

ANTI HYPERTENSIVE DRUGS ADVERSE EFFECTS

* Thiazide Diuretics

- Hypokalemia
- Hypomagnesemia
- Hyponatremia
- Hyperuricemia
- Hypovolemia → can cause orthostatic hypotension or light-headedness
- Hypercalcemia
- Hyperglycemia

* Loop Diuretics

- Acute hypovolemia → possibility of hypotension, shock and cardiac arrhythmias
- Hypokalemia
- Hypomagnesemia
- Ototoxicity → Reversible or permanent hearing loss
- Hyperuricemia

* Potassium Sparing Diuretics

- Hyperkalemia
- Gynecomastia in males → Spironolactone only

* Selective α_1 -Blockers
• Prazosin causes first dose phenomenon \rightarrow postural hypotension that occurs after first dose

* Minoxidil
• Reflex tachycardia
• Na^+ and H_2O retention

* Carbonic Anhydrase Inhibitor: Acetazolamide

- Mild metabolic acidosis
- Potassium depletion
- Renal stone formation
- Drowsiness
- Parasthesia

* Centrally Acting Sympatholytics: Clonidine

• Dryness of eyes and mouth

• Sedation

• Depression

• Bradycardia

• Impotence

• Nausea, Dizziness

• Parotid gland swelling and pain

• Postural hypotension may occur

• Sudden stoppage of Clonidine can cause withdrawal syndrome

- Headache

- Sweating

- Nervousness

- Tremors

- Tachycardia

- Palpitation

- Rebound HTN

This withdrawal syndrome can be treated with IV sodium nitroprusside or Labetalol

* α -Methyl dopa

• Nasal stuffiness

• Headache

• Sedation

• Mental depression

• Dryness of mouth

• Bradycardia

• Impotence

• Gynecomastia

• Hepatitis

DRUGS FOR HEART FAILURE

ADVERSE EFFECTS

* ACE Inhibitors (prils)

- Postural hypotension
- Renal Insufficiency
- Hyperkalemia
- Persistent dry cough
- Angioedema (rare)

• contraindicated in pts with bilateral renal artery stenosis

} Result from ↑ bradykinin

* ARBs (sartans)

- similar to ACE inhibitors
- lower incidence of cough and edema

* Aldosterone Receptor Antagonist: Spironolactone

- Gynecomastia
- Dysmenorrhea

* Angiotensin Receptor - Neprilysin Inhibitor (ARNI) (Sacubitril/Valsartan)

- Adverse effect profile similar to ACEi and ARBs
- hypotension more common with ARNI
- Angioedema

* FDC Hydralazine / Isosorbide dinitrate (Vaso and Venodilators)

- Headache, Dizziness, Hypotension
- Hydralazine associated with drug induced lupus (Rare)

* Digoxin Toxicity

- Anorexia

◦ CNS effects → headache, confusion, restlessness, disorientation, weakness, visual disturbances, altered mood, hallucinations

- Nausea, Vomiting

- Blurred vision, or yellowish vision

◦ Arrhythmias

* Recombinant BNP → Nesiritide

- Hypotension and dizziness

- Can worsen renal function

* Contraindications of Digitalis

- Carditis (myocarditis)

- WPW Syndrome

- Hypokalemia, Hypomagnesemia

- Hypercalcemia

- Elderly

- AV block (partial)

- Renal failure

- Hypo or hyperthyroidism

ADVERSE EFFECTS OF ANTI ARRHYTHMIC DRUGS

* Class IA

- enhanced proarrhythmic effects
- ability to worsen heart failure symptoms

Should not be used in pts with atherosclerotic heart disease and systolic heart failure

* Quindine

• Symptoms of cinchonism

- Blurred vision

- Tinnitus

- Headache

- Disorientation

- Psychotic

Quinidine

• may cause reflex tachycardia

• hypotension

• ~~Elongation~~

• Prolongation of QRS and ↑ QT interval associated with syncope (torsades)

* IV Procainamide

• Hypotension

→ SLE-like syndrome

→ hematotoxicity (thrombocytopenia, Agranulocytosis)

