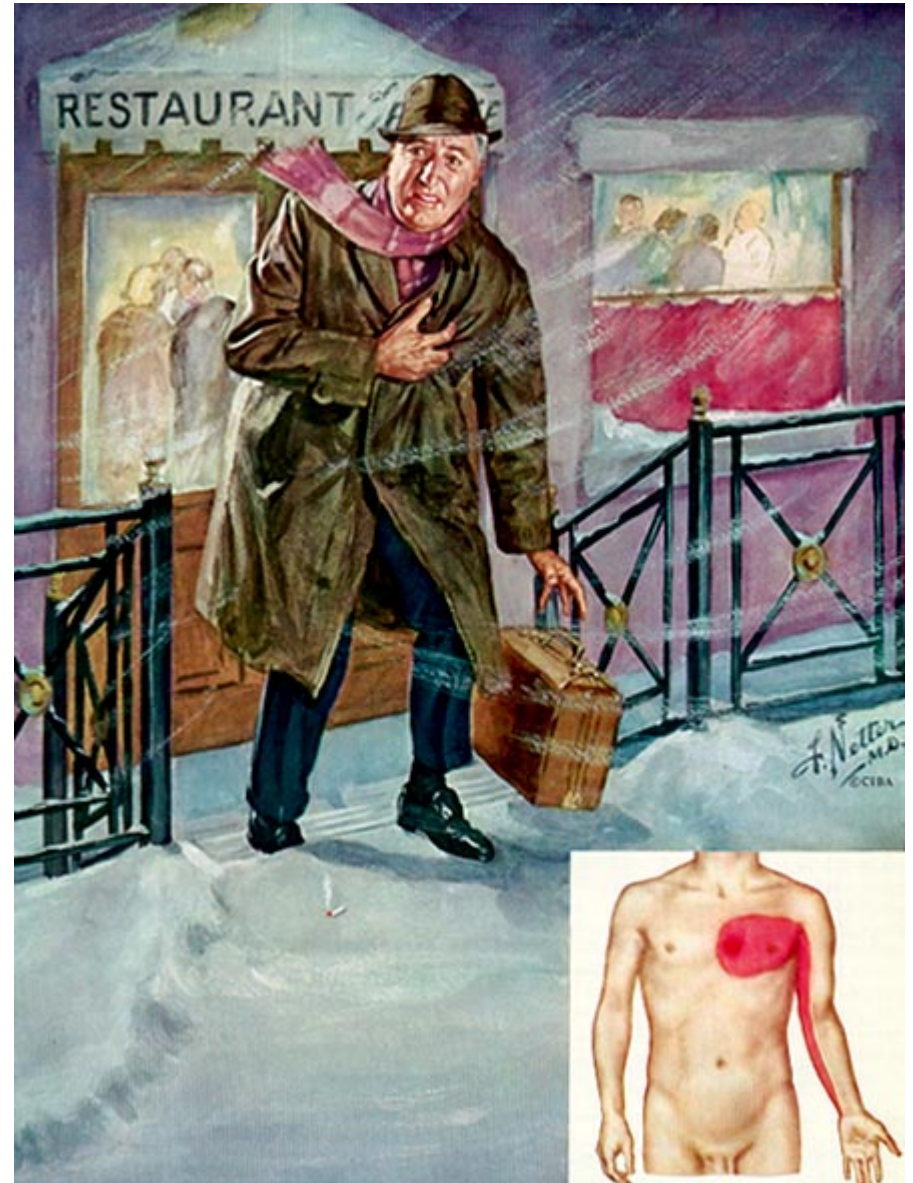


Angina Pectoris

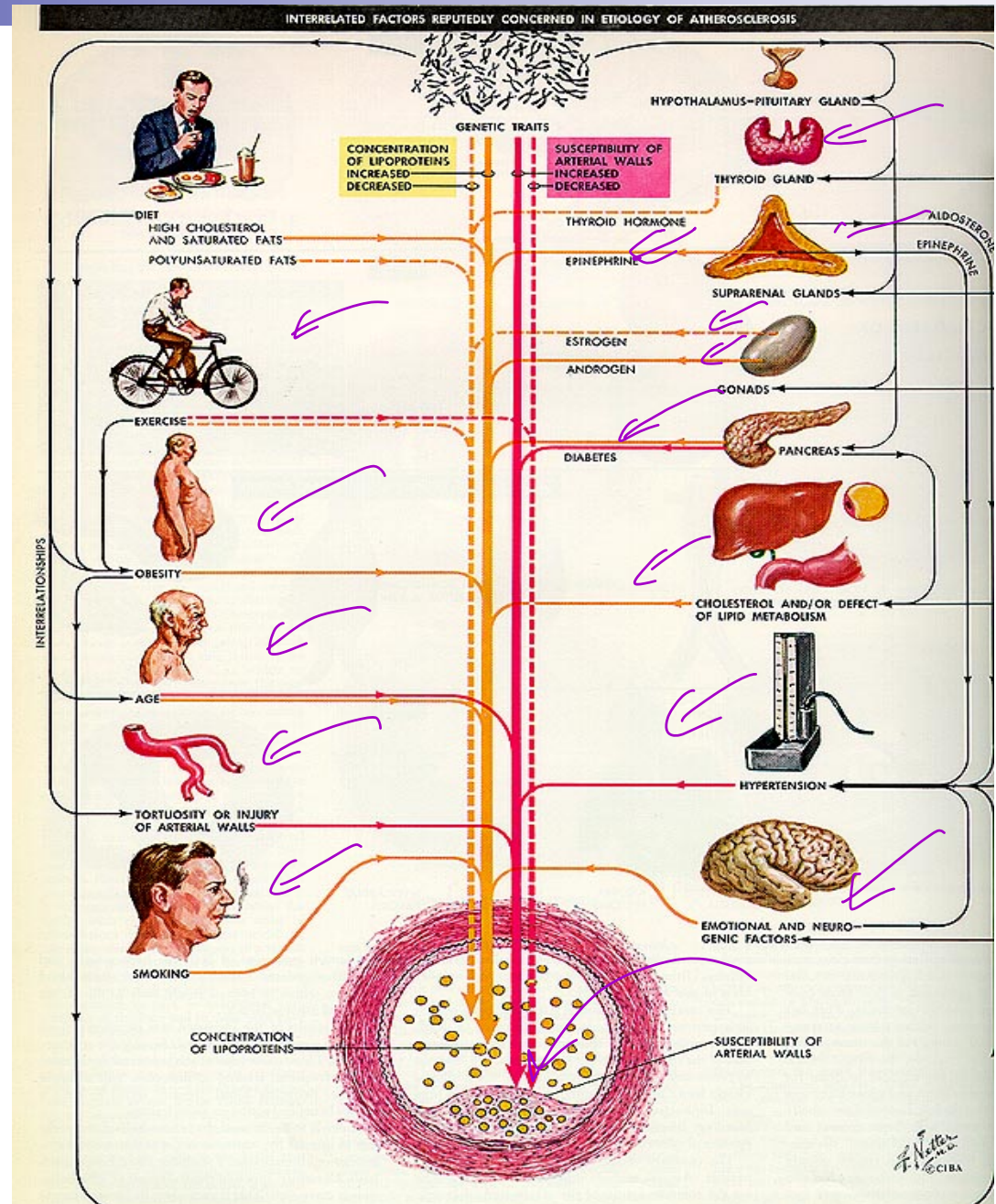


Angina Pectoris

- symptom of myocardial ischemia in the absence of infarction
- characterized by severe chest pain or discomfort during strenuous exercise, but may also develop with no exertion
- may lead to myocardial infarction (MI) if not treated



