ANTI HYPERTENSIVE

DRUGS

Fb/Nurse-Info

Definition of HTN

- Elevation of BP above the normal range, depending on the age and sex.

Fb/Nurse-Info

Initiation of anti HTN

(according to BHS)

- If sys BP > 200 or dias BP > 120 : start treatment immediately
- If sys BP > 160 or dias BP > 100 : should be confirmed over 1-2 wks, then start treatment.

Initiation of anti HTN

(according to BHS)

- If sys BP 140 – 159 or dias BP 90 -99, with CVS complications or target organ damage or DM: should be confirmed over 3-4 wks , then start treatment. If the above associations are absent , remeasure weekly over 4-12 wk, if still sustained start treatment.

Types of Anti HTN Drugs

- DIURETICS
- β BLOCKERS
- Ca Channel Blockers
- ACE inhibitors
- Ang II antagonists
- Vasodilators
- α Blockers
- Central acting agents

DIURETICS

- **MOA:**
- 1- ↑ renal excretion of Na & water ⟶

↓ plasma volume ⟶ ↓ C.O.

- 2- ↓ peripheral resistance (desensitize smooth muscles to action of catecholamines)

1-Thiazide

- Sulfonamide molecule
- Prolonged action
- Flat curve response
- Potentiates action of other anti HTN
- Eg: Hydrochlorothiazide (Ezidrex) , Bendrofluazide
- SE: hypo K+ , hypo Na+, hyperuricemia, hyperglycemia, lipid profile disturb.

Loop Diuretics -2

- Steep curve response
- Restricted to CCF & CRF
- Eg: Frusemide
- SE: ↓ K+ , ↓ Na+ , hypotension, ototoxic in v.high doses

K+ sparing diuretics -3

- Not effective alone, so used in combination
- Eg: Spironolactone, Amiloride ,

Uniretic (HCT + Amiloride)

- SE: ↑ K+, gynecomastia

Beta Blockers

- Cardioselective (Beta1): Atenolol
- Noncardioselective (Beta 1 & 2): Propranolol

Beta Blockers

- **MOA:**
- Block beta receptors → ↓ sympathetic drive →
- 1- ↓ H.R. & contractility, ↑ P.R. → ↓ C.O.
- 2- ↓ Renin release & activity → ↓ Ang II → ↓BP

Act as anti HTN within 3-7 days

Beta Blockers

- **Metabolism:**

  Hydroxylated in liver to water soluble compounds excreted in kidneys

- Preferred in HTN with angina, SVT, HOCM, Thyrotoxicosis, Pheochromocytoma, Migraine and L.cirrhosis.

Beta Blockers

- **SE:** bradycardia, bronchospasm, cold extremeties, hypoglycemia, insomnia, bad dreams
- **Overdose:** hypotension, bradycardia, bronchospasm, coma (treated with Atropine, Isoprenaline, glucagon)
- **C.I:** HF, Asthma, DM, H.Block, Periph.vascular diseases , Hyperlipidemia

Beta Blockers

- Atenolol: less lipid soluble ⟶ less CNS SE
- Timolol: lipid soluble ⟶ more CNS SE.

Ca Channel Blockers

- **MOA:**
- 1- ↓ Arteriolar tone
- 2- ↓ Pacemaker excitability & ↓ contractility ⟶ ↓CO
- 3- ↓ conduction in C.S.

Ca Channel Blockers

TYPES:-

Dihydropyridine: Nefidipine, Amlodipine

- Mainly vasodilators (so combined with B.Blockers)
- Preferable in black old pts & Angina
- Effective in isolated sys HTN
- Used cautiously in HF

Ca Channel Blockers

- SE: Headache, sweating, palpitation, ankle swelling, flushing
  (↓ by concomitant B.Blockers)

Ca Channel Blockers

- **:Nondihydropyridine**
- (Diltiazem : (60mg
- on Heart, by inhibition of AVN 50% conduction
- on Vessels 50%
- Prophylaxis and treatment of angina
- Mild & moderate HTN

Ca Channel Blockers

- SE: sinus bradycardia, SAN block, L.L edema, skin rash, GIT upset (rare)
- C.I: Hypersensitivity , sys BP < 90, CCF, SAN syndrome, H.Block.
- Should not be combined with B.Blockers, Antiarrhythmic and digoxin.

Ca Channel Blockers

- :Verapamil
- H.R. by ↓ SAN and AVN conduction ↓
- Minimal vasodilator effect
- Used mainly as anti arrhythmic
- SE: bradycardia, H.Block, constipation,
- C.I. with B.Blockers and Digoxin

ACE Inhibitors

- Eg: Captopril, Lisinopril

MOA:

- ↓ ang II ⟶ ↓ vasocostriction
- ↓ degradation of Bradykinin (vasodilator)

ACE Inhibitors

- Preferred in DM , LV dysfunction
- Less response in Black African (unless combined with diuretics)
- Less effective in elders & Predominant sys HTN

ACE Inhibitors

- SE: first dose hypotension, hyper K+, dry cough, angioedema (rare)
- C.I.: severe bilat. RA stenosis
- Relative C.I.: periph. Vascular disease
- Monopril has dual route of excretion (Liver & kidney) better in Renal insufficiency.

Angiotensin II receptor Antagonists

- Eg: Losartan, Valsartan
- MOA: block ang II receptors ⟶ vasodilitation & block Aldestrone secretion
- Advantage: No cough

VASODILATORS

Eg: Hydralazine, Minoxidil •

- Used for pt resistant to other anti HTN
- Usually combined with B. BLOCKERS
- SE:
- Hydralazine: Reflex tachycardia, SLE-like syn, fluid retention
- Minoxidil: severe edema , Hirsitism

Central acting agents

- Eg: Methyldopa, Reserpine
- MOA:
- Stimulate α aderenergic receptors in CNS $\longrightarrow \downarrow$ vasomotor tone
- SE: Sedation, Dry Mouth, Postural hypotesion, Impotence

General Principles

- In younger pt avoid B.Blockers alone (impotence, dyslipidemia)
- In elders : 1st diuretics, then B.Blockers, ACE inhibitors.
- In CCF: ACE inh, Nitrate
- Ischemic HD: B.Blockers, Ca blockers
- DM: ACE inh
- CRF: Diureics

(Refractory HTN (Treatment failure

- 1- Noncompliance
- 2- Inadequate treatment
- 3- 2° HTN (RA stenosis, Pheochromocytoma)
- 4- Using of anagonists (eg: steroids, NSAID)

Bibliography

- Text book of Medicine: KUMAR (5th edition)

- Short Textbook of Clinical Diagnosis and Management: M. I. Danish (5th edition)