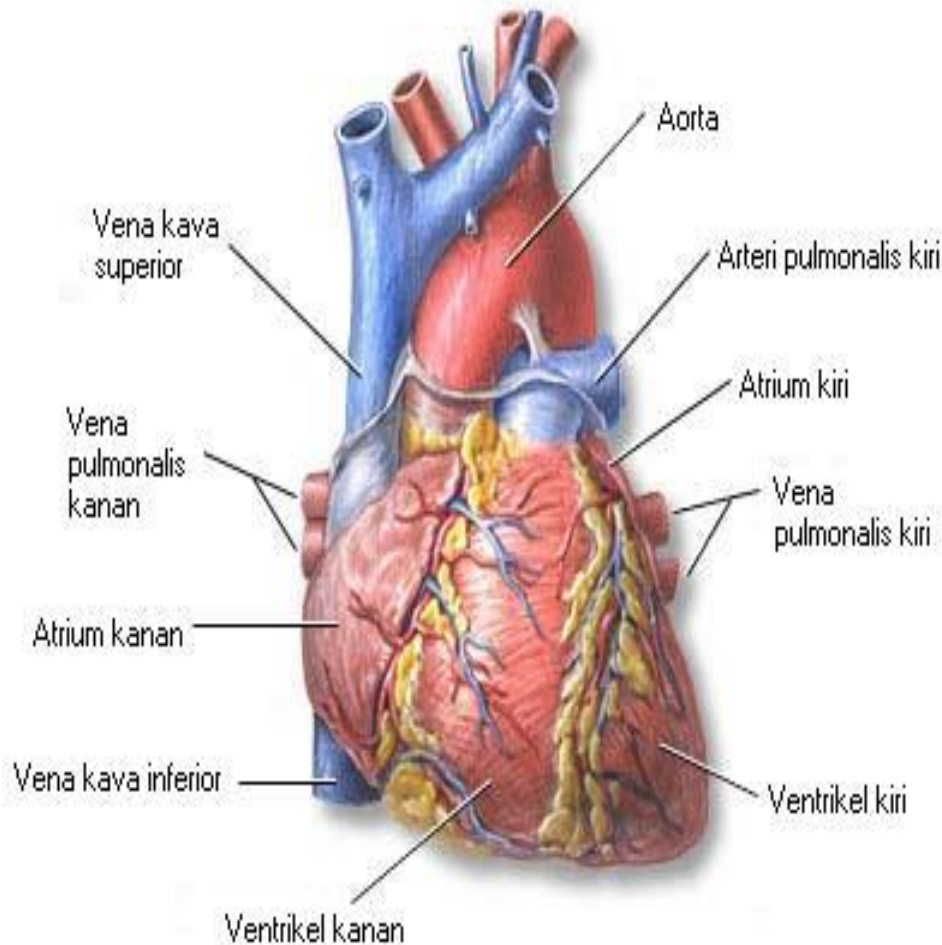# Management Of Chronic Ischemic Heart Disease

dr.Hasril Hadis, SpJP(K)
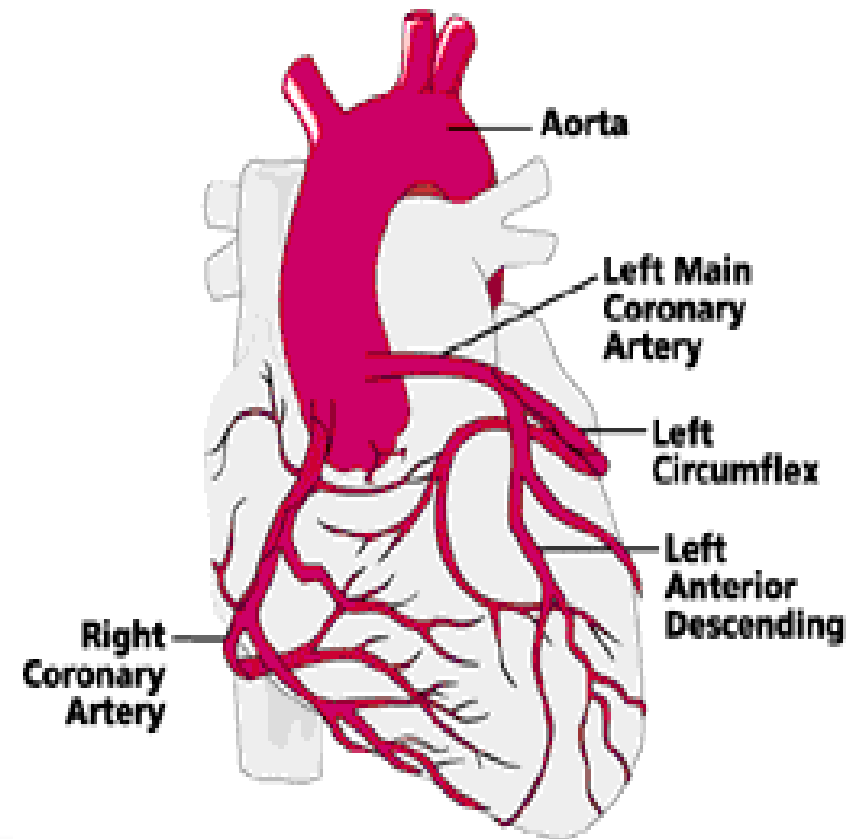
Interventional Cardiologist

RSUP Dr.M.Djamil Padang

Coronary Blood Suply

Aorta
Vena kava superior
Arteri pulmonalis kiri
Atrium kiri
Vena pulmonalis kanan
Vena pulmonalis kiri
Atrium kanan
Vena kava inferior
Ventrikel kiri
Ventrikel kanan

1997 HeartPoint
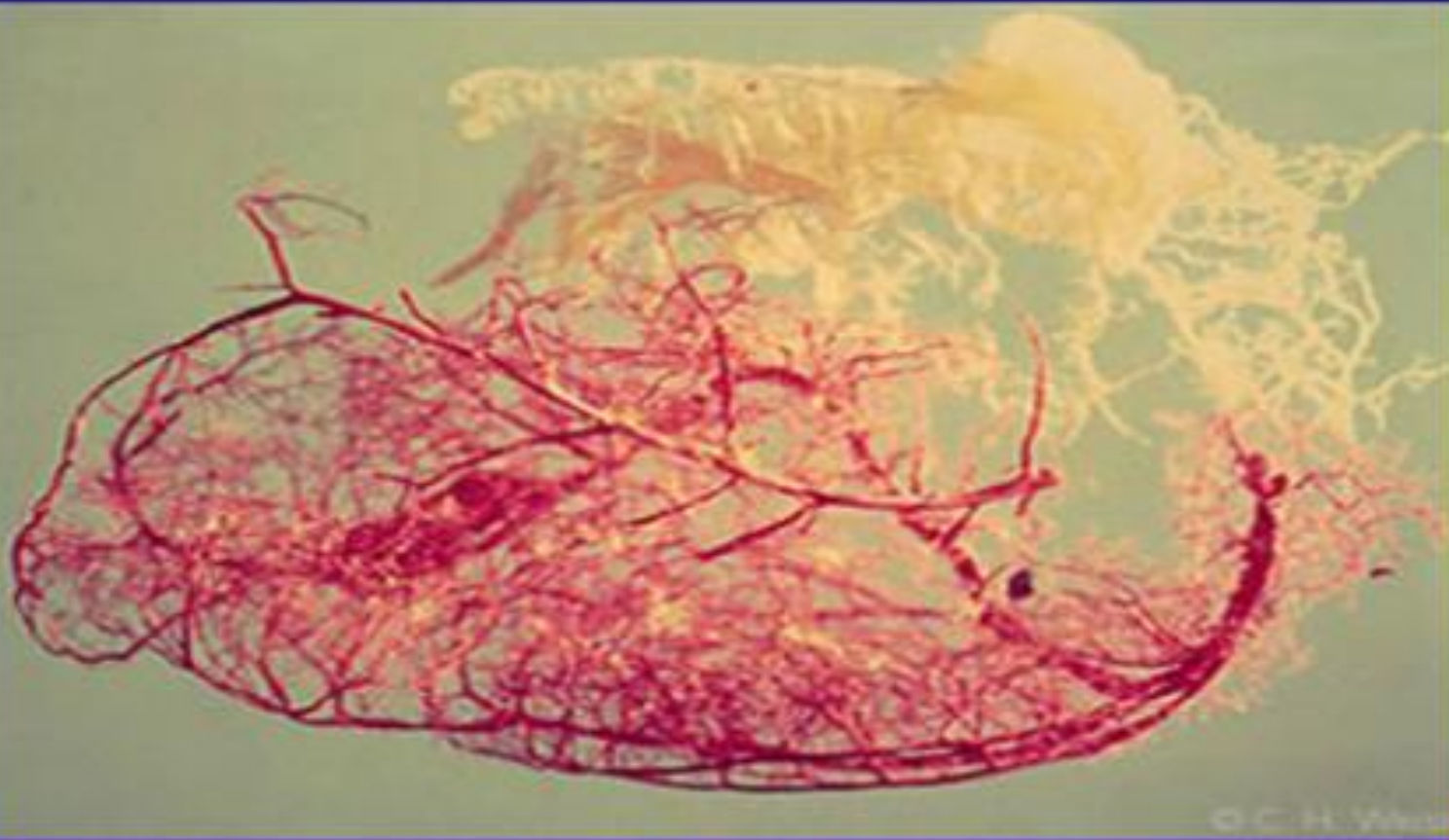
Aorta
Left Main Coronary Artery
Left Circumflex
Left Anterior Descending
Right Coronary Artery