Causes of Atherosclerosis



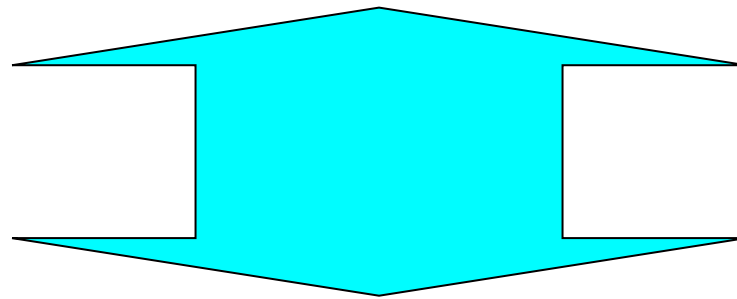
pO₂ / Hgb
serum conc

coronary
flow

coronary
micro-
circulation

O₂
extraction

OXYGEN AVAILABILITY



OXYGEN REQUIREMENTS

heart
rate

myocardial
wall force

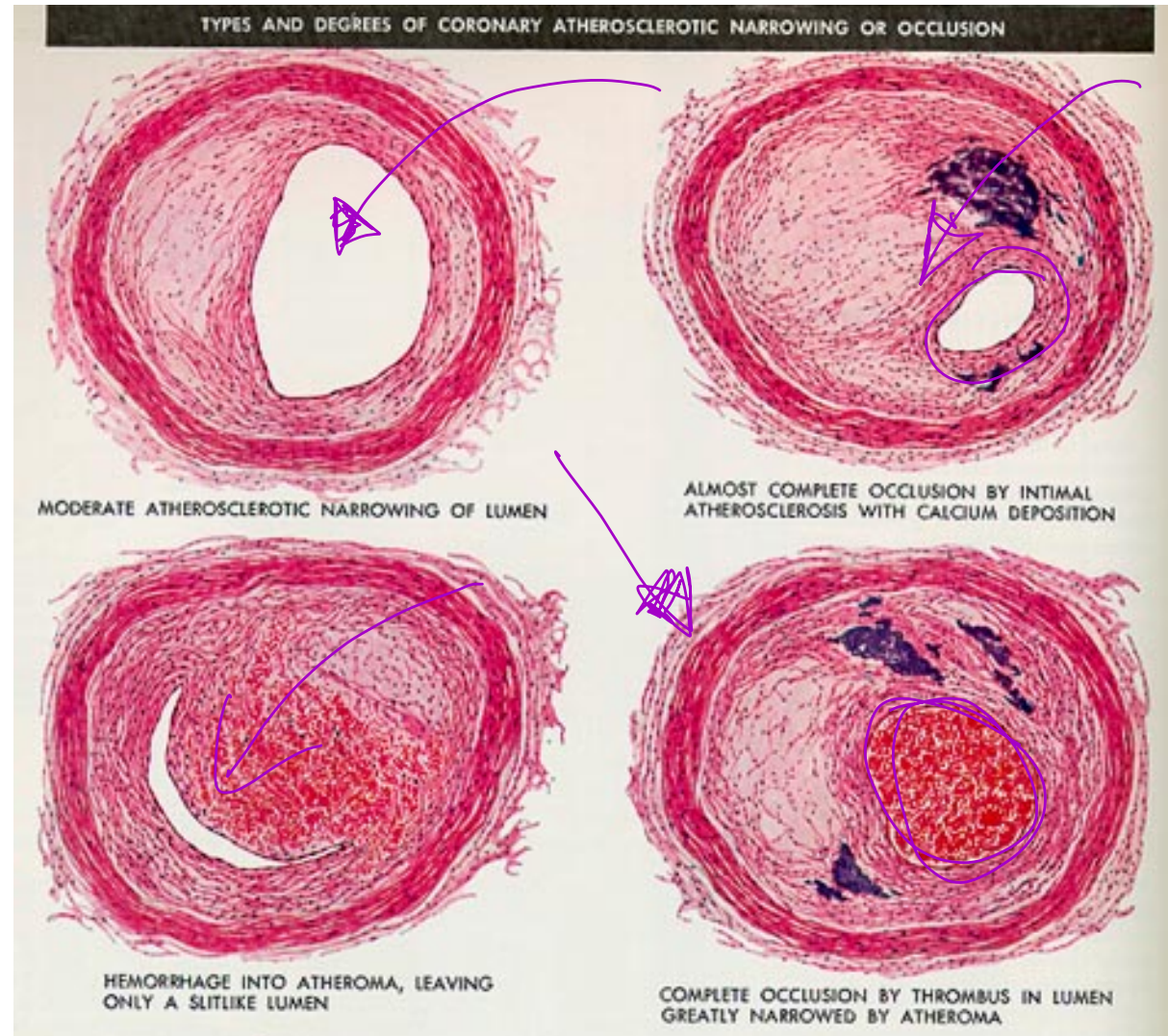
contractile
state

other
factors
(minor)

