The art in managing the elderly hypertensive patient

Eden E. Maro, MD. Amur A. Amur, MBBS.

ABSTRACT

Progressive aging of the World's population means that choosing the most effective drugs for the elderly is becoming increasingly important. The goal of antihypertensive therapy is to lower the blood pressure, as well as to maintain the quality of life of elderly patients and to reduce the overall cardiovascular risks. However, the choice of drug therapy in the elderly must consider alterations in patients physiology due to age, other medical illness, concomitant medications and ease of administration and thus must be individualized. Recent studies have proven diuretic treatment to be safe, effective and well tolerated by older hypertensive patients. It is best to start with a low dose. A potassium-sparing diuretics can be used but both hypokalemia and hyperkalemia have to be guarded against. Probably in the future, the calcium antagonists will become the preferred initial therapy in the elderly. They are certainly very useful drugs but are not without side-effects. The beta-blockers are useful in the elderly but they are not ideal for initial therapy. The initial dose should be small. The angiotensin converting enzyme inhibitors are also very valuable drugs but are best for those elderly hypertensives who have heart failure or whose blood pressure is difficult to control. Alpha-adrenoceptor blockade is desirable but can cause problems with postural hypotension in the elderly.

Keywords: Elderly hypertensives, concomitant conditions, stepped-care regimen, left ventricular hypertrophy.


Prospective studies in the elderly as in the young have confirmed that blood pressure is an important risk factor for cardiovascular disease, with stroke, coronary disease, heart failure and sudden death being important and potentially remediable endpoints. Despite the available evidence from interventional trials, showing benefits of treating hypertension in an elderly population, still many clinics are reluctant to treat the old patients for fear that lowering blood pressure would result in impairment of cerebral perfusion. Other clinicians are concerned that antihypertensive drugs might be less effective in reducing complications and its adverse effects might be more frequent and severe in older patients than in younger ones. The abundant evidence from clinical trials indicates that these concerns are unjustifiable. In fact, several recent studies have shown that treating elderly hypertensives does reduce fatal and nonfatal stroke, coronary artery disease, heart failure and sudden death.

Since the number of older people is projected to increase as the population grows, the question of whether and how to treat older hypertensive patients is a major challenge to medical practitioners and improved methods of treatment are urgently needed.

Areas of practical considerations. Hypertension in the elderly is defined as patients aged 60 - 80 years with systolic blood pressure above 160 mmHg or more or diastolic blood pressure above 90 mmHg or more on three separate occasions. Elderly hypertensive, unlike younger patients, have reduced myocardial reserve, stroke volume, cardiac output, baroreceptors sensitivity, aortic elasticity, intravascular volume and plasma renin activity. Total peripheral resistance is increased and regional blood flow is correspondingly reduced. Thus the elderly are susceptible to orthostatic hypertension and impaired perfusion of vital organs when blood pressure is reduced rapidly. Therefore, blood pressure should be measured in the standing as well as the seated position, and drug therapy should be...
titrated slowly. Drugs that characteristically potentiate orthostatic changes (e.g. Guanethidine) should be avoided.

Frequently older patients have concomitant conditions (such as diabetes mellitus, chronic lung disease, heart failure, rheumatoid arthritis) which may constitute specific indications or contraindications for particular antihypertensive drugs. Example: Beta-blockers may be useful with hypertension and angina, but should be avoided in those with bronchospasm, diabetes mellitus or congestive heart failure. Also drugs taken for concomitant conditions may also affect antihypertensive therapy. Example: Non-steroidal anti-inflammatory drugs taken for arthritis can promote sodium and fluid retention and antagonize antihypertensive therapy. Furthermore anti-arrhythmic agents and digoxin can potentiate the adverse effects of certain calcium antagonists (e.g. Verapamil) on cardiac conduction.

**Choice of drug therapy for elderly hypertensives.**

There is general agreement that hypertension in the elderly should be treated. In view of the problems with drug treatment in older people, it is strongly recommended that non-pharmacological maneuvers should be the first line of treatment of hypertension in all but the severest cases. Elderly hypertensive patients should, in theory, be very sensitive to salt restriction and may also benefit from potassium supplementation. Correction of obesity by calorie restriction and the limitation of alcohol intake are also effective in older patients. When a non-pharmacologic approach fails to control the blood pressure it is unclear which agents are most appropriate.