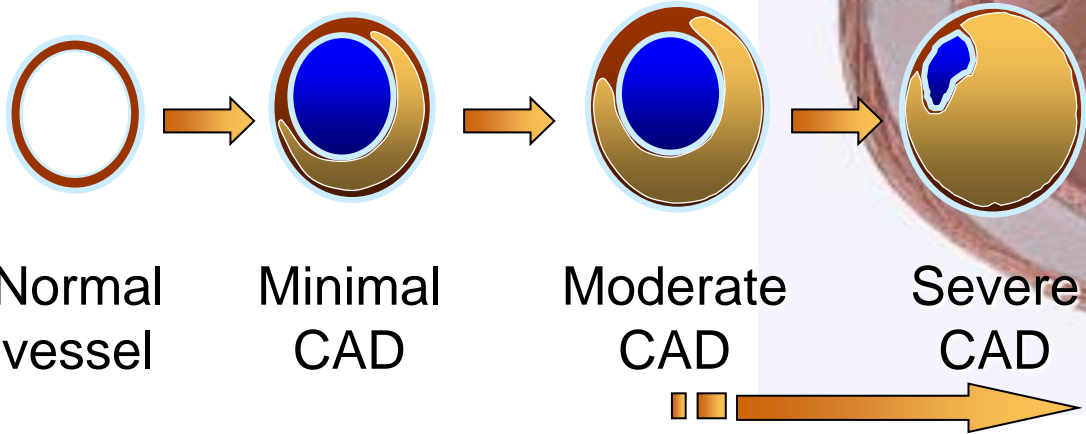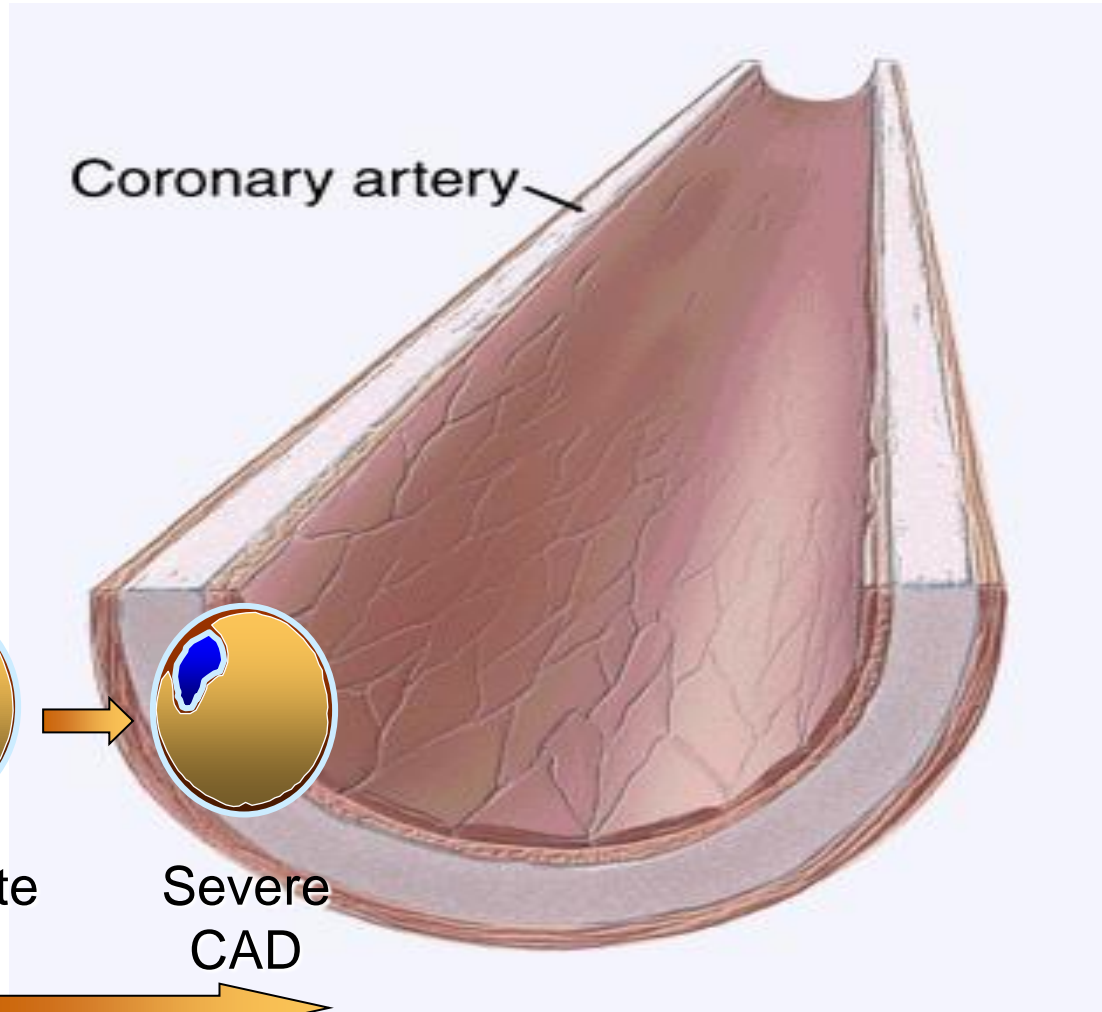# Micro Circulation

Coronary arteries are the network of blood vessels that supply the heart. In this photograph, the left coronary artery has been injected with a red dye, and the right coronary artery with white.

Atherosclerosis

Coronary artery

Normal vessel

Minimal CAD

Moderate CAD

Severe CAD

Canadian Cardiovascular Society Grading Scale (CCS)

Table 2

Canadian Cardiovascular Society Angina Classification

Angina Class	Definition
I	Angina with strenuous or prolonged activity
II	Angina with slightly greater than normal activity (fast-paced walking or climbing stairs)
III	Angina resulting in marked limitation of normal activity
IV	Angina at rest

Stable Angina vs Unstable Angina

Stable Angina

Typical Angina (definite)

1. Substernal Chest discomfort
2. Provoked by exertion or emotion stress
3. Relieved by rest or NTG

Atypical angina (Propable)

- 2 of the above characteristics

Noncardian chest pain

- 1 or 0

Unstable Angina (Acute Coronary Syndrome)

- Prolonged (.20 min) anginal pain at rest
- New onset (*de nuvo*) *angina (Class II or III of CCS)*
- Recent destabilization of previously stable angina (Cresendo angina)
- Post MI Angina

Acute or Chronic ?

Phase 1
I-III

Phase 2
IV-Va

No symptoms

Phase 4
VI

Acute Syndromes
Myocardial infarction
Unstable angina
Ischemic sudden death

Phase 6
VI

Phase 3
VI

Phase 5
Vb-Vc

Onset of angina pectoris?

