EVALUATION OF SUSPECTED CORONARY ARTERY DISEASE

HEART FAILURE

ATRIAL FIBRILLATION

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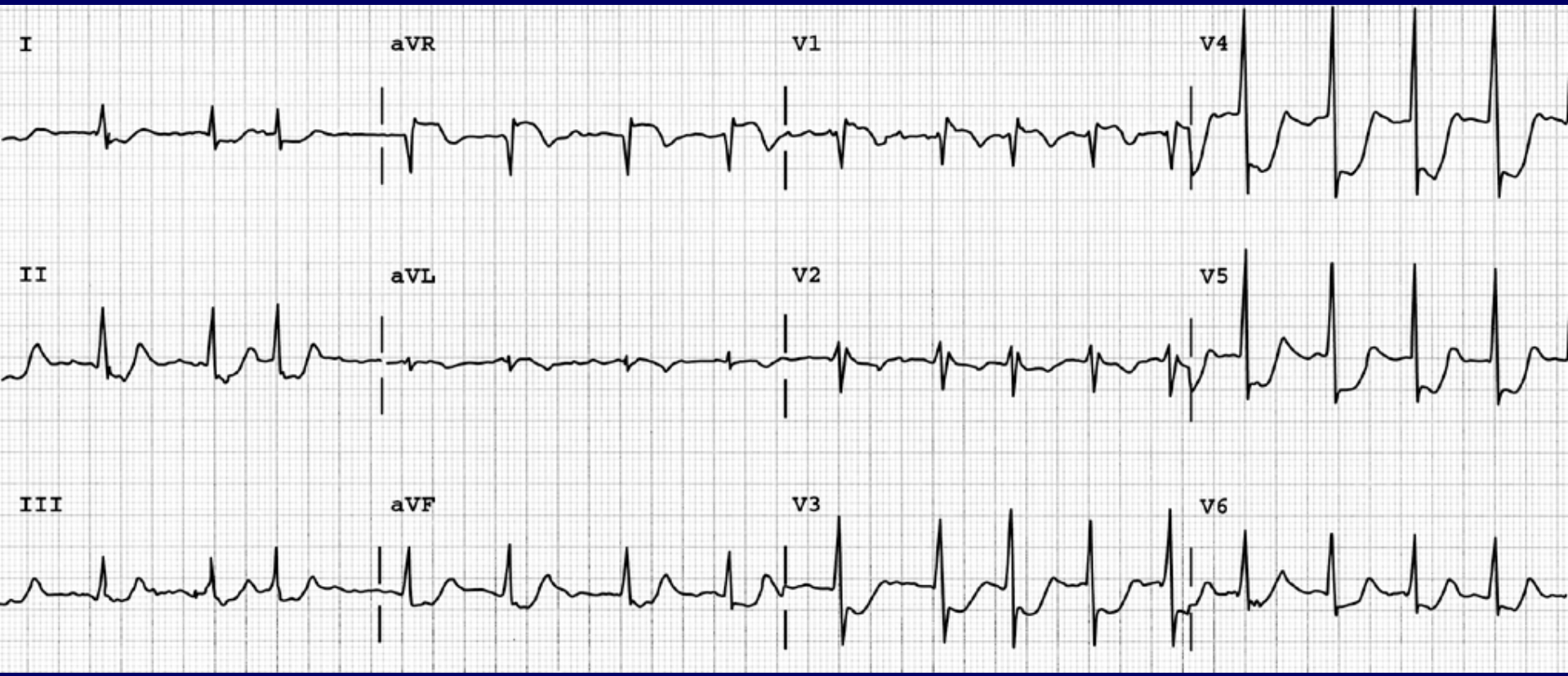
Disclosures: None

CHEST PAIN
NOT DUE TO MYOCARDIAL ISCHEMIA

- Pericarditis
- Aortic dissection
- Esophageal spasm/rupture/reflux
- Peptic ulcer disease
- Cervical spine disease
- Pulmonary embolism
- Mediastinitis/pneumomediastinum

MYOCARDIAL ISCHEMIA NOT DUE TO CORONARY ARTERY DISEASE

- Aortic valve disease (aortic stenosis)
- Hypertrophic cardiomyopathy (obstructive and nonobstructive)
- Dilated cardiomyopathy
- Tachycardia
- Hypertension
- Coronary artery embolism
- Syndrome X (chest pain, and positive treadmill, normal coronary arteries on angiography)
- Coronary artery dissection
  (e.g., Ao dissection, cocaine)
- Coronary arteritis
- Tako-tsubo syndrome


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6

ASSESSMENT OF RISK FOR CORONARY ARTERY DISEASE

- Is CAD known to be present (past angina, MI)?
- If CAD is not known to be present, what is the risk profile? (lipids, blood pressure, diabetes, family history, smoking)
- What are the symptoms?
- Are there physical findings of acute ischemia? Of past MI?
- Are there ECG abnormalities, and are they reversible?
- What is the response to sublingual nitroglycerin?

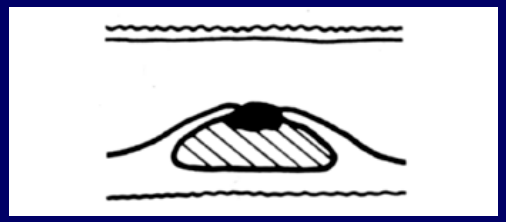
IMPACT OF DIABETES ON CORONARY ARTERY DISEASE

- CAD accounts for 60-80% of deaths in diabetics.
- Over 15 million Americans have diabetes, projected increase to over 45% by 2050.
- Risk of CAD in diabetic women is 5.1 (2.4 in men).
- Over 45% of asymptomatic diabetics have coronary Ca^{++}.
- Annual death or MI rate if ischemic is 10% (vs 6% in ischemic non-diabetics).
- Silent ischemia in 15-60% of diabetics.

ISCHEMIC CHEST PAIN SYNDROMES

- Stable effort angina
- Crescendo angina
- Acute coronary syndromes
  - Unstable angina
  - Acute MI: ST elevation, non ST elevation

Healed fissure-buried thrombus, plaque larger

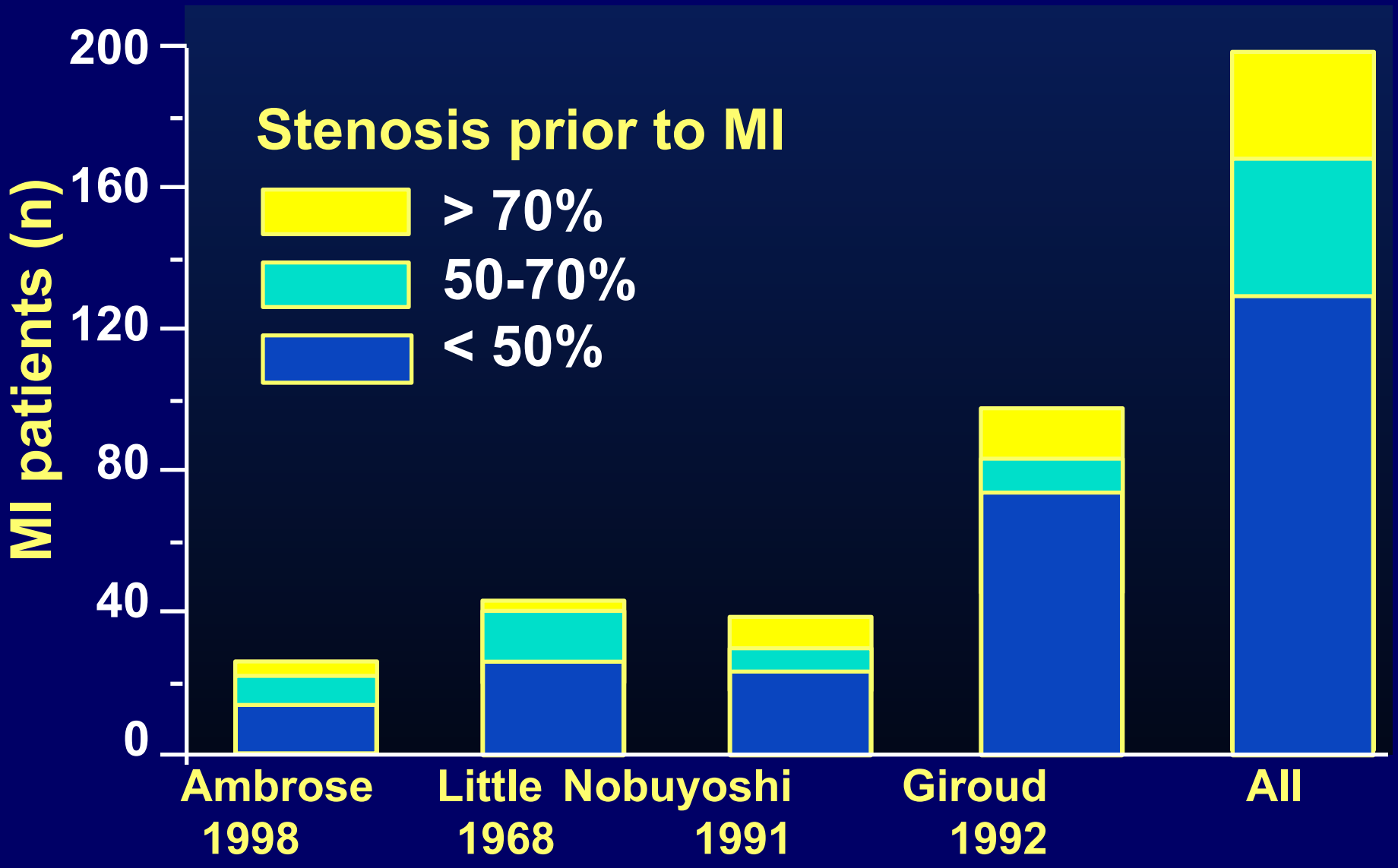


Plaque fissure

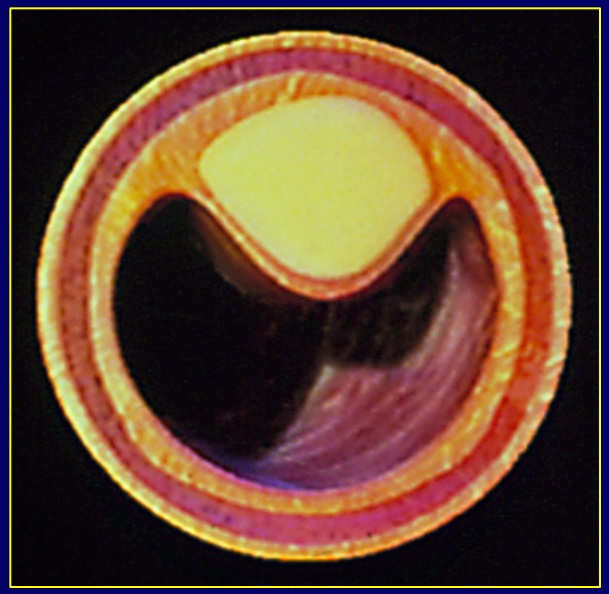
Mural intraluminal thrombus and intraintimal thrombus

