Antihypertensives

PROF. RIVERA-MITU

BLOOD PRESSURE

CARDIAC OUTPUT × PERIPHERAL VASCULAR RESISTANCE (PVR)

CARDIAC OUTPUT → CONTRACTILITY, RATE × SV, PRELOAD

Calcium channel blockers
Phenylalkamines
Verapamil
Benzothiazepines
Diltiazem

CNS

Sympathetic
Adrenoreceptor antagonists - labetalol (beta/alpha blocker)
Beta-blockers -lol
Atenolol,metoprolol,propranolol, carvedilol
Alpha-blockers
Doxazosin, Tamsulosin (BPH); phentolamine, phenoxybenzamine,

sympathetic/adrenergic

stress
physical (illness, strenous)
emotional

Centrally-Acting agent
Clonidine, methyldopa
PM/OI
s/e lethargy

PVR ← ARTERIAL/VENOUS VASOCONSTRICTION ← VASCULAR SMOOTH MUSCLE

Direct-Acting Vasodilators
Hydralazine, minoxidil

Diuretics
Thiazides
Bendroflumethiazide, hydrochlorothiazide
Thiazide-like
chlortalidone,indapamide
Loop
furosemide, bumetanide

Dihydropyridines - dipines
Amlodipine, nifedipine, nimodipine
Reflex tachy
s/e edema
flushing
h/a

RENIN-ANGIOTENSIN ALDOSTERONE SYSTEM

Inflammation
Insulin
Estrogen
glucocorticoid
thyroid Hormones

Liver → angiotensinogen (AGT)

BV, Kidneys, adipose tissue

Direct Renin antagonist
aliskiren

↓BP → ↓ perfusion → afferent arterioles of Kidney → Renin

↑↑BP

beta-activation

↓Na load in the distal convoluted tubule

Angiotensin I → ACE ← vascular endothelium, Lungs, Kidneys

ACE INHIBITOR-pril
captopril, lisinopril, ramipril

Angiotensin II

ARB-sartan
candesartan, losartan, valsartan

Direct-Acting Vasodilators
Hydralazine, minoxidil
Dihydropyridines - dipines
Amlodipine, nifedipine, nimodipine

Systemic arterioles → Potent arterial vasoconstriction → ↑PVR → ↑BP

BRAIN

Hypothalamus → stimulates thirst → ↑H_2O intake

Posterior Pituitary → ADH (Vasopressin) → Kidneys → ↑H_2O reabsorption

↓ sensitivity of baroreceptor Reflex → ↓ baroreceptor Response to ↑BP → sustained ↑BP

Kidneys
proximal convoluted tubule → ↑Na reabsorption → ↑ osmolarity → Fluid shift to ↑BV → ↑ Blood volume → ↑ arterial pressure

Diuretics
Thiazides – s/e – ↓Na
Bendroflumethiazide, hydrochlorothiazide
Thiazide-like
chlortalidone,indapamide
Loop – s/e ↓K
furosemide, bumetanide

Aldosterone antagonist/
Potassium sparing diuretic
Amiloride,spironolactone

Adrenal cortex → ↑aldosterone (mineralocorticoid) → kidneys - distal tubule + collecting ducts of nephron → ↑Na Reabsorption, K excretion

s/e androgen-inhibition
⊕ gynecomastia
Indication – acne, MTF transition