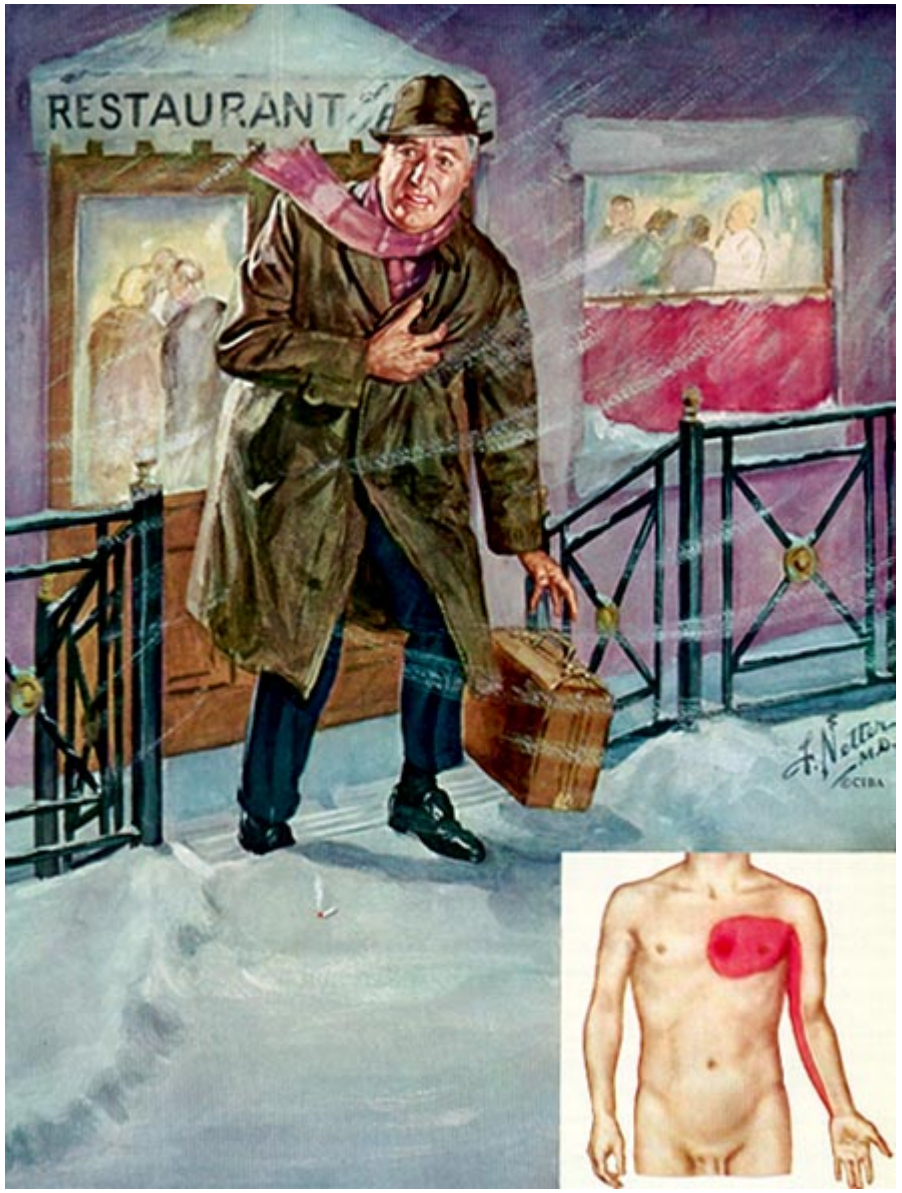