Traditionally, a stepped-care regimen, similar to that recommend for use in younger patients, has been advocated for use in elderly hypertensive patients but with lower initial doses and a more gradual increase. Several investigators have criticized this regimen as being excessively rigid. Among the reasons given of thinking this regimen is inadequate are: Lack of inclusion alpha-receptor blocking drugs for initiation of treatment, although these agents have been shown to be effective and well tolerated. Furthermore, inadequate emphasis is given to maintaining control with monotherapy by substituting a second drug when blood pressure is not controlled with the first.

In elderly patients such factors as concomitant diseases should be taken into account, the response to selected monotherapy assessed and a decision made on an individual basis ie. individualize treatment instead of step-care regimen. In this paper, a review on the scientific basis for the prescription of drugs for elderly is made, taking the aforementioned factors into account.

**Thiazide diuretics.** The long term use of Thiazide diuretics is associated with lowered peripheral resistance and reduction in intravascular volume. They do lower blood pressure effectively and reduce the complication of hypertension in elderly hypertensives.

In the European Working Party on high blood pressure in the Elderly (EWPHE), diuretics alone resulted in a 60% reduction in cardiovascular morbidity and fatal events and a 38% decrease in cardiovascular mortality. Reasons for the enhanced antihypertensive response to the Thiazide among the elderly are: with aging there are spontaneous reductions in stroke volume, blood volume, renal blood flow and plasma renin activity which are then augmented by the volume depleting effects of the diuretics. In addition, baroreceptor control is impaired with age, leading to a diminished ability to compensate for the volume and cardiac output.

Low-dose Thiazide treatment in the elderly is the most cost effective form of treatment. The recommended initial dose in those who are otherwise well, is Bendrofluazide 2.5 mg daily. A favorable Thiazide effect of considerable clinical importance in the elderly is a 33% reduction in the incidence of hip fractures associated with their long-term use. However, this advantage must be weighed against the potential hazards or adverse metabolic effects including hypokalemia, decreased glucose tolerance, increased serum uric acid and Creatinine levels and lipid abnormalities. Hypokalemia and lipid abnormalities are of special importance because they can negate the beneficial effects of blood pressure reduction on cardiovascular morbidity and mortality.

Elderly patients are more susceptible to Thiazide induced hypokalemia than younger patients. Whereas the role hypokalemia, as an independent risk factor for ventricular ectopic is disputed, it has been suggested that the elderly because of their propensity to develop left ventricular hypertrophy, may be at special risk of developing diuretic induced arrhythmias. Premature ventricular contractions which can be innocuous if the heart is healthy, can lead to sudden death in the presence of occult heart disease, eg. patients with left ventricular hypertrophy or coronary artery disease or those with heart failure who are receiving digitalis.

The active approach towards Thiazide-induced hypokalemia can be accomplished by using potassium sparing drugs. The EWPHE trial showed a significant reduction in cardiovascular mortality in elderly patients, treated with a combination of Thiazide and potassium-sparing diuretics. Alternatively, potassium supplements eg. Potassium Chloride, can be given. Large doses of at least 40 - 60 mmol/day are needed. However, the elderly develop complications from potassium maintenance therapy more often than the young, ulceration of the small bowel, hemorrhage, stenosis, perforation and hyperkalemia when renal failure is present. Also several drugs can increase the risk of potassium
supplement induced hyperkalaemia eg. Non-steroidal anti-inflammatory drugs, Beta-receptor blockers and angiotension-converting enzyme, inhibitors. Therefore potassium supplementation should be restricted to those at higher risk as a result of digitalis therapy, hypokalemia below 3 mmol/l, predisposition to hepatic coma and symptoms attributable to hypokalemia.

Calcium channel antagonists. These agents act on the arteriolar smooth muscle cell by preferentially blocking the inward calcium current without affecting the much faster sodium current thereby reducing smooth muscle tone. The resulting vasodilatation occurs mainly in the resistance vessels with the venous vascular bed virtually unaffected.

Calcium antagonists are unequivocally effective in a broad range of older hypertensive patients. They produce a greater absolute reduction in blood pressure in older than a younger patients. There is evidence that they lower blood pressure particularly effectively when plasma renin is low, as it often is in the elderly. They have a favorable hemodynamic profile in older patients, reducing peripheral vascular resistance without inducing reflex tachycardia or impairing renal blood flow. Also they may cause a mild sustained duresis. These agents have a neutral effect on serum lipids and have been shown to reduce arterial atherosclerotic lesions in animal models. Other advantages of these agents which make them potentially useful in long-term treatment is that they cause no problems with bronchospasm or cold extremities. They do not adversely affect renal function, a particular advantage in elderly patients who often have decreased renal perfusion. Also cerebral blood flow is unaltered. Unlike beta blockers, calcium antagonists have a less negative impact on quality of life. Furthermore, these agents have been shown to be safe and well tolerated by elderly hypertensive patients with concomitant diseases, including diabetes mellitus, coronary artery disease, obstructive lung disease, peripheral vascular disease and chronic cerebrovascular disease.

