

47 Hypertension in Elderly

"YOU DO NOT HEAL OLD AGE; YOU PROTECT IT; YOU PROMOTE IT; YOU EXTEND IT"

— Sir James Sterling Ross

Abstract: The prevalence of hypertension rises with age and the complications secondary to hypertension also accumulate with time. Therefore, hypertension poses a formidable challenge in the elderly for the treating physician. Besides, there are age-related changes in the cardiovascular system. A thorough clinical and investigative work-up is mandatory in the elderly. Non-pharmacologic therapy should be offered not only as first line but also as an adjunct to pharmacologic agents. Weight reduction, dietary sodium reduction, dietary modifications, physical activity, restricting alcohol consumption all have a role. Thiazide diuretics and calcium channel blockers should be used as first line agents. ACE inhibitors, ARB, β -blockers and α -blockers also can be used if specific indications exist. Treatment goals in elderly remain the same as for general population but should be more strictly enforced.

INTRODUCTION

Indian elderly in 1961 were 5.63%, numbering around 24.7 million whereas in 2001 it rose to 7.4% (76.6 million). By considering current demographic trend it is projected that in middle of this century geriatric population will go up to 324 million i.e. four times of the current aged population.¹

Cross-sectional population studies showed that SBP increases throughout life, whereas DBP increases until about age 50 years and then declines in men and women and in all racial groups resulting in a widening Pulse Pressure (PP) resulting in Isolated Systolic Hypertension (ISH) in older persons. By age 60 years about two-thirds of those with hypertension have Isolated Systolic Hypertension (ISH); by age 75 years, almost all hypertensive have isolated systolic hypertension.² ISH is defined as a SBP of >140 mmHg and a DBP of < 90 mmHg. Now, it is widely recognized that SBP is equally important than DBP in determining cardiovascular and renal complications of hypertension³ (Fig.1).

EPIDEMIOLOGY

In 1999-2000, NHANES, 65% of American older than 60 years of age were hypertensive. Studies from India about the prevalence of hypertension showed linear increase in blood pressure with casual blood pressure being high in 15% of all surveyed 34.5% in those over 55 years 38.5% in those 65 years and 44% in those over 70 years.⁴

Hypertension is a powerful, independent and modifiable risk factor for the development of all the major clinical manifestations of atherosclerotic CVD that commonly afflicts the elderly, including coronary disease, stroke, Peripheral Artery Disease (PAD), heart failure, renal failure, and dementia.⁵

HYPERTENSION AWARENESS, TREATMENT AND CONTROL

Hypertension is highly prevalent in India. The prevalence increases with age consistently all over the world including India. Pooled data from epidemiological studies show that hypertension is found to be present in at least 25% urban and 10% rural adult subjects in India. Despite the high rate of prevalence, the rates of awareness and control are relatively low, suggesting a nationwide need for preventing and controlling high blood pressure in India in order to avert and prevent epidemic of cardiovascular diseases. It is difficult to say whether awareness of hypertension has actually increased in the population or not. In India and its surrounding countries, awareness level is $\leq 45\%$. Adequacy of control of blood pressure is abysmal and has been achieved in $< 10\%$ of hypertensives. The control rate in India is less than half of that in the west. Adequacy of treatment needs to be stressed at all levels using every public platform and every governmental agency. Controlling blood pressure should be the national priority as untreated hypertension adds significant number of disability adjusted years to life.⁶

AGE RELATED CHANGES IN THE CARDIOVASCULAR SYSTEM

The major age related changes in cardiovascular system are

- Arterial wall thickening and dilatation leads to arterial stiffening
- Endothelial dysfunction promoting vasoconstriction
- Increased left ventricular wall thickness and compliance
- Impaired cardiac reserve/with changes in rate and rhythm
- A decline in renal function that contributes to improper maintenance of extra cellular fluid volume and composition
- Others like obesity, cigarette smoking and diabetes also contribute to hypertension in elderly.

CLINICAL EVALUATION OF HYPERTENSION IN ELDERLY (TABLE 1)

Laboratory Assessment

The investigations are common to hypertensive patients. In elderly renovascular hypertension is a cause of secondary hypertension⁷ as seen more frequently and needs to be carefully looked at.

