

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE
TECHNOLOGY

COURSE NAME : PHARMACOLOGY

TOPIC : ANTIANGINAL DRUGS

UNIT : 1

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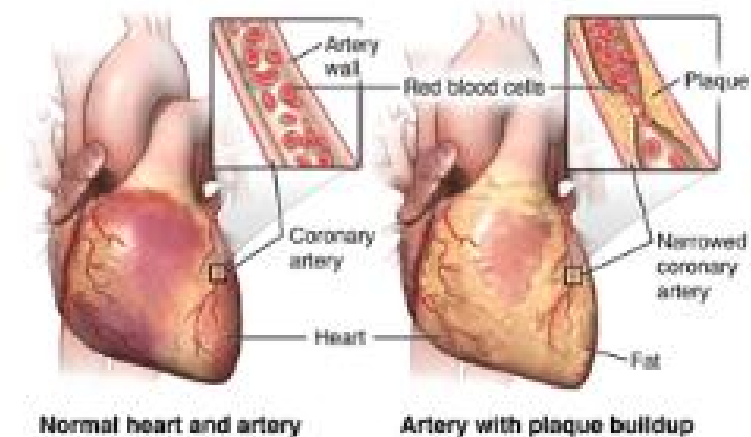
INTRODUCTION

- **DEFINITION { DEFINE STAGE } :**

- Angina pectoris is a clinical syndrome of chest pain or discomfort caused by transient myocardial ischemia — an imbalance between myocardial oxygen supply and demand.
- Antianginal drugs are used to restore this balance.

GOALS OF THERAPY :

- Relieve acute symptoms of an angina attack.
- Prevent further attacks and improve exercise tolerance.
- Reduce the risk of myocardial infarction (MI).



CLASSIFICATION



Nitrates :
e.g., Nitroglycerin,
Isosorbide Dinitrate.
Primarily act as
vasodilators to reduce
preload.



Beta-Blockers:
e.g., Metoprolol, Atenolol.
Decrease heart rate and
contractility to reduce
oxygen demand.



Calcium Channel Blockers:
e.g., Amlodipine, Diltiazem.
Reduce afterload and/or
heart rate.



Other Agents :
e.g., Ranolazine, Ivabradine.
Newer agents with unique
mechanisms of action.

NITRATES

MECHANISM OF ACTION :

- Converted to Nitric Oxide (NO), which increases cGMP.
- leads to smooth muscle relaxation (vasodilation),(importantly veins)
- reduces venous return (preload) and , myocardial oxygen demand.

PHARMACOKINETICS (NITROGLYCERIN SL)

- Dosage: 0.3 - 0.6 mg Sublingual
- Onset: 1-3 minutes (Rapid)
- Half-life ($t_{1/2}$): 2-3 minutes
- Duration: 10-30 minutes



PROS AND CONS



INDICATIONS : Used for acute angina attacks (Sublingual) and for long-term prophylaxis (oral, transdermal forms).



ADVERSE EFFECTS : Most common is a throbbing headache. Also causes flushing, postural hypotension, and reflex tachycardia.



CONTRAINDICATIONS : Severe hypotension. Critically, DO NOT use with PDE5 inhibitors (e.g., Sildenafil) due to risk of life-threatening hypotension.



BETA BLOCKERS

MECHANISM OF ACTION :


- Competitively block β_1 -adrenergic receptors in the heart.
- This decreases heart rate (negative chronotropy) and contractility (negative inotropy),
- reducing myocardial oxygen demand, (especially during exertion.)


• PHARMACOKINETICS (METOPROLOL):


- Bioavailability: ~50% (variable, high first-pass)
- Metabolism: Hepatic (CYP2D6)
- Half-life ($t_{1/2}$): 3-7 hours
- Excretion: Renal (as metabolites)



PROS AND CONS

 **INDICATIONS :** First-line for prophylaxis of exertional angina. Also used for hypertension and post-myocardial infarction.

 **ADVERSE EFFECTS :** Bradycardia, fatigue, lethargy. Non-selective β -blockers (like Propranolol) can cause bronchospasm in asthma patients.

 **CONTRAINDICATIONS :** Severe bradycardia, high-degree AV block, acute decompensated heart failure, and severe asthma (for non-selective agents).



CALCIUM CHANNEL BLOCKERS

MECHANISM OF ACTION :

- Block L-type calcium channels.
- **Dihydropyridines (e.g., Amlodipine):** Potent peripheral vasodilation, reducing afterload.
- **Non-Dihydropyridines (e.g., Diltiazem):** Also decrease heart rate and contractility.
- **PHARMACOKINETICS (AMLODIPINE) :**
 - Bioavailability: 64-90%
 - Metabolism: Hepatic (extensive)
 - Half-life ($t_{1/2}$): 30-50 hours (very long)
 - Onset: Slow (suitable for prophylaxis)



PROS AND CONS



INDICATIONS: Prophylaxis of angina, especially vasospastic angina. Also used for hypertension and arrhythmias (Non-DHPs).



ADVERSE EFFECTS : (Amlodipine) Peripheral edema, flushing, headache. (Diltiazem/Verapamil) Constipation, bradycardia.