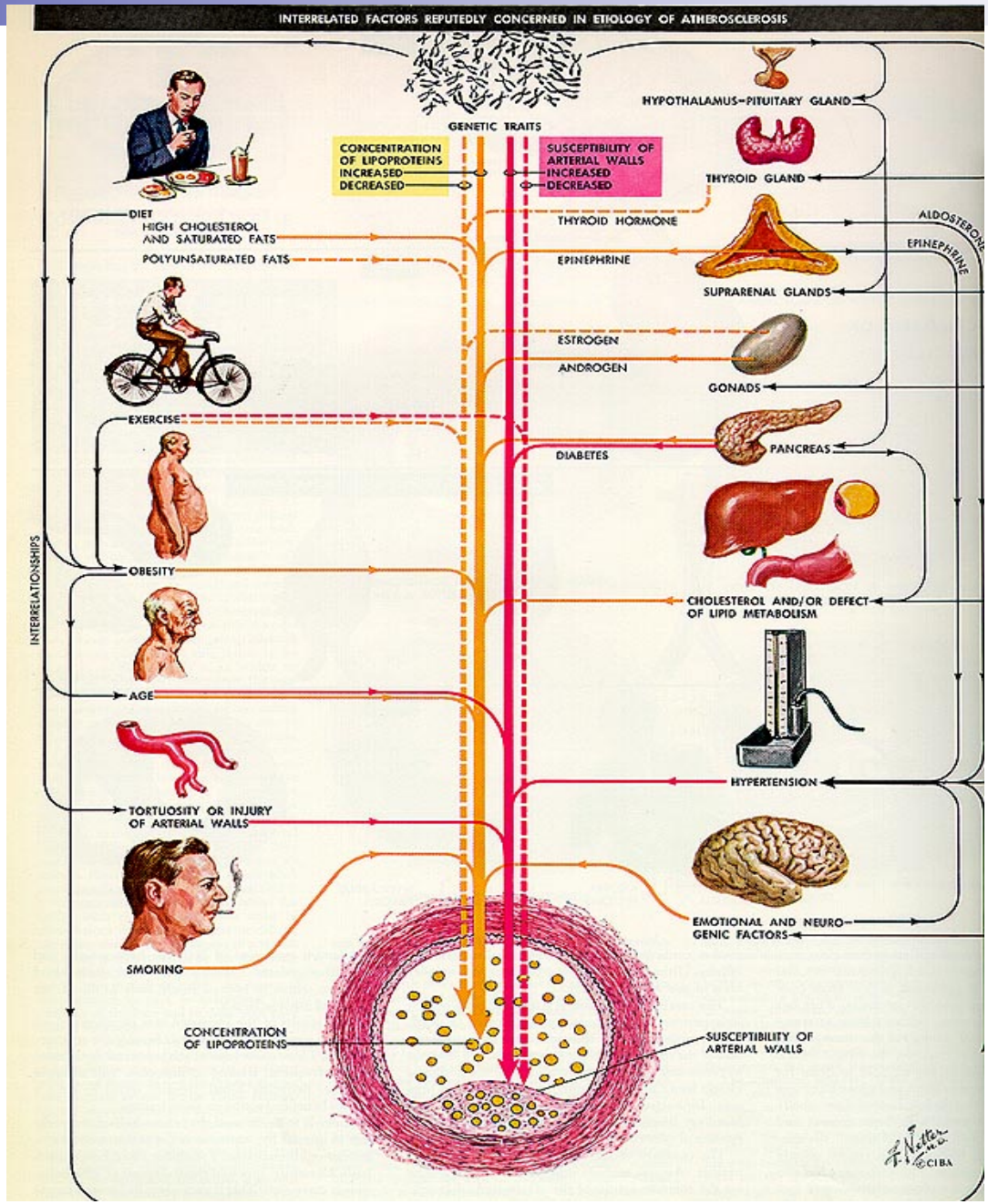
Angina Pectoris