Treatment of Hypertension⁸

Non-pharmacological Therapy

Lifestyle changes particularly small weight loss and reduced sodium intake are beneficial in controlling BP in elderly hypertensive and are associated with need for pharmacological therapy.⁹ However these changes have to be in moderation, as they should not compromise with the quality-of-life in the elderly as IHD, cardiac failure, renal failure, peripheral vascular disease and orthopedic problems are also co-existent in this population.

Table 2 outlines the various lifestyle measures and the effect they have on BP.

Pharmacological Therapy

General guidelines related to Antihypertensive Treatment in the Elderly

- Therapy in older individuals with hypertension should begin with lifestyle modification
- Weight loss and sodium restriction may decrease the need for antihypertensive medication in this population

- The starting dose of medication should be one half of that used in younger patients
- In the elderly patient with hypertension and no compelling indications, a thiazide type diuretic is recommended as initial therapy
- The minimum goal for BP control is < 140/90 mmHg while in those with diabetes and renal disease the goal is <130/80 mmHg.
- Patients with ISH should reduce their SBP to <140 mmHg
- Caution should be exercised when lowering DBP to < 55 mmHg when treating the older patient with ISH.
- α -blocker therapy should not be used as initial therapy to further help reduce blood pressure (BP)
- The effects of hormone replacement therapy on BP are unclear.

An algorithm for treatment of hypertension has been outlined in Figure 2. Individual chapter of drugs are discussed below.

DIURETICS

In 2003, Psaty *et al*¹⁰ conducted a “network” meta-analysis comparing cardiovascular outcomes of various antihypertensive agents, the majority of participants were elderly. They confirmed a highly significant ($p \leq 0.002$ for each) reduction in CHD (-21%), strokes (-29%), heart failure (-49%), CVD (-24%), CVD mortality (-19%) and total mortality (-10%) for low dose diuretics compared with placebo. Diuretics reduced CVD events significantly more (-11%) than β -blockers, and CHD (-13%) heart failure (-17%), and stroke (-10%) were significantly lower with diuretics.

β -blockers have appeared less effective in hypertension trials of the elderly in reducing CHD or mortality than thiazide-type diuretics have.

The results of ALLHAT¹¹ trial support the initial use of diuretics over CCBs and ACE inhibitors as initial therapy in most older patients with hypertension, including those with diabetes mellitus or prior CHD and also suggest ACE inhibitors or CCBs may be acceptable alternatives if a diuretic is contraindicated or not tolerated and preferred agents to add to a diuretic.

Thiazide-type diuretics should be used as initial therapy for most patients with hypertension in elderly, either alone or in combination. When a compelling indication is present for another agent (Table 3), a diuretic should also be used for optimal CVD benefit and BP control.

CALCIUM ANTAGONISTS

Clinical trails have shown benefit of BP reduction and prevention of cardiovascular and cerebrovascular events using calcium antagonists.

Syst-Eur and SHEP studies^{12,13} were among the very first to demonstrate the ability of a dihydrophyridine calcium antagonist to significantly reduce cardiovascular morbidity and mortality in older patients with hypertension and also emphasize the importance of BP reduction regardless of the agent used even in diabetics because the BP reduction plays a greater role than blood glucose control in reduction of macrovascular events.

Major clinical trials showing percentage of event reduction

	<i>SHEP</i>	<i>Syst-Eur</i>
Stroke	33%	42%
CAD	27%	30%
CHF	55%	29%
All CVR disease	32%	31%

The effectiveness and safety of the calcium antagonist class of antihypertensive in older patients has been proven in comparison to placebo and several other types of antihypertensive agents. Earlier reports of increased cancer incidence and bleeding risk have not proven to be significant in recent trials.

ACE INHIBITORS

ACE inhibitors also improve endothelial function, facilitate vascular remodeling, and favorably alter the viscoelastic properties of blood vessels. These vascular properties of ACE inhibitors are the likely explanation for the incremental reduction in BP with the long-term use of these drugs.¹⁴

Physician preference for these drugs in elderly derives from their favorable side-effect profile and their end-organ protection features in at-risk cardiac and renal patients.

ACE inhibitors are of value in the treatment of patients with cerebrovascular disease because they preserve cerebral autoregulatory ability despite their reducing BP.

