

## **Clinical assessment of hypertensive patient:**

- You have to take history regarding the presence of other risk factors for CAB like diabetes mellitus, smoking, etc.
- Take history whether the patient takes medications that cause hypertension or the patient has symptoms suggestive of secondary cause (like sweating and palpitation suggestive of pheochromocytoma) or symptoms suggestive of complications (like breathlessness and chest pain).

## **Signs:**

- On examination, you have to look for radio-femoral delay for evidence of Coarctation of aorta.
- Examination of the kidneys, abdomen for evidence of polycystic disease of the kidney (Palpable kidney).
- Look for bruit for evidence of renal artery stenosis.
- Look for the face for evidence of Cushing's syndrome.
- Assess other risk factors like obesity, features of hyperlipidemia like xanthelasma.
- Evidence of complications like heaving apex beat, loud S<sub>2</sub>, S<sub>4</sub> and so on.

## **Treatment:**

- Treatment of hypertension reduces cardiovascular insults (Stroke and CAD).
- For patient with mild hypertension general measures regarding change in life style (non-pharmacological treatment) may be tried for (3-6 months) and these measures may make the patient does not require medication and these include reduce weight of obese patients, regular exercise, decrease salt and alcohol intake (Salt less than 6g/day) and excessive intake of vegetables.
- These measures need to be used in patient with moderate or severe hypertension and there will decrease requirement for antihypertensive drugs.

## **Antihypertensive drugs:**

### **I. Thiazide and other diuretics:**

- These medications need to be used for all patient with hypertension unless there is a contraindication because these drugs have a significant role in decrease morbidity and mortality.
- The exact way of action is unknown and they require for up to 1 month for them to get full action.
- They include 2.5mg/day Bendroflumethiazide (Bendrofluazide) or 0.5mg/day Cyclopenthiazide.
- The more potent diuretics like Furosemide 40mg/day or bumetanide 1mg/day has no much advantages over Thiazide except in patients with renal impairment or in patients using ACEI(s).

## II. B-adrenoceptor antagonists:

- Metoprolol 100-200mg/day, Atenolol 50-100mg/day, Bisoprolol 5-10mg/day. All of these drugs are cardioselective.
- They act on  $\beta_1$  receptors and they don't act on  $\beta_2$  receptors (vasodilatation and bronchodilatation).
- Labetalol (200mg-2.4g daily) is an  $\alpha$  and  $\beta$  antagonist so it is more powerful than pure  $\beta$  antagonists and it's used in patients with malignant hypertension.

## III. ACEI

Drug	Dosage
Captopril	25-75mg twice daily
Enalapril	20mg daily
Lisinopril	10-20mg daily
Ramipril	5-1mg daily

- ☒ These medications inhibit conversion of angiotensin I to II. They need to be used with precaution in patients with renal artery stenosis or impaired renal function because these conditions decrease glomerular filtration and blood urea needs to be checked prior and 1-2 week after starting medications and not to be used when serum creatinine above 3mg.

☒ Other side effects include:

- a. First dose hypotension.
- b. Cough.
- c. Skin rash.
- d. dysgeusia (unpleasant metallic taste).
- e. Proteinuria and nephrotic syndrome.
- f. Leukopenia and even may cause pancytopenia.

**IV. Angiotensin II receptor antagonists:**

Valsartan 40-160mg/day, Losartan 50-100mg/day. are similar to ACEIs but they don't interfere bradykinin metabolism so unlikely to cause cough.

**V. Calcium channels blockers (CCB):**

Dihydropyridines		Rate limiting CCB.	
Drug	Dosage	Drug	Dosage
Nifedipine	30-90mg/day	biltiazem	200-300mg.day
Amlodipine	5-10mg/day	Verapamil	240mg/day
They're well tolerated in elderly but they can cause side effects in form of flushing of face, tachycardia, postural hypotension and headache.		These can cause bradycardia and they are useful in patient with angina. The main side effect of Verapamil is constipation.	