Angina pectoris
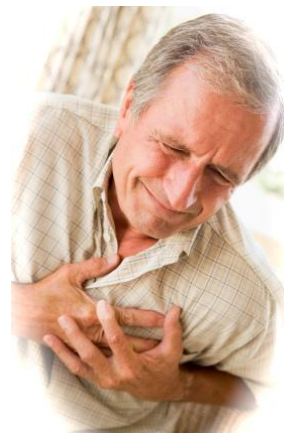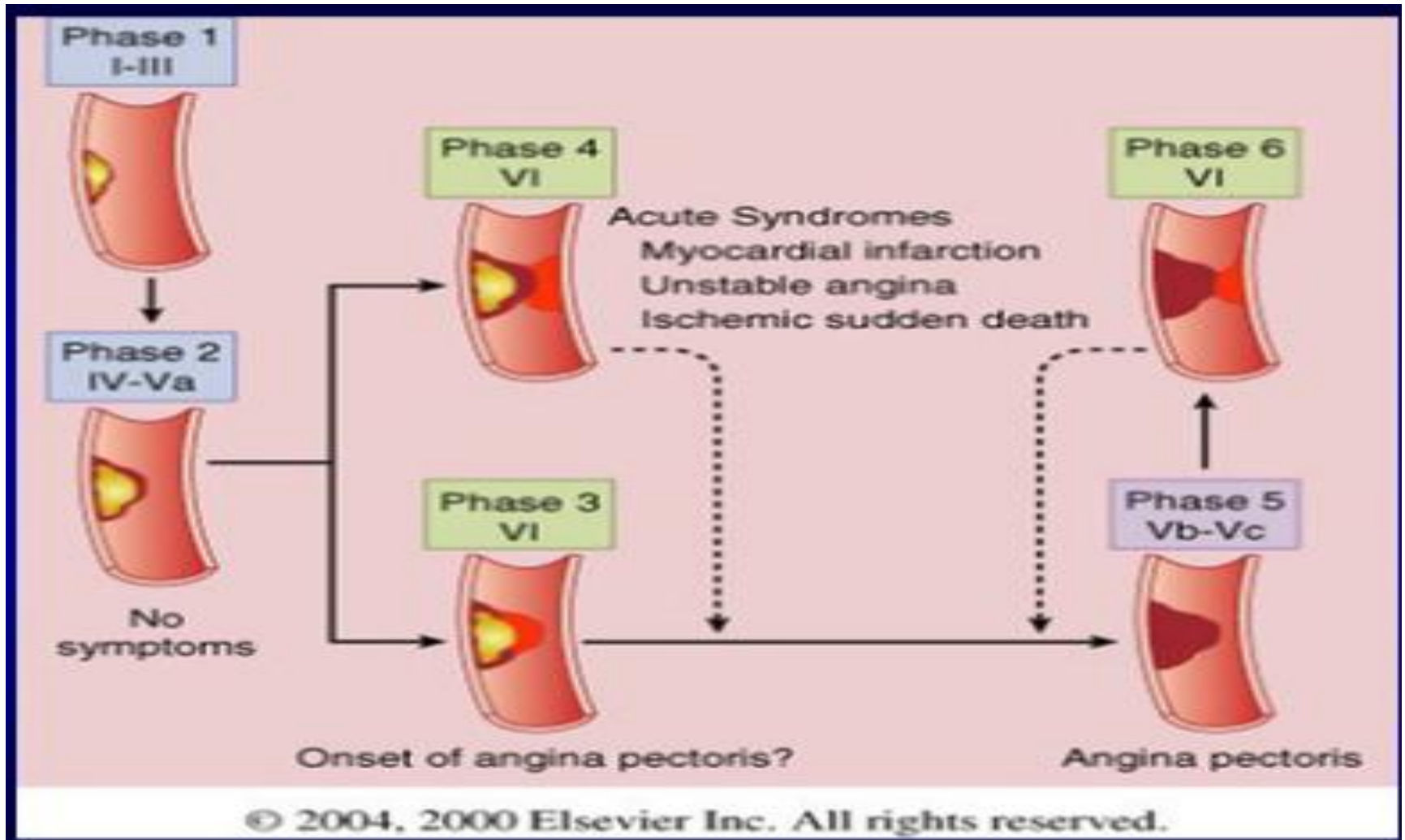
Angina treatment: Objectives

Reduce ischemia and relieve anginal symptoms

⬇

Improve quality of life

Prevent MI and death

⬇

Improve quantity of life

Gibbons RJ et al. ACC/AHA 2002 guidelines.
www.acc.org/clinical/guidelines/stable/stable.pdf

Comprehensive management of myocardial ischemia

ACC/AHA guidelines: Chest pain evaluation

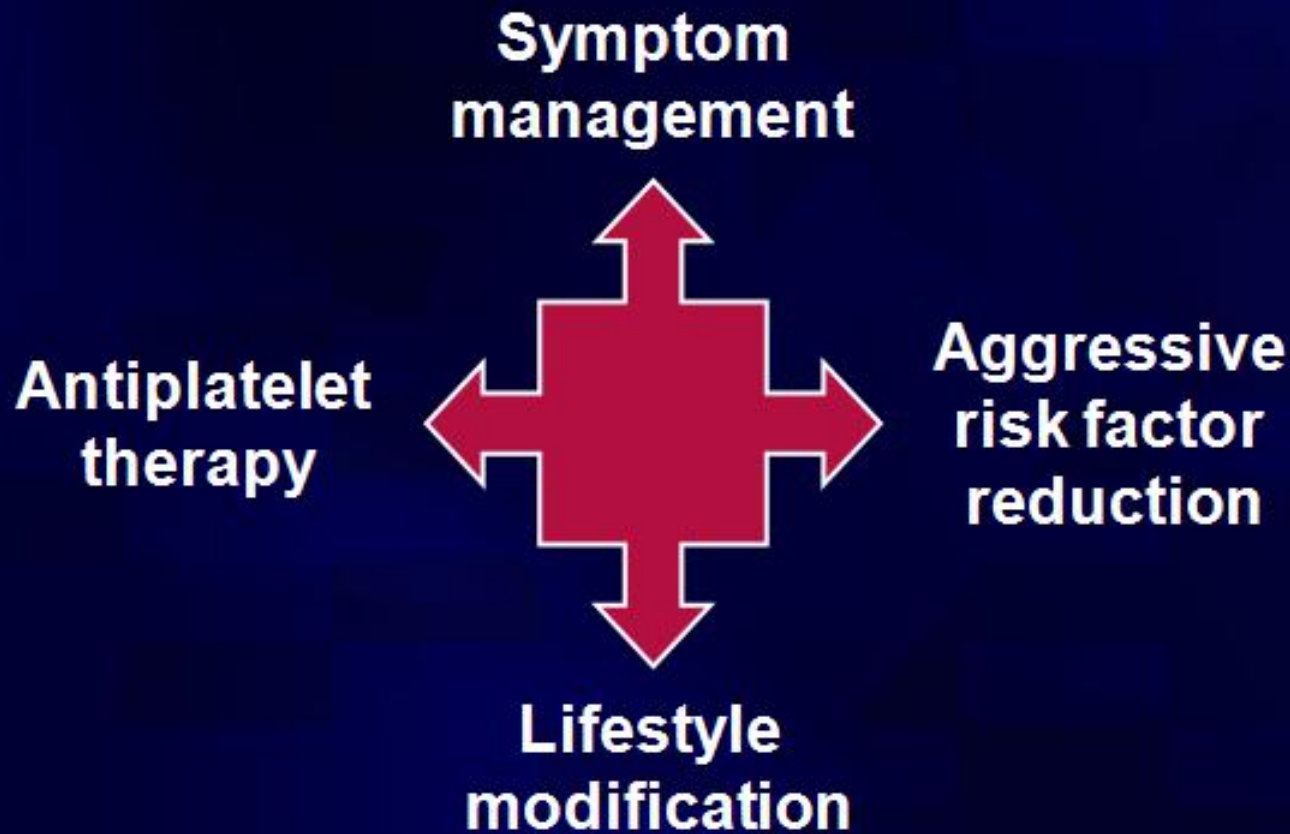**Contraindications to stress testing** —Yes→ **Consider angiography**

No ↓

Symptoms/clinical findings warrant angiography —Yes→

No ↓

Patient able to exercise —No→ **Pharmacologic imaging study** —Low/intermediate risk→ **Treatment***

Yes ↓

Previous coronary revascularization —Yes→ **Exercise imaging study**

No ↓

Resting ECG interpretable —No→

High risk ↓ **Consider angiography**

Yes ↓

Exercise test —High risk→ **Consider angiography/ revascularization**

↓ **Consider imaging study/ angiography**

Treatment*

*If adequate information on diagnosis/prognosis available

Gibbons RJ et al. ACC/AHA 2002 guidelines. www.acc.org/clinical/guidelines/stable/stable.pdf.

