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Hypertension: A Systemic Review, Treatment and Control of Hypertension

***Hakam Singh[1], Dr. Bharat Parashar[1]**

[1]*IEC University, Baddi, India.*

Abstract: ***Hypertension (HTN) or high blood pressure, sometimes called arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is elevated. Blood pressure is summarised by two measurements, systolic and diastolic, which depend on whether the heart muscle is contracting (systole) or relaxed between beats (diastole). This equals the maximum and minimum pressure, respectively. Normal blood pressure at rest is within the range of 100–140mmHg systolic and 60–90mmHg diastolic. High blood pressure is said to be present if it is often at or above 140/90 mmHg. Hypertension is classified as either primary (essential) hypertension or secondary hypertension. Hypertension puts strain on the heart, leading to hypertensive heart disease and coronary artery disease if not treated. Hypertension is also a major risk factor for stroke, aneurysms of the arteries (e.g. aortic aneurysm), peripheral arterial disease and is a cause of chronic kidney disease. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of health complications, although drug treatment is still often necessary in people for whom lifestyle changes are not enough or not effective.***

Keywords: *Hypertension, systolic, diastolic, aorta.*

INTRODUCTION:

Hypertension is a haemodynamic disorder, associated with a rise in peripheral vascular resistance that can, in turn, lead to myocardial infarction, renal failure, strokes and death, if not identified early and treated correctly. Most patients with hypertension do not attain the blood pressure (BP) goal of < 140/90 mmHg. A reduction in BP is considered to be the primary determinant of a reduction in cardiovascular ris6k. Factors found to be associated with high BP are the result of a complex relationship between genetic and environmental elements, which can lead to activation or inhibition of one or more of the processes involved in the normal control of BP, Dietary factors and physical inactivity contribute to the genetic predisposition, while environmental factors include smoking, drinking, obesity and alcohol, thus making hypertension a preventable cause of morbidity and mortality. The advantages of populations with hypertension leading a healthy lifestyle cannot be stressed enough, and this includes a controlled diet and regular exercise. The primary goal of treatment is to abolish the risks factors associated with hypertension, without reducing the patient's quality of life. Hypertension is a growing global problem that is associated with numerous underlying pathophysiological conditions. These include ventricular hypertrophy, endothelial dysfunction, metabolic syndrome, a procoagulant state, oxidative stress, inflammation and a genetic predisposition to cardiovascular events. The high prevalence of hypertension is a particular concern in developing countries as it contributes to the present and anticipated pandemic of cardiovascular disease (CVD). The control of hypertension and trying to curb the risk factors, such as cigarette smoking, dyslipidaemia and diabetes mellitus, is a major challenge.13 this indicates that there is a great need for antihypertensive agents that achieve more than the mere lowering of BP, and which provide advantages in the prevention and management of CVD.

RISK FACTORS:

Having a personal family history of hypertension increases the likelihood that an individual develops hypertension. Essential hypertension is four times more common in black than white people, accelerates more rapidly and is often more severe with higher mortality in black patients. Obesity can increase the risk of hypertension to fivefold as compared with normal weight, and up to two-thirds of hypertension cases can be attributed to excess weight. More than 85% of cases occur in those with a Body mass index greater than 25. Another risk factor is salt sensitivity which is an environmental factor that has received the greatest attention. Approximately one third of the essential hypertensive population is responsive to sodium intake. The increased sodium ion concentration stimulates ADH and thirst mechanisms, leading to increased concentrated reabsorption of water in the kidneys, urine, and thirst with higher intake of water. Also, the water movement between cells and the interstitial plays a minor role compared to this. The interstitial plays a minor role compared to this. The relationship between sodium intake and blood pressure is controversial. Reducing sodium intake does reduce blood pressure, but the magnitude of the effect is insufficient to recommend a general reduction in salt intake.

An enzyme secreted by the juxtaglomerular apparatus of the kidney and linked with aldosterone in a negative feedback loop. In consequence, some Renin elevation is another risk factor. Renin is hypertensive patients have

been defined as having low-renin and others as having essential hypertension. High renin levels predispose to hypertension by causing sodium retention through the following mechanism: Increased renin Increased angiotensin II Increased vasoconstriction, thirst/ADH and aldosterone → Increased sodium reabsorption in the kidneys (DCT and CD) Increased blood pressure. Hypertension can also be caused by Insulin resistance and or hyperinsulinemia. Cigarette smoking, a known risk factor for other cardiovascular disease, may also be a risk factor for the development of hypertension.

PREVENTION:

It is therefore recommended that all cases of hypertension should restrict their sodium intake to approximately 6 Gms of sodium chloride salt or 2.4 Gms of sodium per day. In order to achieve that much sodium restriction, following measures should be adopted.

a) Reduce salt for cooking by 50%.

b) Substitute natural foods for processed foods.

c) Avoid salty snacks such as pickles, chutneys,

d) pappad, salted nuts.

e) Use salt substitutes containing potassium.

f) Avoid medications such as antacids as these are rich in salt.

The universal recommendation is to consume less than 10 Gms of NaCl per day. WHO recommends 5 Gms or less especially in populations known to have a high salt intake or a high prevalence of blood pressure. Chain smokers have a sustained increase in blood pressure. So, prevention from smoking is must here. These are widely practised for stress reduction. So far, no substantial evidence in support of benefits of yoga, meditation is available. Yet the availability of some controlled research, its overall cost effectiveness and its lack of side effects make further investigations of yoga a topmost priority. Clinically several clinical trials are in progress. Epidemiological studies have revealed a strong relation between obesity & hypertension. So maintaining the body fitness and monitoring the blood pressure is very must. Preventing the body from obesity is very necessary.

