

Amlodipine in the Currently Management of Hypertension

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Abstract: High blood pressure is a major cause of heart disease, stroke, and kidney problems. Amlodipine, a calcium channel blocker, is one of the most commonly used medicines to manage hypertension. This review explains how amlodipine works, how effective it is, and why it is suitable for many types of patients. Amlodipine provides steady 24-hour blood pressure control with just one daily dose. It works well alone or in combination with other blood pressure medicines, such as angiotensin receptor blockers and diuretics. Studies show it is effective in older adults, people with diabetes, chronic kidney disease, and different ethnic groups, including Asian and Black patients. It also helps reduce the risk of stroke, heart attack, and blood pressure fluctuations. Compared to some other medicines, amlodipine has fewer side effects, does not harm kidney function or blood sugar, and improves long-term heart health. Because of its safety, effectiveness, and convenience, amlodipine remains an important choice for treating mild to moderate hypertension.

Keywords: Amlodipine, Hypertension, Calcium channel blockers, Blood pressure control, Combination therapy, Chronic kidney disease, Blood pressure variability, Pharmacoeconomics

I. INTRODUCTION

¹Amlodipine (AD) is a calcium channel blocker. Newer medicines in this group, such as amlodipine, felodipine, and nisoldipine, work mainly on blood vessels and last longer. They act slowly and steadily, giving smooth control of blood pressure for 24 hours. Since they need to be taken only once a day, they are more convenient for patients and cause fewer side effects. Calcium channel blockers can be safely used by many people with high blood pressure, including older adults, Black patients, and those who cannot take other blood pressure medicines.

Amlodipine is widely used to treat heart problems such as angina and high blood pressure. Different dosage forms of amlodipine have been developed to improve its effectiveness and stability. This review looks at the various formulations of amlodipine reported in the literature, which can help researchers and drug developers find the most suitable dosage form.

²Calcium channel blockers (CCBs) were first used more than 35 years ago to treat coronary heart disease (CHD). Later, they became well known for effectively controlling high blood pressure (hypertension). Apart from hypertension, they were also used for angina, peripheral vascular disease, and some heart rhythm problems. Amlodipine has several special features that make it different from other medicines in this group. This review aims to compare amlodipine with other blood pressure medicines, focusing on how well it improves heart health and lowers the risk of heart-related problems.

³High blood pressure (BP) is a major risk factor for stroke, heart disease, and kidney failure. Many clinical studies have shown that lowering BP can reduce the risk of stroke by about 35%, heart failure by 42%, and coronary heart disease by 28%. Current European guidelines suggest keeping systolic BP (SBP) below 140 mmHg and diastolic BP (DBP) below 90 mmHg in the general population.

However, even with these recommendations and clear evidence linking high BP to heart and kidney problems, BP control remains poor, especially in Europe. The main goal of any blood pressure treatment is to bring BP down to target levels and reduce health risks as much as possible.



Recent European guidelines suggest aiming for BP levels between 130–139/80–85 mmHg in most patients with hypertension, including those with diabetes. These guidelines recommend angiotensin receptor blockers (ARBs) and calcium channel blockers (CCBs) as first-choice treatments, either alone or in combination.

