

Growing Older, Getting Stronger

Preventive Health in Geriatrics

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In this article:

1. Ways to prevent complications of hypertension.
2. How to prevent delirium.
3. What is the role of vaccinations?
4. How to prevent household injuries.
5. How to prevent complications of diabetes mellitus.

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While many older adults (over 65) will age successfully and enjoy good health, a significant proportion will have some form of chronic disease. The frail elderly are particularly at risk for multiple illnesses and functional impairment. It is important to implement preventive interventions that reduce the risk of common medical conditions and/or complications in the elderly. This article provides an evidence-based overview of primary and secondary preventive measures for health maintenance (non-oncologic) among older adults.

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Case 1

You are seeing a 79-year-old male in your office for the first time. He indicates that he has had “borderline diabetes” and high cholesterol for many years, has an irregular heartbeat, and smokes two cigarettes every day. He denies any past or family history of stroke or heart attack, and does not take any medication. Physical examination shows an abnormally irregular pulse rate of 85 bpm, blood pressure 200/80 mmHg supine and 170/80 mmHg standing. While you continue to examine him, he asks for your advice on how to improve his overall health condition.

Discussion of Case 1

Vascular (coronary and cerebrovascular) diseases are common in the elderly. The patient in our case scenario has several risk factors that are potentially modifiable: hypertension, diabetes mellitus, hyperlipidemia, atrial fibrillation and cigarette smoking.

Hypertension

Hypertension is more common in older adults, yet the diagnosis may not be apparent unless routine screening blood pressure (BP) measurements are conducted. It has been suggested that the BP of older adults should be routinely checked during their medical visits at least once every one to two years.¹ The proper techniques for cardiac examination in the elderly person have been well-described.² In the elderly, the numerical cut-off values for defining hypertension are extrapolated from data in younger adults (Table 1).³

There is no proper data to support primary prevention of hypertension in the elderly, especially when essential hypertension is the most common type seen. The purpose for hypertension screening is to identify high-risk individuals so that secondary preventive measures can be implemented. Our patient has isolated systolic hypertension, which is defined by an elevation of the systolic BP over 140 mmHg with diastolic BP of 90 mmHg or lower. A recent meta-analysis showed a 13% reduction in all-cause mortality when older adults with isolated systolic hypertension were treated.⁴ However, despite numerous efforts to promote awareness of hypertension and its treatment, a recent multi-centred longitudinal cohort analysis showed that many older adults continued to have poorly controlled hypertension in the last decade.⁵

The efficacy of various classes of anti-hypertensive medications [*e.g.*, diuretics, beta-antagonists, calcium channel antagonists, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers, and other centrally acting agents] has been studied extensively. In older adults, their selection depends on

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tolerability and/or concomitant medical illnesses. For instance, while beta antagonists are preferred in the hypertensive patient who has a history of myocardial infarction (MI), they may exacerbate breathing difficulties in patients with severe bronchospasm. On the other hand, ACE inhibitors can lower BP and slow the progression of diabetic nephropathy in an older diabetic person, but they may worsen renal function in the frail elderly with pre-existing, significant renal failure due to non-diabetic reasons. In most situations, we recommend, “starting low and going slow” with one anti-hypertensive medication at a time, and to

ensure that the dosage and treatment duration are adequate before using combination therapy. There are some exceptions. For instance, a recent analysis showed that elderly patients with left ventricular dysfunction and past MI enjoyed additional benefit when treated with ACE inhibitors and beta antagonists together compared with any single class alone.⁶ Potential secondary causes of hypertension should be explored in elderly patients who present with hypertensive emergency, rapidly progressive disease, or who are refractory to standard treatments.

For the patient in case one, it is reasonable to initiate any one of the following anti-hypertensives: a thiazide diuretic, beta antagonist, or an ACE inhibitor (the latter because of his diabetes mellitus). His BP requires serial monitoring. In the presence of diabetes, such as this case, the target systolic BP after treatment should be 130 mmHg or lower.