TREATMENT:

Beta-blocker is one of a drug used to reduce hypertension. It works by making our heart beat more slowly and with less force, thereby reducing blood pressure. But they are found to be less effective than other treatments. Calcium channel blockers are very helpful because they keep calcium from entering the muscle cells of the heart and blood vessels. This method widens the arteries and reduces the blood pressure.

The following information is more specific to the First-line and later-line treatment should be limited to four classes of medicine:

- Thiazide-type diuretics
- Calcium-channel blockers
- ACE inhibitors
- ARBs.

Second and third-line alternatives include higher dosages or a combination

- Thiazide-type diuretics
- Calcium-channel blockers
- ACE inhibitors
- ARBs.

Numerous medications are now selected as later-line alternatives, such as

- β-receptor blockers
- Loop diuretics
- α-receptor blockers
- Direct vasodilators
- Aldosterone antagonists
- α-1 blockers and β blockers
- Vasodilating β blockers
- Central α2-adrenergic receptor agonists
- Peripherally acting adrenergic antagonists.

Guideline for the management of high blood pressure in adults. Class of drug Example of drug, First-line and second-line treatment should be limited to four classes of medicines. Initiate one of these medications, either alone or in combination:

Angiotensin-converting enzyme inhibitors

- Captopril
- Enalapril
- Lisinopril
- Perindopril
- Quinapril
- Ramipril
- Trandolapril

Angiotensin II-receptor blockers

- Eprosartan
- Candesartan
- Lorsartan
- Valsartan
- Irbesartan

Thiazide-type diuretics

- Hydrochlorothiazide
- Indapamide

Beta blockers

- Atenolol
- Bisoprolol
- Carvedilol
- Metoprolol
- Propranolol

Calcium-channel blockers

- Amlodipine
- Diltiazem (extended release)

α1 and β-blocking agents

- Carvedilol

If the BP goal is not achieved with the first drug of a particular class, the dosage of the initial drug should be titrated to the maximum recommended dosage to achieve the BP goal. If the BP goal is not achieved with one drug from a particular class, a second drug should be added from the list above, and titrated up to the maximum recommended dose of the second drug to achieve the BP goal.

If the BP goal is not achieved with two drugs from a selected class, a third drug should be selected from the list above (different class), and it should be ensured that the combined use of angiotensin-converting enzyme inhibitors and angiotensin-receptor blockers is avoided.

The third drug should be titrated up to the maximum recommended dosage to achieve the BP goal. If all of the above medication fails, then a later-line alternative can be added from the list below.

Later-line alternatives

Add one of the following medications below to the therapy regimen:

Loop diuretics

- Bumetanide
- Furosemide
- Torsemide

Potassium-sparing diuretics

- Amiloride
- Triamterene

Aldosterone-receptor blockers

- Eplenerone
- Spironolactone

α blockers

- Doxazosin
- Prazosin
- Terazosin

Direct vasodilators

- Hydralazine

Peripherally acting adrenergic antagonists

- Reserpine

LIFESTYLES MEASURES:

Lifestyle modification should be used to prevent mild hypertension and to decrease the dose levels of drugs needed to control hypertension. Weight reduction, consuming a diet rich in fruits, vegetables, and low-fat dairy products with a reduced amount of saturated fat and total fat, intake, avoidance of excessive caffeine, and avoidance of drugs which can increase sodium reduction to not exceed 1.5 grams daily, smoking cessation, regular aerobic physical activity, avoidance of excessive alcohol blood pressure including nonsteroidal anti-inflammatory drugs, glucocorticoids, and sympathomimetics are recommended. Implementing a national salt reduction program is likely a simple and cost-effective way of improving public health.

Long-term observational follow-up was performed in 744 patients in the trial of hypertension prevention (TOHP) I (10 years after its end) and in 2,382 patients in TOHP II (5 years after its end) in which persons with prehypertension were randomized to sodium reduction or usual diet (25%-35% greater sodium intake). In these studies, sodium reduction decreased cardiovascular events by 25% (p =0.04). At 31-month follow-up of 1,981 Taiwanese veterans, mean age 75 years, living in a retirement home, those randomized to a potassium enriched diet with 50% less sodium had a 41% reduction in cardiovascular mortality (95% CI, 0.37, 0.95) compared with those randomized to a regular salt diet.

Current guidelines suggest no more than 2,300 mg of sodium daily in the general population and no more than 1,500 mg of sodium daily in the elderly, in blacks, persons with hypertension, diabetes mellitus, chronic kidney disease, or CHF.

Adopting a healthy lifestyle is critical for the prevention of HBP and an indispensable part of managing it. We must think of these changes as a *"lifestyle prescription"* and make every effort to comply with them. If we have been diagnosed with high blood pressure, also called hypertension, or are concerned because we have some of the risk factors for the disease, we must understand this: while there is no cure, high blood pressure is manageable. Maintaining a healthy life style is necessary.

Hypertension is a haemodynamic disorder, associated with a rise in peripheral vascular resistance than can in turn lead to myocardial infarction, renal failure, strokes and death, if not identified early and treated effectively. As part of the stepwise treatment in the management of hypertension, thiazide type diuretics are still considered to be the initial first step, with an antihypertensive drug added according to the risk profile of the patient and/or the response to treatment.

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