Types of Angina

1. Chronic Stable Angina (Exertional Angina)

- reproducible with level of physical activity
- usually due to atherosclerosis
- relieved by rest and/or NTG





Types of Angina (continued)

2. Unstable or Crescendo Angina

- angina characterized by increased intensity, frequency, or duration of symptoms due to atherosclerosis

3. Prinzmetal or Variant Angina (Vasospastic Angina)

- angina which occurs at rest
- spasm in coronary artery → decrease in blood flow



4. Mixed Angina

- when coronary vasospasm occurs at the site of a fixed atherosclerotic plaque



General Management

1. Goal of Therapy

- relieve or prevent symptoms
 - prevent myocardial ischemia
 - prevent myocardial infarction (death)

2. Lifestyle Alterations

- lifestyle changes to avoid stresses known to precipitate an anginal attack

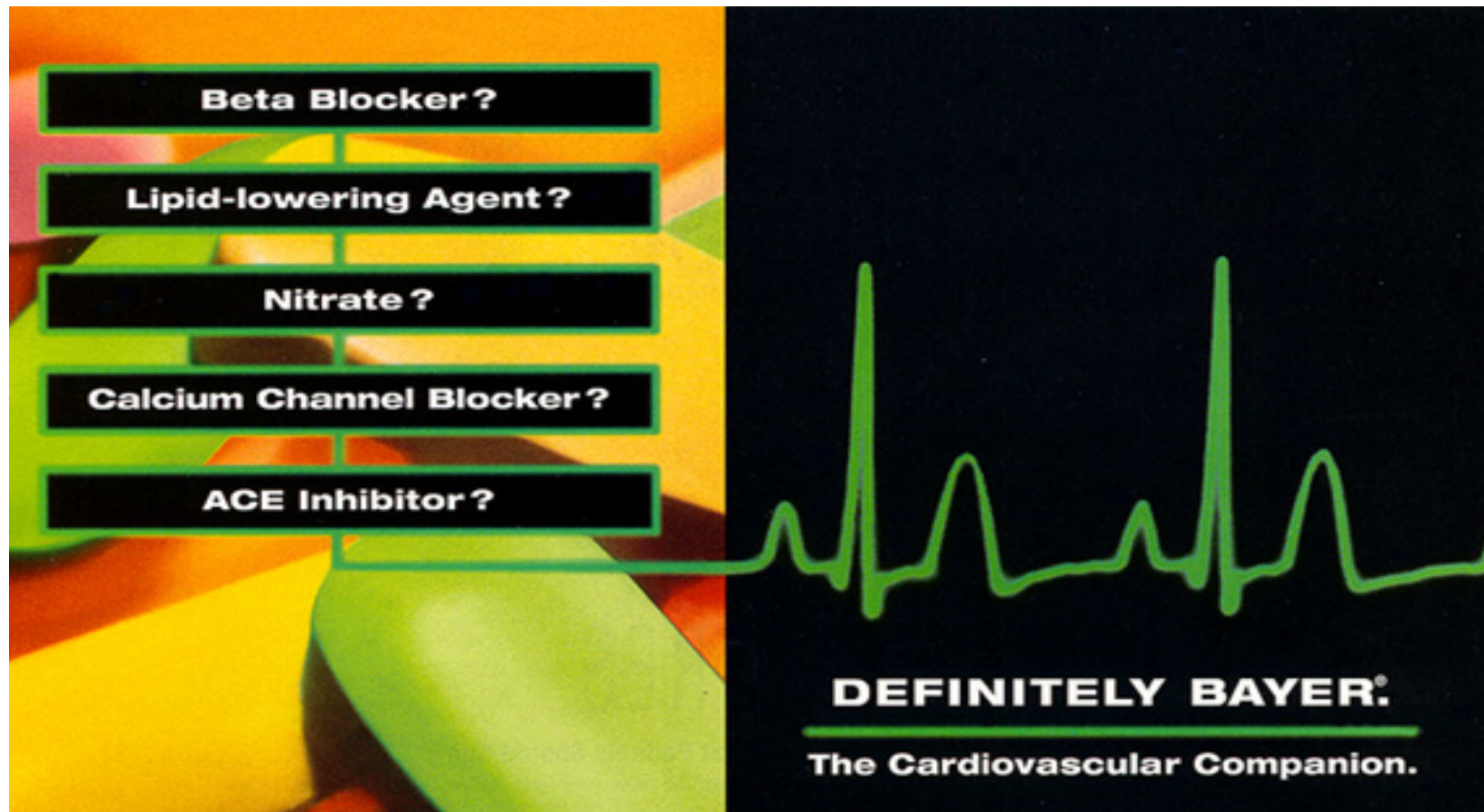
3. Sublingual (SL) NTG and Aspirin (ASA)