ACC/AHA guidelines: Chronic stable angina treatment

Sublingual NTG	Patient education

Prinzmetal angina? — **Yes** → CCB, Long-acting nitrate

Medications/conditions that provoke/exacerbate angina? — **Yes** → Treat appropriately

No

β-blocker → Routine follow-up

Serious contraindication or unsuccessful treatment

Add/substitute CCB

Serious contraindication or unsuccessful treatment → Consider revascularization

Add long-acting nitrate

Unsuccessful treatment

Gibbons RJ et al. ACC/AHA 2002 guidelines. www.acc.org/clinical/guidelines/stable/stable.pdf.

ACC/AHA/ACP-ASIM

Guidelines for Management of Stable Angina

Aspirin and anti-anginals

Beta blocker and blood pressure

Cholesterol and cigarettes

Diet and diabetes

Education and exercise

A
B
C
D
E

ent mnemonic: the 10 most important elements of stable angi

A

(Aspirin and Anti Angina)

Aspirin Recommendations

I IIa IIb III
A

Start and continue indefinitely aspirin 75 to 162 mg/d in all patients unless contraindicated
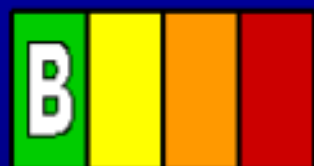
I IIa IIb III
B

For patients undergoing CABG, aspirin (100 to 325 mg/d) should be started within 48 hours after surgery to reduce saphenous vein graft closure

I IIa IIb III
B

Post-PCI-stented patients should receive 325 mg per day of aspirin for 1 month for bare metal stent, 3 months for sirolimus-eluting stent and 6 months for paclitaxel-eluting stent

Aspirin Evidence: Secondary Prevention
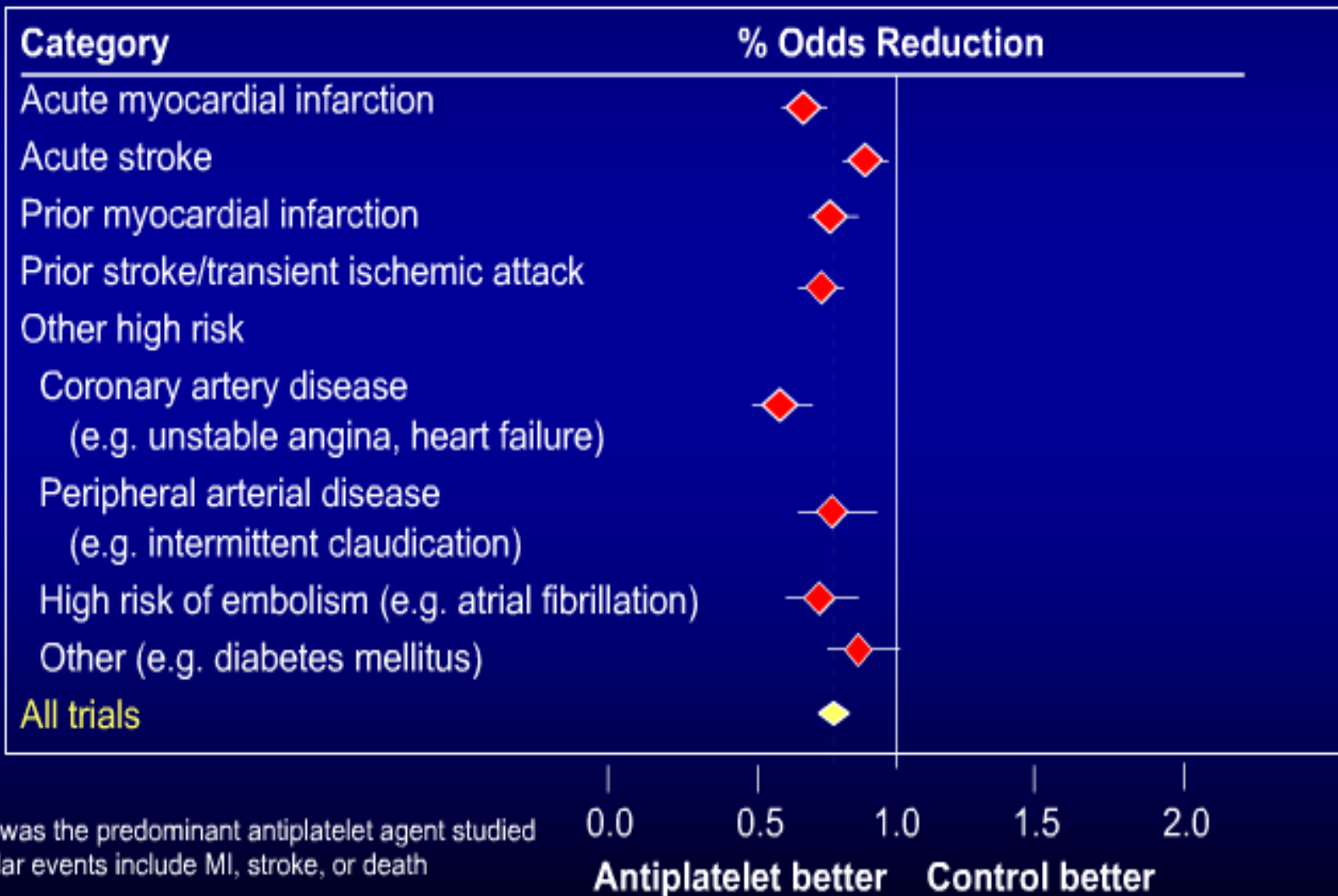## Effect of antiplatelet therapy* on vascular events**

Category	% Odds Reduction
Acute myocardial infarction	
Acute stroke	
Prior myocardial infarction	
Prior stroke/transient ischemic attack	
Other high risk	
Coronary artery disease (e.g. unstable angina, heart failure)	
Peripheral arterial disease (e.g. intermittent claudication)	
High risk of embolism (e.g. atrial fibrillation)	
Other (e.g. diabetes mellitus)	
All trials	

0.0   0.5   1.0   1.5   2.0

Antiplatelet better   Control better

*Aspirin was the predominant antiplatelet agent studied
**Vascular events include MI, stroke, or death

Antithrombotic Trialist Collaboration. *BMJ* 2002;324:71–86.

B

(Beta Blocker and Blood Pressure)