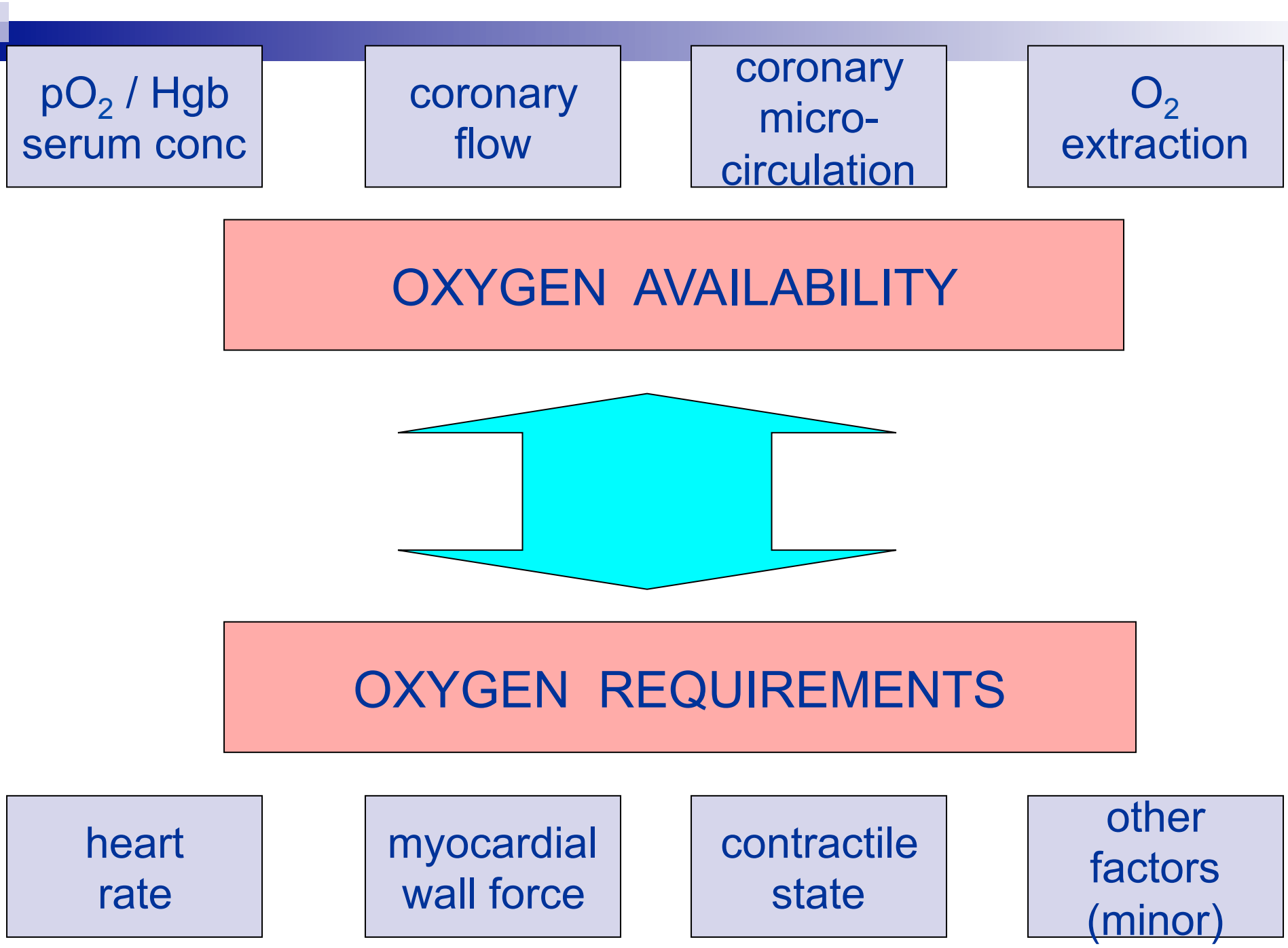
Angina Pectoris

- 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



Causes of Atherosclerosis

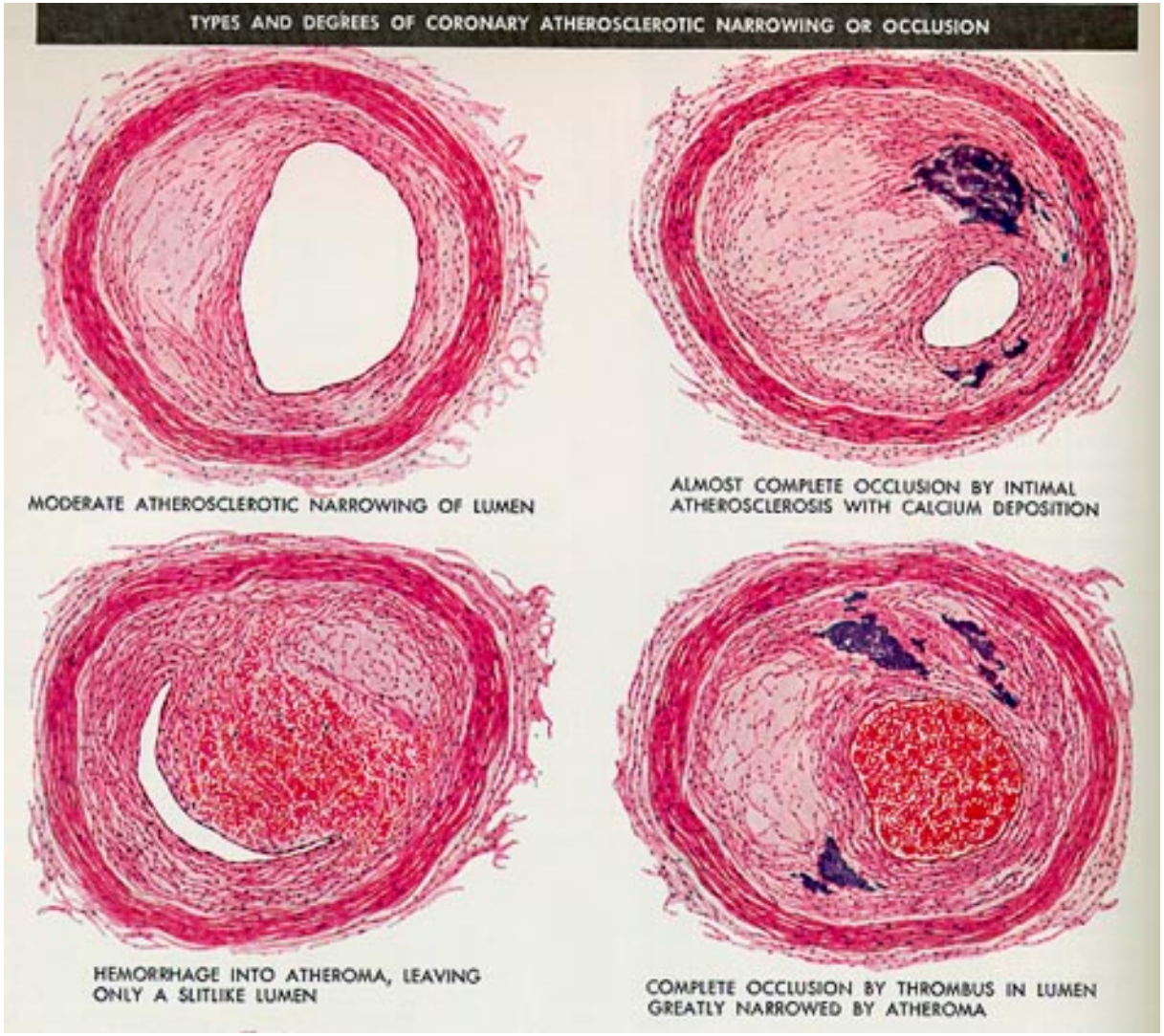



pO_2 / Hgb serum conc
coronary flow
coronary micro-circulation
O_2 extraction
OXYGEN AVAILABILITY
OXYGEN REQUIREMENTS
heart rate
myocardial wall force
contractile state
other factors (minor)