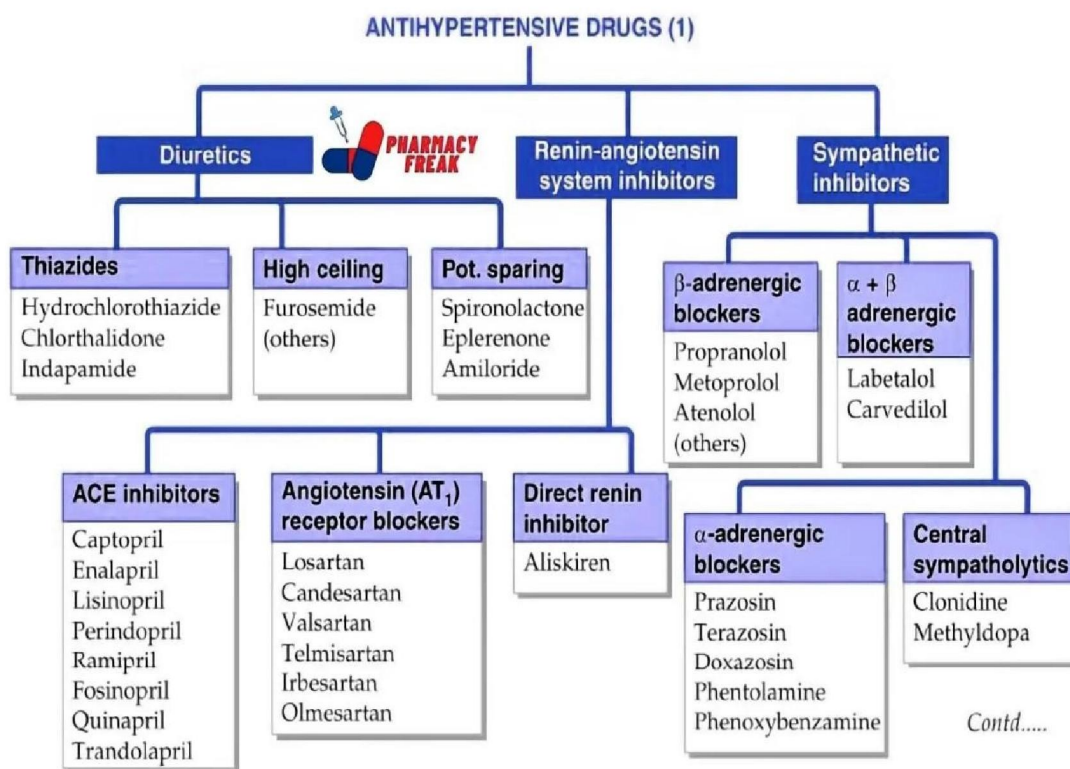
This article focuses on the reasons for using a fixed-dose combination of the ARB olmesartan medoxomil and the CCB amlodipine.

⁴ Several clinical trials have shown that amlodipine works well for Indian patients with high blood pressure. However, there is no real-world evidence from electronic medical records (EMR) about how effective it is in India. Therefore, we carried out this study to provide evidence on how well amlodipine works, either alone or with other medicines, in Indian patients with high blood pressure in real-world conditions.

HYPERTENSION EPIDEMIOLOGY

⁵ High blood pressure (hypertension) becomes more common as people get older. More than 60% of people over the age of 60 have it. A large study with over 100 million people found that high blood pressure is especially common in Central and Eastern Europe, Central Asia, Oceania, Southern Africa, and some parts of Latin America and the Caribbean.

Blood pressure readings of 130–139/80–89 mm Hg or higher are called stage 1 hypertension according to the 2017 American College of Cardiology/American Heart Association (AHA) guidelines. This level of blood pressure is often seen in young adults and can be harmful if left untreated.



In China, a long-term study of over 21,000 people showed that 65% of middle-aged adults (35–59 years old) with stage 1 hypertension developed stage 2 hypertension (140/90 mm Hg or higher) within 15 years. Stage 1 hypertension in this group was linked to a 26.5% higher risk of death from heart disease and a 13.4% higher risk of heart-related problems compared to people with normal blood pressure.

The AHA also highlights that treating stage 1 hypertension, even in people with a low 10-year risk of heart disease, provides more benefits than risks.



Diuretics in Hypertension (Simplified)

Diuretics have been the main drugs for high blood pressure (hypertension) for almost 50 years, but they do not reduce blood pressure in people with normal BP.

Thiazide Diuretics

Common drugs: Hydrochlorothiazide (HCZ) and Chlorthalidone.

Both work equally well, but chlorthalidone lasts longer (up to 48 hours) compared to HCZ (< 24 hours).

Because of this, NICE guidelines recommend chlorthalidone over HCZ.

Indapamide is also widely used and is just as effective.

Other thiazides are not interchangeable for treating hypertension.

At first, they make the body lose water and salt (5–15%), which lowers blood volume and cardiac output (CO).

Later, the body adjusts and restores most of the volume and CO. But blood pressure still stays lower because total peripheral resistance (TPR) slowly decreases.