Occlusive intraluminal thrombus

STENOSIS SEVERITY PRIOR TO MI



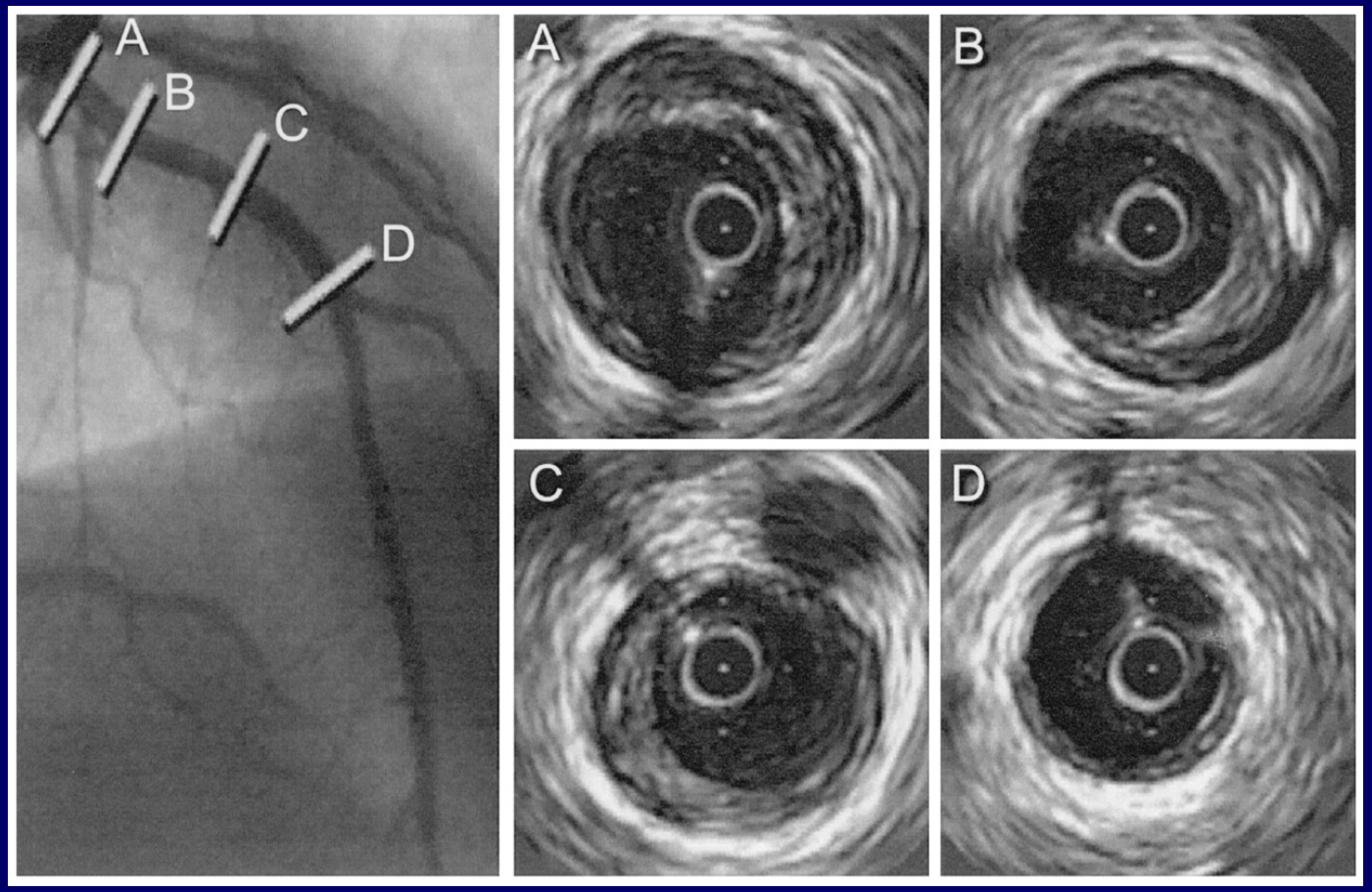
Atherosclerosis: Traditional vs. Contemporary Model



Traditional

Contemporary

Coronary remodeling concealing extensive disease

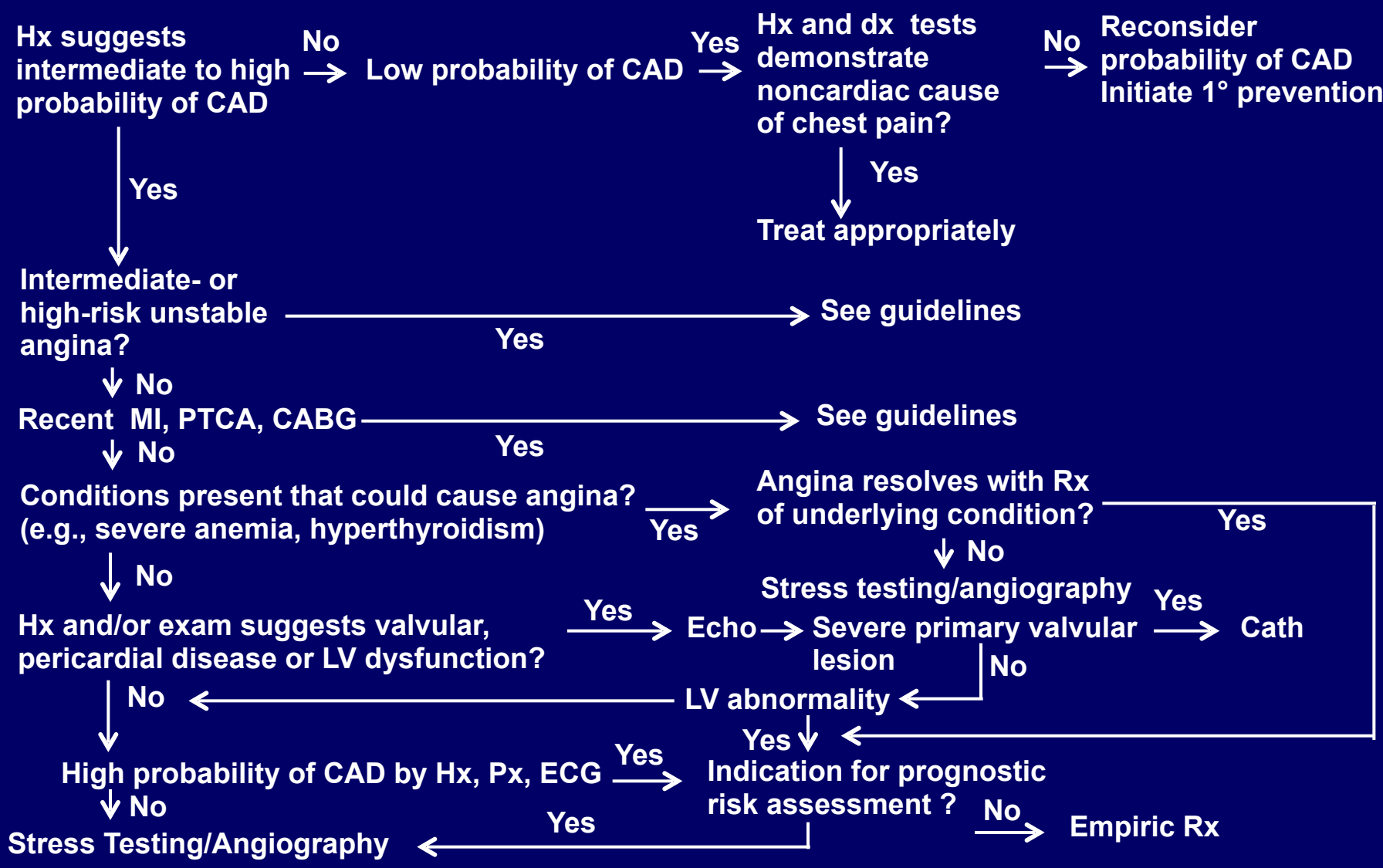


Nissen, S. E. J Am Coll Cardiol 2003;41:103S-112S

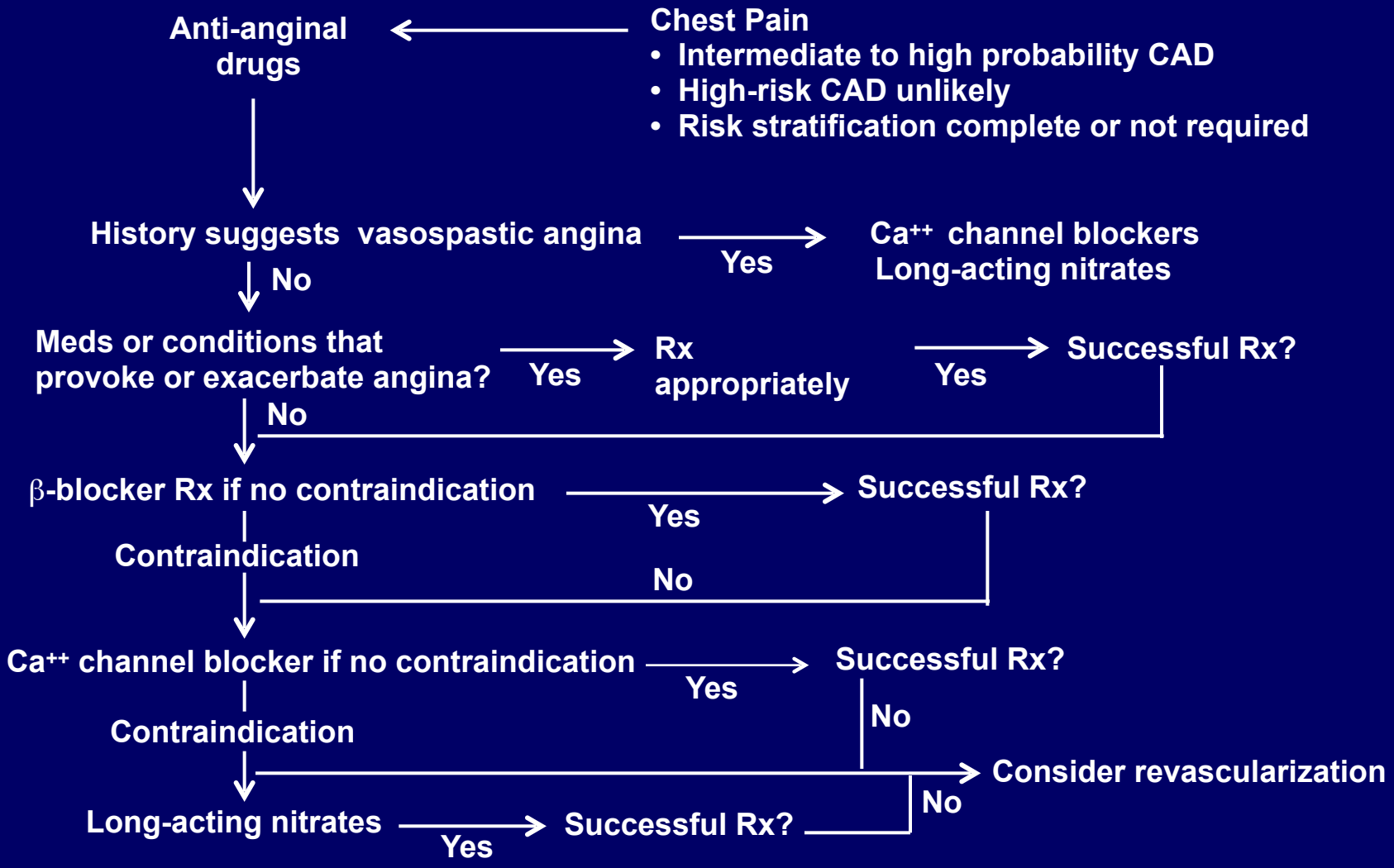
CLINICAL PRESENTATION OF MYOCARDIAL ISCHEMIA

- Chest pain/pressure/burning/ fullness/squeezing
- Breathlessness
- Epigastric discomfort/fullness/burning
- Jaw/throat/tooth pain
- Shoulder/back discomfort
- Fatigue
- Acute or worsening peripheral vascular insufficiency
- Dizziness, syncope

CLINICAL ASSESSMENT IN PATIENTS WITH STABLE ANGINA



Rx OF STABLE ANGINA



FEATURES OF INTERMEDIATE OR HIGH-RISK UNSTABLE ANGINA

- Rest pain lasting up > 20 min
- Age > 65 years
- ST-T wave changes on ECG
- Pulmonary edema