Diabetes mellitus

Diabetes is common and underdiagnosed in the elderly. Many complications (end organ damage) can result in significant functional impairment. While screening guidelines remain variable in the general population, the American Diabetes Association recommends measuring the fasting serum glucose at least once every three years in the presence of the following risk factors: age over 45 (hence all elderly persons), positive family history of diabetes, obesity, hypertension, and glucose intolerance. In our case scenario, we should check the fasting serum glucose and hemoglobin A1c (which reveals the level of glycemic control in the preceding three months).

Like hypertension, most preventive strategies in diabetes target for secondary rather than primary prevention. In older diabetic patients, proven

Table 1

Numerical cutoff values for defining hypertension.

Category	SBP (mmHg)	DBP (mmHg)
Optimal	< 120	< 80
Normal	< 130	< 85
High-normal	130-139	85-89
Stage 1	140-159	90-99
Stage 2	160-179	100-109
Stage 3	≥ 180	≥ 110

SBP = Systolic blood pressure. DBP = Diastolic blood pressure.

benefits of good glycemic control include reducing the risk of retinopathy and coronary heart disease. These patients also enjoy a better quality of life. Conversely, poor glycemic control is associated with increased risk of glaucoma, hyperosmolar coma, limb amputation (because of peripheral vascular disease and/or other complications such as skin ulcers), and cognitive impairment. In older adults, the need for good glycemic control must be balanced by the increased risk of hypoglycemia. In achieving the former, whether via oral hypoglycemic medications or insulin, common challenges include variable adherence and difficulty adjusting their own medications (especially with insulin).

In our case scenario, it is important to confirm the diagnosis of diabetes mellitus (Type 2) and consider starting hypoglycemic therapy for secondary prevention of diabetic complications. The benefits and risks of different diabetic treatments have been well-established and are beyond the scope of this article.⁷

Hyperlipidemia

Routine screening for elevated serum lipids in the elderly remains controversial. There is currently no definitive data to support population-wide screening. However, in high-risk individuals (our case scenario), it is reasonable to screen

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the fasting lipid levels (low-density lipoprotein and high-density lipoprotein cholesterol, triglycerides), regardless of age. Interestingly, hypocholesterolemia is associated with increased mortality risk in the nursing home population, presumably a surrogate marker of overall frailty and malnourishment.

In a randomised, controlled trial, patients over the age of 65 with coronary disease and plasma cholesterol of 4.0 mmol/L to 7.0 mmol/L demonstrated survival benefits when treated with pravastatin compared to controls.⁸ More recently, findings from the heart protection study confirmed that the addition of 40 mg simvastatin daily reduced the rates of MI, stroke, and revascularisation by at least one-quarter in all high-risk patients, regardless of age.⁹ These findings also raise the possibility of using statin for primary prevention purposes. In our case scenario, it is reasonable to consider adding a statin once hyperlipidemia is confirmed. It will be prudent to monitor for possible muscle pain (and/or rhabdomyolysis) as an adverse drug event in the frail elderly.

Atrial fibrillation

Numerous studies have demonstrated atrial fibrillation (AF) as a significant and independent risk factor of stroke. The risk escalates further in the presence of other factors, including advanced age (over 60 years), hypertension, congestive heart failure, diabetes, hyperlipidemia, previous stroke, and smoking. The gold standard for secondary stroke prevention in the elderly patient with AF is warfarin. Despite the clearly proven therapeutic benefit of warfarin, many older adults with AF remain undertreated. A recent American study showed that only 53% of nursing-home residents who had AF, in the absence of bleeding risk factors, were treated with warfarin.¹⁰

In our case scenario, a 12-lead electrocardiogram will be helpful to confirm the diagnosis of AF. This

should be followed by a discussion of the potential benefits and risks of initiating warfarin therapy, with a target therapeutic international normalisation ratio of 2.0 to 3.0.

Smoking

While studies have shown that mortality risk decreases in older adults who quit cigarette smoking after age 70, the main challenge is that many smokers may require several attempts to quit. The use of a nicotine patch or gum, and supportive counselling has been shown to increase abstinence rates beyond a year. We should definitely discuss strategies of smoking cessation with our patient in this scenario.

Case 2

You are seeing a 75-year-old female patient who experienced three episodes of pneumonia in the last year, which necessitated hospitalisation on all three occasions. She wonders whether her risk of pneumonia can be reduced.

