Perspectives in Aging: Incorporating Geriatric Principles into the History and Physical Exam

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Abstract:

Physiology alters during aging, and the attendant physical exam changes are often underemphasized in medical school curricula. The University of Arizona has a mentoring program, The Societies Program, in the context of which a faculty member tutors small groups of students in the art of patient examination. The “Perspectives in Aging” are succinct additions to the University of Arizona’s Societies 1st and 2nd year medical school syllabus which focus students’ attention on many of the differences found in the examination of older adults.

Educational objectives:

At the end of their second year in the Societies Program incorporating the Perspectives on Aging, students will be able to:
1) Identify the contributions of the physiological changes of aging on the cardiovascular, renal, and pulmonary examinations.
2) Discuss the challenges faced by older adults in interacting with their environments as a result of age-related changes in hearing, vision and the musculoskeletal system.
3) List unique presentations of at least three common conditions in older adults.

Additional information/Special implementation requirements or guidelines:

This serves as a basic Geriatrics supplement to a more comprehensive undergraduate medical Physical Exam course. Its content is limited to a few paragraphs to be added to the main course material. As such, the topics of delirium and dementia, as well as other geriatric syndromes, are not covered, as these are addressed separately in the body of the general curriculum.

Skin (Foundations Block)

Our largest and most visible organ, skin, can give clues to underlying problems in older as well as younger patients. In older adults, evidence of abrasions or hematomas might result from falls, trauma, or abuse. Ecchymoses or purpura of the skin can be suggestive of capillary fragility (vitamin C deficiency), a coagulopathy, or simply be a result of thinning of the skin with age. This occurs because of loss of epidermal and dermal thickness, decreasing stores of proteoglycans and collagen, decreased and fragmented elastin, and loss of underlying subcutaneous fat.
An increased incidence of skin cancers (basal, squamous, and melanoma) in the elderly should prompt careful evaluation of suspicious lesions, both in sun-exposed and non-exposed areas.

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**Nervous System Block**

*(n.b. Dementia & Delirium, and Falls are covered by the required Geriatrics UpToDate readings)*.

In addition to the causes of delirium and falls mentioned in your *UpToDate* readings, it is important to consider the following as possible causes of neurological disorders in the full spectrum from youth to elderly.

Celiac disease: This gluten-stimulated autoimmune disorder has been shown to cause ataxia, dementia, neuropathy, migraines and other headaches. Despite the dietary etiology, as many as 40% of adult patients with celiac disease have no gastrointestinal symptoms. This surprisingly common disease is undiagnosed in >90% of Americans who have it.

Heavy Metals: The effects of chronic exposure of heavy metals, even at low doses, can range from peripheral neuropathies to behavioral, cognitive and other central neurologic problems. An example of a heavy metal with these clinical effects that you are probably familiar with is lead.

MPTP (synthetic heroin), pesticides, and herbicides: Animal studies and some epidemiological data suggest these may be related to Parkinson’s like movement disorders in adult patients.

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**Eyes (Nervous System Block)**

Visually impaired older adults may have an increased risk for falls, limitations on driving and mobility, and social withdrawal. Although routine vision screening of the elderly has been recommended, the benefits of this unfortunately have not been realized in many studies. Do look for evidence of cataracts, since the surgical treatment can yield impressive improvements in visual acuity, and may decrease the incidence of hip fractures.

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**Head, Ears, Nose and Throat (HENT) (Nervous System Block)**

Impaired hearing in the elderly (especially in combination with diminished eyesight) can be a harbinger of looming functional dependence. Checking for a patient’s ability to repeat a series of whispered numbers and letters (see box 1) is a remarkably sensitive way to screen for hearing loss in adults. (Make sure that cerumen is not blocking the external canal before testing a patient’s hearing).

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**Box 1: Conducting the whispered voice test**

Technique: stand arm’s length behind patient and whisper 6 letters and numbers softly in
direction of each ear. If patient gets half of the sequence correct, hearing is considered sufficient.