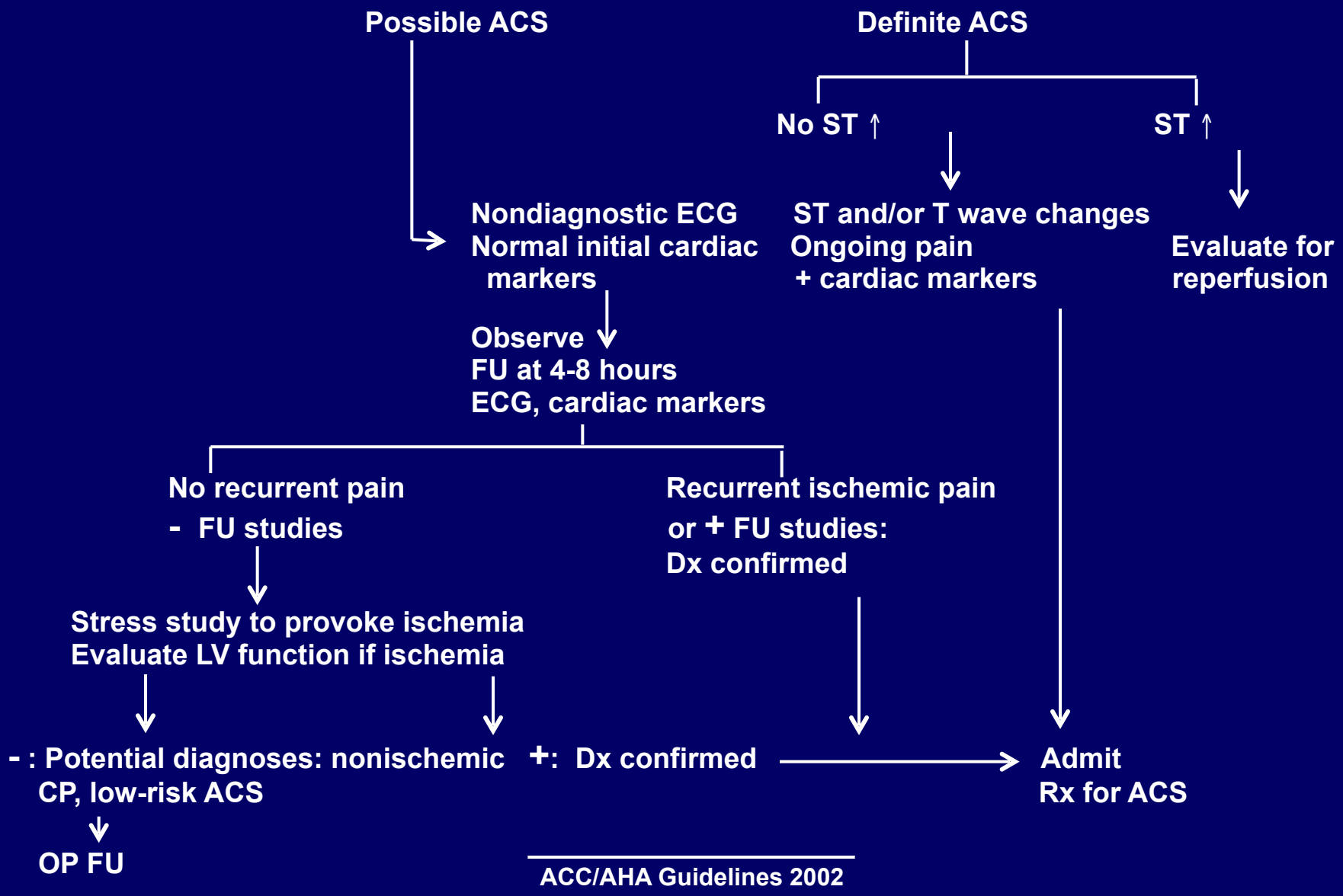
SHORT-TERM RISK OF DEATH OR NONFATAL MI IN PATIENTS WITH UNSTABLE ANGINA - 1

	HIGH	INTERMEDIATE	LOW
Hx	Accelerating tempo of ischemic sx in 48 h	Prior MI, peripheral or cerebrovascular disease or CABG, prior ASA use	
Pain	Prolonged ongoing (> 20 min) rest pain	Prolonged (> 20 min) rest angina, resolved with moderate or high likelihood of CAD Rest angina (<20 min) or relieved with rest or SL NTG	New-onset or progressive CCS III or IV angina in past 2 wks, with moderate or high likelihood of CAD
Clinical	Pulmonary edema, New or worsening MR, S_3 or new/ worsening rales, hypotension, bradycardia, tachycardia Age > 75 yrs	Age 70 yrs	

SHORT-TERM RISK OF DEATH OR NONFATAL MI IN PATIENTS WITH UNSTABLE ANGINA - 2

	HIGH	INTERMEDIATE	LOW
ECG	Angina at rest with transient ST-segment changes > 0.05 mV Bundle branch block, new or presumed new Sustained VT	T-wave inversion > 0.2 mV Pathological Q-waves	Normal or unchanged ECG during an episode of chest discomfort
Cardiac markers	Elevated	Slightly elevated (eg., TnT > 0.01 but < 0.1 ng/ml)	Normal

EVALUATION AND MANAGEMENT OF PATIENTS WITH SX SUGGESTIVE OF ACS



ACC/AHA Guidelines 2002

BIOCHEMICAL CARDIAC MARKERS FOR THE EVALUATION AND MANAGEMENT OF PATIENTS SUSPECTED OF HAVING AN ACS - 1

Marker: Troponin

Advantages:

- Powerful tool for risk stratification
- Greater sensitivity and specificity than CK-MB
- Detection of MI up to 2 weeks after onset

Disadvantages:

- Low sensitivity in very early phase of MI (< 6 h after symptom onset)
- Limited ability to detect late minor reinfarction

Recommendation:

- Useful as a single test to diagnose NSTEMI

BIOCHEMICAL CARDIAC MARKERS FOR THE EVALUATION AND MANAGEMENT OF PATIENTS SUSPECTED OF HAVING AN ACS - 2

Marker: CK-MB

Advantages:

- Rapid, cost-efficient, accurate assays
- Ability to detect early reinfarction

Disadvantages:

- ↓ specificity in setting of skeletal muscle disease or injury
- Low sensitivity during very MI (< 6 h after sx onset or later (> 36 h) and for minor myocardial damage detectable by troponins

Recommendation:

- Prior standard still acceptable in most clinical circumstances.

TIMI RISK SCORE for UA/NSTEMI

Historical	POINTS
Age ≥ 65	1
≥3 CAD risk faactors (FHx, HTN,↑ chol, DM, smoker)	1
Known CAD (stenosis ≥ 50%)	1
ASA use in past 7 days	1
Presentation	
Recent (≤ 24 h) severe angina	1
↑ cardiac markers	1
≥ 0.5 mm ST ↓	1
RISK SCORE:	
Total Points	(0-7)

14-DAY RISK OF CARDIAC EVENTS (%)

RISK SCORE	DEATH/MI	DEATH/MI URGENT REVASC
0/1	3	5
2	4	8
3	5	13
4	7	20
5	12	25

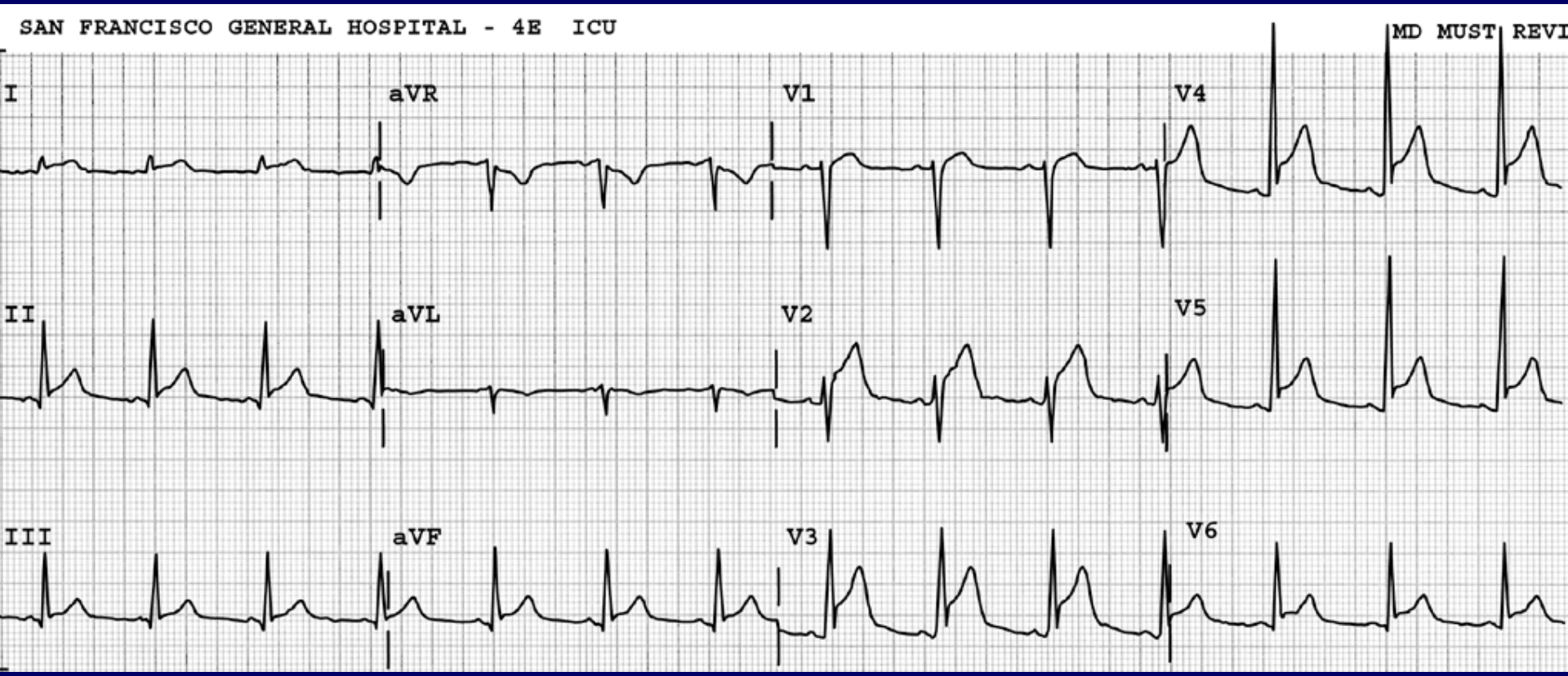
TIMI RISK SCORE for STEMI

Historical	POINTS
Age ≥ 75	3
65-74	2
DM, HTN or angina	1
Exam	
SBP < 100 mmHg	3
HR > 100 bpm	2
Killip II-IV	2
Weight < 67 kg	1
Presentation	
Anterior STE or LBBB	1
Time to Rx > 4 hrs	1

RISK SCORE

Total points (0-14)

RISK SCORE	30-DAY MORTALITY (%)
0	0.8
1	1.6
2	2.2
6	4.4
8	27
>8	36


SAN FRANCISCO GENERAL HOSPITAL - 4E ICU
MD MUST REVI
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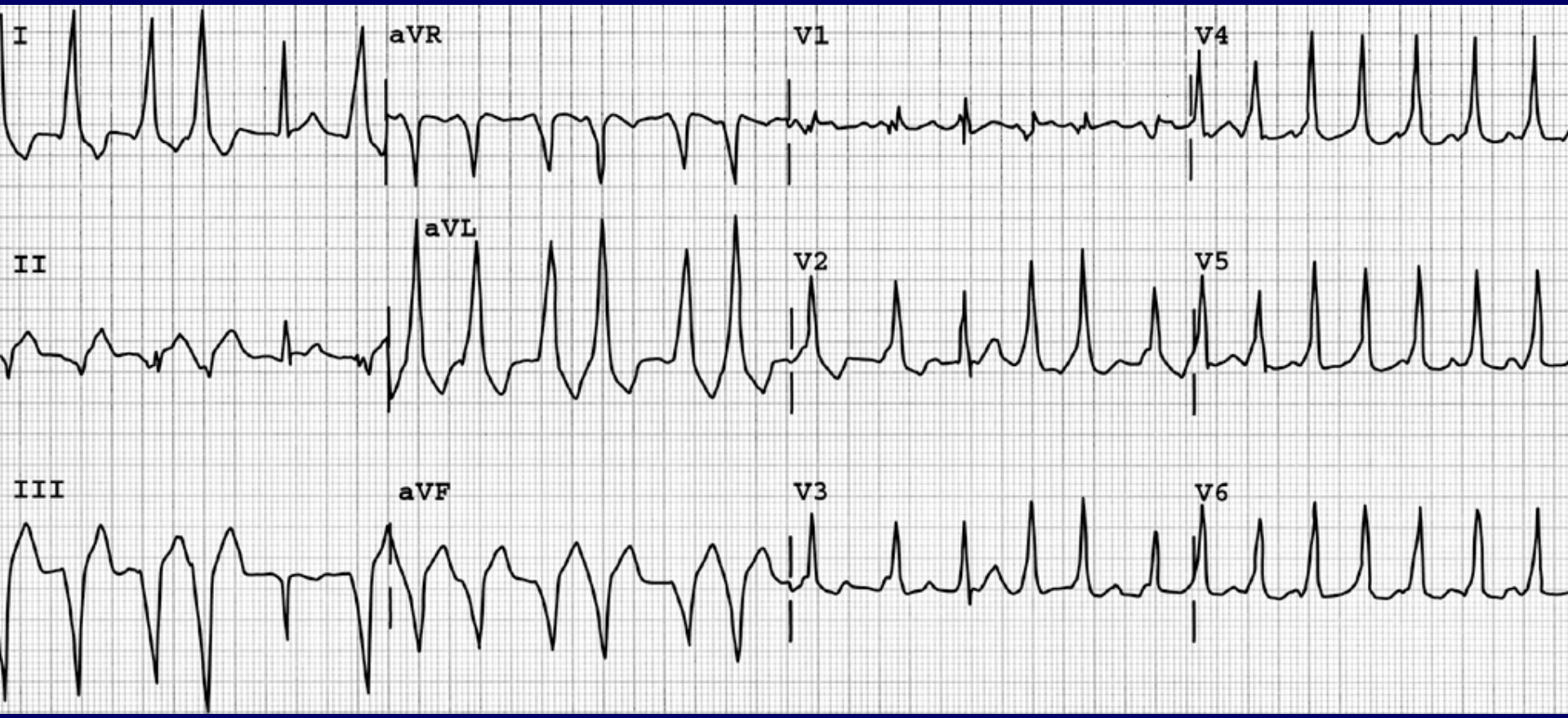
V3
V6

WPW MIMICKING INFEROPOSTERIOR WALL MI



ESOPHAGEAL PAIN

More likely to:

- Continue for hours, rather than stuttering
- Be retrosternal, without lateral radiation
- Be nonexertional
- Interrupt sleep
- Be meal-related
- Be relieved with antacids
- Be associated with heartburn, dysphagia, regurgitation