Discussion of Case 2

Role of vaccinations

Pneumonia carries significant morbidity and mortality risks in older adults. Overall, the age-adjusted mortality rate of pneumonia is 25/100,000. The mortality risk increases further in nursing home residents (32%) and intensive care unit patients (40%).

A recent prospective study confirmed that older persons who received influenza A and pneumococcal vaccines had significantly lower all-cause mortality risk compared to the unvaccinated.¹¹ Influenza A vaccination is also effective in reducing hospitalisation rates and the likelihood of nursing home outbreaks, and it is cost effective. Annual administration to all

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older adults is recommended, as well as to those who are immunocompromised. Pneumococcal vaccination is effective in preventive invasive disease. It requires administration every five to 10 years. Its indications are similar to those in the influenza A vaccine.

In our case scenario, both influenza A and pneumococcal (if not received in the last five years) vaccinations are indicated.

Case 3

You are seeing a previously well 89-year-old male who is scheduled to have transurethral prostate resection in a week. He is worried that he may become confused around the time of his procedure. He asks you whether acute confusion in older adults can be prevented.

Discussion of Case 3

Primary prevention of delirium

Delirium is common in the elderly, and more common in individuals who have underlying dementia, severe medical illness (especially in the intensive care unit population), major surgery, and major depression. It carries significant morbidity and mortality risk. A recent controlled clinical trial demonstrated that multi-component interventions were effective in preventing delirium among hospitalised patients over age 70.¹² The individual components are summarised in Table 2.

In our case scenario, we can reassure our patient that the risk of delirium can be reduced when these interventions are used in combina-

tion. However, once delirium occurs, they have no significant impact on the severity or recurrence rate. Specialised medical units, such as acute care for elders units, can facilitate the implementation of these interventions.

Case 4

You are seeing an 83-year-old female in the company of her daughter. The patient, who does not see or hear very well, lives alone in a split-level house with one flight of stairs inside. The bedroom and bathroom are on the top level, whereas, the kitchen and a second bathroom are on the main level. The daughter is worried about her mother injuring herself at home and being unable to solicit any emergency help. She asks you what can be done to reduce her mother's risk of injury.

Discussion of Case 4

Prevention of household injuries

Injury prevention in older adults requires a multi-faceted approach. Ideally, an inter-disciplinary team (consisting of physicians, nurses, physical therapists, occupational therapists, social workers, and home care workers) should work with the elderly person and family/friends to complete the assessment and implement

the necessary interventions.

The patient in our case scenario has visual impairment. Routine visual acuity testing should be done in all older adults every one to two years. Common causes of visual impairment include pres-

The Heart Protection Study confirmed that adding 40 mg simvastatin daily reduced the rates of MI, stroke, and revascularisation by at least 1/4 in all high-risk patients, regardless of age.

byopia (consider corrective lenses), macular degeneration, cataracts, and glaucoma. Our patient is also hearing impaired. Audiologic testing can be helpful in identifying the subgroup of elderly persons who may benefit from hearing aids. A common challenge when implementing the proper use of corrective lenses or hearing aids is poor compliance, which arises either from the older person's strong sense of independence, or a lack of insight as seen in those with cognitive impairment.

Other primary preventive measures in reducing the likelihood of injuries remain inconclusive. A common cause of accidental injuries is falls. Comprehensive geriatric assessment has been shown to be helpful in managing the potentially reversible causes of falls. While there is some observational data that suggest improve-

