WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Review Article

An Overview on Lifestyle Management and Prescribing Pattern of Antihypertensives in Geriatric Patients

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ABSTRACT

High blood pressure, or hypertension, is a major health problem that is common in older patients. Nonpharmacological strategies is used as a first-line approach to lower blood pressure in elderly patients. Exercise is an efficient lifestyle tool that can benefit health-related outcomes, including blood pressure control, in older adults. Calcium channel blockers were the most common antihypertensive drug prescribed and more than half of the elderly patients in monotherapy. Antihypertensives should be started at very low dose then gradually increased. The aim of this review is to highlight importance of hypertension in aged people in order to improve the quality of life and to lower the incidence of cardiac complications.

KEY WORDS – Hypertension , Elderly , Lifestyle management, Antihypertensives

INTRODUCTION

Hypertension is also known as high blood pressure it is defined as the systolic blood pressure(SBP) of 140mm Hg or more, or a diastolic blood pressure(DBP) of 90mm Hg or more. Hypertension is the major causes of mortality worldwide. Hypertension is a very common disorder particularly elderly. Hypertension is the modifiable and major risk factor for coronary artery disease,heart failure ,chronic renal failure.([1])

CLASSIFICATION OF HYPERTENSION([2])

Classification	Systolic blood pressure(mmHg)	Diastolic blood pressure(mmHg)
Normal	<120	<80
Prehypertension	120-139	80_89
Stage 1 hypertension	140-159	90_99
Stage 2 hypertension	>160	>100

TABLE 1: classification of hypertension

ETIOLOGY

1. Essential Hypertension:

It is also known as primary hypertension. Numerous mechanism have been identified that may contribute to the pathogenesis . ([3]).95% cases no cause of hypertension found uncommon before age 20. Onset is between ages 25 and 55 years .

A. NON-MODIFIABLE
B. MODIFIABLE

2. Secondary Hypertension**:**

Less than 10% of patient has secondary hypertension, where either a drug is responsible for elevating blood pressure. In most of the cases renal dysfunction resulting from chronic kidney or endovascular disease is most common secondary cause. ([2])

EPIDEMIOLOGY

- Recent studies from Indian have shown the prevalence of hypertension to be Increased 25% in urban and 10% in rural people in India
- According to WHO estimate, the prevalence of raised Blood pressure in Indians is 32.5%(33.2%in men and 31.7% women)
- Andhra Pradesh (13.3%)Odisha(9%),Chhattisgarh(8.4%) and Gujarat(6.7%)have highest prevalence ([5])

A significant increase of 5.6% in women from 1988-2000,whearas the prevalence in man has remained unchanged .prevalence rates are highest in non –Hispanic black(33.5%)followed by non –Hispanic whites (28.9)and Mexican- Americans(20.7%).([4])

Year 2000	Year 2025
26.4%of world adult population had hypertension	29.2%of world adult population had hypertension
Total of 929 million adults	Total 1.56 billion adults 20%in developed nations,80%in developing nations

PATHOPHYSIOLOGY([6])

- RENIN-ANGIOTENSIN ALDOSTERONE SYSTEM (RAAS).
- NATRIURETIC HORMONE
- PERIPHERAL AUTOREGULATION
- ELECTROLYTE AND OTHER CHEMICALS

LIFESTYLE MANAGEMENT FOR HYPERTENSION

Lifestyle modification is indicated for all patients with hypertension. And regardless of drug therapy ,life style management is used rather than antihypertensives In addition to the immediate goal of lowering blood pressure ,the recommended life changes result in range of health benefits, including better outcomes of chronic disease. Lifestyle factor play an important role on management of hypertension.([10])

1. Physical activity: It is clear that activity lowers resting and daytime ambulatory blood pressure . It has been reported that a habitual physical activity is able to prevent the development of hypertension. Engage in regular aerobic physical activity such as brisk walking (at least 30min per day ;most day of the week).

2. Smoking: It is the strong independent risk factor of cardiovascular disease. Thus cigarette smoking has a double role action on vascular resistances, acting by an impaired endothelium dependent vasodilation and an increased catecholamine dependent vasoconstriction.

3. Salt intake: High dietary sodium intake is associated with an increased incidence of stroke and with increased risk of death due to coronary heart disease.Reducing dietary sodium, by approximately 1700mg (75mmol)per day can lower systolic blood pressure by 4-5 mmHg in hypertensive individual.This may reduce the need for antihypertensive drugs.Reduced salt diet in combination with thiazide diuretics may predispose elderly patient to hyponatraemia ,so electrolyte should be monitored regularly. The DASH study showed that reducing salt intake systolic and diastolic pressure lowered in linear manner both in hypertensives and normotensive patients.([7])

4. Alcohol intake: Epidemiological data show a linear relationship between alcohol consumption and hypertension prevalence. Reducing alcohol consumption can lower systolic blood pressure by average of 3.8 mmHg in patient with hypertension.