SOME REASONS TO PERFORM ECHO IN PATIENTS WITH CHEST PAIN AND SUSPECTED CAD

Suggestive of CAD

- Segmental wall motion abnormalities (prior MI/ischemia)
- Reduced ejection fraction with WMA (ischemic cardiomyopathy)

Not necessarily suggestive of CAD

- LVH (hypertension, hypertrophic cardiomyopathy)
- Aortic valve stenosis
- Intimal flap of aortic dissection
- Reduced ejection fraction - no segmental WMA
- RVH

CLINICAL USES OF EXERCISE TESTS

- Evaluation of chest pain syndromes
  - Effort angina:* stable, crescendo
  - Atypical chest pain,* cardiac origin
  - Atypical chest pain, noncardiac origin
- Assessment of effort tolerance
  - Post-myocardial infarction
  - Post-revascularization
  - Valve disease
- Chronotropic competence
- Evaluation of rate control in AF
- Evaluation of Rx of CAD (medical, surgical, post-PCI)

*or angina equivalents

CLINICAL USES OF EXERCISE TESTS

- Evaluation of blood pressure Rx in hypertension
- Detection of myocardial ischemia in pts at high risk for CAD
- Exercise prescription and risk-stratification post-MI
- Detection of exercise arrhythmias
  - Due to myocardial ischemia
  - Symptoms of cerebral hypoperfusion with exercise

CONTRAINDICATIONS TO MAXIMUM EXERCISE

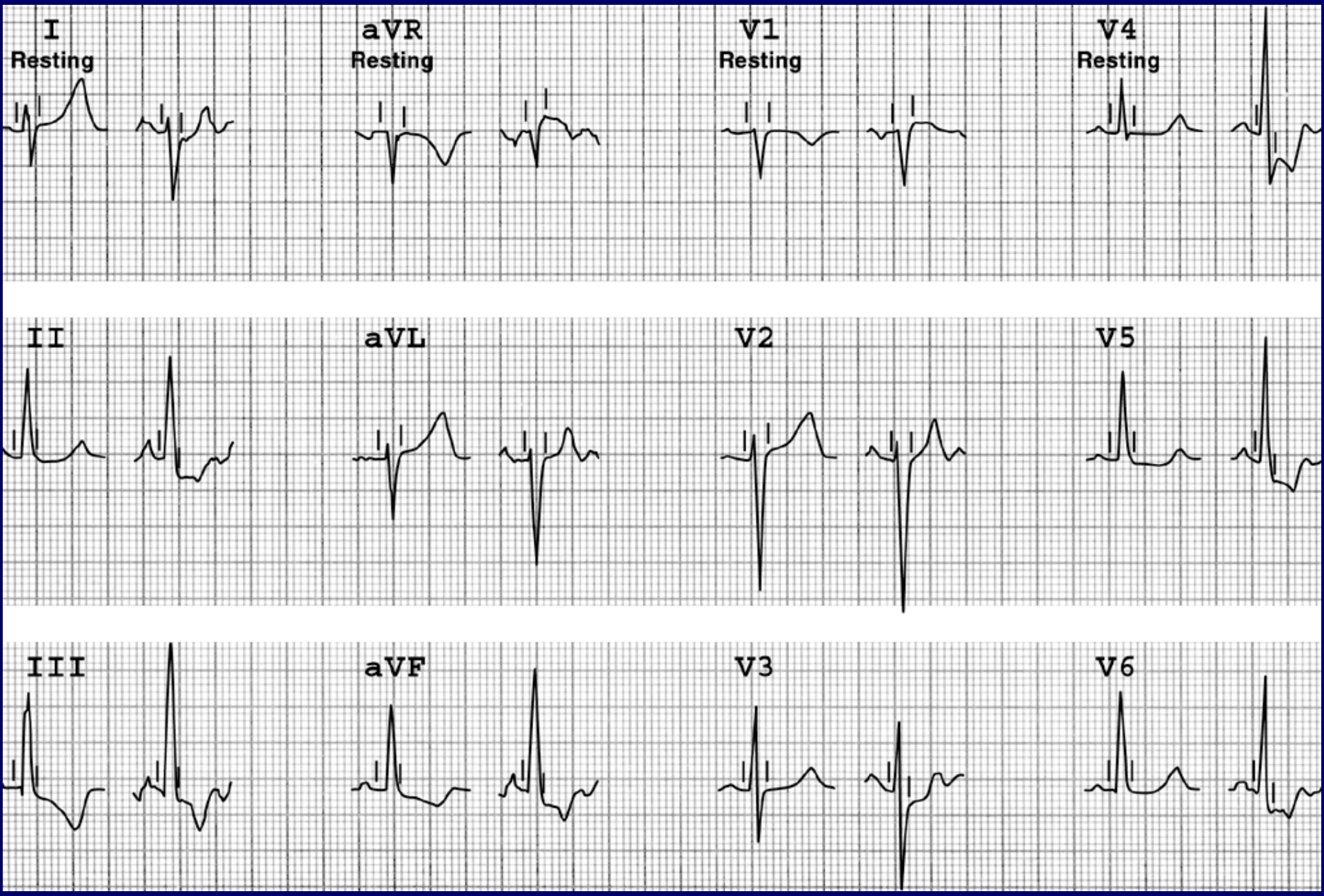
- Unstable angina pectoris
- Baseline uncontrolled ventricular arrhythmias
- ECG suspicious for recent MI

ST SEGMENT RESPONSES DURING EXERCISE TESTING: PATHOPHYSIOLOGY

- Primary ↑ in myocardial oxygen demand (usually produces ST depression)
- Primary ↓ in myocardial oxygen supply (can produce ST elevation)

ECG RESPONSES DURING EXERCISE TESTING

- ST segment abnormalities
  - Depression (downsloping, horizontal, slowly upsloping)
  - Elevation
  - Scooping
  - Alternans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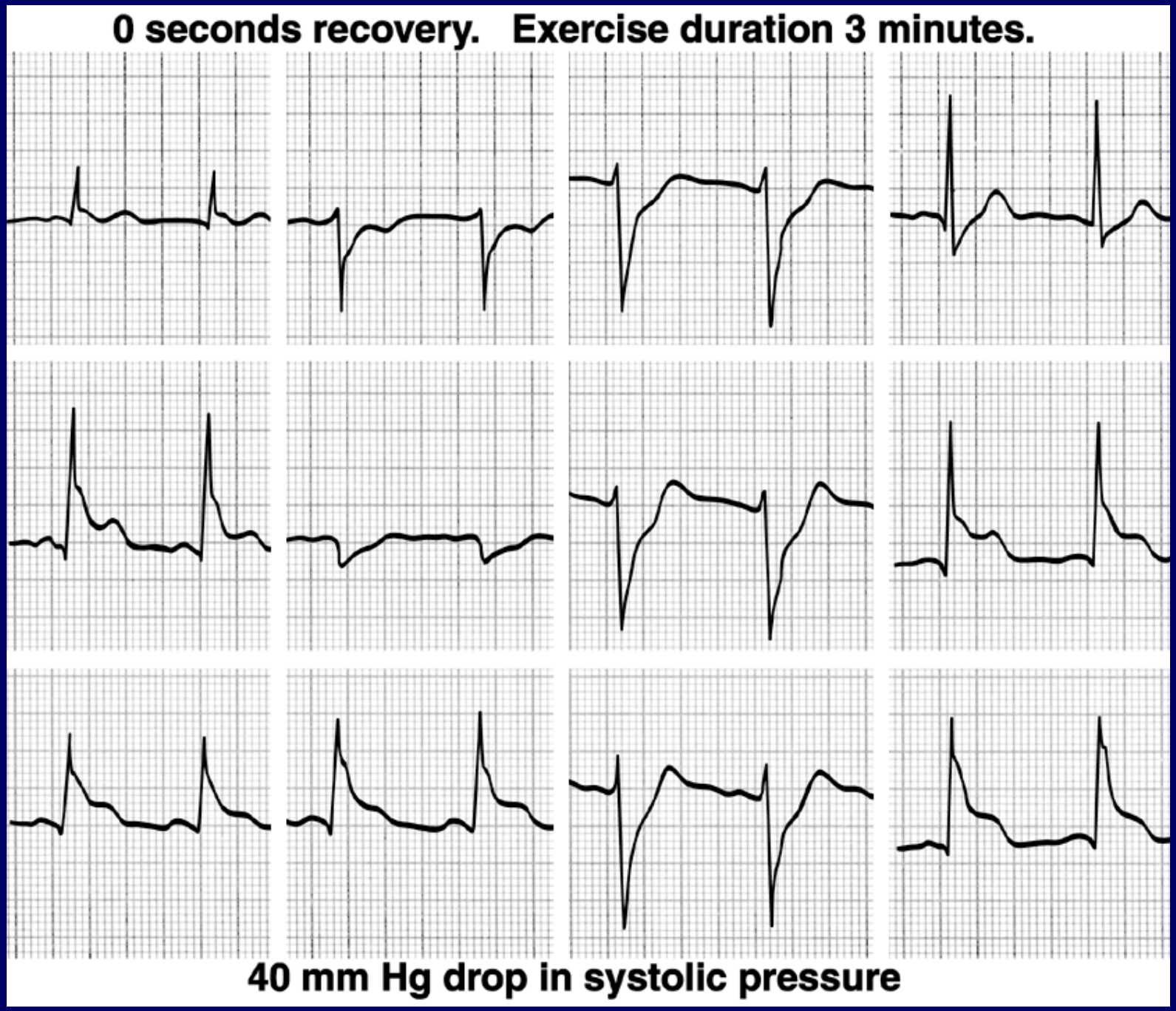
V6

54 y.o. male - recent admission for unstable angina; isordil, β-blocker on discharge


0 seconds recovery. Exercise duration 3 minutes.
40 mm Hg drop in systolic pressure

2 minutes recovery

45 y.o. woman with chest pain and hypertension


EX 4.5 min


REC 3 min

EXERCISE TEST RESPONSES PREDICTING SEVERE CAD

- ST segments: downsloping, elevated
- Early onset of ischemic ECG changes (1st 3 min)
- Prolonged duration of ischemic ECG changes in recovery (> 7 min)
- Hypotension associated with evidence of ischemia

EXERCISE TEST RESPONSES NOT HELPFUL IN PREDICTING SEVERE CORONARY ARTERY DISEASE

- Inappropriate sinus tachycardia
- Failure of heart rate to increase appropriately
- Failure of systolic blood pressure to rise
- Rise in diastolic blood pressure
- Ischemic ECG changes in exercise vs recovery
- Ventricular arrhythmias at high heart rate
- Atrial arrhythmias
- Bradyarrhythmias

EXERCISE RESPONSES PREDICTING ADVERSE PROGNOSIS

- Severe ischemic ECG response
- Poor effort tolerance (METs, exercise duration)
- Chronotropic incompetence
- Hypotension associated with ischemic response
- Abnormal systolic BP ratio (≤ 0.9) (3 min SBP: peak Ex BP)
- Abnormal HR recovery
  - E.g., peak HR: 1 min recovery HR < 20 bpm; peak HR: 2 min recovery HR < 40 bpm
  - Criteria not defined
- Duke Treadmill score
- Dyspnea

CAUSES OF ISCHEMIC-APPEARING ECG ABNORMALITIES DURING EXERCISE ("FALSE +" TESTS*)

- Hyperventilation (D/d vasospasm)
- LVH
- Abnormal ventricular activation
  - WPW
  - LBBB
  - RBBB
- Syndrome X*
- Drugs, electrolytes
  - Hypokalemia
  - Digitalis
- Vasoregulatory abnormalities

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* Gold standard is coronary angiography

INDICATIONS FOR STRESS SCINTIGRAPHY

- Exercise ECG uninterpretable for diagnosis of ischemia
  - LBBB
  - RBBB
  - WPW
  - LVH
  - Baseline ST-T abnormalities
  - Paced ventricular rhythm
- Exercise ECG of known low sensitivity
  - Post myocardial infarction
  - Single vessel CAD
- Exercise ECG of possible low specificity
  - Vasoregulatory abnormalities
  - ? Women
- T wave normalization
- Risk stratification

RISK STRATIFICATION MEASUREMENT OF PERFUSION OR FUNCTION - 1

- Amount of infarcted myocardium
- Amount of jeopardized myocardium
- Left ventricular systolic function

