

## **MANAGEMENT OF HYPERTENSION**

- 1. History**
- 2. Examination**
- 3. Investigations**
- 4. Non pharmacological therapy**
- 5. Pharmacological therapy**

### **HISTORY**

Hypertension is called the ***silent killer*** because most patients with high blood pressure have no symptom. Hypertension may be associated with headaches, blurred vision, breathlessness, epistaxis or nocturia.

Attacks of sweating, headaches and palpitations point towards the diagnosis of secondary hypertension due to pheochromocytoma. Also hypertensive patients may presents with history of chest pain, dyspnea and palpitation as a complications of hypertension (angina, pulmonary edema and arrhythmias).

Family history (genetic predisposition), social history (sedentary life style, physical activity, salt intake, alcohol and smoking) and drugs history (steroid, non-steroidal anti-inflammatory, anabolic steroid and contraceptive pills) all are important histories in patient with hypertensive disease.

### **EXAMINATION**

Elevated blood pressure is usually the only abnormal sign. Examination of hypertensive patients should concentrate on three important steps:

#### **((1)) Confirm the diagnosis:**

Using sphygmomanometer to detect any elevated blood pressure measurement.

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### **((2)) Signs of secondary hypertension:**

Like sign of radio femoral delay (coarctation of aorta), enlarged kidneys (polycystic kidney disease), abdominal bruits (renal artery stenosis), the characteristic facies and habitus of Cushing's syndrome and acromegaly.

### **((3)) Signs of target organ damage (i.e. complication):**

Like signs of hypertensive retinopathy (fundoscopic examination), facial palsy and hemiplegia (stroke), basal crackle and third heart sound (heart failure), earthy color and oliguria (renal failure) and others.

## **INVESTIGATIONS**

All hypertensive patients should undergo a limited number of investigations. Additional investigations are appropriate in selected patients.

### ***Routine investigations for all hypertensive patients should include:***

- *ECG.*
- *Urinalysis for protein, blood and glucose.*
- *Fasting blood for lipids (total and HDL cholesterol) and glucose.*
- *Serum urea, creatinine and electrolytes.*

If the urea or creatinine is elevated, more specific renal investigations are indicated – creatinine clearance, renal ultrasound (in case of polycystic kidney disease, or parenchymal renal artery disease) and a renal isotope scan or renal angiography if renovascular disease (either atheromatous or fibromuscular type of renal artery stenosis) is suspected. A low serum potassium may indicate an endocrine disorder (either primary hyperaldosteronism or glucocorticoid excess), and aldosterone, cortisol and renin measurements must then be made, preferably prior to initiating pharmacological therapy. Clinical suspicion of pheochromocytoma should be investigated further with measurement of urinary metanephrines and plasma or urinary catecholamines.

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If the ECG shows evidence of coronary artery disease the coronary vascular status should be assessed. If left ventricular hypertrophy is suspected echocardiography should be undertaken. A chest X-ray is indicated if cardiac involvement or aortic coarctation is likely.

### **Special investigations for selected hypertensive patients include:**

- *Chest X-ray: For cardiomegaly, heart failure, coarctation of the aorta.*
- *Ambulatory BP recording: to assess 'white coat' hypertension.*
- *Echocardiogram: to detect or quantify left ventricular hypertrophy.*
- *Renal ultrasound: to detect possible renal disease.*
- *Renal angiography: to confirm presence of renal artery stenosis.*
- *Urinary catecholamines: to detect possible phaeochromocytoma.*
- *Urinary cortisol and dexamethasone suppression test: to detect possible Cushing's syndrome.*
- *Plasma renin activity and aldosterone: to detect Conn's syndrome.*

## **TREATMENT:**

The importance of managing hypertensive patient is to reduce the incidence of adverse cardiovascular events, particularly coronary heart disease, stroke and heart failure. The relative benefits of antihypertensive therapy are approximately 30% reduction in risk of stroke and 20% reduction in risk of coronary heart disease.

## **NON PHARMACOLOGICAL THERAPY**

Unless the patient has severe or malignant hypertension, there should be a period of assessment with repeated blood pressure measurements, combined with advice and non-pharmacological measures prior to the initiation of drug therapy.

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Use of non-pharmacological therapy in all hypertensive and prehypertensive people:

- Weight reduction – BMI should be < 25 kg/m<sup>2</sup>
- Low-fat and saturated fat diet
- Low-sodium diet – < 6 g sodium chloride per day
- Limited alcohol consumption
- Dynamic exercise – at least 30 minutes' brisk walk per day
- Increased fruit and vegetable consumption
- Reduce cardiovascular risk by stopping smoking and increasing oily fish consumption.