Beta Blockade Effects on Ischemic Heart

↓↓Heart rate

↓Afterload

Wall stress

↑Heart size

↓Contractility

↓O_2 wastage

O_2 demand vs O_2 supply

Subendocardial ischemia

Increased diastolic↑ perfusion

Less exercise vasoconstriction

More spasm?↓

Collaterals
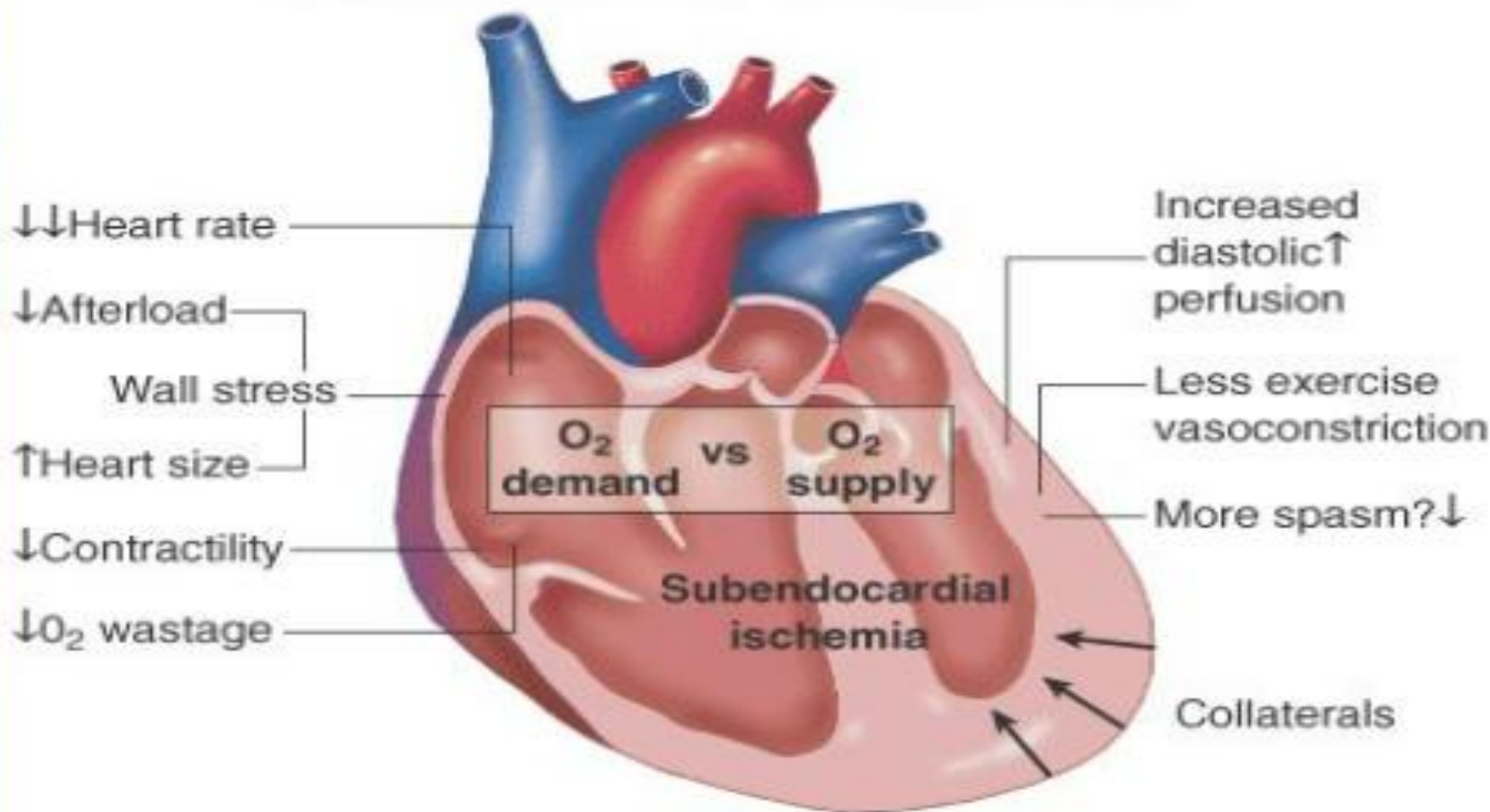
DEMAND ↓↓↓　　**SUPPLY ↓↑**

O_2 deficit↓↓ anaerobic metabolism

β-blocker Recommendations

I	IIa	IIb	III
A			

Start and continue indefinitely in all post MI, ACS, LV dysfunction with or without HF symptoms, unless contraindicated.

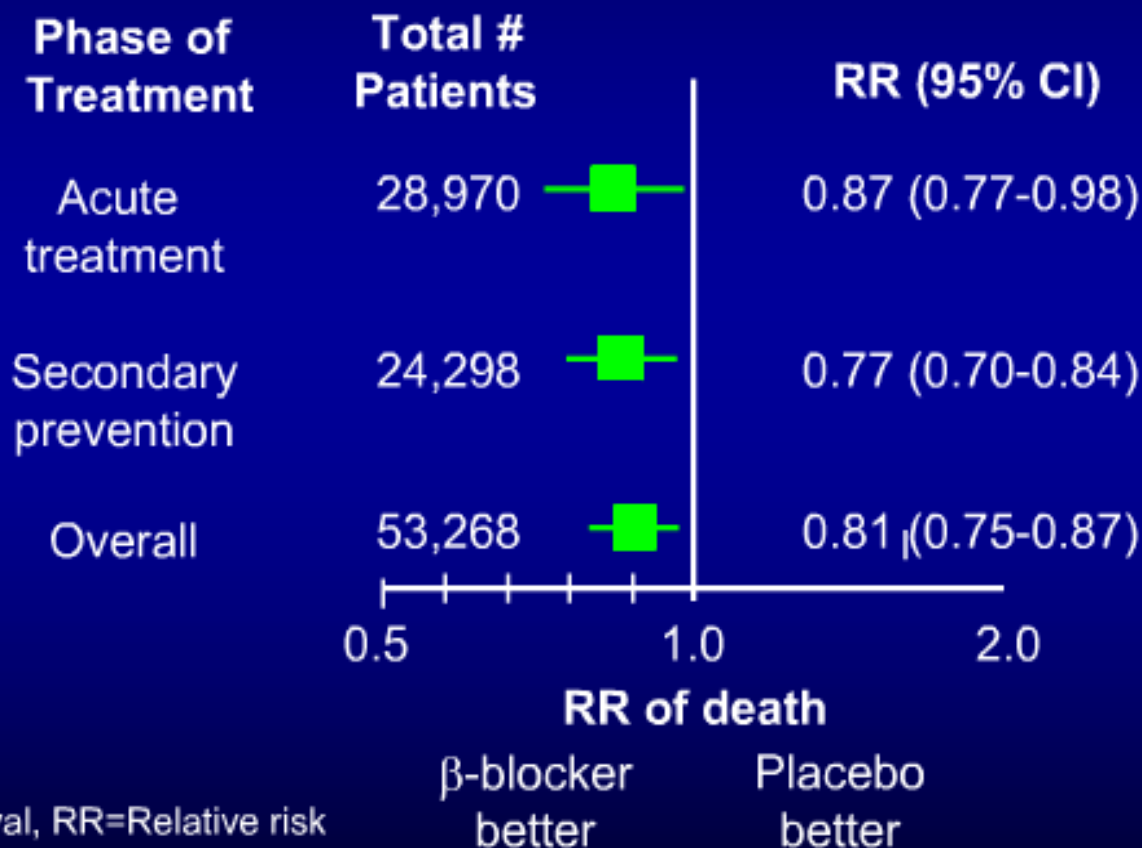| I	IIa	IIb	III
	C		

Consider chronic therapy for all other patients with coronary or other vascular disease or diabetes unless contraindicated.

*Precautions but still indicated include mild to moderate asthma or chronic obstructive pulmonary disease, insulin dependent diabetes mellitus, severe peripheral arterial disease, and a PR interval >0.24 seconds.

MI=Myocardial infarction, HF=Heart Failure

β-blocker Evidence

Summary of Secondary Prevention Trials of β-blocker Therapy

Phase of Treatment	Total # Patients		RR (95% CI)
Acute treatment	28,970		0.87 (0.77-0.98)
Secondary prevention	24,298		0.77 (0.70-0.84)
Overall	53,268		0.81 (0.75-0.87)

0.5   1.0   2.0

RR of death

β-blocker better   Placebo better
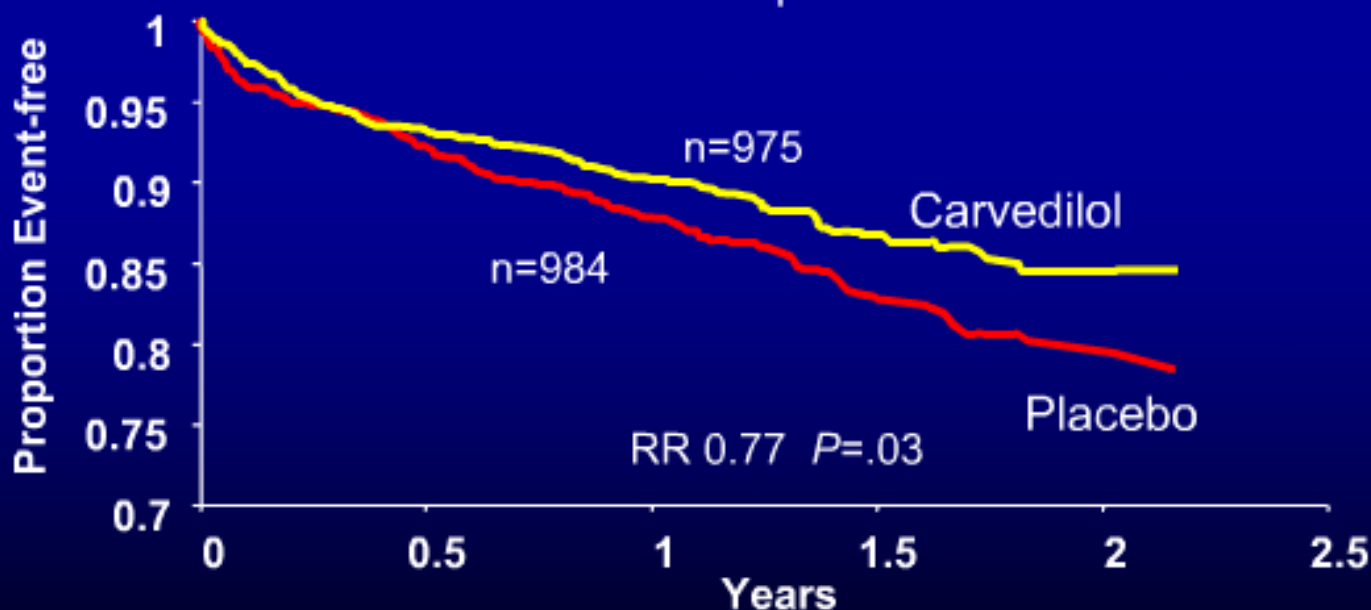
CI=Confidence interval, RR=Relative risk