This lasting effect is probably due to a small ongoing loss of sodium, which makes blood vessels less stiff and more relaxed.

The blood pressure drop happens gradually over 2–4 weeks.

With long-term use, heart rate and CO stay normal, but TPR remains lower.

Sympathetic reflexes (like standing up quickly) are not affected, so postural hypotension is rare.

On average, thiazides lower BP by less than 10 mmHg.

Use:-

- Alone, thiazides work well in about 30% of patients.
- More often, they are combined with other BP medicines because:
 - They boost the effect of most antihypertensives (except dihydropyridine calcium channel blockers).
 - They prevent tolerance by stopping fluid retention.
 - Especially effective in elderly patients.
- Usual effective dose: 25 mg/day of HCZ (higher doses cause more urination, not better BP control).
- Their effect can be reduced by NSAIDs.
- Loop Diuretics (High Ceiling Diuretics) Example: Furosemide.
- Strong at removing fluid but not as good at lowering BP compared to thiazides.
- BP reduction only happens while blood volume and CO are low.
- Effect wears off quickly (4–6 hours), and sodium reabsorption later cancels out the benefit.
- Do not reduce TPR or improve vessel relaxation.
- More likely to cause electrolyte imbalance, weakness, and side effects.

Mainly used in:

- Chronic kidney disease (CKD)
- Heart failure (CHF)
- When combined with vasodilators that cause fluid retention

Advantages of Thiazides

Taken once daily, with simple dosing.

Do not cause tolerance or fluid retention.

Rarely cause postural hypotension or central nervous system (CNS) side effects.

In short:

Thiazides (HCZ, chlorthalidone, indapamide) are the preferred diuretics for hypertension.

Loop diuretics (like furosemide) are reserved for patients with kidney failure, heart failure, or severe fluid overload.

Goal of Antihypertensive Therapy:-



The main aim of treatment for high blood pressure (BP) is to prevent illness and early death caused by constantly raised BP. This is done by lowering BP to the target level with as little trouble to the patient as possible.

Both systolic (upper value) and diastolic (lower value) BP can predict the chances of damage to important organs (called target organ damage – TOD) and related problems, such as:

Brain problems: stroke, mini-stroke (TIA), brain swelling.

Heart problems: thickening of heart muscle (LVH), heart failure.

Coronary artery disease: angina, heart attack, sudden death.

Narrowing of peripheral arteries, eye damage (retinopathy).

Aortic aneurysm (ballooning of the aorta).

Kidney damage leading to kidney failure.

People who already have TOD are at higher risk of further damage and death, even if their BP is only moderately raised.

•Blood Pressure Grading and Risk Factors:-

According to NICE guidelines (2019), hypertension is classified into grades.

But the risk of complications depends not only on BP level, but also on:

•Other risk factors:-

Age >55 years (men), >65 years (women)

Family history of early heart disease

Smoking

High cholesterol (↑LDL, ↓HDL, ↑triglycerides)

Diabetes

Existing hypertension

Obesity (BMI ≥ 30)

Chronic kidney disease (CKD)

Sedentary lifestyle

The JNC guidelines also list special situations (compelling indications) where some drugs must be used, even if BP is only mildly raised. Sometimes, in people with co-morbidities (like diabetes, kidney disease, or heart disease), the BP target is kept lower (<130/90 mmHg).

•Treatment Thresholds:-

In most patients, drug treatment is started if BP ≥ 140/90 mmHg.

Even patients with BP 120–139/80–89 mmHg may benefit if they have diabetes or other risk factors.

In patients ≥60 years, JNC 8 (2014) recommends starting drugs only if systolic BP ≥150 mmHg, and the target is <150/90 mmHg.

•Benefits of BP control:-

Large studies show that good control of BP reduces:

-Stroke by 30–50%

-Heart failure by 40–50%

-Coronary artery disease by ~15%

If the cause of hypertension (like hormonal problems, kidney disease, tumour, or certain drugs) can be identified, it should be corrected.

