss can be **conductive, sensorineural, or mixed**, hearing loss in the elderly is typically in the higher frequencies and bilateral. Medications like acetylsalicylic acid (Aspirin/Disprin) and co-morbid conditions like diabetes can contribute to the hearing loss.

Diagnosis of hearing loss

Ideally, all individuals above the age of 50 years should undergo **hearing screening**. A simple home test is to determine the volume of the television – does the person require a volume that sounds uncomfortably loud to others in the room?

An **office evaluation should include a detailed personal, occupational, family, and medication history**. A history of working in a noisy environment can indicate noise-induced hearing loss, while intake of ototoxic medications can contribute towards a worsening of the hearing.

An **otorhinolaryngologic examination will exclude causes of conductive hearing loss** like ear wax, Eustachian tube dysfunction associated with sinonasal polyposis or allergies or even nasopharyngeal tumors. This should be followed by audiometry in a sound-treated booth to assess the type and degree of the hearing loss.

Treatment of hearing loss

The hearing loss can be **optimally managed depending on the audiogram findings**. Ototoxic medications can be replaced or discontinued (if possible) if they are the underlying cause. Residual hearing can be amplified using hearing aids or assistive devices.

Cochlear implantation may be indicated in patients with bilateral profound hearing loss which cannot be amplified with hearing aids. However, **compliance is often a problem** as hearing loss is not prioritized due to the stigma associated with the hearing aids, and the **cost of the devices can be a problem** since they are often not covered by medical insurance.

Vision of the elderly

Epidemiology

Visual loss is another major morbidity associated with the elderly and contributes to the general decline associated with aging. **One out of three adults** has some visual impairment by the age of 65. The common causes are cataracts, diabetic retinopathy, age-related macular degeneration, and glaucoma.

Cataracts

Cataracts or opacities of the lens are a common correctable cause of visual impairment and blindness in the elderly. They usually develop insidiously over years, although some cataracts are known to develop rapidly. Clinically, the patients complain of blurring of vision or glare.

An **ophthalmologic examination** with a slit-lamp helps to identify the opacifications, its degrees, and extent. Cataract surgery is indicated when vision functioning impairs activities of daily living and it is covered by medical insurance. The **phacoemulsification technique** is used during cataract surgery to fragment the opacified lens. The fragments are then suctioned out and a lens implant used as a replacement.

Age-related macular degeneration (AMD)

Age-related macular degeneration (AMD) is another common problem in the elderly. It is characterized by **degeneration of the macula with loss of central vision**. Increasing age, a family history of AMD, hypertension, diabetes and smoking increase the risk of AMD which can be either exudative or non-exudative.

A majority of the patients suffer from the **non-exudative type** which is either drusen or geographic atrophy. While drusen is not always associated with visual impairment, geographic atrophy is responsible for severe vision loss. Clinical manifestations include blurring or distortion of vision, difficulties while reading or driving, or dependence of bright light and magnifying glasses to fine tasks.

Approximately 10% of the patients develop **exudative AMD** which accounts for 90% of the visual impairment cases due to AMD. In this type, **abnormal blood vessels develop** and leak fluid, blood, and lipids in the subretinal space. Finally, this heals with the formation of a macular scar; therefore, all individuals over 65 years of age should undergo an annual ophthalmic examination after pupillary dilatation.

Self- examination of vision should also be encouraged in this population of patients. The elderly should also be encouraged to consume a diet rich in beta-carotene to delay the onset and progression of AMD. Laser surgery and anti- VEGF (vascular endothelial growth factor) injections are being currently recommended for the treatment of exudative AMD.

Diabetic retinopathy

Diabetic retinopathy is being increasingly recognized as a cause of visual impairment in the elderly due to the **rise in the incidence of diabetes mellitus**. The incidence of retinopathy increases with the increasing duration of diabetes.

Diabetic retinopathy can be proliferative or non-proliferative.

1. Macular edema is the most common cause of visual loss in non-proliferative retinopathy.
2. Proliferative retinopathy is characterized by neovascularization leading to vitreous hemorrhage, retinal detachment, and visual impairment.