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

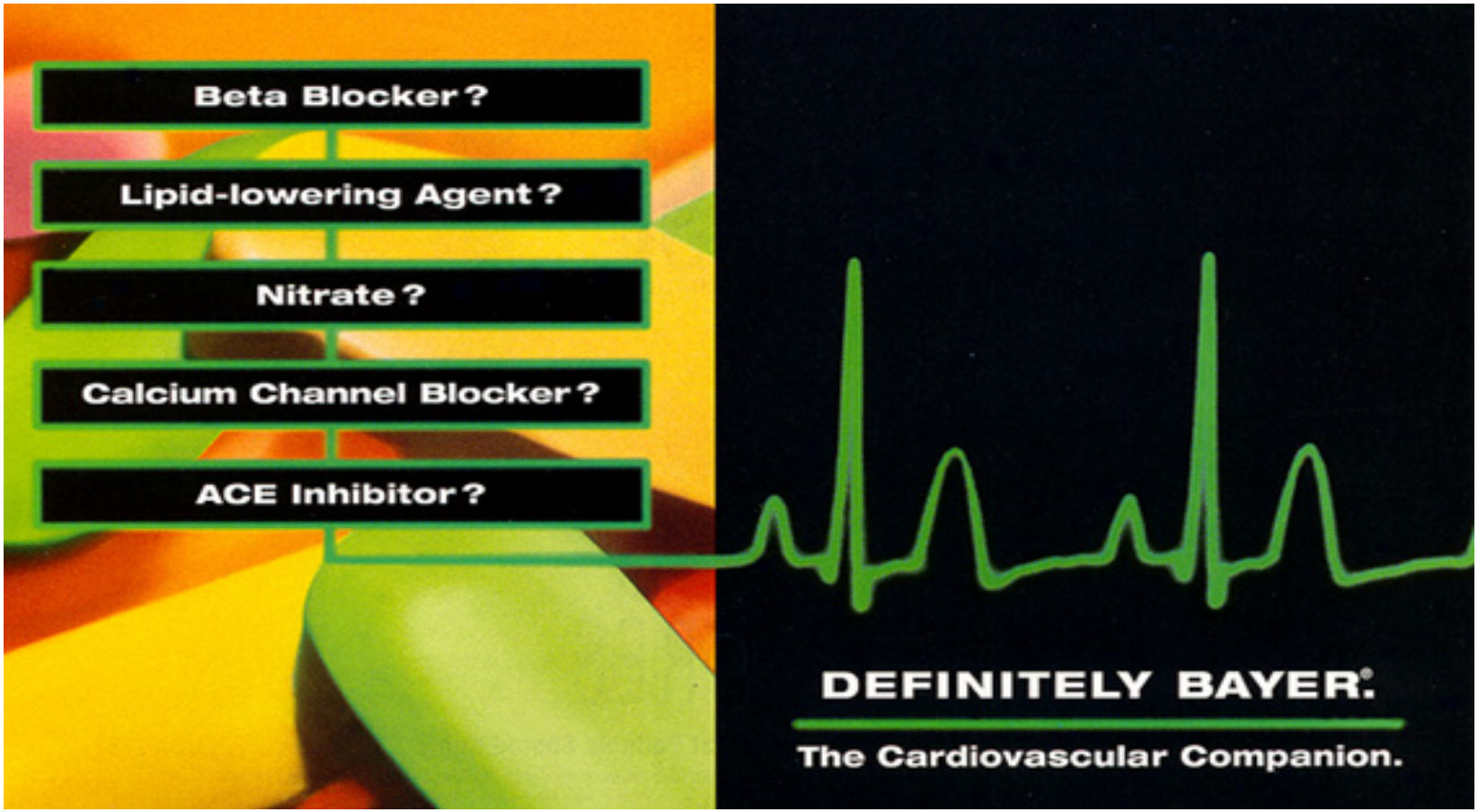
3. Sublingual (SL) NTG and Aspirin (ASA)

- 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



Pharmacologic Agents

1. Nitrates
    a. Mechanism of Action
        (1) dilation of epicardial coronary vessels
        (2) venodilation
            → decreases preload
            → decreases ventricular filling pressures

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
- 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)

Transdermal Nitroglycerin

Beta-Adrenergic Blocking Agents

a. Mechanism of Action

- beta blockers reduce myocardial oxygen demand by decreasing:
  - heart rate
  - contractility
  - blood pressure