•Lifestyle (Non-drug) Measures:-

Before and along with medicines, patients should follow lifestyle changes:

-Healthy diet

-Salt restriction

-Regular exercise/aerobic activity

-Weight reduction

-Limited alcohol intake

-Stress management

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If there is already serious damage to the heart or kidneys, lowering BP too much or too quickly may cause problems (swelling, angina, fainting, kidney worsening). So BP should be lowered gradually and only to the level the patient can tolerate.

▫Compelling Indications for Specific Drugs:-

- Diuretics
- Heart failure
- High risk of CAD
- Recurrent stroke prevention

▫ACE inhibitors / ARBs:-

- Heart failure
- After heart attack
- High risk of CAD
- Diabetes
- Chronic kidney disease
- Stroke prevention

▫Calcium channel blockers:-

- Kidney damage due to high BP or diabetes
- Stroke prevention

▫Beta-blockers

- Stable heart failure
- After heart attack
- High risk of CAD

▫New Evidence:-

The HYGIA Chronotherapy Trial (2020) studied more than 19,000 hypertensive patients. It found that taking one or more BP medicines at bedtime reduced the risk of major heart problems more than taking all medicines in the morning. Night-time dosing also helped normalize the natural fall of BP during sleep.

WORLDWIDE GUIDELINE FOR THE TREATMENT OF HYPERTENSION

71) NC 7 (2003): The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Published by the National Heart, Lung, and Blood Institute's High Blood Pressure Education Program.

2) ESH/ESC Guidelines (2009): A reappraisal of European guidelines on hypertension management. Published by the European Society of Hypertension and the European Society of Cardiology.

3) British Guidelines (2004): The British Hypertension Society Guideline for Hypertension Management (BHS-IV).

4)WHO-ISH Statement (2003): World Health Organization and International Society of Hypertension's statement on managing hypertension.

5) Japanese Guidelines (2009): The Japanese Society of Hypertension Guidelines for the Management of Hypertension.

6) NICE Guidelines (CG34): Hypertension management in adults in primary care (pharmacological update). Published by the National Institute for Health and Clinical Excellence.

7) Canadian Guidelines (2010): The Canadian Hypertension Education Program recommendations for measuring blood pressure, diagnosis, risk assessment, and therapy.

8) ISHIB Statement (2010): Guidelines for managing high blood pressure in Black patients. Published by the International Society on Hypertension in Blacks.



ROLE OF AMLODIPINE IN MILD TO MODERATE HYPERTENSION:-

- ⁸1) Studies show that amlodipine works better than diltiazem and hydrochlorothiazide. ⁹
- 2) In people with mild or moderate high blood pressure, amlodipine lowers both systolic (SBP) and diastolic (DBP) pressure. It works just as well as chlorthalidone in lowering average blood pressure in patients aged 50 years or older.
- ¹⁰3) In Asian patients with mild to moderate high blood pressure, increasing amlodipine from 5 mg to 10 mg per day greatly lowered systolic pressure (SBP).

ROLE OF AMLODIPINE IN BPV, INCLUDING THE MORNING BP SURGE:-

- ¹¹1) Amlodipine is a long-acting calcium channel blocker that is commonly used to lower high blood pressure.
- 2) Recent studies show that amlodipine can lower blood pressure and reduce the risk of heart problems when combined with other types of blood pressure medicines.
- 3) There is strong evidence that combining amlodipine with diuretics or ACE inhibitors benefits the heart and blood vessels, especially in high-risk patients such as those with heart disease, diabetes, or kidney problems.
- 4) Combining amlodipine with medicines that affect the renin-angiotensin-aldosterone system (like angiotensin II receptor blockers or renin inhibitors) effectively lowers blood pressure, but we are still waiting for trial results to confirm benefits for kidney disease and heart-related health outcomes.