Glaucoma

Glaucoma is another common cause of visual impairment and the most common cause amongst African Americans. It leads to **optic nerve damage and loss of field of vision**.

Primary open-angle glaucoma is the most prevalent type of glaucoma. It is asymptomatic until individuals develop visual impairment. Risk factors for primary open-angle glaucoma are advancing age, high myopia, hypertension, diabetes and a family history of glaucoma.

Measurement of intraocular pressure at regular intervals during routine ophthalmic examinations is the ideal way to detect this condition early. Treatment is usually with medications but may require surgery in intractable cases.

Falls of the elderly

Falls are associated with a **majority of accidental deaths** in the elderly above the age of 75. Imbalance and falls are indicators of poor health and progressive decline. Falls lead to several injuries with long bone fractures, head trauma and soft tissue injuries contributing to the morbidity in this age group.

Hip fractures account for up to 2% of the complications of a fall and 25% of the elderly die within six months after the hip fracture. The other major sequelae of a fall is psychological – the elderly individual becomes afraid of falling and begins to restrict movements, becomes immobile and dependent on caregivers.

Causes of falls

Causes of falls in the elderly in the order of occurrence include:

- Accidents
- Balance disorders
- Gait disorders
- Arthralgias or arthritis
- Vertigo
- Side-effects of medications
- Alcohol
- Acute infections
- Cognitive impairment
- Postural hypotension
- Visual impairment
- Syncopal attacks or seizures
- Dietary deficiencies

Sedative – hypnotics and anxiolytics are the most common **prescription medications responsible for falls** in the elderly. Others are:

- Tricyclic antidepressants
- Tranquilizers
- Anti-hypertensive medications (leading to hypotension)
- Hypoglycemic drugs
- Cardiac medications
- Corticosteroids
- Non-steroidal anti-inflammatory drugs
- Anti-cholinergic drugs

Malnutrition and vitamin deficiencies can lead to weakness and sensorimotor problems which can also contribute to falls.

Diagnosis

All elderly patients at risk of falls should be thoroughly evaluated. History will reveal the activities of daily living, circumstances related to the fall, risk factors, medications being consumed, as well as the associated comorbid conditions. A **physical examination** should include detailed neurological, balance, gait and cardiovascular assessment, along with a visual acuity test. One-leg balance and the timed ‘up and go’ test help to determine balance abnormalities. A home visit should be performed to assess factors that can be modified to prevent future falls.

Prevention of falls

Prevention of falls can be attempted by referring an elderly individual at risk to a fall prevention program. Modifiable interventions include:

- Modification of environmental hazards, especially within the home (anti-skid tiles, support bars, etc)
- Arrange for home support
- Modify the number of medications consumed, especially anxiolytics and sedative-hypnotics
- Regular monitoring of blood pressure and blood sugar
- Evaluating vision impairment
- Assessment of cognitive and neuropsychiatric status to exclude depression
- Provide balance training
- Involve extended family
- Modify restraints
- Regular follow-ups

References

Fuller, George F. "Falls in the Elderly." American Family Physician. 2000 Apr 1;61(7):2159-2168. Available at: http://www.aafp.org/afp/2000/0401/p2159.html

Quillan, David A. "Common Causes of Vision Loss in Elderly Patients." American Family Physician. 1999 Jul 1;60(1):99-108. Available at: http://www.aafp.org/afp/1999/0701/p99.html

Walling, Anne D. and Gretchen M. Dickson. "Hearing Loss in Older Adults." American Family Physician. 2012 Jun 15;85(12):1150-1156. Available at: http://www.aafp.org/afp/2012/0615/p1150.html

Wells, Jennie L. and Andrea C. Dumbrell. "Nutrition and Aging: Assessment and Treatment of Compromised Nutritional Status in Frail Elderly Patients." Clinical Interventions in Aging. 2006 Mar; 1(1): 67–79. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2682454/

World Health Organization. "Nutrition for older persons." Available at: http://www.who.int/nutrition/topics/ageing/en/index1.html

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