A visual inspection and gloved palpation of the mouth can help evaluate for oral cancer (which, in early stages, can appear as a painless pink or red lesion that persists longer than 2 weeks). The state of a patient’s oral health can also lead you to consider whether the patient is able to ingest adequate nutrition (it is hard to eat crunchy vegetables or chewy meat if your teeth are in poor shape or non-existent). It can also clue you in to whether the patient is at increased risk for heart disease related to gum inflammation, or whether she has ill-fitting dentures that can contribute to poor nutrition, social isolation, and possibly even oral cancer arising from the points of constant irritation.

**Psychosocial (section of Nervous System Block)**

Older Americans have a disproportionally high rate of suicide, and 75% of elderly patients have visited a physician within the month prior to attempting suicide. Those with lower functional status (e.g. requiring home health services) are more likely to be depressed than the vital, high-functioning home dwelling elderly. Because depression is a common, debilitating, potentially lethal, and often, treatable disease, it is important to conscientiously screen for depression in the elderly. This can be achieved by directly inquiring about symptoms of depression and/or with the use of a validated, sensitive questionnaire such as the Geriatric Depression Scales (the short form is below, from [http://www.stanford.edu/~yesavage/GDS.english.short.score.html](http://www.stanford.edu/~yesavage/GDS.english.short.score.html)).

**Musculoskeletal System (MSS Block)**

The natural decline in muscle mass and strength seen in aging can be exacerbated by decreased activity and poor diet, both of which are commonly seen in the elderly. When combined with the increasing incidence of skeletal fragility and the rapidly rising susceptibility to falls as people age, fractures become a significant problem in the elderly.

Hip fractures contribute significantly to morbidity and mortality in the elderly. Screen for factors that increase the risk of falls in the elderly.

- Be sure to inquire about **prior falls**, especially within the last year, a very important predictor of subsequent falls.
- Carefully observe **gait and balance**, as impairments in these are closely associated with risk of falling. The “Get Up and Go” test is one way to assess gait. (Box 2)
Additionally, discuss problems with urinary incontinence, vision problems, and the use of benzodiazepines and other medications as these may predispose the elderly to falls.

**Box 2: Get Up and Go Test**

Patient is seated in chair without armrests and is asked to rise, walk 10 feet, turn around and return to sitting. If this task takes > 20 seconds, or if patient cannot independently lift each foot as he or she walks, then s/he is at risk for functional deficits and falls.

(For further information look at your *UpToDate* reading on Falls)

Most hip fractures are evident when a patient presents with hip pain preceded by a history of a fall or other trauma and a subsequent inability to bear weight on the affected leg. However, some patients with a fractured hip will not recall a precipitating incident, will have vague symptoms without distinct hip pain or tenderness, and can even weight-bear on the fractured side. It is thus important to evaluate for hip fracture in an elderly patient who complains of groin, buttocks, back, knee, or leg pain—even if they can ambulate normally.

On physical exam, you usually find that the affected leg is abducted, externally rotated, and shortened. Palpation can elicit hip tenderness, while rotation and flexion of the hip joint can induce pain. However, even when the exam is normal, imaging may be indicated in order not to miss such a common and debilitating ailment. If the initial plain radiographs are normal or inconclusive, an MRI is highly sensitive for hip fracture detection. If not diagnosed promptly, untreated hip fractures can lead to avascular necrosis of the femoral head and other serious sequelae.

**Cardiology section of CPR (Cardiovascular, Pulmonary and Renal Systems)**

The incidence of atherosclerotic disease increases over time, and pathologic arterial plaque can lead to cardiac ischemia and cerebrovascular infarction. It is important to realize that the clinical presentation of an older adult with cardiac infarction often does not include the classical symptom of chest pain. If an elderly patient complains of shortness of breath, fatigue, palpitations, abdominal symptoms, confusion or stroke symptoms, it is essential to consider ischemic cardiac disease as a possible etiology.