Based upon AHCPR Unstable Angina Guidelines

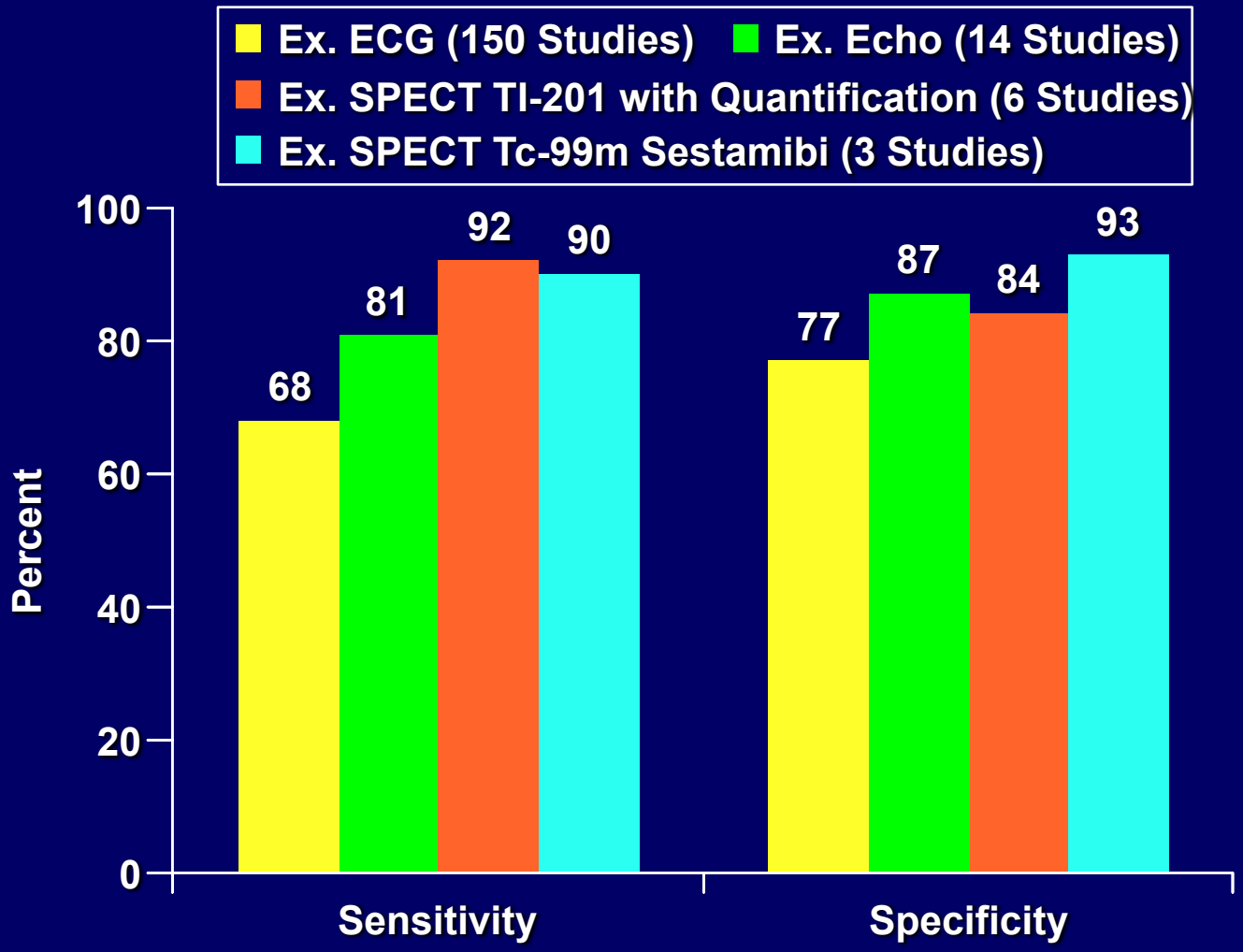
RISK STRATIFICATION: MEASUREMENT OF PERFUSION OR FUNCTION - 2

Risk Categories: Cardiac Death Endpoint

- Low, under 1% per year
- Intermediate, 1-3% per year
- High, greater than 3% per year

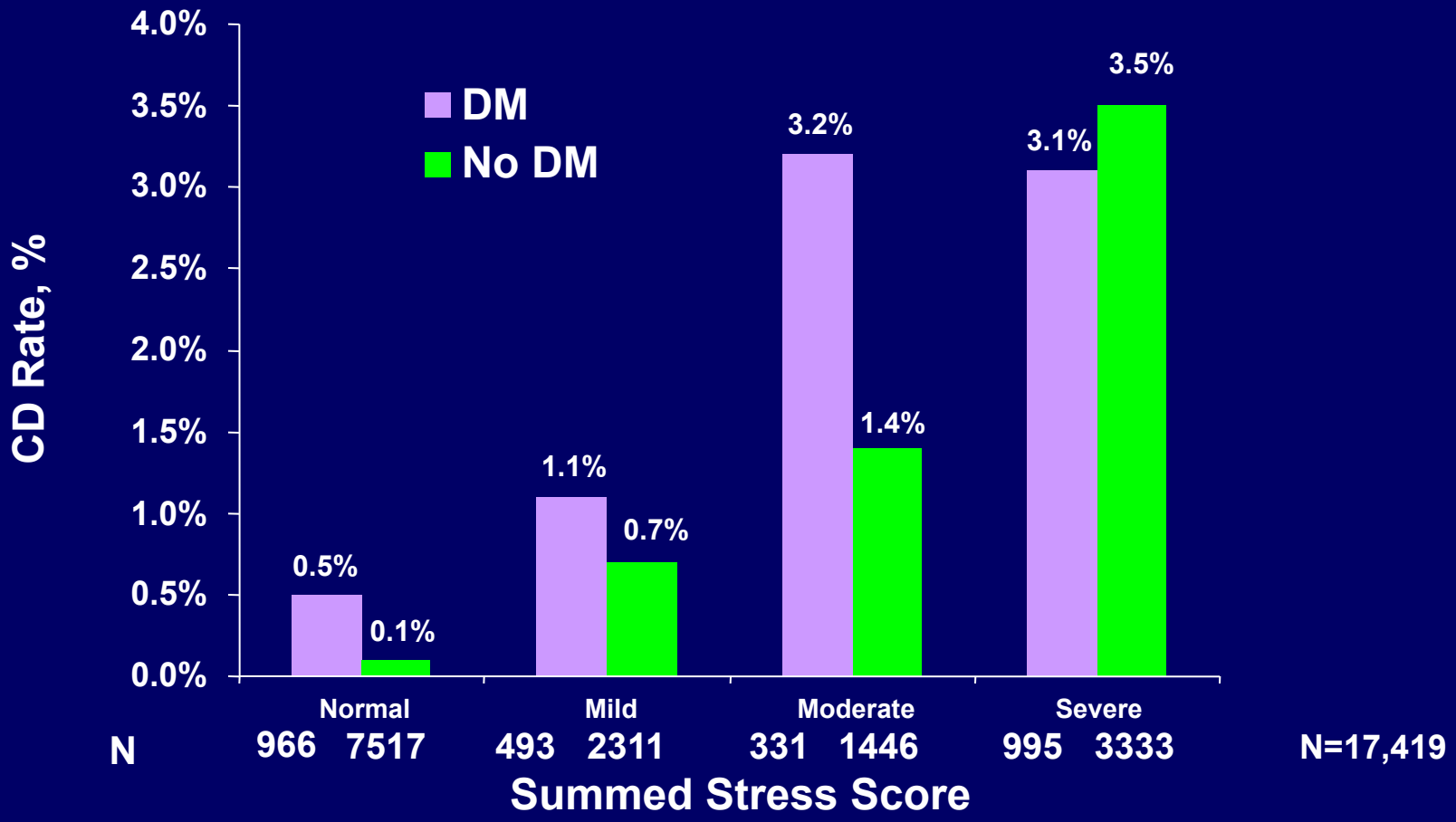
Based upon AHCPR Unstable Angina Guidelines

Sensitivity and Specificity of Tests for Detection of CAD



Adapted from Beller.

The Diabetic Patient: Value of Stress Myocardial Perfusion Imaging



Adapted from Lewin HC, et al. *J Am Coll Cardiol.* 1999;33:447A.

HEART FAILURE

HEART FAILURE - SCOPE OF THE PROBLEM - 1

- Affects 5 million in U.S., 22 million worldwide
- > 500,000 new HF diagnosis / yr
- > 6% of > 65 y.o. have HF
- Only major cardiovascular disorder increasing in incidence / prevalence
- Over 3.5 million hospitalizations annually
- Leading cause of hospitalization of adults > 65; > 90% of CHF deaths are > 65

HEART FAILURE – SCOPE OF THE PROBLEM - 2

- ~ 300,000 deaths / yr
- $56 billion in Rx / yr
- Up to 50% may have normal EF (diastolic dysfunction)
- Up to 45% of patients with HF have diabetes
- 2 million US patients have both HF and diabetes
- HF itself may lead to insulin resistance and risk of diabetes

CLASSIFICATION OF HEART FAILURE

- NYHA I - IV
- New paradigm
  - Stage A: Pts at high risk of developing HF
  - Stage B: LV dysfunction, asymptomatic (e.g., prior MI)
  - Stage C: LV dysfunction, symptomatic
  - Stage D: Refractory HF

CLINICAL EVIDENCE SUGGESTING Dx HF-1

Type of evidence	Highly suggestive	Less specific
Symptoms	Orthopnea	Fatigue ↓ exercise tolerance
	PND	Nocturnal cough Abdominal discomfort Discomfort when bending
Signs	↑ JVP	Tachycardia
	S3 gallop (LV,RV)	Hypotension

AHJ 1991;1221:951

CLINICAL EVIDENCE SUGGESTING Dx HF-2

Type of evidence	Highly suggestive	Less specific
Signs	Displaced left ventricular impulse; parasternal lift	Ascites
	Rales	Peripheral edema
	Narrow pulse pressure/alternans	
	Pulsatile hepatomegaly	Tender hepatomegaly

AHJ 1991;1221:951

CLINICAL EVIDENCE SUGGESTING Dx HF-3

Type of evidence	Highly suggestive	Less specific
CXR	Cardiomegaly	Pleural effusion
Screening lab tests	↑ BNP	
Response to diuretics	↓ orthopnea	
	Improved exercise tolerance	
	Rapid weight loss > 3 lb without dizziness	

AHJ 1991;1221:951

ETIOLOGIES OF HF - 1

- CAD (prior MI, ischemic CM, DM)
- Valve disease
- Arrhythmia (tachycardia CM)
- Hypertension
- Idiopathic (nonischemic)
- Substance abuse (cocaine, ETOH, amphetamines)
- Familial (20% of "idiopathic" CM may be familial)
  - Dilated
  - Hypertrophic (obstructive, nonobstructive)

ETIOLOGIES OF HF - 2

- Hyperthyroidism
- Infiltrative (Chagas, amyloid, hemochromatosis)
- Peripartum
- HIV
- Rheumatologic Disease
- Sleep Disorders
- Mediastinal irradiation

ROLE OF ECHOCARDIOGRAPHY IN HF

- Ejection fraction
- LV volumes
- Ischemic CM (wall motion abnormalities)
- Nonischemic CM
- Valve disease
  - Rheumatic
  - Non-rheumatic (MR, TR, endocarditis)
- Wall thickness
- Congenital HD

LABORATORY TESTS IN HF

- BNP
- Na^+ ($\downarrow$ indicates poor perfusion)
- Serum iron (hemochromatosis)
- Hb, Hct (anemia $\rightarrow$ high output state)
- Hb A_{1c} (diabetes = CAD)

IMPORTANT POINTS IN HF - 1

Heart rate

If AF, effort VR is likely to be high; AVN ablation/PM may be required

AF is present in ~ 30% of HF pts and is an independent predictor of mortality

IMPORTANT POINTS IN HF - 2

- Chronic renal insufficiency - worsens prognosis
- Troponin leakage - poor prognostic sign

STAGES IN HF - STAGE A

- At high risk for HF but without structural heart disease or symptoms of HF
  - Hypertension
  - CAD
  - DM
  - Cardiotoxins
  - Family history CM

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STAGES IN HF - STAGE A: Rx

- Treat HT
- Control blood glucose
- Smoking cessation
- Treat lipid disorders
- Regular exercise
- Avoid alcohol intake, illicit drug use
- ACE inhibitors or ARB Rx

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STAGES IN HF - STAGE A: Rx

- If AF, control ventricular rate or restore sinus rhythm
- Treat thyroid disorders, if present
- ICD
- Digoxin not recommended if no Sx HF (no proved benefit)