The HOPE study¹⁵ treatment with the ACE inhibitor ramipril reduced the risk of stroke in high-risk patients. A highly significant 32% reduction in total stroke rate, and recurrent strokes were reduced by 33%. American Heart Association guidelines for the primary prevention of stroke recommend ramipril to prevent stroke in high-risk patients and in patients with diabetes and hypertension. The ACE inhibitors also decreased the incidence of new-onset type 2 diabetes mellitus but this finding has not been confirmed in DREAM Trial.

Certain patient types are presumed to be less responsive to ACE inhibitor monotherapy, low-renin state, salt-sensitive individuals such as the diabetic and African-American or elderly hypertensive.

Angiotensin Receptor Blockers (ARB)

ARBs are proven to be effective in reducing the rate of renal insufficiency among diabetic hypertensive, reducing strokes for elderly patients and hypertensive patients with left ventricular hypertrophy,¹⁶ and reducing cardiovascular mortality and total mortality.

Equivalent reduction in BP was observed when directly comparing ARBs with ACE inhibitors, β -blockers, or calcium antagonists. ARBs, when combined with a diuretic or a calcium antagonist, resulted in greater declines in BP than monotherapy.

α -ADRENOCEPTOR BLOCKERS

Selective α_1 -blockers have been shown to be effective antihypertensive agent whether used as monotherapy or as part of a regimen of multiple antihypertensive drugs. Their effects are additive to other class antihypertensive drugs. They are proven beneficial effects on serum lipid profile, improvement in insulin sensitivity, reduction in serum insulin level, and reducing fasting glucose.¹⁷

COMBINATION THERAPY

There are three options for the treatment of hypertension if the initial drug choice fails to achieve the target of BP control: (a) Drug titration, (b) Drug substitution and (c) Drug combination.

Combination therapy is needed by most patients to achieve the optimal BP control.¹⁸ The recommendation of recent guidelines is to consider initiating therapy with combination of two agents in those whose blood pressure is substantially elevated or where target organ damage or other risk factors demand an aggressive approach. JNC 7 recommends combination therapy for the BP of 160/100 mmHg or more.⁸

The target BP for diabetes and chronic kidney disease is less than 130/80 mmHg. Thus, the presence of diabetes, chronic kidney disease as well as systolic hypertension increases the probability of the requirement of two or more drugs.

Follow-up of Hypertensive Patients (Table 4)

Most patients with well controlled BP after 6 to 9 month of treatment remain stable for long periods and can be seen every 6 month there after.

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multiple choice questions

MULTIPLE CHOICE QUESTIONS

- 1. The common type of hypertension in elderly:**
 - A. Isolated diastolic hypertension
 - B. Both systolic and diastolic Hypertension
 - C. Isolated systolic Hypertension
 - D. All the above
- 2. The strong marker of cerebrovascular disease morbidity and mortality:**
 - A. Diastolic blood pressure
 - B. Both systolic and diastolic blood pressure
 - C. Pulse pressure
 - D. Mean arterial pressure
- 3. Osler's sign is positive in:**

ol type="A"> A. Orthostatic hypotension C. Pseudohypertension	ol type="A"> B. White coat hypertension D. None
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- 4. Uses of ambulatory blood pressure monitoring is useful in all *except*:**
 - A. White coat hypertension
 - B. Borderline hypertension
 - C. Routine diagnosis of hypertension
 - D. Refractory hypertension on treatment
- 5. DASH eating plan alone reduces systolic blood pressure by:**

ol type="A"> A. 2-4 mmHg C. 16-20 mmHg	ol type="A"> B. 8-14 mmHg D. >25 mmHg
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- 6. Hypertension treatment decrease stroke by:**

ol type="A"> A. 10-20% C. 60-70%	ol type="A"> B. 30-40% D. 90-100%
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- 7. The goal of BP reduction in hypertension patient suffering from diabetes and renal disease:**

ol type="A"> A. <140/90 mm Hg C. <130/80 mm Hg	ol type="A"> B. <150/90 mm Hg D. <160/90 mm Hg
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- 8. Which antihypertensive combination has higher incidence of new onset diabetes?**

ol type="A"> A. CCB + diuretic C. ARB + diuretic	ol type="A"> B. BB + diuretic D. Alpha + Beta blocker
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- 9. JNC-7 recommendation level of BP for initiating combination antihypertensive drug is:**

ol type="A"> A. > 160/100 C. >180/110	ol type="A"> B. >140/90 D. >200/110
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1. C 2. C 3. C 4. C 5. B 6. B 7. C 8. B 9. A