CONTRAINDICATIONS : (Non-DHPs) Severe bradycardia, AV block, acute heart failure. (DHPs) Use with caution in severe hypotension.



OTHER AGENTS (RANOLAZINE)

MECHANISM OF ACTION :

- Selectively inhibits the late inward sodium current Na in myocardial cells,
- preventing Ca^{2+} overload, improving relaxation and perfusion.

PHARMACOKINETICS :

- Administered as 500 -1000 mgBID
- Highly metabolized by CYP3A4 and CYP2D6.
- Short $T_{1/2}$: 2-3 hours,
- with renal excretion.



PROS AND CONS

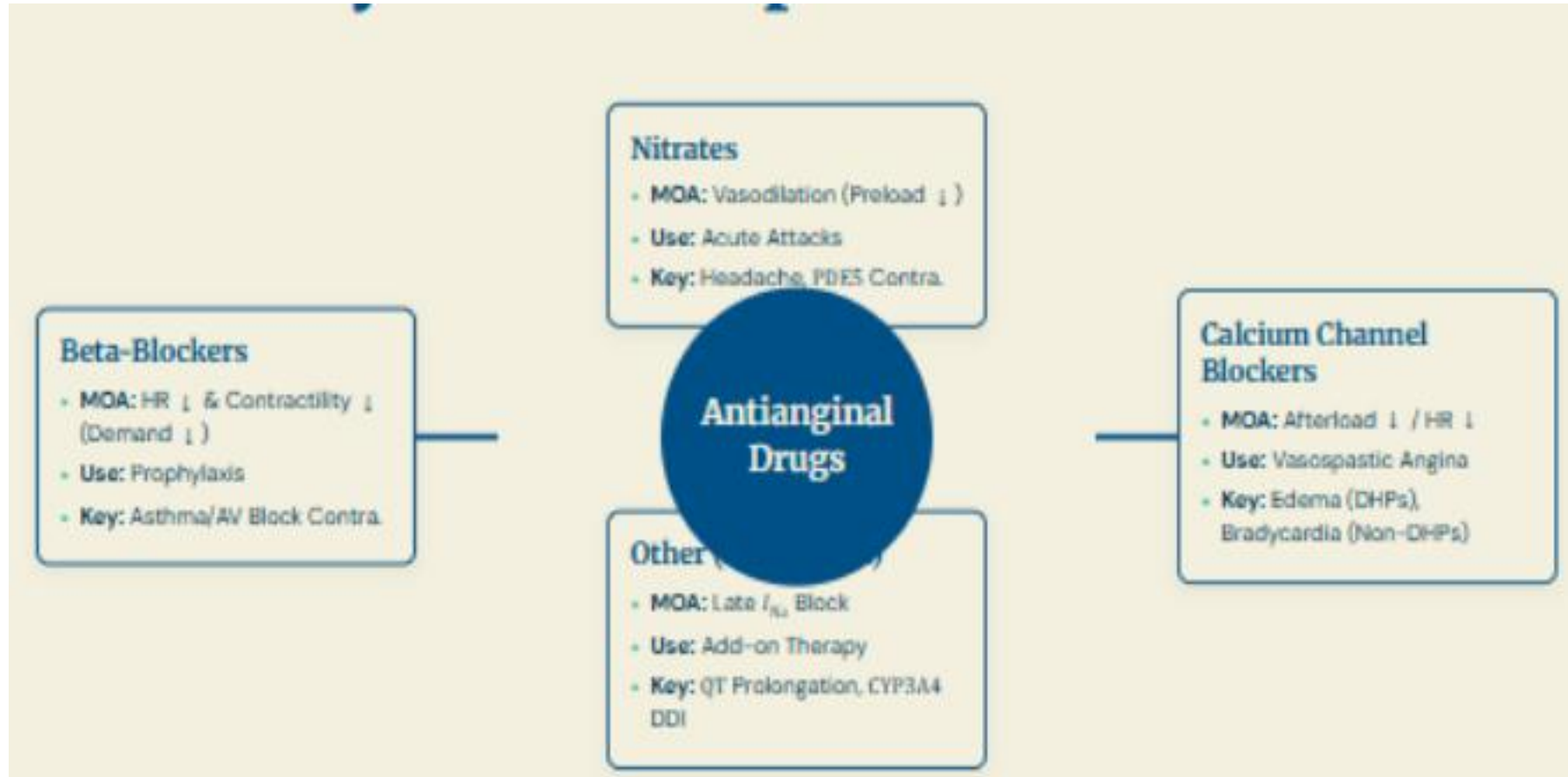
INDICATIONS : Chronic stable angina (used in combination with other antianginals).

ADVERSE EFFECTS : Constipation, nausea, dizziness, and QT interval prolongation.

CONTRAINDICATIONS: Liver cirrhosis, co-administration with potent CYP3A4 inhibitors (e.g., Ketoconazole).



SUMMARY



KEY DEPICTION AND REFERENCES

<https://www.drugs.com/drug-class/antianginal-agents.html>

<https://www.slideshare.net/slideshow/antianginal-drug-88309899/88309899>

<https://www.thecardiologysadviser.com/ddi/antianginal-drugs/>

<https://pubmed.ncbi.nlm.nih.gov/30165445/>