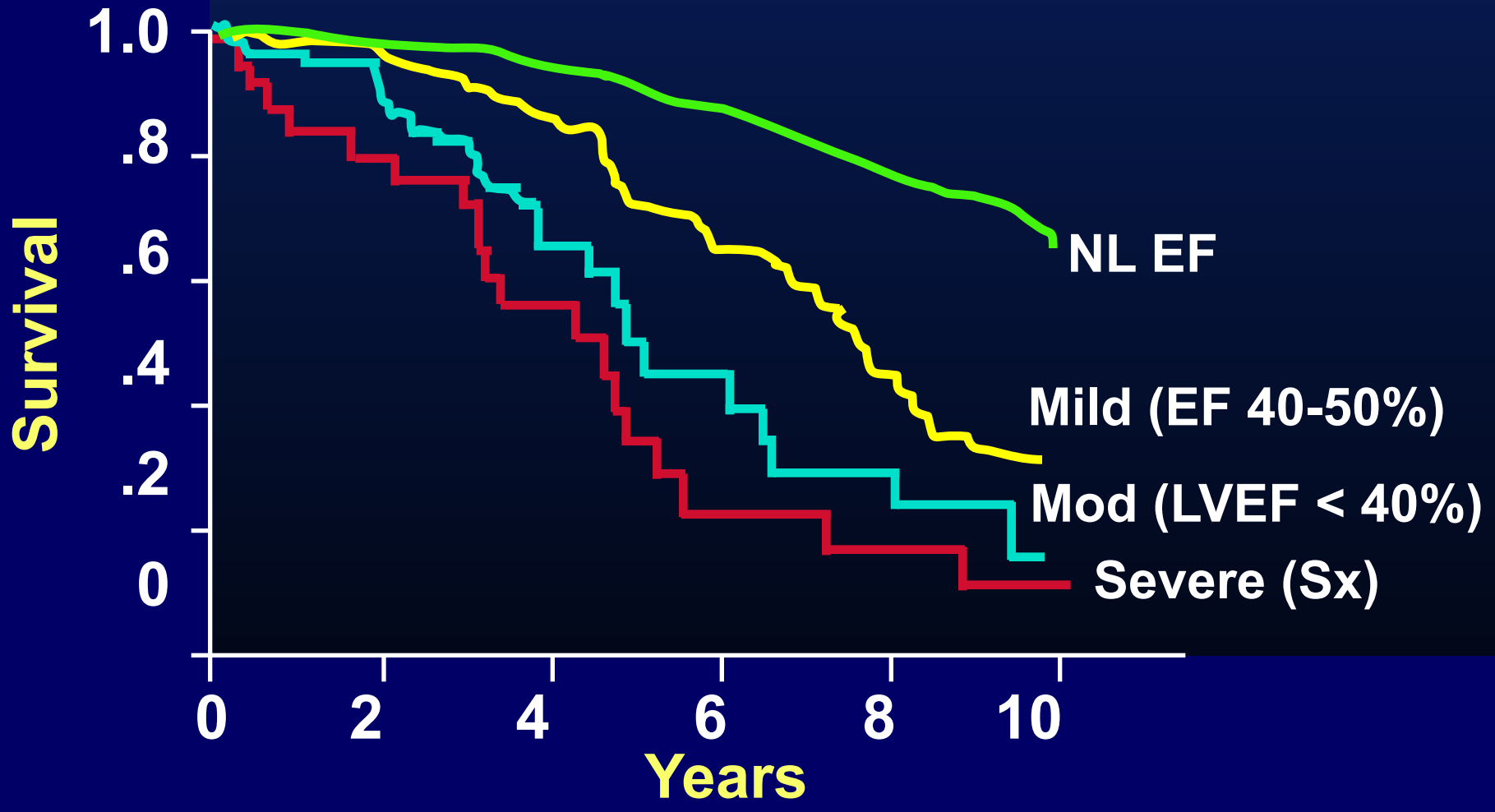
ACC/AHA Guidelines 2005

STAGES IN HF - STAGE B

- Structural HD but without symptoms of HF
  - Previous MI, regardless of EF
  - LV systolic dysfunction
  - Asx valvular disease

ACC/AHA Guidelines 2005

SURVIVAL IN PTS WITH ASYMPTOMATIC LV SYSTOLIC DYSFUNCTION (STAGE B)



Wang et al (Framingham) Circulation 2003; 108:971
N = 4257 (usual cause CAD)

STAGES IN HF - STAGE B

- Rx
  - All measures under stage A
  - ACE inhibitors
  - ARB, if ACEI - intolerant
  - Coronary bypass surgery if LM and/or 3V CAD and ↓ EF or high risk ischemic burden
  - β-blockers

ACC/AHA Guidelines 2005

STAGES IN HF - STAGE C

- Structural HD with prior or current symptoms of HF
  - Known structural HD
  - SOB, fatigue, ↓ exercise tolerance

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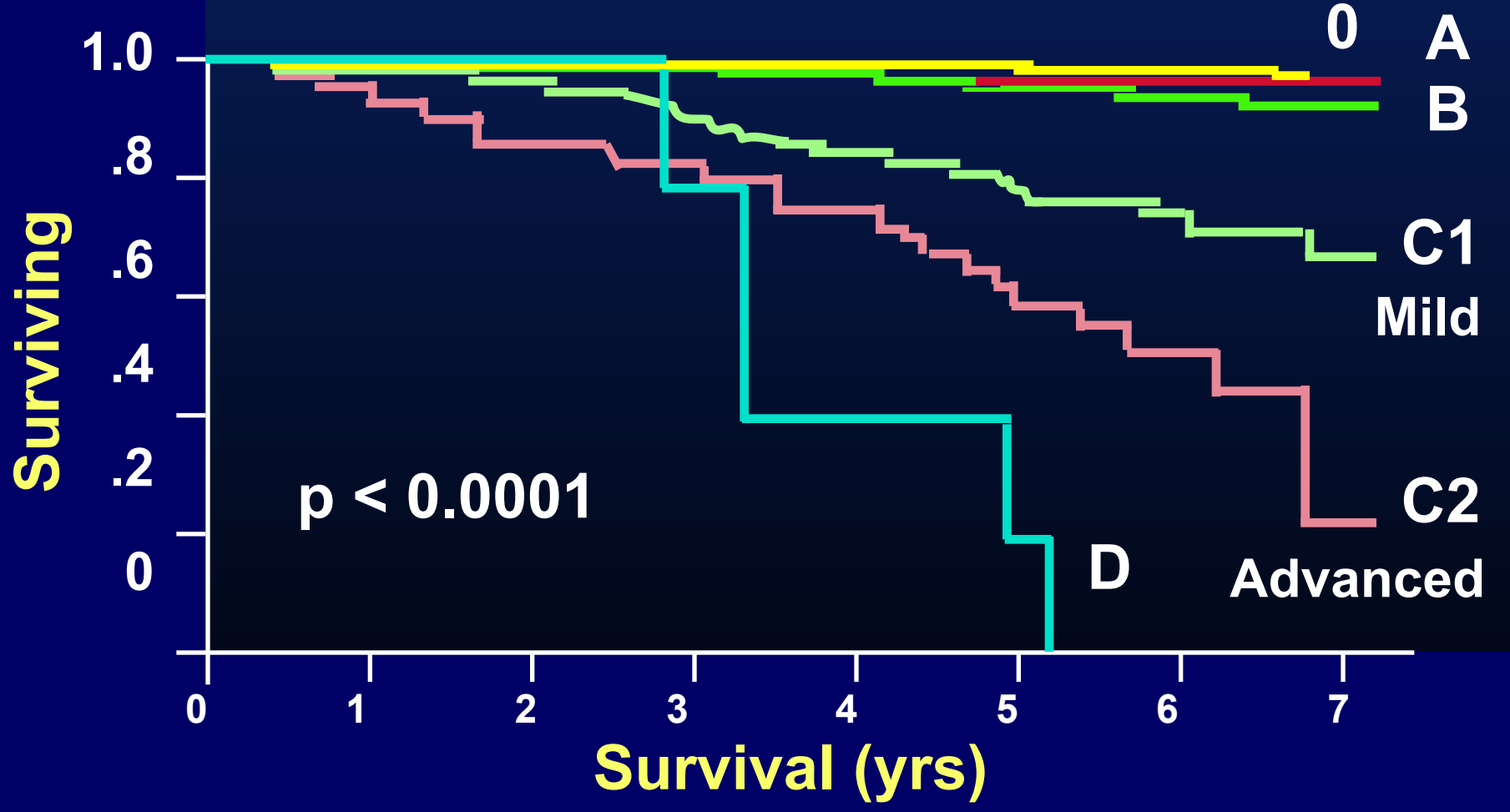
SURVIVAL BY STAGES OF HF



Ammar et al Circulation 2007; 115:1563 N = 2029 Olmsted County

STAGES IN HF - STAGE C: Rx

- All measures under Stage A
- Diuretics
- ACE inhibitors/ARBs
- β-blockers
- Digitalis

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STAGES IN HF - STAGE C: Rx

- Aldosterone antagonists
- Hydralazine/isordil
- Salt restriction
- Exercise training
- ICD as secondary sudden death prevention
- ICD as primary sudden death prevention
- Cardiac resynchronization pacemaker Rx

ACC/AHA Guidelines 2005

EFFECTS OF ALDOSTERONE

- ↑ Na^+ retention
- ↑ loss of Mg^{++}, K^+
- Sympathetic activation
- Parasympathetic inhibition
- Myocardial fibrosis
- Vascular fibrosis
- Baroreceptor dysfunction
- ↓ arterial compliance

ACC/AHA Guidelines 2002

STAGES IN HF - STAGE D

- Refractory HF requiring specialized interventions
  - Pts with symptoms at rest despite maximal medical Rx
- Rx
  - All measures under stages A, B, and C
  - CRT in appropriate pts
  - Mechanical assist devices
  - Heart transplantation
  - Continuous (not intermittent) IV inotropic infusions for palliation

ACC/AHA Guidelines 2005

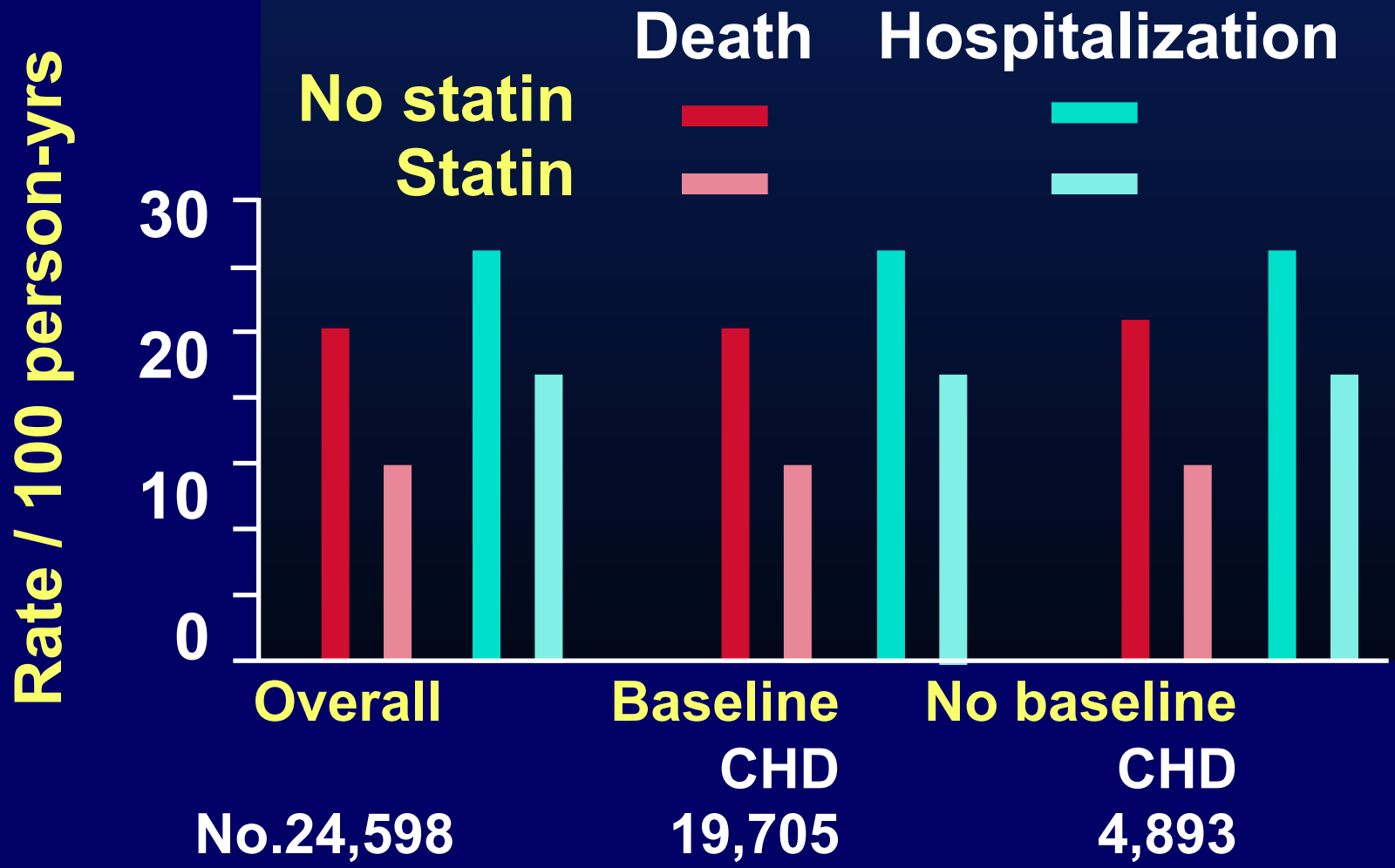
POTENTIAL BENEFITS AND RISKS OF TREATING ANEMIA IN HF

Potential benefits	Potential risks
Improved oxygen delivery	↑ thrombosis
Improved exercise tolerance	Platelet activation
Attenuate adverse remodeling	Hypertension
Antiapoptotic	Endothelial activation
? Improved QOL	
? ↓ in hospitalizations	
? Improved survival	

