
بسم الله الرحمن الرحيم

Sympatholytic drugs;

- Adrenergic Blockers.
- Adrenergic antagonists.
- Adrenergic receptor antagonists.
- Adrenoceptor antagonists.

by

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Clinical Uses of β blockers;

- **Cardiovascular Uses;**
  - Hypertension,
  - IHD,
  - MI,
  - Cardiac arrhythmias,
  - Chronic (not acute) heart failure,
  - Dissecting aortic aneurysm,
  - Hypertrophic cardiomyopathy.
- **Other Uses;**
  - Pheochromocytoma,
  - Thyrotoxicosis,
  - Migraine,
  - Anxiety (to reduce somatic manifestations),
  - Essential tremors,
  - Glaucoma,
  - Cirrhosis (to reduce portal vein pressure).

Cardiovascular Uses;

➢Hypertension;

- β blockers are relatively **mild antihypertensives.**
- **All β blockers** are nearly **equally effective.**
- **First choice antihypertensive drugs in patients of IHD.**
- Can be given in **combination with other antihypertensives.**
- **Combination** with **verapamil and diltiazem is contraindicated.**

➢ IHD;

- All β blockers **benefit angina of effort.**
- **↓ frequency of attacks of angina** and
- **↑ exercise tolerance.**
  - **Cardiac work** and **oxygen consumption** are **reduced.**

- **Undesirable effects of β blocking drugs in angina;**
- **Total coronary flow** is **↓**(subepicardial region) due to **blockade of β_2 and unopposed α_1 receptors.**
- These deleterious effects of β blocking agents can be balanced by the **concomitant use of nitrates.**

➢ Myocardial Infarction;

- ***<u>Given I/V within 4-6 hours of an acute MI;</u>***
  - May **limit infarct size** by reducing O2 consumption.
  - **Prevent arrhythmias** including **VF.**
- ***<u>Secondary prophylaxis of MI (after recovery from acute MI);</u>***
  - **↓ mortality by 20 %**
    - » By **preventing reinfarction.**
    - » By **preventing sudden VF** at second attack of MI.
- **Not to be given in;**
  - » **shock**, **bradycardia** or **heart block.**

➢ Cardiac arrhythmias;

- **Class II anti-arrhythmic drugs.**
  (Vaughan Williams classification)
- **Suppress adrenergic mediated ectopic activity;**
  - Very useful in treating inappropriate **sinus tachycardia, atrial** and **nodal Extrasystoles** provoked by emotions or exercise.
  - Thyrotoxicosis
  - β blockers **suppress extrasystoles and tachycardia**.
- They **control ventricular rate** in **Atrial Fibrillation** and **A. Flutter** but only occasionally restores sinus rhythm.
- **PSVT** (adenosine, verapamil) --- Esmolol I/V.

➢ Chronic (not acute) heart failure;

- β blockers **may worsen heart failure.**
- **Beneficial hemodynamic effects at low doses.**
  - Over activity of cardiac β_1 receptors exert toxic effects on heart.
  - Low dose β blockade antagonize the **sympathetic over activity** on myocardium.
- **Not to be given in patients;**
  - Acute heart failure,
  - With marked fluid retention,
  - Those requiring I/v vasodilatation,
  - Those requiring I/v ionotropic drugs.

- **Dissecting aneurysm of aorta;**
  - **Reduce cardiac contractile force** and **aortic pulsation.**
  - Decrease rate of development of systolic pressure.
- **Hypertrophic cardiomyopathy;**
  - β blockers **improve diastolic dysfunction** and **LV compliance.**
  - β blockers **improve cardiac output during exercise**, but have little effect at rest.
- **FALLOT'S TETRALOGY;**
  - To **reduce right ventricular infundibular spasm** in Tetralogy of Fallot with Pulmonary stenosis.

Other Uses;

- **Pheochromocytoma;**
  - To **control tachycardia and arrhythmia.**
  - **Should never be given before α blocker.**
    - Dangerous rise in BP
  - Suppress cardiomyopathy caused by excess catecholamines.

➢ Thyrotoxicosis;

- Propranolol rapidly **control symptoms** without significantly affecting the thyroid status.
  - Palpitation, nervousness, tremors, severe myopathy and sweating.
- Highly valuable during **thyroid storm;**
  - Inhibit peripheral conversion of T4 to T3.
- Used preoperatively and while awaiting response to antithyroid drugs / Radioactive iodine.

➢ Migraine;

– Propranolol is used in **prophylaxis of migraine.**

➢ Anxiety;

– Propranolol exert **antianxiety effect** under conditions which provoke nervousness and panic attacks.

- **Block peripheral manifestation of anxiety** (palpitation, tremors)
- Reduce somatic manifestations.
- **Ineffective in anxiety neurosis.**

➢ Cirrhosis of liver

– To reduce portal vein pressure.

➢ Essential tremors;

- **Non selective β blockers** are effective.
- Do not benefit Parkinsonian tremors.

➢ Glaucoma;

- **Timolol** and other ocular β blockers are **first choice** drugs for chronic simple (wide angle) glaucoma.
- Used as adjuvant in angle closure glaucoma.

Adverse Effects (propranolol);

- **CNS:**
  - Sedation, sleep disturbances, depression, increased dreaming, nightmares and rarely hallucinations.
- **CVS:**
  - Bradycardia, cardiac conduction abnormalities,
  - Cardiac failure;
    - Precipitate CCF and edema by blocking sympathetic support to heart.
  - Peripheral arterial insufficiency,
    - Cold hands and feet,
    - Tiredness and reduced exercise capacity,
      - due to blunting of β2 mediated increase in blood flow to exercising muscles and attenuation of glycogenolysis and lipolysis.
  - Exacerbate variant (prinzmetal's) angina due to unopposed α mediated coronary constriction.

Adverse Effects;

- **Respiratory Tract:**
  - Bronchoconstriction, Can precipitate an attack of bronchial asthma.
- **GIT:**
  - Nausea, vomiting, constipation, diarrhea.
- **Metabolism:**
  - Hypoglycemia.
  - Impair carbohydrates tolerance in prediabetics.
  - Alter plasma lipid profile;
    - Total triglycerides and LDL-cholesterol tend to increase while HDL-cholesterol falls.
    - Cardioselective β blockers and those with intrinsic sympathomimetic activity do not affect blood lipids.
- **Allergy:**
  - Rash, fever, purpura.
- **Impotence in males.**

- **Effects of sudden withdrawal;**
  - Worsening of angina,
  - Rebound hypertension,
  - Tachycardia,
  - cardiac arrhythmias and even sudden death.
    - This is **due to super sensitivity of β receptors** occurring as a result of long term reduction of agonist stimulation.

Precautions/ contraindications;

- ***Precautions;***
  - Patients with asthma.
  - patients with diabetes mellitus esp. IDDM.
    - Non selective Beta blockers mask the effects of hypoglycemia.
- **Contraindications;**
- Cardiogenic shock,
- Right ventricular failure secondary to pulmonary hypertension,
- Congestive cardiac failure (acute),
- Greater than 1st degree heart block,
- Hypotension,
- Peripheral arterial insufficiency e.g., Raynaud's phenomenon.
- Severe Bronchial Asthma and COPD.
- Patients on MAO inhibitors.


Thank You