ROLE OF AMLODIPINE IN STROKE PREVENTION

- ¹²1) We read the article by Wang et al.¹ about preventing stroke and heart attack with amlodipine and angiotensin receptor blockers. Their findings support earlier studies showing that calcium channel blockers (CCBs) give the best protection against stroke and heart attack compared to other blood pressure medicines. The authors said that lowering blood pressure is the main reason for this benefit, but they did not rule out other effects of the drugs that are not directly related to blood pressure. They also suggested that more research on angiotensin receptor blockers is needed, as earlier reports indicated that amlodipine may work better than other medicines because it controls central aortic pressure more effectively.
- 2) The main effect of calcium channel blockers (CCBs) is to widen small arteries (arteriolar vasodilation).² However, different parts of the body respond differently to this effect, which may be due to the drugs' selectivity for certain tissues.² CCBs lower blood pressure more in people with hypertension than in those with normal blood pressure. Similarly, in hypertensive rats, which have blood vessels that depend heavily on calcium, there is stronger narrowing of blood vessels (vasoconstriction) and a greater relaxing effect from CCBs.²
- 3) We suggest that this tissue selectivity of CCBs, which changes blood flow differently in various vascular regions, may help explain the difference between brachial (arm) blood pressure and central aortic pressure. Some effects of CCBs that are not directly related to lowering blood pressure may also play a role in protecting against stroke, especially in hypertensive rats given extra salt. These include preventing excess production of endothelin-1 (a strong vessel-constricting substance) in blood vessel walls and blocking its narrowing effect on small arteries.

AMLODIPINE IN SPECIFIC POPULATIONS:-

¹³Patients with angina pectoris:-

High blood pressure (hypertension) is responsible for about 47% of the risk of developing ischemic heart disease.² Both the European Society of Cardiology and the American Heart Association recommend calcium channel blockers (CCBs), either alone or with a β -blocker, as first-choice treatment for stable ischemic heart disease.

In one double-blind study, amlodipine reduced the chances of repeat coronary angioplasty and other complications when given 2 weeks before and continued for 4 months after the procedure. In another open-label, randomized trial involving patients with both high blood pressure and type 2 diabetes, amlodipine lowered carotid intima-media thickness (IMT) more than angiotensin receptor blocker (ARB) therapy, suggesting that amlodipine slows the early development of atherosclerosis.

A different randomized study also showed that amlodipine reduced hospital admissions for unstable angina by 33% and the need for coronary revascularization by 43%, regardless of whether patients were also taking β -blockers, nitrates, or cholesterol-lowering drugs.



(Abbreviations: ARB = angiotensin receptor blocker; BB = β -blocker; CCB = calcium channel blocker; CCBND = non-dihydropyridine calcium channel blocker; DD = non-loop diuretic drug.)