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

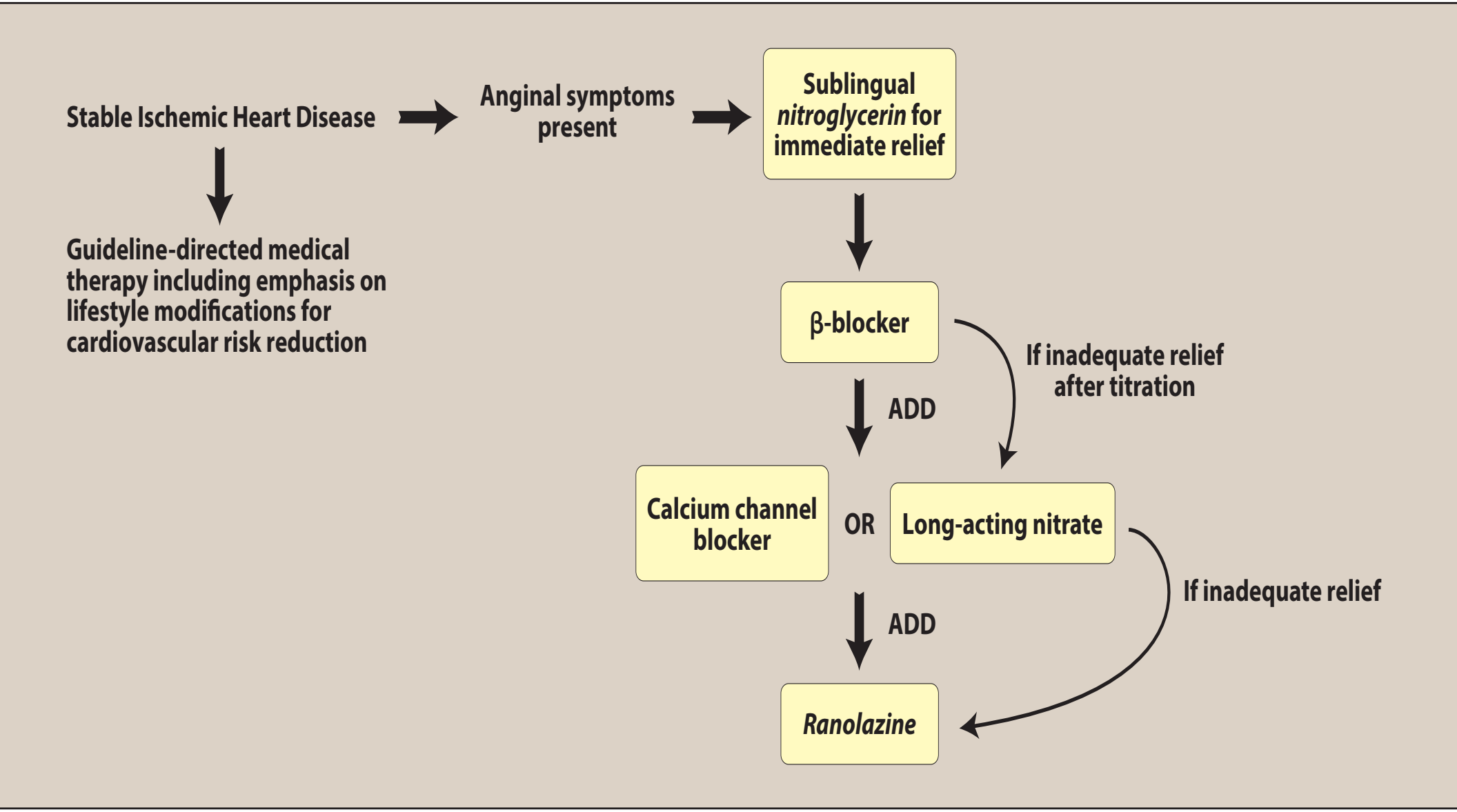
c. Cautions

- 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
- 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




PHARMACY
CLOSED