### **PHARMACOLOGICAL THERAPY**

The decision to commence specific drug therapy should usually be made only after a careful period of assessment, of up to 6 months with repeated measurements of blood pressure.

- The initiation of antihypertensive therapy in subjects with sustained systolic BP  $\geq 160$  mmHg, or sustained diastolic BP  $\geq 100$  mmHg.
- Decide on treatment in subjects with sustained systolic blood pressure between 140 and 159 mmHg, or sustained diastolic BP between 90 and 99 mmHg, according to the presence or absence of target organ damage or a high cardiovascular disease risk score.
- In patients with diabetes mellitus, the initiation of antihypertensive drug therapy if systolic BP is sustained  $\geq 140$  mmHg, or diastolic BP is sustained  $\geq 90$  mmHg.
- Target blood pressure. For most patients a target of  $\approx 140$  mmHg systolic blood pressures and  $\approx 90$  mmHg diastolic blood pressures is recommended.
- The main determinant of outcome following treatment is the level of blood pressure reduction that is achieved rather than the specific drug used to lower blood pressure.
- Most hypertensive patients will require a combination of antihypertensive drugs to achieve the recommended targets.

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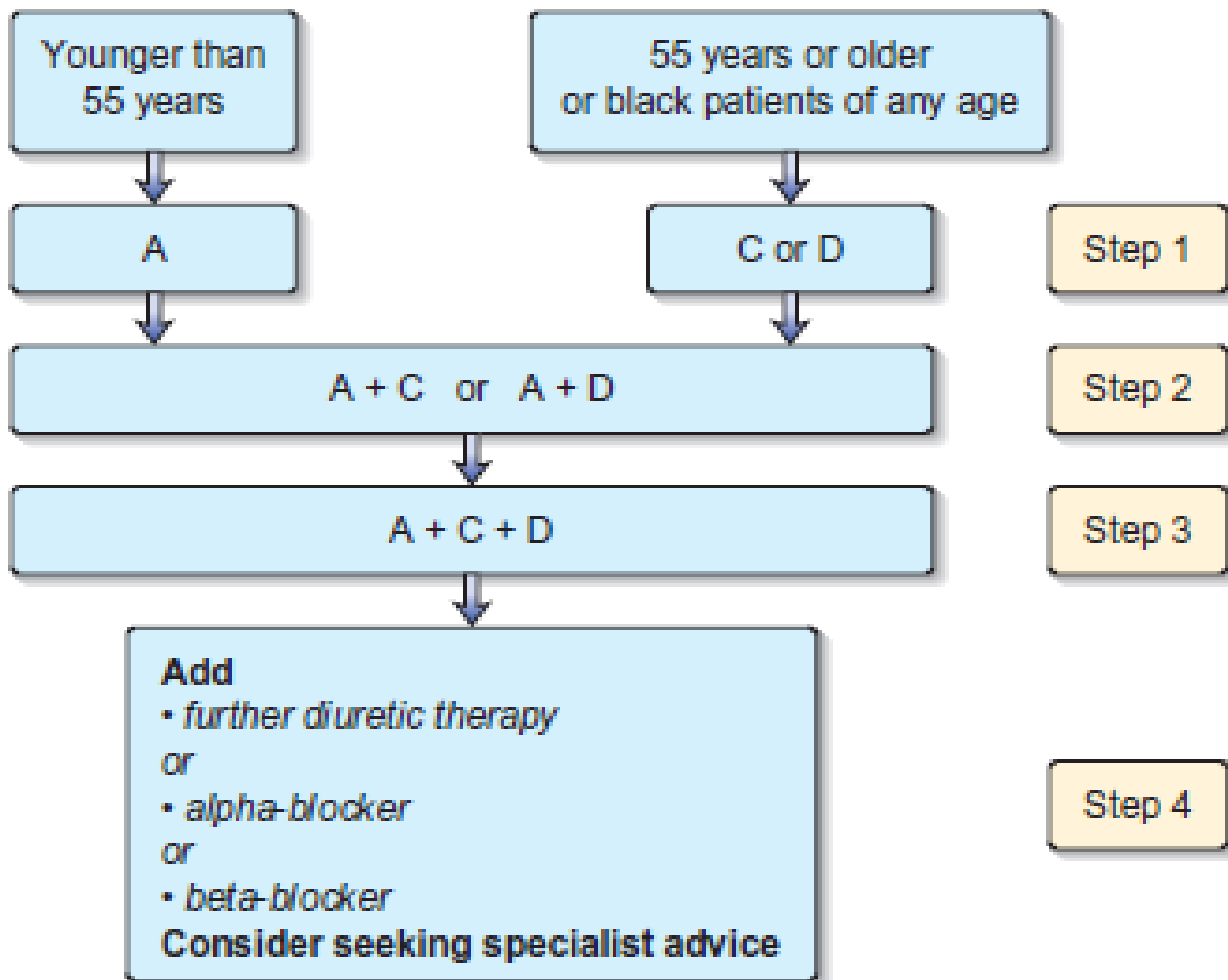
- In most hypertensive patients therapy with statins is added to reduce the overall cardiovascular risk burden. Glycaemic control should be optimized in diabetics (HbA1c < 7%).