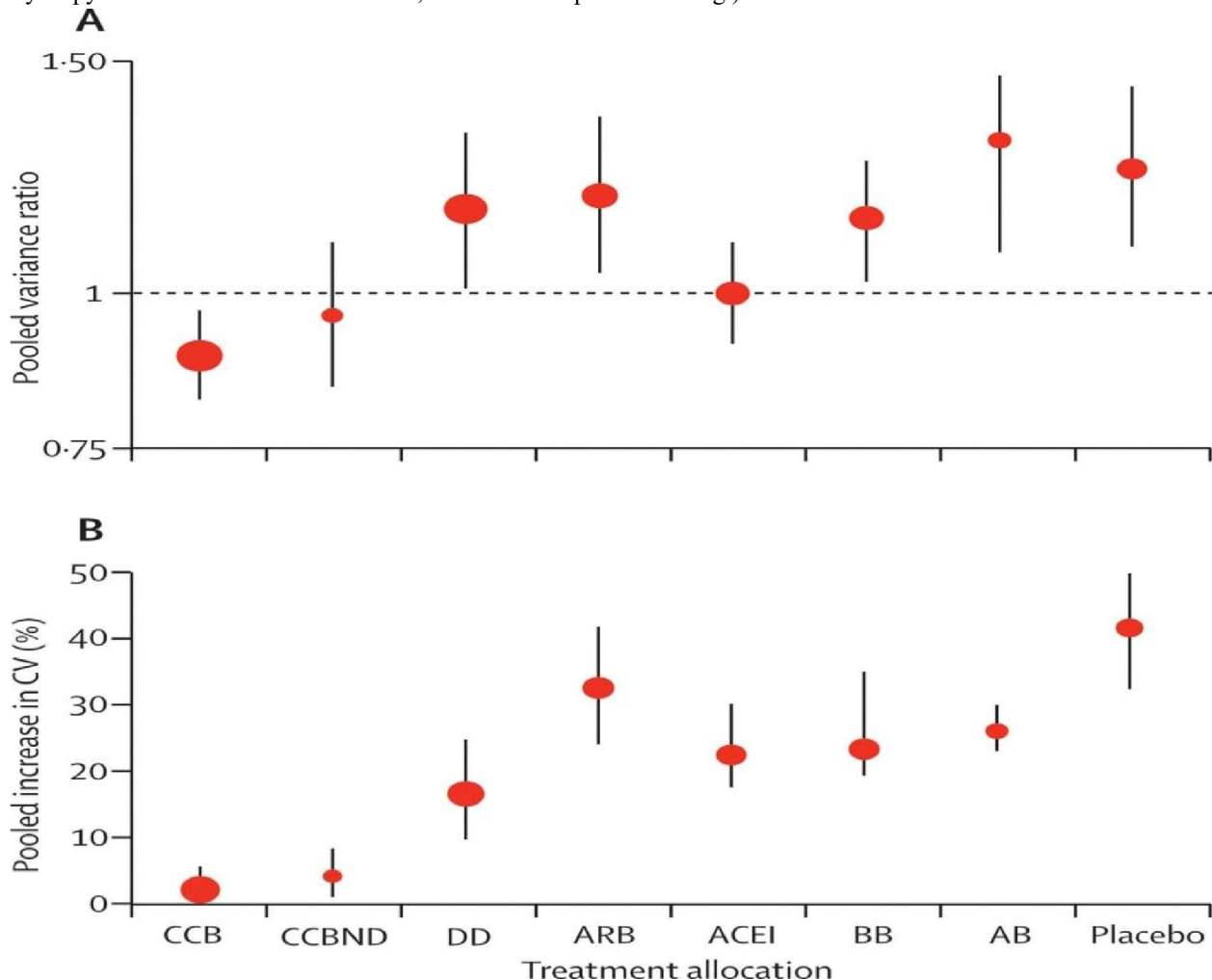


Figure 1 This shows a meta-analysis of how different blood pressure medicines affect longterm blood pressure variability (BPV). (A) Change in systolic blood pressure (SBP) variation over time, shown as a variance ratio (on a log scale). (B) Percentage increase in the coefficient of variation (CV). The error bars show the 95% confidence intervals. The increase in variance ratio and CV from the start to follow-up was mainly because many clinical trials required patients to have similar blood pressure levels at the beginning. Over time, the range of blood pressures naturally widened, which increased the standard deviation. This effect was seen across all drug classes in a similar way. (Abbreviations: AB = α_1 -blocker; ACEI = angiotensin-converting enzyme inhibitor; ARB = angiotensin receptor blocker.)

In the ASCOT trial, amlodipine was found to work together with atorvastatin to better prevent heart problems.⁵⁴ Other studies have also reported this combined benefit,⁵⁵ and researchers have even suggested a possible molecular explanation for how they interact.⁵⁶ Therefore, amlodipine may be a good option to help slow down the progression of atherosclerosis (hardening of the arteries)

Patients with diabetes mellitus:-

¹⁴People often believe that diabetes always makes someone more likely to get infections, but strong evidence for this is lacking.^{1 2} However, certain specific infections are seen more often in people with diabetes, and some infections occur almost only in them. Other infections may also be more severe and cause more complications in diabetic patients.



¹⁵In diabetic patients who did not respond well to amlodipine 5 mg, a review study showed that increasing the dose to 10 mg per day led to a meaningful and statistically significant drop in both systolic (SBP) and diastolic (DBP) blood pressure.

Patients with chronic kidney disease:-

¹⁶ Empagliflozin in patients with chronic kidney disease (EMPA-KIDNEY, 2023)

Source: EMPA-Kidney Collaborative Group, New England Journal of Medicine, 388(2), 117–127

The study looked at the effects of empagliflozin in CKD patients at risk of disease progression.