- prophylactic NTG before inciting events (exercise, coitus) helps minimize symptoms
- ASA provides antiplatelet protection against thromboembolic events



4. Frequent or Recurrent Angina

- recurrent angina is treated with scheduled drug therapy



Beta Blocker ?

Lipid-lowering Agent ?

Nitrate ?

Calcium Channel Blocker ?

ACE Inhibitor ?

DEFINITELY BAYER®

The Cardiovascular Companion.

The advertisement features a vertical checklist of five drug classes: Beta Blocker, Lipid-lowering Agent, Nitrate, Calcium Channel Blocker, and ACE Inhibitor. Each item is in a black box with white text. To the right, a green ECG line is shown against a black background. At the bottom, the Bayer logo and tagline are displayed in white text.

Pharmacologic Agents

1. Nitrates

a. Mechanism of Action

(1) dilation of epicardial coronary vessels

(2) venodilation

→ decreases preload

→ decreases ventricular filling pressures

✓
MOA

b. Short-Acting Nitrates (Sublingual & Translingual NTG)

- immediate prophylaxis
- treatment of acute attack

NITRATES	DOSAGE FORM	DURATION (minutes)	ONSET (minutes)	USUAL DOSE
NTG	SL	10-30 min	1-3 min	0.4-0.6 mg
NTG	Translingual	10-30 min	2-4 min	0.4 mg/spray
NTG	IV	3-5 min	1-2 min	5 mcg/min

c. Long-Acting Nitrates

NITRATES	DOSAGE FORM	DURATION (hours)	ONSET (minutes)	USUAL DOSE
NTG	SR capsule	4-8 hrs	30 min	6.5-9mg q8h
NTG	ointment	4-8 hrs	30 min	0.5-2 in q6h
NTG	patch	10-12 hrs	30 min	2.5-20mg qd
ISDN (isosorbide)	oral	2-6 hrs	15-40 min	5-60mg q6h
	SR	4-8 hrs	15-40 min	40-80mg q8h
ISMO	oral	3-6 hrs	30-60 min	20mg bid
Imdur	oral	8-12 hrs	30-60 min	60-120mg qd

e. Transdermal NTG

- continued use is associated with the development of tachyphylaxis resulting in only a 4- to 18-hour duration of effect

- ✓ • dosage regimens should maintain a nitrate-free interval at bedtime *to prevent the development of tachyphylaxis*

- examples: Nitro-Dur 0.1 mg/hr (2.5 mg/day)

Transderm-Nitro 0.2 mg/hr (5 mg/day)

Minitran 0.3 mg/hr (7.5 mg/day)

Nitrodisc 0.4 mg/hr (10 mg/day)

improve the efficacy and duration of nitrates during daytime hours, when

myocardial oxygen demand is higher

Transdermal Nitroglycerin

NDC-0085-3315-01 Contents: 1 unit
INPATIENT USE ONLY

Nitro-Dur[®]
(nitroglycerin)
Transdermal Infusion System

0.3 mg/hr
(15 cm²)

Each 15 cm² unit contains 60 mg of nitroglycerin
Approximate rated release *in vivo* 0.3 mg/hr