Felker et al JACC 2004;44:959

STATINS IN HEART FAILURE PATIENTS:

Age- and sex-adjusted rates of death (any cause) and HF hospitalization by incident statin exposure



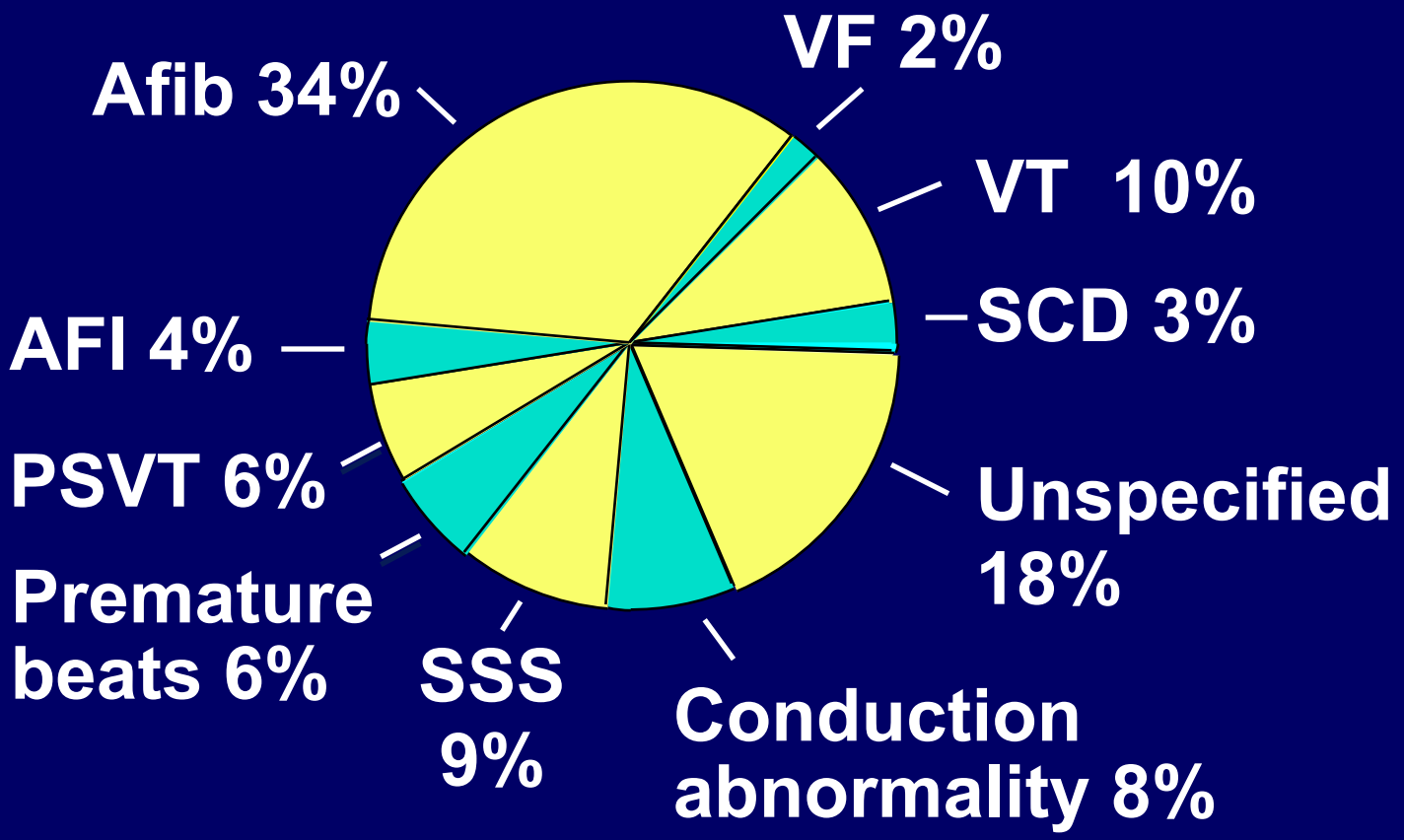
Go et al (Kaiser) JAMA 2006; 296:2105 FU 2.4 yr

ATRIAL FIBRILLATION

INCIDENCE

- Occurs in 2% of population
  (more than 5 million pts in US)
- Prevalence increases with age
  1% in people > 60
  5 - 6% of people > 65
  14% of people > 80
- Associated with > 100,000 strokes / yr
- Present in 6 - 25% of ischemic strokes
- Present in 50% of cardioembolic strokes
- Develops in 10 - 30% of pts with
  LV dysfunction; is a predictor of mortality (1 - 3x)
- RR for death 1.5 (men) and 1.9 (women)

HOSPITALIZATION FOR ARRHYTHMIAS IN US



CLASSIFICATION

Types

- Paroxysmal – Self-terminating
- Persistent – Requires cardioversion to restore sinus rhythm
- Permanent – Complete inability to maintain sinus rhythm

Etiologies

- Rheumatic
- Nonrheumatic
- Lone

ASYMPTOMATIC ATRIAL FIBRILLATION

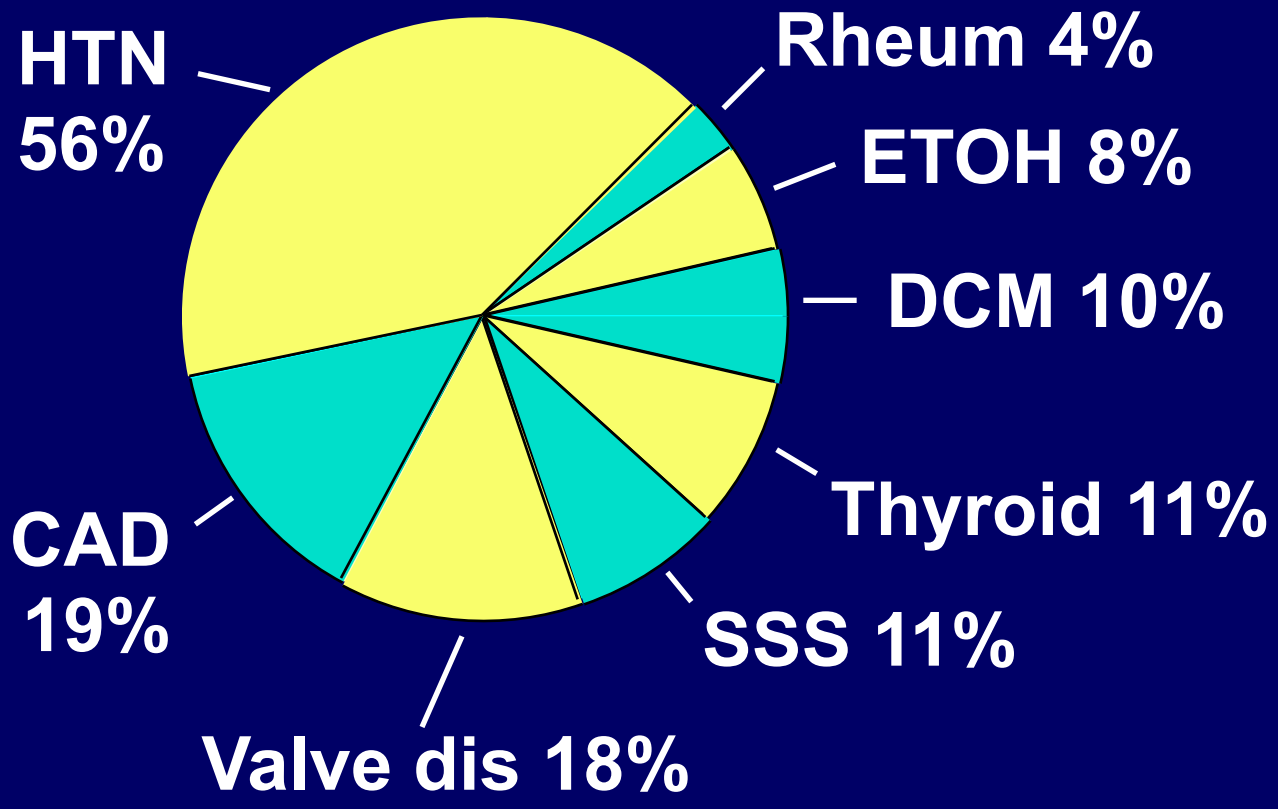
- Incidence 20 - 50%
- Most asymptomatic pts have chronic AF
- Up to 50% of pts with paroxysmal AF have no symptoms (pacemaker stored data)
- Occurs in up to 20% of pts with no AF history (ICD stored data)
- Is present in up to 30% of pts presenting with stroke without AF history

PREVALENCE OF AF IN VARIOUS CLINICAL CONDITIONS

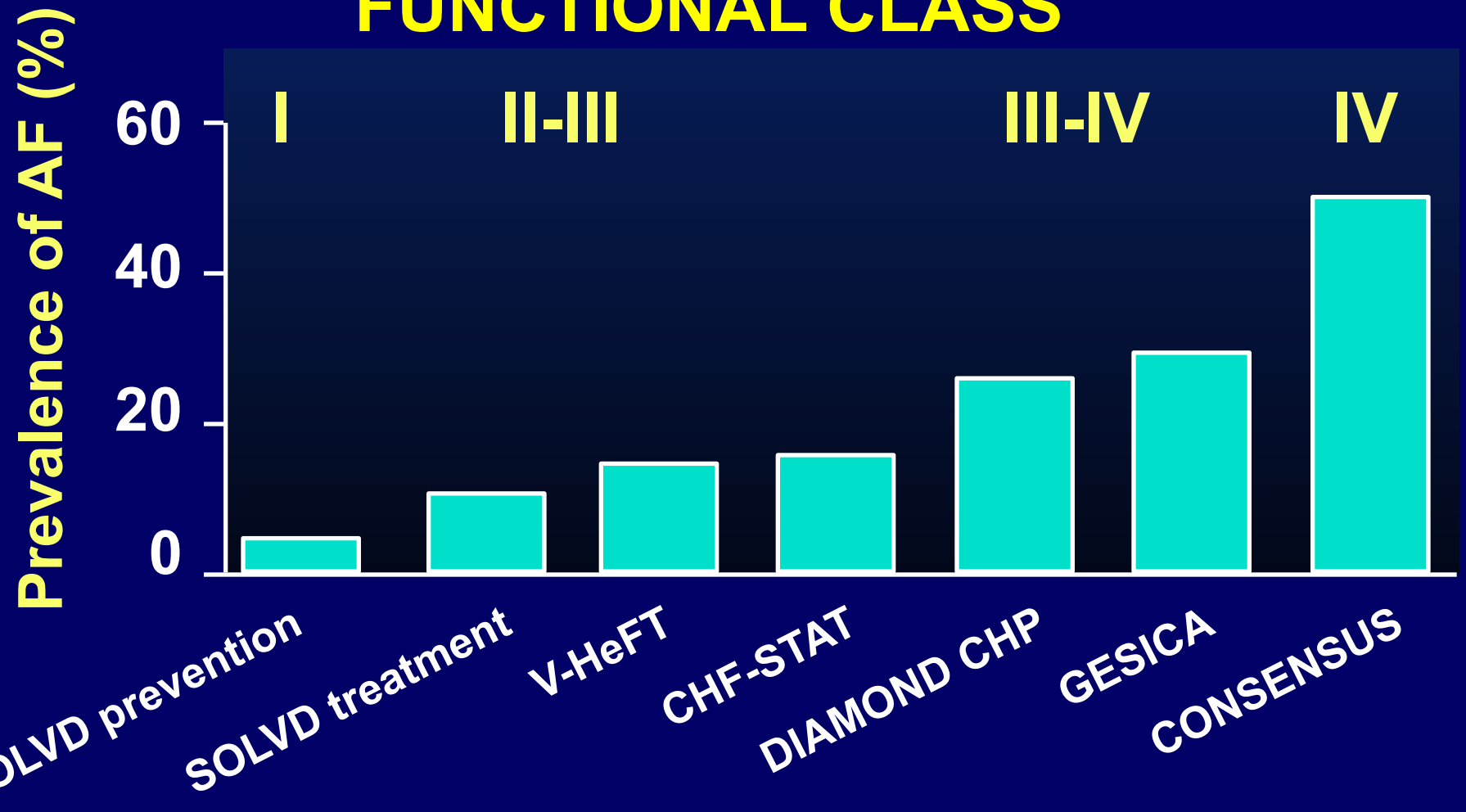
(Framingham, 1970s - 2000s)