Increased left ventricular stiffness and other age-related changes contribute to a rising incidence of congestive heart failure due to diastolic dysfunction in the elderly. This, along with an increased propensity for the development of atrial fibrillation (with loss of the “atrial kick” to enhance cardiac filling), valvular disease (e.g. aortic stenosis that can impede cardiac outflow), autonomic dysfunction (e.g. orthostatic hypotension), and systolic hypertension, can leave the older adult more prone to develop significant cardiac hemodynamic disturbances. Older adults are also more vulnerable to the effects of these hemodynamic disturbances.
Therefore, pay close attention to symptoms suggestive of decreased coronary or cerebrovascular perfusion, including fatigue, confusion, exercise intolerance, and breathing difficulties. Be sure to carefully evaluate heart rhythm (atrial fibrillation is not uncommon, as are benign premature beats). Assess for the presence of an S3 gallop, suggesting the presence of heart failure. It is important to test for orthostatic blood pressure by noting the difference in systolic (>20 mm Hg) or diastolic (>10 mm Hg) blood pressure (BP) with the patient supine vs standing after a 3-minute equilibration for each position (consider hypovolemia, sepsis, autonomic dysfunction or cardiac pathology). A slow and weak pulse (*parvus et tardus*) in the carotid arteries with a systolic aortic murmur radiating to the right-left carotid suggests aortic stenosis.

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**Pulmonary section of (Cardiovascular, Pulmonary and Renal Systems)**

Age-related changes in the lung parenchyma (“senile emphysema”) result in lower alveolar surface area for gas exchange and ventilation and perfusion mismatch resulting in hypoxemia. Additionally, skeletal changes (vertebral fractures and kyphosis that limit thoracic expansion), and decreased muscle strength, further limit the lung’s effectiveness (e.g. cough is weaker, physical resilience to pneumonia is compromised). Swallowing difficulties (often occult) and poor dentition can predispose to aspiration pneumonia. Because the bronchial route leading to the right middle lobe is the most direct of all bronchial paths, aspiration pneumonia is most often localized in that lobe.

In the elderly, pneumonia can present without a classic cough and fever. A change in mental status, abdominal pain, syncope, chest pain, diarrhea, and hypothermia can all be symptoms associated with pneumonia. If the respiratory rate is >25 breaths/minute, you should have a strong suspicion that there is significant pulmonary pathology (e.g. pneumonia, pulmonary embolus) present. If a patient with pneumonia is dehydrated (which is not uncommon in the elderly), an initial chest radiograph might be read as falsely negative. After the patient has been adequately rehydrated, a visible confluence of white (the density of water) will “bloom” on a chest x-ray that previously had been read as normal.

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**Renal section of CPR (Cardiovascular, Pulmonary and Renal Systems)**

As we age, our kidneys function less effectively than in younger patients. Clearance of waste slows, and, accordingly, the rate of removal of toxins and medications decreases. One measure of this is the decreased ability of the nephron to filter out creatinine, a byproduct of muscle degradation. Creatinine clearance,--an estimate of the glomerular filtration rate, decreases proportional to age. Age is taken into account by the Cockcroft-Gault formula in which creatinine clearance is used to estimate the GFR:
CrCl = \((140 - \text{age}) \times (\text{mass in kg}) \times (0.85 \text{ if female})\) \\
\quad \times (72) \times (\text{serum Cr in mg/dL})

This has practical implications when prescribing medications that are cleared from the body by the kidneys. When using this equation, bear in mind the patient’s muscle mass when interpreting the results. An older patient tends to have less lean muscle mass, and will therefore generate less creatinine from muscle turnover than a younger adult, who typically has a larger muscle volume. Hence a creatinine of 1.1 in an older patient would be more concerning for impaired renal function than the same level in a younger patient.