Several classes of drugs are available to treat hypertension. These include:

- ACE inhibitors or angiotensin receptor blockers (ARBs)**, e.g. Lisinopril & Enalapril (ACE inhibitors), Valsartan & Candesartan (ARBs).
- Beta-blockers**. These include:
  - ✓  $\beta_1$ -adrenoceptors blockers, e.g. Metoprolol & Bisoprolol.
  - ✓  $\beta$ - and  $\alpha$ -adrenoceptors blockers, e.g. Carvedilol & Labetalol.
- Calcium-channel blockers**. These include:
  - ✓ Dihydropyridines, e.g. Amlodipine & Nifedipine.
  - ✓ Non- dihydropyridines, e.g. Diltiazem & Verapamil.
- Diuretics**. These include:
  - ✓ Thiazide group, e.g. Hydrochlorothiazide & Chlorthalidone.
  - ✓ Aldosterone antagonist, e.g. Spironolactone.
  - ✓ Other diuretics, e.g. Amiloride.
- Other antihypertensive drugs**. These include:
  - ✓ Alpha-blockers, e.g. Doxazosin & Prazosin.
  - ✓ Renin inhibitors, e.g. Aliskerin.
  - ✓ Other vasodilators, e.g. Hydralazine & Minoxidil.
  - ✓ Centrally acting drugs, e.g. Methyldopa & Clonidine.

## How to choose antihypertensive drugs

Choosing of antihypertensive drugs for patients with newly diagnosed hypertension (without presence of comorbidities) usually depend on the age and race of the patients initially as seen in the following scheme:



**Abbreviations:**  
A = ACE inhibitor  
(angiotensin-II receptor antagonist if ACE intolerant)  
C = calcium-channel blocker  
D = thiazide-type diuretic

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## **THE INFLUENCE OF COMORBIDITY ON THE CHOICE OF ANTIHYPERTENSIVE DRUG THERAPY**

<b>Class of drug</b>	<b>Indications</b>	<b>Possible indications</b>	<b>Caution</b>	<b>Contraindication</b>
<b><math>\alpha</math>-blockers</b>	Benign prostatic hypertrophy	–	Postural hypotension, heart failure	Urinary incontinence
<b>Angiotensin-converting enzyme (ACE) inhibitors</b>	Heart failure  LV dysfunction, post-MI or established coronary HD, type 1 diabetic nephropathy Secondary stroke prevention	Chronic renal disease  Type 2 diabetic nephropathy	Renal failure  Peripheral vascular disease	Pregnancy  Renovascular disease
<b>Angiotensin II receptor blockers</b>	ACE inhibitor intolerance Type 2 diabetic nephropathy HT with LVH Heart failure in ACE-intolerant patients after MI	LV dysfunction after MI Intolerance of other anti-HT drugs Proteinuric renal disease, Chronic RF	Renal impairment Peripheral vascular disease	Pregnancy
<b><math>\beta</math>-blockers</b>	MI, angina Heart failure	–	Heart failure Peripheral vascular disease DM (except with coronary HD)	Asthma or chronic obstructive pulmonary disease Heart block

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<b>Calcium channel blockers (dihydropyridine)</b>	Elderly patients, isolated systolic hypertension	Angina	–	–
<b>Calcium channel blockers (rate-limiting)</b>	Angina	Elderly patient	Combination with $\beta$ -blockade	Heart block, heart failure
<b>Thiazides or thiazide-like diuretics</b>	Elderly patients, isolated systolic hypertension, HF, secondary stroke prevention	–	–	Gout

## PROGNOSIS

The prognosis from hypertension depends on a number of features:

- *Level of blood pressure*
- *Presence of target-organ changes (retinal, renal, CNS, cardiac or vascular)*
- *Coexisting risk factors for cardiovascular disease, such as hyperlipidemia, diabetes, smoking, obesity, male sex*
- *Age at presentation.*

Several studies have confirmed that the treatment of hypertension, even mild hypertension, will reduce the risk of stroke and coronary artery disease.