Antman E, Braunwald E. Acute Myocardial Infarction. In: Braunwald E, Zipes DP, Libby P, eds. Heart Disease: A textbook of Cardiovascular Medicine, 6th ed., Philadelphia, PA: W.B. Sanders, 2001, 1168.

β-blocker Evidence: Post MI with Left Ventricular Dysfunction

Carvedilol Post-Infarct Survival Control in LV Dysfunction (CAPRICORN)

6,644 patients with LVEF <0.40 after a MI with or without HF randomized to carvedilol or placebo for 24 months

n=975

Carvedilol

n=984

RR 0.77 P=.03

Placebo

Proportion Event-free — 1, 0.95, 0.9, 0.85, 0.8, 0.75, 0.7

Years — 0, 0.5, 1, 1.5, 2, 2.5

The CAPRICORN Investigators. *Lancet.* 2001;357:1385–1390.

Blood Pressure Control Recommendations

Goal: <140/90 mm Hg or <130/80 if diabetes or chronic kidney disease

I IIa IIb III

B

Blood pressure 120/80 mm Hg or greater:

• Initiate or maintain lifestyle modification: weight control, increased physical activity, alcohol moderation, sodium reduction, and increased consumption of fresh fruits vegetables and low fat dairy products

I IIa IIb III

A

Blood pressure 140/90 mm Hg or greater (or 130/80 or greater for chronic kidney disease or diabetes)

• As tolerated, add blood pressure medication, treating initially with beta blockers and/or ACE inhibitors with addition of other drugs such as thiazides as needed to achieve goal blood pressure
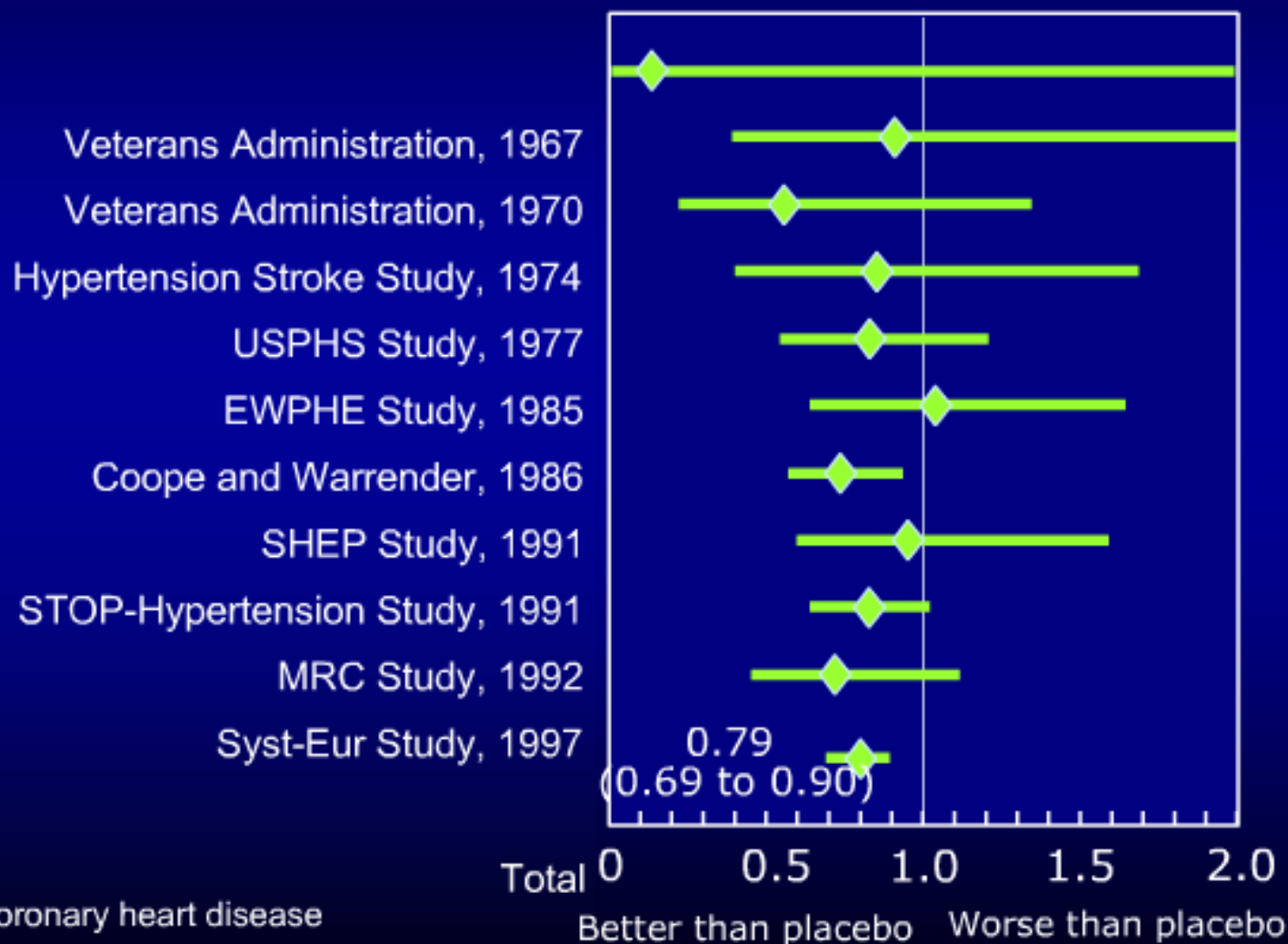
Blood Pressure: Lower is Better