The common adverse effects of the calcium antagonists are headache, flushing, ankle oedema and in the cases of verapamil, constipation. These adverse effects occurred as frequently in young as in elderly patients.

Beta-adrenergic antagonists. These agents cause reduction in cardiac output and a decrease in arterial pressure with a readjustment in total peripheral resistance. Given the aforementioned pathophysiologic characteristics of the elderly, plus the age-related changes in the sympathetic nervous system, notably an increase in plasma norepinephrine levels and reduced beta-adrenoceptor responsiveness, theoretically it would appear that these drugs are unsuitable for elderly hypertensives. However, several studies have shown a useful reductions in blood pressure in elderly hypertensive patients treated with various beta blockers. Coope and Warrender studied 884 elderly hypertensive patients randomized to receive Atenolol (with or without a diuretic) or no treatment. Blood pressure was reduced by 18/11 mmHg during active treatment. Moreover, atenolol was well tolerated and the incidence of stroke was reduced by 58%.

Hypertension is associated with significant intellectual impairment in elderly. Beta blockers may be associated with depression, sleep disturbances (especially the more lipophilic agents such as propanolol and Metaprolol). From controlled studies, no deleterious effect on mental performance was found with Metaprolol or Atenolol.

Beta-blockers must be used selectively in order patients and they appear to be somewhat less effective in this age group than in younger patients. These agents should be avoided in patients with chronic obstructive airway disease, peripheral vascular disease, heart block and diabetes mellitus. However, beta blockers may be particularly useful in the elderly hypertensive patient with angina pectoris, a recent myocardial infarction, migraine or arrhythmia's sensitive to treatment with these agents.

Angiotension-converting enzyme inhibitor (ace). These drugs lower blood pressure by reducing peripheral resistance without affecting heart rate or cardiac output. As plasma renin activity and consequently angiotension II levels tend to decrease with increasing age, ACE inhibitors theoretically might be less effective in lowering blood pressure in elderly hypertensive patients, but this has not been borne out in practice.

Efficacy wise, ACE inhibitors have been shown to be effective in the management of elderly patients with hypertension although the elderly tend to have low renin salt sensitive hypertension. Available evidence indicates that ACE inhibitors improve survival in patients with congestive heart failure and may retard the progression of renal disease in diabetic patients. ACE inhibitors lower blood pressure without adverse metabolic effects. Hypertensive patients treated with ACE inhibitor benefit by showing less obvious impairment in wellbeing than during treatment with other drugs. They also have been reported to reduce the incidence of arrhythmia's in cardiac failure. Moreover, ACE inhibitors have been shown to improve survival after myocardial infarction and thus may have antianginal effects.

On the other hand, ACE inhibitor has been known to precipitate proteinuria and renal failure in patients with underlying renal insufficiency or renal artery stenosis and dehydration. Dysgesia and especially cough are moderately frequent side effects that may discourage patient adherence to ACE inhibitor.
therapy.

**Alpha-adrenoceptor blockers.** This group of drugs are selective antagonists for post-synaptic alpha-adrenoceptors and cause vasodilatation in both the arteriolar and venous beds with little or no reflex tachycardia—example Prozasin and related drugs.

Hemodynamically these agents would appear to be useful in the management of hypertension in the elderly. Unfortunately, they should be used selectively in older patients because they may induce or worsen orthostatic hypotension particularly after the first dose. Alpha-blockers have been reported to have favorable effects on serum lipids and on the symptoms of prostatic obstruction so they may be especially useful for patients with hyperlipidemia or prostatism.

**Vasodilator drugs.** The drugs in this group include the non-specific vasodilators, such as hydralazine and the specific agents such as the potassium channel activators, pinacidil, alpha-adrenoceptor blockers and calcium and serotonin antagonists that interact with known receptor.

Baroreceptor sensitivity decreases with increasing age and increasing arterial pressure. Moreover, heart rate response to hypertension induced by nonspecific vasodilators, example hydralazine, nitroprusside, is lower in elderly hypertensive patients than in young hypertensive and normotensive patients. Thus it has been hypothesized that the diminished baroreflex response in elderly hypertensive patients might attenuate the tachycardia associated with the use of arteriolar dilator drugs.

### References