→ Torsades

* Disopyramide

• Most anticholinergic adverse effects of Class IA

- Dry mouth, urinary retention, blurred vision, constipation

* Lidocaine / Lignocaine

• CNS effects

- Nystagmus, drowsiness, slurred speech, paresthesia, agitation, confusion, convulsions

* Mexiletine

• Nausea, Vomiting

• Dyspepsia

* Flecainide

- Blurred vision
- Dizziness
- Nausea

* Propafenone

- Bronchospasm → should be avoided in asthma

* β -Blockers

- Bradycardia
- Hypotension
- Fatigue

* Amiodarone Toxicity

- Pulmonary Fibrosis
- Neuropathy
- Hepatotoxicity
- Corneal deposits
- Optic neuritis
- Blue-gray skin discoloration
- Hypo or Hyperthyroidism
- Photosensitivity

* Dronedronone

- Liver failure
- Contraindicated in $\left\{ \begin{array}{l} \rightarrow \text{Symptomatic heart failure} \\ \rightarrow \text{Permanent atrial fibrillation} \end{array} \right.$

* Sotalol

- Typical adverse effects associated with β -blockers
- Proarrhythmic effects \rightarrow (pts should be monitored in hospital for QT interval)

* Class IV Anti Arrhythmic Drugs (Ca^{+2} Channel Blockers)

Verapamil, Diltiazem

- Bradycardia
- Hypotension
- Peripheral edema

* Digoxin Toxicity

- Ectopic ventricular beats that may result in VT and fibrillation

* Adenosine \rightarrow side effects are transient due to short duration of action

- Flushing
- Headache
- Chest pain
- Hypotension
- Bronchospasm
- Dyspnea

* Ranolazine

- Dizziness
- Constipation

* Amiodarone Toxicity Mnemonic

The Thyroidism (Hyper, Hypo)

Periphery of Peripheral Neuropathy

My Myocardial Infarction

Lung Lung Fibrosis

Liver, Hepatotoxic

Cornea is Corneal deposits

Photosensitive Photosensitivity

ADVERSE EFFECTS OF ANTI ANGINAL DRUGS

* β -Blockers (Mnemonic - BBALD FISH)

Bronchoconstriction

Bradycardia

Arrhythmias

Lethargy

Disturbance in glucose metabolism

Fatigue

Insomnia

Sexual dysfunction

Hypotension

β -Blocker Contraindications
(ABCDE)

A - Asthma

B - Block (Heart Block)

C - COPD

D - Diabetes mellitus

E - Electrolyte (hyperkalemia)

Use in caution in diabetes patient receiving hypoglycemic drugs

- It is important not to discontinue β -blocker therapy abruptly. The dose should be gradually tapered off over 2-3 weeks to avoid rebound angina, MI and HTN

* Dihydropyridine Calcium Channel Blockers:

- Short acting dihydropyridines should be avoided in CAD bcz of evidence of increased mortality after an MI and an increase in acute MI in hypertensive patients

* Non dihydropyridine Calcium Channel Blockers

- contraindicated in pts with preexisting depressed cardiac function or AV conduction abnormalities
- can worsen heart failure due to their negative inotropic effect

* Dihydropyridine Calcium Channel Blockers (dipines)

- Peripheral edema
- Headache
- Flushing
- Rebound tachycardia (immediate release formulations)
- Hypotension

* Nondihydropyridine Calcium Channel Blockers

• Bradycardia

(Reflex tachycardia minimal or absent with verapamil and Diltiazem)

• Constipation

• Heart failure exacerbations

• Gingival hyperplasia (verapamil)

• Edema (Diltiazem)

* Sodium Channel Blocker: Ranolazine

• Constipation

• Headache

• Edema

• Dizziness

• QT interval prolongation

* Nitrates

Adverse effects are due to extensive vasodilation

- headache
- postural hypotension
- tachycardia
- palpitation
- weakness
- flushing
- syncope (rare)

Overdose may cause methemoglobinemia

ADVERSE EFFECTS OF HYPOLIPIDEMIC DRUGS

* HMG CoA Reductase Inhibitors (Statins)