Ischemic Heart Disease Mortality
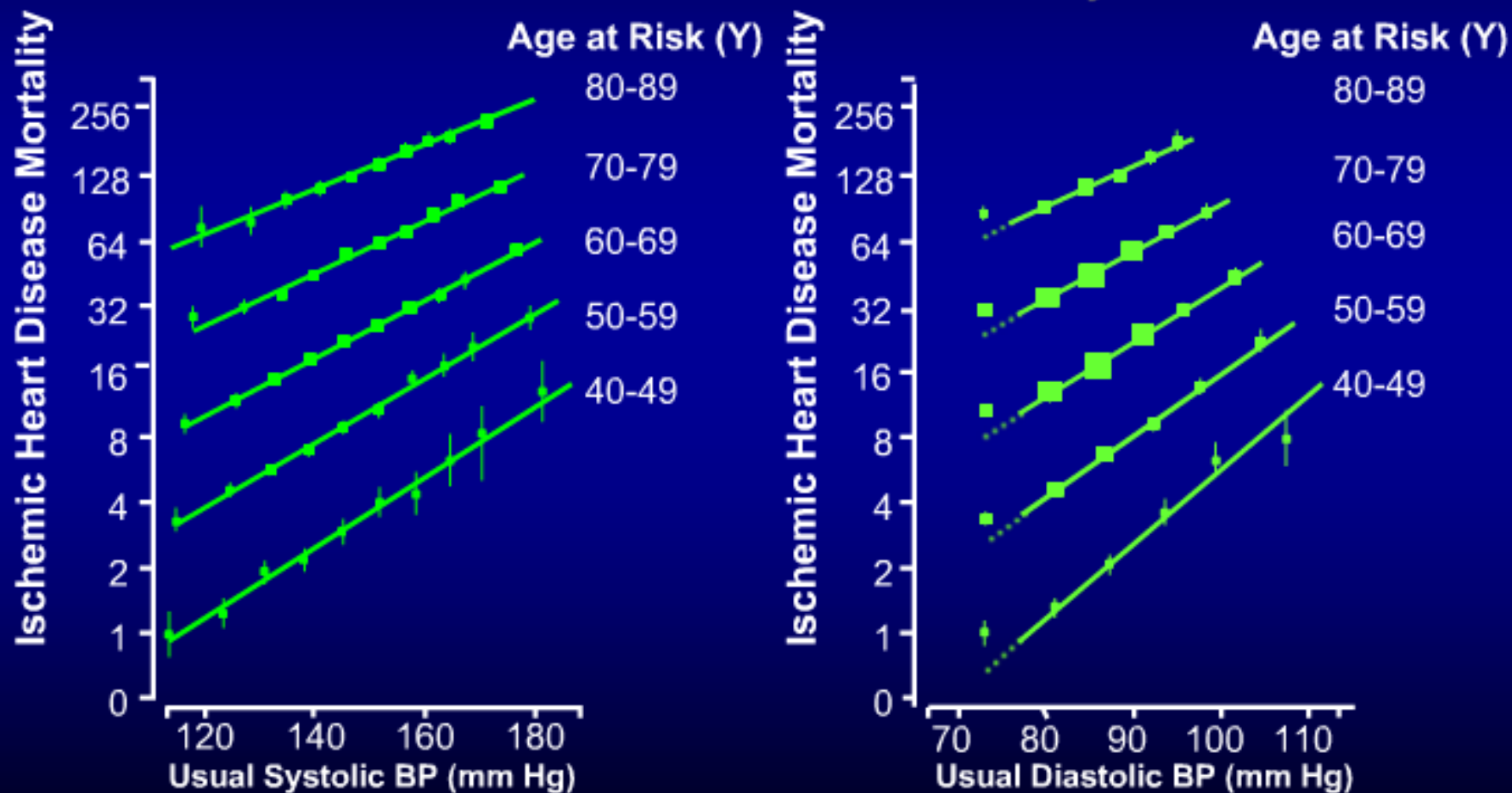
Prospective Studies Collaboration. *Lancet.* 2002;360:1903-1913

Blood Pressure: Risk of CHD with Active Treatment

Veterans Administration, 1967
Veterans Administration, 1970
Hypertension Stroke Study, 1974
USPHS Study, 1977
EWPHE Study, 1985
Coope and Warrender, 1986
SHEP Study, 1991
STOP-Hypertension Study, 1991
MRC Study, 1992
Syst-Eur Study, 1997

0.79
(0.69 to 0.90)

Total   0   0.5   1.0   1.5   2.0

Better than placebo   Worse than placebo

CHD=Coronary heart disease

He J et al. *Am Heart J* 1999; 138:211-219

JNC VII Guidelines for Management and Treatment

BP classification	SBP* mmHg	DBP* mmHg	Lifestyle modification	Initial drug therapy	
					With compelling indications
Normal	<120	<80	Encourage		
Pre-hypertension	120–139	80–89	Yes		Drug(s) for compelling indications. ‡
Stage 1 Hypertension	140–159	90–99	Yes		Drug(s) for the compelling indications.‡
Stage 2 Hypertension	≥160	≥100	Yes		Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.

ACEI=Angiotensin converting enzyme inhibitor, ARB=Angiotensin receptor blocker, BB=β-blocker, BP=Blood pressure, CCB=Calcium channel blocker, DBP=Diastolic blood pressure, SBP=Systolic blood pressure

*Treatment determined by highest blood pressure category. †Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.

‡Treat patients with chronic kidney disease or diabetes mellitus to blood pressure goal of <130/80 mmHg.

Chobanian AV et al. *JAMA*. 2003;289:2560-2572

JNC VII Lifestyle Modifications for BP Control

Modification	Recommendation	Approximate SBP Reduction Range
Weight reduction	Maintain normal body weight (BMI=18.5-24.9)	5-20 mmHg/10 kg weight lost
Adopt DASH eating plan	Diet rich in fruits, vegetables, low fat dairy and reduced in fat	8-14 mmHg
Restrict sodium intake	<2.4 grams of sodium per day	2-8 mmHg
Physical activity	Regular aerobic exercise for at least 30 minutes on most days of the week	4-9 mmHg
Moderate alcohol consumption	$\leq$2 drinks/day for men and $\leq$1 drink/day for women	2-4 mmHg

BMI=Body mass index, SBP=Systolic blood pressure

Chobanian AV et al. *JAMA*. 2003;289:2560-2572

JNC VII Compelling Indications for Drug Classes

Compelling Indication	Initial Therapy Options	Clinical-Trial Basis
Heart Failure	Diuretic, BB, ACEI, ARB, Aldo Ant	MERIT-HF, COPERNICUS, CIBIS, SOLVD, AIRE, TRACE, Val-HeFT, RALES
Post-MI	BB, ACEI, Aldo Ant	ACC/AHA Post-MI Guideline, BHAT, SAVE, Capricorn, EPHESUS
High CAD Risk	Diuretic, BB, ACEI, CCB	ALLHAT, HOPE, ANBP2, LIFE, CONVINCE
Diabetes Mellitus	**Diuretic, BB, ACEI, ARB, CCB**	**NKF-ADA Guideline, UKPDS, ALLHAT**
Chronic Kidney Disease	**ACEI, ARB**	**NKF Guideline, Captopril Trial, RENAAL, IDNT, REIN, AASK**
Recurrent Stroke Prevention	**Diuretic, ACEI**	**PROGRESS**

ACEI=Angiotensin converting enzyme inhibitor, Aldo Ant=Aldosterone antagonist, ARB=Angiotensin receptor blocker, BB=b-blocker, CAD=Coronary artery disease, CCB=Calcium channel blocker, MI=Myocardial Infarction

Chobanian AV et al. JAMA 2003;289:2560-2572.

C

(Cholesterol and Ciggarate)

Cigarette Smoking Recommendations

Goal: Complete Cessation and No Exposure to Environmental Tobacco Smoke

I IIa IIb III

B

- Ask about tobacco use status at every visit.

- Advise every tobacco user to quit.

- Assess the tobacco user's willingness to quit.

- Assist by counseling and developing a plan for quitting.

- Arrange follow-up, referral to special programs, or pharmacotherapy (including nicotine replacement and bupropion.

- Urge avoidance of exposure to environmental tobacco smoke at work and home.

Lipid Management Goals: NCEP

LDL-Cardiovascular Risk Category LDL-C Goal C Goal			Consider Drug Therapy
High risk: CHD or CHD risk equivalents (10-year risk >20%) and	<100 mg/dL if TG > 200 mg/dL, non-HDL-C should be < 130 mg/dL	≥100 mg/dL	≥100 mg/dL (<100 mg/dL: consider drug options)
Very high risk: ACS or established CHD plus: multiple major risk factors (especially diabetes) or severe and poorly controlled risk factors	<70 mg/dL, non-HDL-C < 100 mg/dL	All patients	≥100 mg/dL (<100 mg/dL: consider drug options)

ATP=Adult Treatment Panel, CHD=Coronary heart disease, LDL-C=Low-density lipoprotein cholesterol,
TLC=Therapeutic lifestyle changes

Grundy, S. et al. *Circulation* 2004;110:227-39.

Lipid Management Recommendations

For all patients

I	IIa	IIb	III
B			

Start dietary therapy (<7% of total calories as saturated fat and <200 mg/d cholesterol)

I	IIa	IIb	III
B			

Adding plant stanol/sterols (2 gm/day) and viscous fiber (>10 mg/day) will further lower LDL

Promote daily physical activity and weight management.

I	IIa	IIb	III
		B	

Encourage increased consumption of omega-3 fatty acids in fish or 1 g/day omega-3 fatty acids in capsule form for risk reduction.