Along with a decrease in the clearance of creatinine, aging affects sodium and water balance. Hyponatremia is a common finding in the geriatric population, and may be the consequence of the syndrome of inappropriate antidiuretic hormone (SIADH), low sodium intake, medications, or impaired sodium-conserving capability found with increasing age. Conversely, you can also see an impaired ability to excrete water or sodium in the aging kidney. Hyponatremia can be found in the setting of hypovolemia, euvoeemia, or hypervolemia. It is important to determine the elderly patient’s fluid status, which can be difficult to ascertain from the usual markers. In the older adult, seemingly dry skin, dry mucosa, and orthostatic BP and pulse changes might be due to causes other than dehydration. The urinary fractional sodium excretion, hematocrit (a marker of hemoconcentration), and the blood urea nitrogen (BUN)- to-creatinine ratio can help clarify the fluid status of the patient.

Urinary tract infections (UTIs) in the elderly occur frequently, and, at times, are frustratingly deceptive to diagnose. An older patient with a UTI can present with seemingly unrelated symptoms, such as alterations in mental acuity, or behavioral changes. A patient who has a marked alteration of character with bizarre behavior can be “miraculously” returned to his or her baseline with the appropriate antibiotic to treat a urinary tract infection. Beware, however, of over-diagnosing UTI’s; since, with bacteruria so common in the elderly, the mere presence of bacteria in urine may turn out to be a ‘red herring’ that distracts from another true clinical problem.

Another problem often encountered in elderly patients is urinary obstruction. An enlarged prostate or medications with anticholinergic effects can lead to obstruction of urinary flow and cause bladder distension and even hydronephrosis. Palpation and percussion of the bladder can hint at bladder enlargement, and firm percussion of the flank area may cause discomfort in a patient with hydronephrosis (albeit this is not specific for hydronephrosis since kidney infections, stones, and tumors can also produce flank tenderness).

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**Endocrine (Digestion, Metabolism and Hormones)**

As with so many other ailments in the geriatric population, endocrine problems can present with subtle and enigmatic symptoms in this cohort. Thyroid disease is one of the more common maladies in the elderly, yet the diagnosis is often delayed or missed entirely because the classic symptoms of hypothyroidism may either be absent or else so common among geriatric patients that the complaints unfortunately are not ascribed to possible endocrine abnormalities. Noting
that an octogenarian is cold-intolerant, and has dry skin, slower thinking, muscle aches, 
weakness, and constipation might not prompt you to test for hypothyroidism as quickly as you 
would in a younger patient with the same symptoms. A 70-year-old man with cardiac ischemia, 
heart failure, or atrial fibrillation may have undiagnosed hyperthyroid disease. Changes in mental 
status, weakness, gait problems, anorexia (the opposite of the hyperphagia seen in young 
hyperthyroid patients), can all be indicative of hyperthyroid disease in the elderly. With the 
vague and myriad presentations of thyroid disease in older adults, virtually any change from 
baseline warrants an investigation of an elderly patient’s thyroid status. (n.b. Beware of 
supplementing hypothyroid patients until you have considered whether there is an underlying 
adrenal insufficiency. Thyroid hormone can precipitate adrenal crisis if cortisol is not proactively 
supplemented in such cases.) Thyroid replacement should be initiated slowly and at low dose, to 
prevent potential precipitation of cardiac ischemia.

Gastrointestinal (Digestion, Metabolism and Hormones)

In the elderly, abdominal pathology can present with frustratingly subtle or ambiguous 
symptoms and signs. A quarter of older patients with appendicitis have no abdominal pain, and 
of those with pain, almost half have no guarding with deep palpation. Half of elderly patients 
with acute cholecystitis have no fever, nausea or vomiting. Mesenteric ischemia classically 
presents with the findings of “pain out of proportion to exam.” This lack of classical symptoms 
contributes to delayed diagnoses and significant (5-10%) mortality for geriatric patients with 
serious abdominal processes.

An increasingly appreciated and prevalent GI-based ailment, celiac disease, appears to increase 
in incidence with age. The protean manifestations of this disease include: neuropsychiatric 
problems (see Neuro section), osteoporosis, iron-deficiency anemia, fatigue, myalgias, hepatic 
failure, autoimmune diseases and lymphomas. It is reasonable to consider celiac disease as a 
contributing factor in any of the above disorders.

References