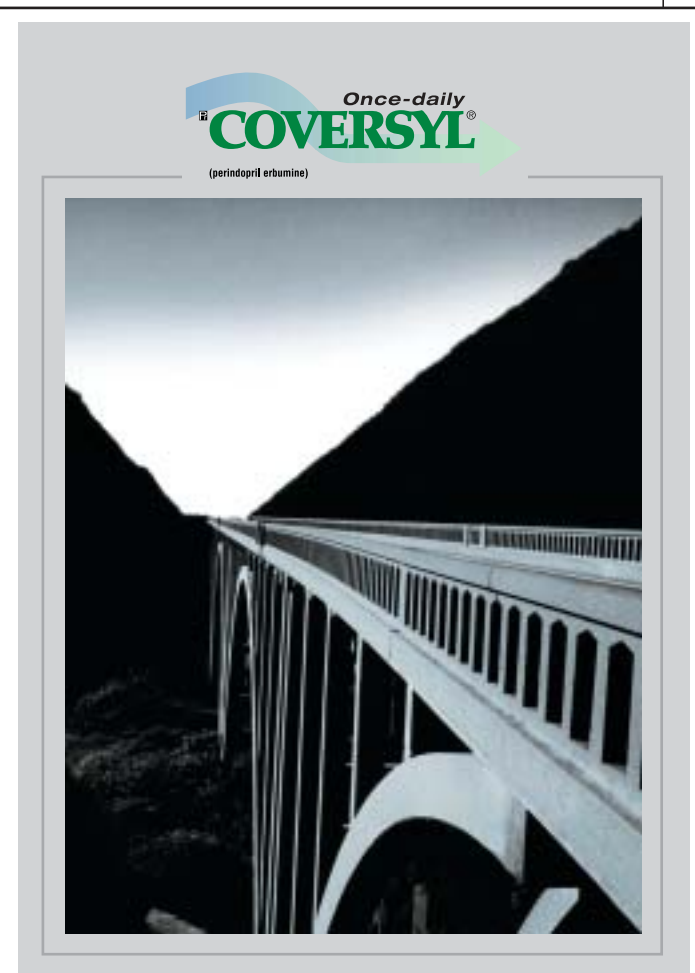
The mortality risk of pneumonia increases further in nursing home residents (32%) and intensive care unit patients (40%).

ment in the quality of life of older adults who engage in regular physical activities, exercise programs *per se* have not been proven to reduce the risk of falls in the general elderly population. In older adults with recurrent falls, environmen-

Table 2

Multi-component interventions for primary prevention of delirium in hospitalised older patients

Domains	Interventions
Cognition	Frequent reassessments Re-orientation (calendars, clocks) Activities (individual or group)
Adequate sleep	Quiet ambience hygiene Relaxation techniques (light music)
Early mobility	Frequent physical therapy (exercise) Avoid the use of physical restraint
Visual aids	Corrective lenses Enlarged signs with big fonts
Hearing aids	Portable amplifiers
Adequate hydration	Monitor volume status Adequate fluid intake Check blood tests (serum electrolytes, urea, creatinine)



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Table 3

Key points in preventive health in geriatrics

- Screen and treat older adults with hypertension, including isolated systolic hypertension.
- Screen and treat diabetes mellitus; aim to maintain good glycemic control.
- Screen and treat hyperlipidemia if known vascular risk factors are present.
- Anti-coagulation (warfarin therapy) in atrial fibrillation can reduce stroke risk.
- Influenza A and pneumococcal vaccinations are effective.
- Screen and treat sensory disorders, such as visual and hearing impairment.
- Comprehensive geriatric assessment and multi-faceted interventions can reduce risk and/or impact of injuries.
- Multi-component interventions are effective in the primary prevention of delirium.

tal modifications can help to improve their safety.

In our case scenario, we can discuss with the patient and her family the possibility of moving her bedroom to the main level. We can also suggest using appropriate assistive devices (*e.g.*, elevated toilet seats, bath stool, grab bars, *etc.*) and/or gait aids, improving overall lighting of the home, and removing clutter or other potential fall hazards. To reduce the impact of falls, *i.e.*, fracture risk reduction, the possibility of osteoporosis should be entertained (consider bone densitometry in selected individuals) and adequately treated.¹³ A recent randomised, controlled trial in ambulatory older adults also showed that the risk of hip fractures was significantly reduced by the use of external hip protectors.¹⁴ In some jurisdictions, lifeline subscription service is available and provides an additional

means for seniors who reside alone to obtain urgent assistance when needed. These are all important considerations for our patient in the case scenario. [CME](#)

Take Home Message

- Table 3 summarises the main points in preventive health among older adults. Many of these initiatives can be started by family physicians.
- Referral to specialists in geriatric medicine can be considered in the presence of common geriatric syndromes (dementia, delirium, depression, polypharmacy, mobility failure and falls, incontinence, dizziness, *etc.*), multiple and/or complex medical illnesses, or unexplained functional decline.
- A team approach is helpful in promoting health maintenance in the elderly.

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