5. Healthy Eating; Blood pressure reduction in people with and without hypertension can be achieved by healthy eating pattern based on Dietary Approach. To Stop Hypertension(DASH),in addition to reduced salt intake. .The DASH diet emphasises on fruits, vegetables, whole grains, low fat dairy products and dietary fibre. Epidemiological evidence suggest that low dietary intake of calcium and magnesium can increase the prevalence of hypertension. High dose (at least 3g/day) omega -3 polysaturated fatty acid supplement(fish oil) may also lower

blood pressure in diuretic.

6. Body Weight: There is a direct association between blood pressure and body weight .Weight loss studies show that clinically significant blood pressure reduction can be achieved by modest weight loss in people with and without hypertension and that blood pressure reduction is proportionaltoweight loss. In overweight patient with hypertension, weight reducing diet can achieve 3-9 %decrease in body weight and may reduce systolic and diastolic blood pressure by approximately 3mmHg([12]).

ELDERLY HYPERTENSION AND INFLUENCE OF CLASS OF DRUGS

Between 1988-1994 and 2005-2008, the prevalence of hypertension increased among patients aged greater than 65 years. The use of antihypentensives medication also increased during that period. As the life expectancy continues to rise, approaching 75 years for men and 80 years for women,the use of antihypertensives medication in elderly will intensify. Elderly people have a high prevalence with over 70% having blood pressure greater than 140/90mmHg.Therefore the absolute benefits of blood pressure treatment are particularly large in this group .The elderly are at particular risk of certain adverse effects of treatment such as postural hypertension and it is important that both sitting and standing blood pressure are monitored.

Elderly patients are prone to have isolated systolic hypertension(ISH)- systolic BP greater than 140mmHg-which is likely a result of an increase in arterial stiffness fron arteriosclerosis or impairment of nitric oxide-mediated vasodilation.The majority of the trial uses the Diuretics and β blockers as first line drug choice. The benefit of calcium channel blockers and ACE inhibitors has been reported more recently in the prevention of cardiovascular and cerebrovascular complication in older patients.([9])

The following factors to be considered in elderly peoples

- Decrease the baroreflex function
- Increase the venous insufficiency
- Increases salt sensitivity
- Renal dysfunction occurs
- Arteries stiffness
- Initial hyperplasia in aorta
- Change in arterial vasculator

PRESCRIBING PATTERNS OF HYPERTENSION IN GERIATERICS

The prevalence of hypertension increases with age, therefore the burden of hypertension is expected to rise with world's rapidly ageing population . The treatment goal for hypertension among elderly patients are similar to those for hypertension among younger patients; to lower the patient's blood pressure to prevent major cardiovascular events that attribute to hypertension .In general drug treatment in elderly patients aims to use the least number of drugs to control BP, and reduction in BP should be gradual so as to minimise the risk of ischemic events(especially in patients with postural hypertension).

Hypertension is present in 57%of 1,160 older men ,mean age 80 years, and in 60% of 2,464 older women mean age 81 years. The Present study was to assess the prescribing pattern of antihypertensive medication in geriatric population suffering mainly from hypertension with or without comorbidities .The various observational study was carried out for 6 months and also in patient general medicine department.([13])

Various research studies shows that high blood pressure in more common in men than women. The risk of high blood pressure increases with age mainly in early middle age. In the present study 76% of patient were literate people , 57% were employed,31% of patients having monthly income of 5000-10000 and 2 % were smokers and 15% were alcoholic patients.

The women's were more likely to develop high blood pressure after the menopause. The most commonly prescribed drug classes in study was calcium channel blockers 37% followed by Angiotensin 2 receptor antagonist 21% and most commonly prescribed drugs in the study population were Amlodipine 37%, Losartan 11%,and Telmisartan 10%. The study shows that most prescribed drug classes involved were calcium channel blockers followed by Angiotensin 2 receptor antagonist. The most co two drug combination therapy involved in the study was Amlodipine+ Atenolol 7% followed by Metoprolol + Amlodipine 1%.([14])

1. CALCIUM CHANNEL BLOCKERS

CCBs can be used as first line hypertension treatment in the elderly. In general CCBs are well tolerated in elderly. Several clinical trial have shown that CCBs are effective and safe in elderly population. One of landmark study involving this drug clss include systolic hypertension in Europe.([15])

MECHANISM OF ACTION

Decreases calcium current and calcium entry into cardiac and vascular smooth muscles

Decrease heart rate, decrease contractibility, decrease conduction velocity

⇩

Relaxation of vascular smooth muscle

DOSE:

Amlodipine- 2.5–10mg

Nifedipine- 30–90mg

Verapamil-180- 400mg

SIDE EFFECTS OF CALCIUM CHANNEL BLOCKERS

- Vasodilation
- Ankle edema
- Bradycardia
- Constipation
- Headache
- Nausea
- Rash
- Swelling in feet and lower legs

DRUG INTERACTIONS

- Verapamil and Diltiazem reduce the elimination and increase blood level of carbamazepine and lead to toxicity.
- Grapefruit juice may elevate serum concentration of Verapamil, felodipine, Nicardipine.

CONTRAINDICATION

- Heart failure
- Bradycardia
- Atrioventricular Block
- Dihydropyridine calcium channel blockers should not be used in people with uncontrolled heart failure.