Lipid Management Recommendations

I	IIa	IIb	III
B			

If TG are 200-499 mg/dL, non-HDL-C should be < 130 mg/dL

I	IIa	IIb	III
	B		

Further reduction of non-HDL to < 100 mg/dL is reasonable

Therapeutic options to reduce non-HDL-C:
More intense LDL-C lowering therapy I (B) or
Niacin (after LDL-C lowering therapy) IIa (B) or
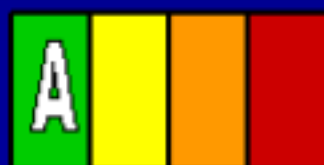**Fibrate (after LDL-C lowering therapy) IIa (B)**

I	IIa	IIb	III
C			

If TG are ≥ 500 mg/dL, therapeutic options to prevent pancreatitis are fibrate or niacin before LDL lowering therapy; and treat LDL-C to goal after TG-lowering therapy. Achieve non-HDL-C < 130 mg/dL, if possible

Lipid Management Goal

I	IIa	IIb	III
A			

LDL-C should be less than 100 mg/dL

I	IIa	IIb	III
	A		

Further reduction to LDL-C to < 70 mg/dL is reasonable

If TG ≥200 mg/dL, non-HDL-C should be < 130 mg/dL*
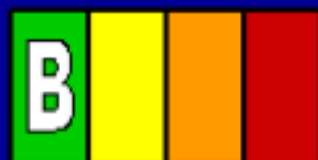
*Non-HDL-C = total cholesterol minus HDL-C

D
(Diet and Diabetes)

# Weight Management Recommendations

Goal: BMI 18.5 to 24.9 kg/m2
Waist Circumference: Men: < 40 inches
Women: < 35 inches

I IIa IIb III

B

Assess BMI and/or waist circumference on each visit and consistently encourage weight maintenance/ reduction through an appropriate balance of physical activity, caloric intake, and formal behavioral programs when indicated.

I IIa IIb III

B
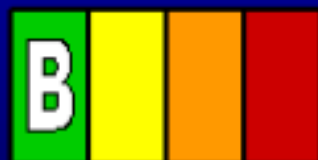
If waist circumference (measured at the iliac crest) $\geq$35 inches in women and $\geq$40 inches in men initiate lifestyle changes and consider treatment strategies for metabolic syndrome as indicated.
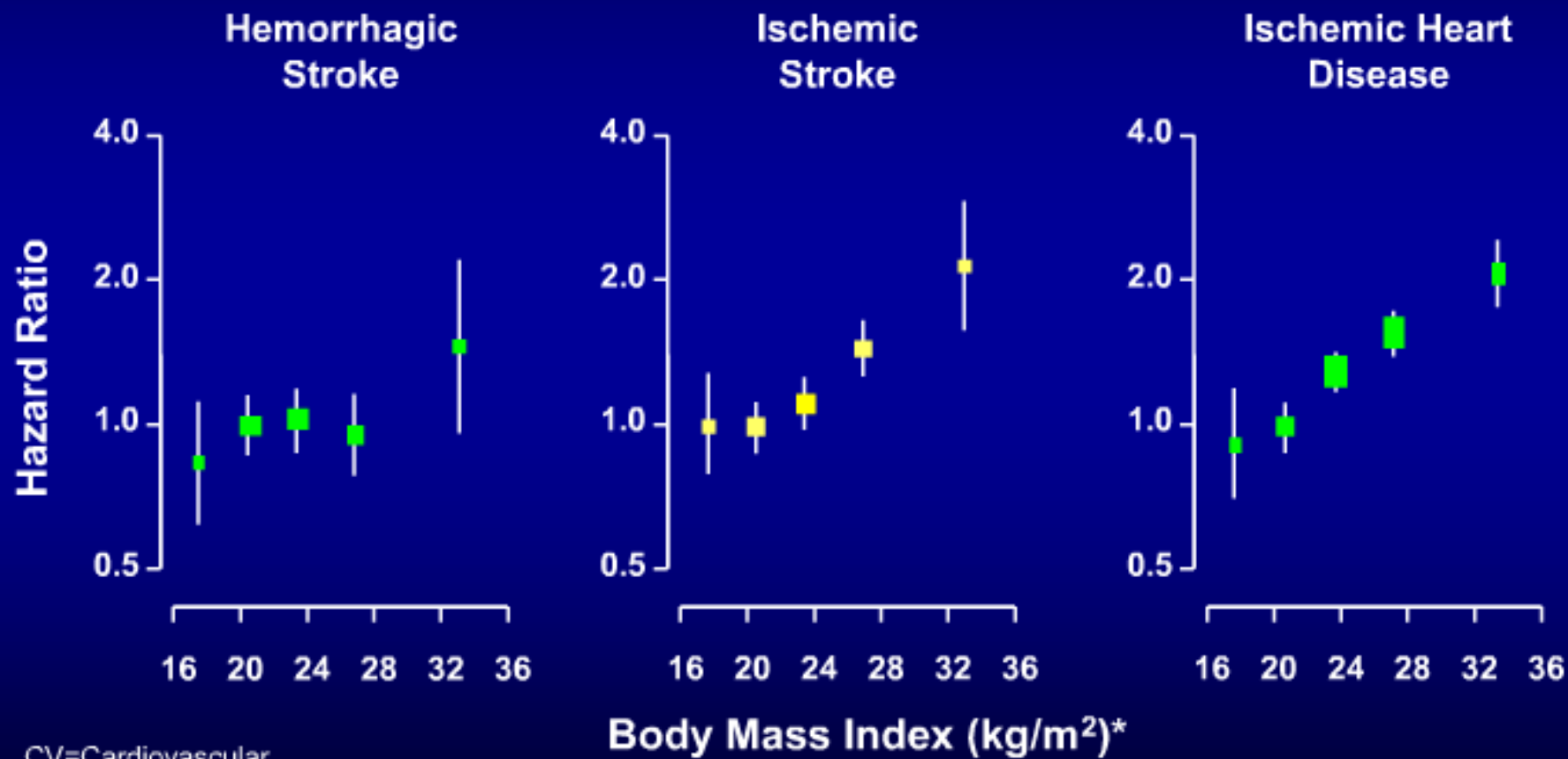
I IIa IIb III

A

The initial goal of weight loss therapy should be to reduce body weight by approximately 10 percent from baseline. With success, further weight loss can be attempted if indicated.

*BMI is calculated as the weight in kilograms divided by the body surface area in meters^2. Overweight state is defined by BMI=25-30 kg/m2. Obesity is defined by a BMI >30 kg/m2.

CV Risk Increases with Body Mass Index

Hemorrhagic Stroke — Ischemic Stroke — Ischemic Heart Disease

Hazard Ratio vs Body Mass Index (kg/m^2)*

CV=Cardiovascular

Body mass index is calculated as the weight in kilograms divided by the body surface area in meters^2.

Mhurchu N et al. *Int J Epidemiol* 2004;33:751-758

Definition of the Metabolic Syndrome

Defined by presence of ≥3 risk factors

Risk Factor	Defining Level
Waist circumference (abdominal obesity)	≥40 in (>102 cm) in men ≥35 in (>88 cm) in women
Triglyceride level	≥150 mg/dl
HDL-C level	<40 mg/dl in men <50 mg/dl in women
Blood pressure	≥130/≥85 mmHg
Fasting glucose	≥100 mg/dl

HDL-C=High-density lipoprotein cholesterol

Grundy, et al. Diagnosis and management of the metabolic syndrome: an AHA/NHLBI Scientific Statement. *Circulation* 2005;112:2735-2752.

Diabetes Mellitus Recommendations

Goal: Hb A1c < 7%

I	IIa	IIb	III
B			

Lifestyle and pharmacotherapy to achieve near normal HbA1C (<7%).

I	IIa	IIb	III
B			

Vigorous modification of other risk factors (e.g., physical activity, weight management, blood pressure control, and cholesterol management as recommended).

I	IIa	IIb	III
C			

Coordinate diabetic care with patient's primary care physician or endocrinologist.)

HbA1c = Glycosylated hemoglobin

E
(Education and Exercixe)

Physical Activity Recommendations

Goal: 30 minutes 7 days/week, minimum 5 days/week

I   IIa   IIb   III

| B | | | |

Assess risk with a physical activity history and/or an exercise test, to guide prescription

I   IIa   IIb   III

| B | | | |

Encourage 30 to 60 minutes of moderate intensity aerobic activity such as brisk walking, on most, preferably all, days of the week, supplemented by an increase in daily lifestyle activities

I   IIa   IIb   III

| B | | | |

Advise medically supervised programs for high-risk patients (e.g. recent acute coronary syndrome or revascularization, HF)

TERIMA KASIH