- Hepatotoxicity
- Headache and sleep disturbances
- Myopathy
- Rhabdomyolysis
- Anorexia, Nausea, Vomiting, Diarrhea
- **Contraindicated in pregnancy**

* Bile Acid Sequestrants (Resins)

- Unpalatability
- Bloating
- Nausea, Flatulence, Constipation

* Fibrates

- Dyspepsia, Nausea, Vomiting, Diarrhea
- Muscle pain
- Headache
- Clofibrate → increased incidence of gallstones
- Gemfibrozil + Statins → ↑ risk of myopathy
- **Contraindicated in pregnancy**

* Niacin

- Flushing (Prostaglandin mediated vasodilation)
- Dyspepsia
- Itching
- Headache
- Hyperpigmentation
- Peptic ulcer
- Hyperuricemia*
- Hepatotoxicity
- Hyperglycemia
- Atrial arrhythmias (rare)
- Contraindicated in pregnancy

* Omega-3 Fatty Acids

- Nausea
- Belching

ADVERSE EFFECTS OF ANTI PLATELET DRUGS

* Aspirin

- Gastric irritation
- Bleeding
- Children or teenagers with certain viral infections may develop Reye's Syndrome

* Ticlopidine

- Diarrhea
- Bleeding
- Neutropenia
- Thrombocytopenia

* Ticagrelor

- Nausea
- Dyspnea
- Arrhythmias
- Bleeding

* Glycoprotein IIb/IIIa Receptors ^{Antagonists} → Abciximab, Eptifibatid, Tirofiban

- Bleeding
- Thrombocytopenia

EPTA
T also for Thrombocytopenia

ADVERSE EFFECTS OF ANTI COAGULANT DRUGS

* Heparin

• aPTT should be monitored

- Bleeding (hematuria usually earliest sign)
- Heparin-induced Thrombocytopenia (HIT)
- Hypersensitivity reaction → skin rash, urticaria, fever
- Osteoporosis
- Reversible alopecia
- Abnormalities in liver function tests

• Heparin is Contraindicated in:

- hemophiliacs
- Intracranial hemorrhage
- pts with HIT
- bacterial endocarditis
- Severe HTN
- Active TB
- peptic ulcer
- threatened abortion
- cirrhosis

* Warfarin

• INR should be monitored (PT)

- Bleeding
- Teratogenic → contraindicated in pregnancy
- Skin necrosis → Rare complication that occurs during 1st week of therapy
↳ lesions commonly seen on breast, buttocks, abdomen, thighs

• Other Rare Side Effects:

- Diarrhea
- Dermatitis
- Alopecia
- Abdominal cramp
- Urticaria
- Anorexia

ADVERSE EFFECTS OF ANTI ASTHMATICS

* Selective β_2 Adrenergic Agonists

→ Salbutamol, Terbutaline, Bambuterol

- Tremor
- Tachycardia
- Palpitations
- Hypokalemia
- Cardiac arrhythmias (rare)

• well tolerated when inhaled

* Methylxanthines

Theophylline, Aminophylline, Etophylline, Dioxophylline

Have a narrow margin of safety.

↑ cAMP

Can cause:

• Tachycardia

• ~~can~~ cross placental and BBB

• Palpitation

• Hypotension

• Sudden death due to cardiac arrhythmias

* Leukotriene-Receptor Antagonists

- headache
- skin rashes
- Eosinophilia (rare)
- Zileuton → Hepatotoxicity

* Mast Cell Stabilizers

• Symptoms of Local Irritation:

- Cough

- Headache

- Bronchospasm

- Nasal Congestion

(LABA)

- Combination of Long Acting β Agonist + Steroid
- used in bronchial asthma and COPD.
- moderate and severe persistent asthma

Salmeterol + Fluticasone

Formoterol + Budesonide

* Inhalational Glucocorticoids

- hoarseness of voice
- dysphonia
- oropharyngeal candidiasis

* Systemic Glucocorticoids

Side effects with long term use:

- Gastric irritation
- Na^+ and water retention
- Hypertension
- Muscle weakness
- Osteoporosis
- HPA Axis suppression

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