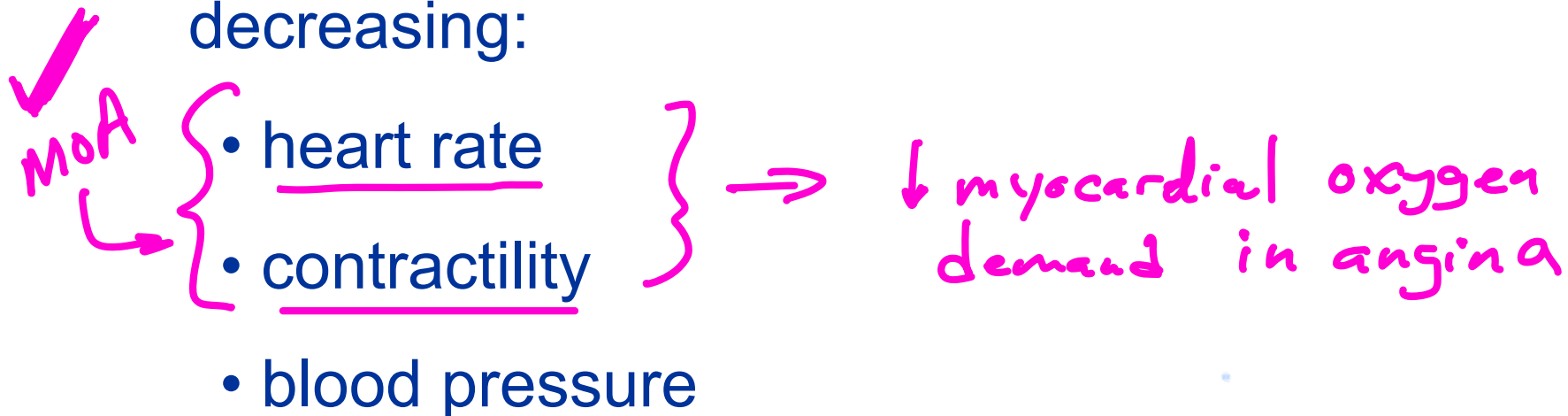
Caution: Federal law prohibits
dispensing without prescription.

KEY Key Pharmaceuticals, Inc.
TM Kenilworth, NJ 07033 USA

Beta-Adrenergic Blocking Agents

a. Mechanism of Action

- beta blockers reduce myocardial oxygen demand by decreasing:





b. Indications

- beta blockers are especially indicated in patients with concomitant disorders: hypertension, arrhythmias, vascular headaches
- beta blockers should be used with caution in patients with:
 - HF (heart failure)
 - COPD (chronic obstructive pulmonary disease)
 - peripheral vascular disease



c. Cautions

- ✓ • abrupt withdrawal of beta-blockers may lead to a rebound increase in underlying cardiac disease and possibly an increased risk of myocardial infarction or sudden death

Calcium Channel Blockers

a. Mechanism of Action

- calcium channel blockers inhibit calcium entry in myocardial and smooth muscle
 - dilation of coronary vessels
 - relief of vasospasm in vasospastic angina
 - peripheral arterial vasodilation → ↓ afterload
 - negative inotropic effect (esp. verapamil) similar to beta-blockers

Calcium Channel Blockers

Effects	Nifedipine (Procardia)	Diltiazem (Cardizem)	Verapamil (Calan, Isoptin)
vasodilation	(+++)	(+)	(+/-)
reflex tachycardia	(+++)	(+)	0
AV block (negative inotrope)	0	(+)	(+++)



b. Indications

- calcium channel blockers have an additive benefit in patients with hypertension, supra-ventricular tachycardia (SVT), peripheral vascular disorders (e.g., Reynauds disease), and chronic migraine

c. Cautions

- calcium channel blockers should be used with caution in patients with CHF, with verapamil having the most negative inotropic effect

Ranolazine (Ranexa) – Sodium-Channel Inhibitor

- MOA: inhibits the late phase of the Na current (Late I_{Na})
→ reduces intracellular Na & Ca → improves diastolic function → decreases O_2 demand → decreases angina
- used alone or in combination w/ other traditional meds
- ✓ • most often used in patients who have failed other anti-anginal meds *since it's the source of many drug-drug interactions and prolongs QT-interval.*
- extensively metabolized by liver → source of drug-drug interactions: i.e., inducers (phenytoin) and inhibitors (antifungals) of Cytochrome P450 enzyme system
- SE: constipation, headache, edema, dizziness, QT interval prolongation

Treatment Algorithm for Improving Symptoms in Stable Angina