2. ANGIOTENSIN2RECEPTORANTAGONIST

Antagonist of rennin- angiotensin- aldosterone system are more effective in older persons, many of whom have concomitant condition such as diabetes mellitus, renal dysfunction and other cardiovascular risk factors. Treatment with ACE inhibitors and Angiotensin 2 receptor blockers have been shown more amount of improvement in many of complications of hypertension including left ventricular hypertrophy and renal disease[15]. Morbidity(CHARM)added evidence that Angiotensin 2 receptor blockers are suited for the treatment of hypertension in older patients These trials also indicate that they are appropriate therapy for heart failure patients and for patients who are experienced acute myocardial infraction, particularly those who are unable to tolerate an ACE inhibitor. ARBs exhibit effective BP control in elderly when compared with other antihypertensives.([16])

MECHANISM OF ACTION:

Angiotensin 2 receptor blockers

↓

Block the action of Angiotensin 2 by preventing Angiotensin 2 from binding to Angiotensin 2 receptors on blood vessel

As a result, blood vessel dilates

DOSE

↓

Losartan-50- 100mg

Candesartan- 16- 32mg

Valsartan-40- 160 mg

SIDE EFFECT

- Dizziness
- Headache
- Elevated Potassium level
- Muscle pain
- Black and terry stools
- Troubled breathing
- Blood in urine or stools

INTERACTIONS

- Fluconazole impairs conversion of Losartan to its active form
- Rifamycin reduces blood level of Losartan

CONTRAINDICATION

- Pregnancy because cause congenital malformation, stillbirth, neonatal death

- Patients hypersensitive to any of ARBs

3. ANGIOTENSIN CONVERTING ENZYME INHIBITORS

Used mainly as monotherapy the effectiveness of ACE inhibitors is limited. There are advantage for using them in combination with other drugs, is calcium antagonist.One important clinical trial that Illustrated the effectiveness and beneficial effect of

ACE inhibitors in elderly population with hypertension is Second Australian National Blood pressure Study(ANBP2).

This study randomized 6083 patient with hypertension (aged 65-84) to receive either Enalapril or Hydrochlorothiazide. At end of the study BP reduction was found to be similar in both groups. The ACE inhibitors group was found to have fewer cardiovascular event(6595Vs 736) and fewer cerebrovascular events (152 Vs 163).In addition males, receiving an ACE inhibitors achieved 17% reduction in all cardiovascular events.([16])

. The log term use of ACE inhibitors is associated with improved survival and reduced cardiovascular and renal morbidity in these patients.

MECHANISM OF ACTION

1. Inhibit the generation of angiotensin 2 resulting in:
    - Dilation of arterioles_peripheral vascular resistance- decrease in BP,
    - Decrease in aldosterone production_ Decrease in sodium and water retention_ decrease in BP.
    - Decrease in sympathetic nerve system activity
2. Inhibit degradation of bradykinin by ACE inhibitors.
3. Stimulating the synthesis of vasodilatingprostaglandin by Bradykinin.([2])

DOSE

Captopril -- 12.5 -100 mg

Enalapril -- 2.5 – 20 mg

Lisinopril -- 10 -40mg

Perindopril -- 2 8 mg

SIDE EFFECT

- Hyperkalaemia
- Rashes
- Teratogenic effect
- Angioedema
- Itching
- Dysgeusia

DRUG INTERACTIONS

- Can cause an increased effect on medication especially with diuretics.
- Cause an increased risk of hyperkalaemia due to the suppression of aldosterone.
- Increase to risk of lithium toxicity when given with lithium.
- Allopurinol increase hypersensitivity to medications.

CONTRAINDICATIONS

- Pregnancy
- Allergy /Angioedema
- Renal artery stenosis/ Renal failure
- Hyperkalaemia (potassium> 5.5)
- Hypotension

CONCLUSION

Hypertension is a very important disorder in aged people and is associated with high risk of cardiovascular morbidity and mortality. The fact of reducing blood pressure value decreases the risk for cardiac death in aged people. Therefore the aim of treatment in elderly must is to reduce cardiovascular risk and to maintain an adequate quality of life and the good functioning of body. Hypertension manly increases with age affecting approximately 66% of elderly population(aged ≥ 65 years). A number of placebo controlled clinical trials have thus demonstrated that blood pressure control reduces cardiovascular events in elderly patients, even those aged >80 years. Lifestyle changes have the potential to decrease the hypertension

in elderly people. Screening of blood pressure ,improving care, adoption of guideline reduces the impact of hypertension in elderly. Despite advances in medical care, hypertension controls rates remain low , especially in elderly populations.Lifestyle modification is effective in this population, but it is difficult to maintain. The beneficial effects on exercise on hypertension control in elderly have been illustrated in many studies. Encouraging lifestyle is the first line treatment. Medication should be started as appropriate, Diuretics, ACE inhibitors, ARBs, and CCBs a have been proved as first line treatment agent, and show be started with low dose and titrated as tolerated for elderly. For elderly patients aged (>80 years), the risk and benefits of tight control need to be frequently revaluated.

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