Patients had moderately reduced kidney function (eGFR 20–90) and some had high protein in urine.

They were given empagliflozin 10 mg daily or a placebo.

Main outcome: worsening kidney disease or death from heart problems.

Results:

Empagliflozin reduced the risk of kidney disease progression or cardiovascular death (13.1% vs 16.9% with placebo).

Benefits were seen in patients with or without diabetes and across different kidney function levels.

Hospitalizations were lower with empagliflozin. Serious side effects were similar between groups.

Conclusion: Empagliflozin helps slow CKD progression and lowers cardiovascular risk.

2. Risk of acute kidney failure in CKD (2008):-

Source: Hsu CY, Ordonez JD, Chertow GM, et al., Kidney International, 74(1), 101–107

Study of hospitalized patients to see how CKD affects risk of acute kidney failure.

Compared 1,746 patients who developed dialysis-requiring acute kidney failure with 600,820 who did not.

Findings:

Lower eGFR (worse kidney function) greatly increased the risk of hospital-acquired kidney failure.

Diabetes, high blood pressure, and protein in urine were additional independent risk factors.

Conclusion: Even moderate CKD increases the risk of serious kidney problems during hospitalization.

3. Chronic kidney disease overview (2021):-

Source: Kalantar-Zadeh K, Jafar TH, Nitsch D, et al., The Lancet, 398(10302), 786–802

CKD is a progressive, incurable disease with high illness and death rates, especially in people with diabetes and high blood pressure.

Protecting kidney function improves outcomes and can be done through:

Lifestyle changes: healthy diet (plant-based, low protein, low salt), exercise.

Medications: SGLT2 inhibitors, RAAS blockers, and other drugs to reduce kidney stress, inflammation, or scarring.

Additional goals: reduce cardiovascular risk, prevent infections, avoid acute kidney injury. When dialysis is needed, gradual transition may help preserve remaining kidney function.

Conclusion: CKD care should combine kidney-preserving strategies, supportive care, and new treatments to improve lifespan and quality of life.

Older persons with hypertension:-

¹⁷Older people with high blood pressure (hypertension) have a greater chance of heart problems compared to younger adults. However, lowering blood pressure in them also carries a higher risk of side effects. Frailty (weakness and reduced strength) is a key factor that shows who is more likely to face such problems, and just looking at age alone may not give the full picture of risk.

Because of this, treatment for high blood pressure in older people should be personalised. This means doctors should consider frailty, how ageing affects blood pressure, and the best available research. Care should be holistic—focusing not only on blood pressure numbers but also on the patient's overall health, needs, preferences, and priorities.

This review explains the body changes that happen with ageing and high blood pressure, summarises current treatment guidelines, and points out where evidence is lacking. It also suggests a new, testable way to manage high blood pressure in people aged 70 years and older.

¹⁸Treating high blood pressure in older people helps reduce illness and death. This benefit is seen even in people over 80 years old. However, fewer than one in three older patients have their blood pressure well controlled. Among the blood pressure readings, the systolic pressure (top number) is the strongest predictor of heart disease.



When checking blood pressure in older people, doctors should also look for orthostatic hypotension (a sudden drop in blood pressure when standing up).

For treatment, low-dose thiazide diuretics are the first choice of medicine. Other drugs like beta blockers, ACE inhibitors, angiotensin receptor blockers, and calcium channel blockers are used as second-line options, depending on the patient's other health problems and risk factors.

¹⁹ Research on treating high blood pressure in older adults is limited. Most studies included people over 60 years old with very high systolic blood pressure (above 160 mmHg) and compared treatment to no treatment (placebo).

Doctors often do not measure blood pressure accurately. They may miss problems like white coat hypertension (high BP only at the doctor's office), masked hypertension (normal at the clinic but high at home), low BP after standing up (orthostatic hypotension), low BP after meals (postprandial hypotension), or falsely high readings (pseudohypertension). If 24-hour blood pressure monitoring were used, the treatment targets might need to be much lower. Other conditions that can raise blood pressure in older people include sleep apnea, pain, nighttime low blood sugar, certain medicines, excess hormone production (aldosterone), and rare conditions like pheochromocytoma.