**VI. Vasodilators:**

Alfa -blockers		Directly act on smooth muscles	
Drug	Dosage	Drug	Dosage
Prazosin	0.5-20mg/day	Hydralazine	25-100mg/twice
Indoramin	25-100/12 hours	Minoxidil	10-50mg/day
boxazosin	1-16mg/day		
They can cause headache, postural hypotension, tachycardia while minoxidil can cause hirsutism so not advisable to be used in females.			

**VII. Centrally acting anti-hypertension drugs:**

Methyldopa 250mg/3 times daily, Clonidine 0.05-0.1 mg/8 hourly. Both of them can cause fatigue, generalized weakness and are poorly tolerated.

### **Choice of anti-hypertension drugs:**

The choice depend on:

- a. Cost of medications.
  - b. Compliance.
  - c. Response of blood pressure.
  - d. Development of side-effects.
  - e. Also depend whether there is associated diseases that make you prefer or avoid certain medications.
- ❖ Patient with bronchospasm (asthma) avoid  $\beta$ -blockers.
  - ❖ Patient with Raynaud's phenomena prefer Nifedipine and avoid B-blockers.
  - ❖ Patient with ??????? Alfa-blockers.
  - ❖ Patient with hyperuricaemia and gout avoid diuretics.
  - ❖ Patient with depression avoid B-blockers.
  - ❖ Patient with diabetes mellitus prefer ACEIs or angiotensin II antagonists and avoid B-blockers.
  - ❖ Patient with renal vascular disease avoid ACEIs and angiotensin II antagonists.
  - ❖ Patient with erectile dysfunction avoid B-blockers and diuretics.
  - ❖ Patient with atrial fibrillation prefer B-blockers and rate limiting CCB.
  - ❖ Patient with heart failure prefer diuretics and ACEIs.
  - ❖ Patient with ischemic heart disease prefer B-blockers, CCB and ACEIs.
  - ❖ Patient with heart block avoid  $\beta$ -blockers and rate limiting CCB.
  - ❖ Patient (elderly) prefer CCB and diuretics.

### **Combination therapy:**

50% of hypertensive patients are controlled by single agents. Others may require combinations and the value of combinations is the following:

1. Proper control of blood pressure.

2. Decrease the side-effects of medications by using small doses of multiple medications.
3. There is synergetic benefit from using combinations, e.g. diuretics increase the level of rennin while B-blockers decrease it.

### **Preferred combinations:**

- a. Diuretics preferred to be combined with B-blockers and ACEIs (to decrease hyperkalaemia).
- b. ACEIs preferred to be combined with diuretics and CCB.
- c. B-blockers preferred to be combined with diuretics, Alfablockers and CCB.

### **Treatment of accelerated hypertension:**

It is not preferable to decrease blood pressure rapidly because this will impair tissue perfusion and results in critical ischemia, e.g. patient may get cortical ischemia with blindness or coronary and renal insults.

It is preferable to decrease mean blood pressure by 25% in next

6 hours and then to a level below 160/100 in the following further 6 hours.

In emergency conditions you need to decrease blood pressure and these conditions include:

1. Hypertensive encephalopathy.
2. Pulmonary edema.
3. Dissecting aneurysm of aorta.
4. eclampsia.

### **The medications used are:**

- Labetalol 2mg/mm up to the maximum of 200mg.
- Hydralozine 5-10mg IM repeated at half hourly intervals.
- Intravenous glyceryl trinitrate 0.6-1.2 mg/hour.
- Others include intravenous sodium nitroprusside 0.3-14/kg/min.

### **Refractory hypertension:**

If blood pressure not responding to medication there are 3 causes:

- a. Non-compliance of patient, check if the patient using medication or not.
- b. Inadequate medications.
- c. Presence of undiscovered underlying cause, e.g. renal artery stenosis or pheochromocytoma.

**Adjuvant therapy:**

**Aspirin:** Aspirin therapy has role in decrease cardiovascular risk on the expense it may cause cerebral bleeding and hemorrhage but benefit overcome the risk.

**Statins:** Treatment of hyperlipidemia is important to decrease cardiovascular risk.