Current evidence suggests that starting treatment with a low-dose diuretic or an ACE inhibitor is usually best for older adults.

Amlodipine in Asian and Black patients :-

Asian patients:-

²⁰In the past 30 years, the number of people with high blood pressure in China has gone up. This is mostly because of changes in lifestyle and people living longer. However, blood pressure control is still poor because many people are not aware they have the condition or do not follow their treatment properly.

²¹Most Asian countries (except South Korea and Taiwan) have more people with uncontrolled high blood pressure. However, strict blood pressure control tends to benefit Asian people more than those in Western countries.

²²The Asian Pacific Heart Association's Writing Committee reviewed studies done in East Asia. They found that using calcium channel blockers (CCBs), especially amlodipine, alone was more effective in lowering blood pressure than other types of blood pressure medicines.

²³In a carefully controlled study on Asian patients, amlodipine worked better than nifedipine GITS in preventing blood pressure from rising during the 48 hours after stopping the medicine. Interestingly, only 4 out of 109 patients (about 3.7%) developed swelling (edema) while taking amlodipine 5 mg daily, which was increased to 10 mg after 6 weeks if needed.

Black patients:-

²⁴Calcium channel blockers (like amlodipine) or thiazide-type diuretics are suggested as the first medicines to treat high blood pressure in Black patients, even for those who have diabetes.

²⁵In Nigerian patients with mild to severe high blood pressure, taking amlodipine 5 mg once daily for 2 weeks, then increasing to 10 mg once daily for 10 weeks, was safe and well-tolerated. Blood tests, including cholesterol levels, checked at the start and end of the study, did not change

²⁶A study in Nigerian patients found that starting treatment with amlodipine first, then adding hydrochlorothiazide, controlled blood pressure better than starting with hydrochlorothiazide first, then adding amlodipine, or starting both drugs together. Starting both drugs at the same time can cause a sudden drop in blood pressure, which may trigger the body to release substances that tighten blood vessels, sometimes increasing the systolic blood pressure (SBP).

²⁷Amlodipine works equally well to lower blood pressure in people from three main ethnic groups: Africans, Europeans, and South Asians.

PHARMACOECONOMIC CONSIDERATIONS:-

²⁸Pharmacoeconomic studies can be used to understand the costs of venous thromboembolism (VTE) in patients after orthopedic surgery. This includes the cost to the healthcare system and the value of using a factor Xa inhibitor to prevent VTE.



Preventing VTE is important because it happens often, can have no symptoms, and can cause serious health problems or death if not prevented. VTE also leads to high costs due to longer hospital stays, ICU time, and other medical expenses. Using better preventive treatments can reduce VTE cases, complications, and overall costs.

Studies compared the cost-effectiveness of two drugs: fondaparinux (2.5 mg once daily for 7 days) and enoxaparin (30 mg twice daily for 7 days).

Trial-based analysis: Fondaparinux prevented about 15 thromboembolic events per 1000 patients over three months compared to enoxaparin and saved money per patient at 30 days, 3 months, and 5 years after discharge.

Effectiveness-based analysis: Fondaparinux prevented about 18 events per 1000 patients over three months and saved money per patient at discharge, 1 month, 3 months, and 5 years after discharge.

These results show that fondaparinux is a cost-effective option for preventing VTE after orthopedic surgery.

²⁹This reduces the need for patients to visit the healthcare system often. However, because drugs that affect the renin-angiotensin-aldosterone system can change kidney function or cause high potassium levels, patients usually need blood tests within a few weeks of starting these medications.

II. CONCLUSIONS

This review shows that amlodipine works well for treating high blood pressure in people with readings of 130/80 mm Hg or higher, including those at low risk and those with existing heart problems. Controlling both average blood pressure and blood pressure fluctuations is important to lower the risk of heart attacks and strokes. Amlodipine provides 24-hour blood pressure control and reduces these fluctuations, helping protect the heart and brain. It works well in different ethnic groups, older adults, people with diabetes, and those with chronic kidney disease, without harming blood sugar or kidney function.

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