• CHF	10 - 40%
• Rheumatic heart disease	20%
• Coronary artery disease	1 - 2%
• Hypertension	5 - 10%
• Thyrotoxicosis	2 - 3%
• Postop aortocoronary artery bypass surgery	5 - 40%

HEART DISEASE IN AF PTS



NEW YORK HEART ASSOCIATION FUNCTIONAL CLASS



Maisel, Stevenson AJC 2003;91:2-8

AF IN CHF

- In LVEF < 40% pts, 17% AF if < 70 y.o., 36% if > 70 y.o.
- In CHF pts AF risk in women = 14x, in men pts 8.5x (Framingham)
- Death rate higher than in CHF pts without AF
- Impact on mortality of restoration of NSR unclear
- ACE-I and ARBs may add to AARx benefit in preserving NSR and mortality

AF IN HEART FAILURE

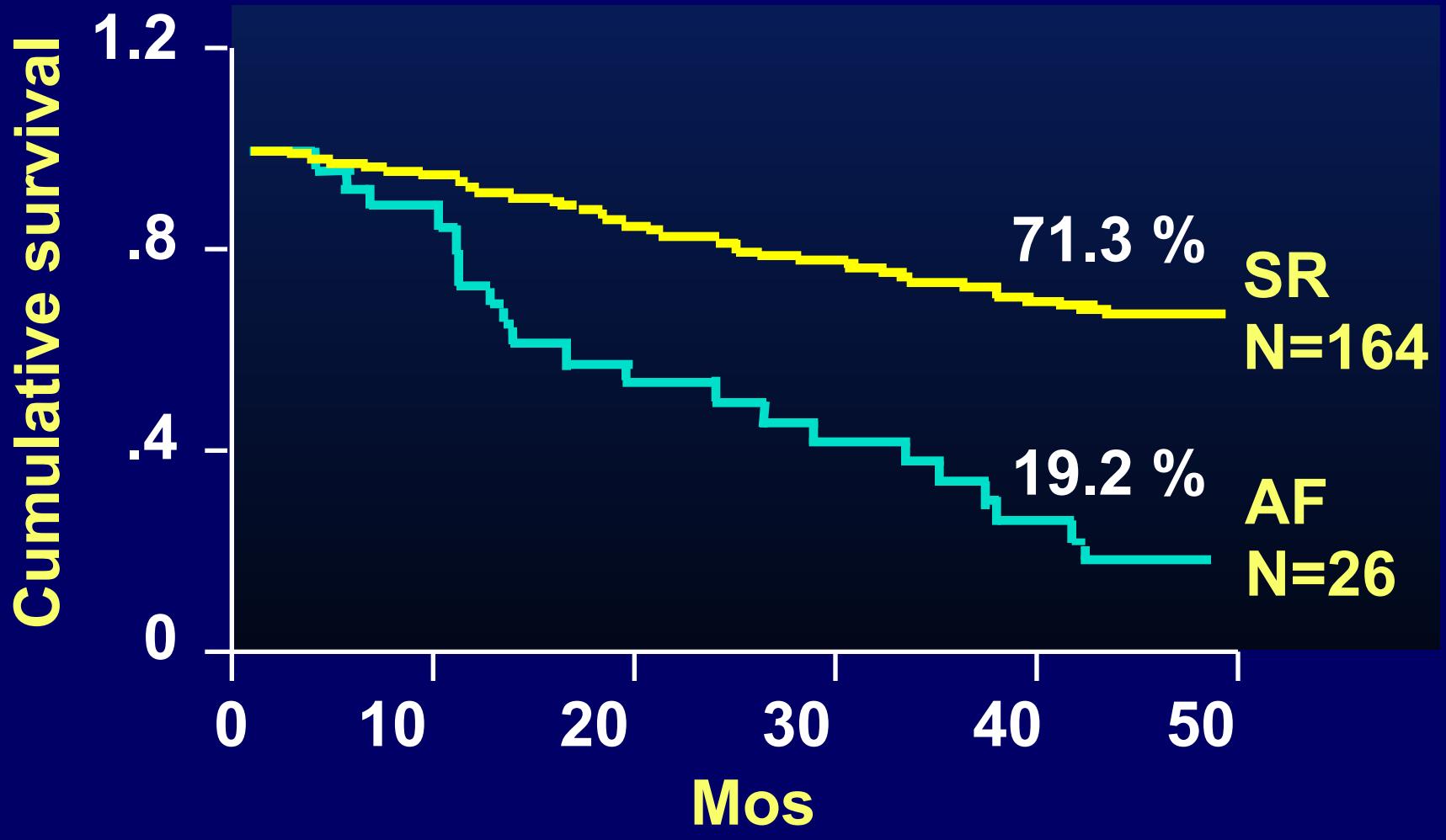
Risk of AF in systolic dysfunction

- Men 4.5x
- Women 5.9x
- Whites 38%
- AA 20%
- NYHA I-II 10%
  IV 50%

AF in diastolic dysfunction

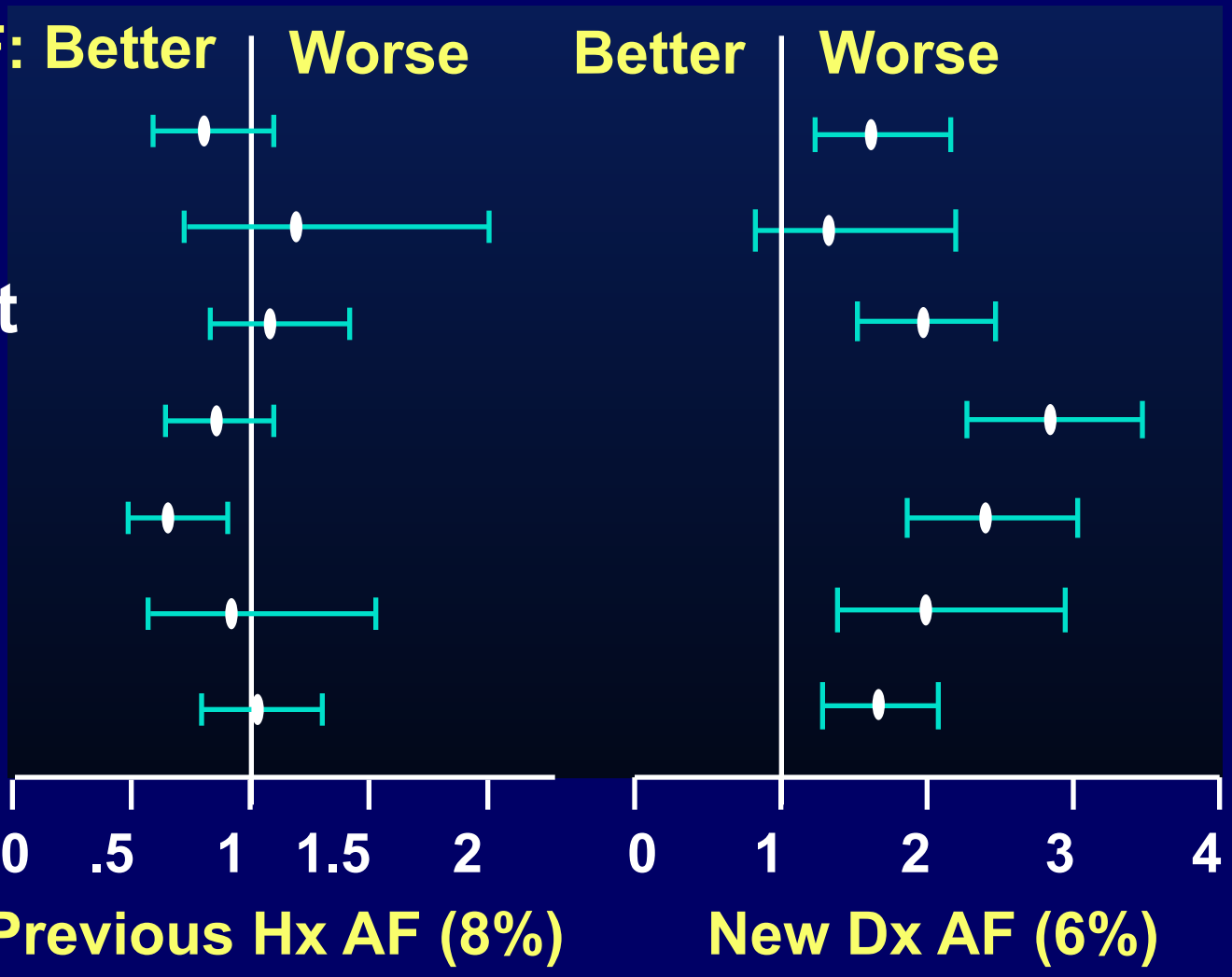
- Prevalence ~ 10%
- Risk related to degree of diastolic dysfunction (echo) - hazard ratio 3.3 → 5.3

EFFECT ON MORTALITY OF AF IN HEMODIALYSIS PTS (INDEPENDENT OF EF)



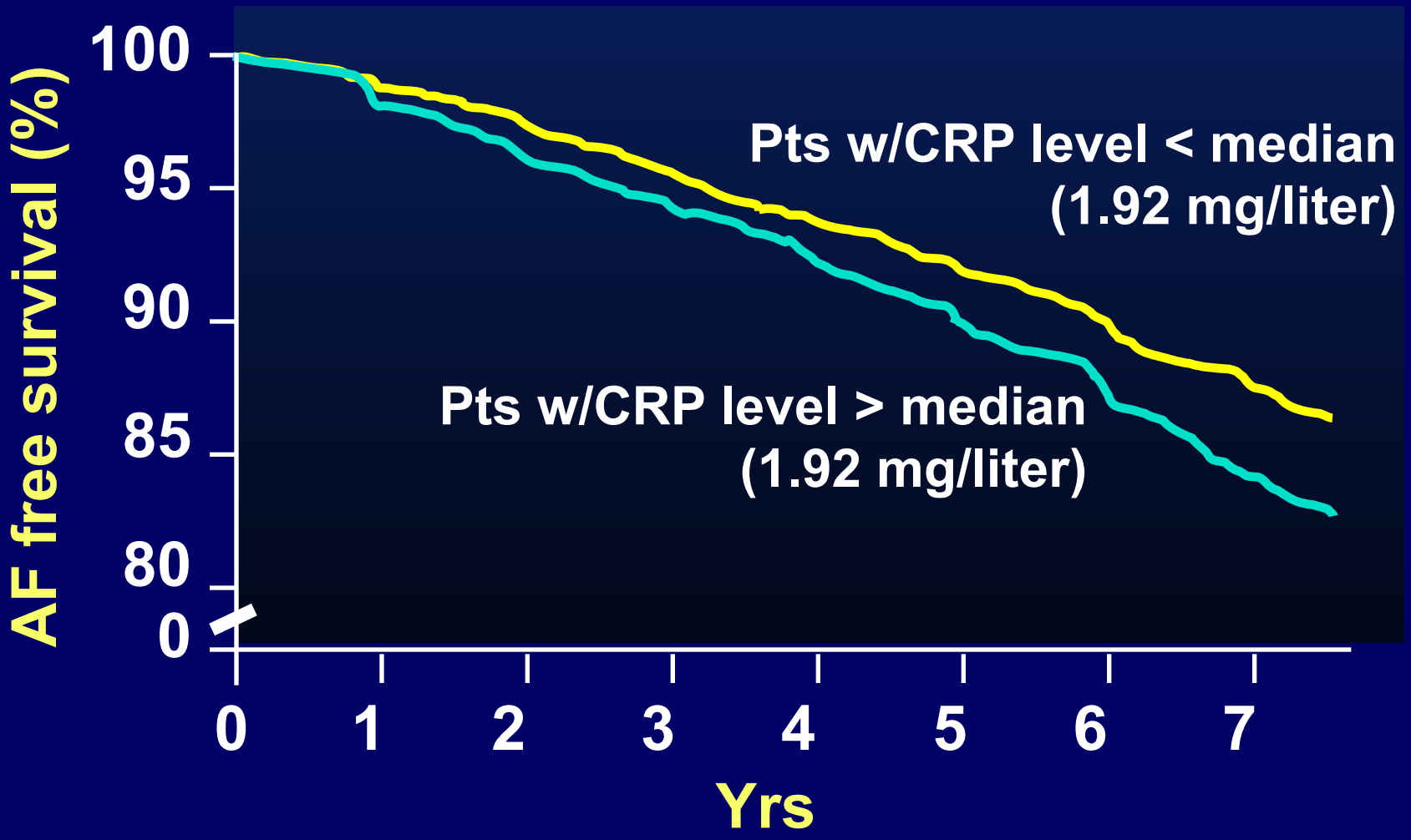
Vazquez et al AJC 10.1.03 N = 190

IMPACT OF AF IN PTS WITH ACS



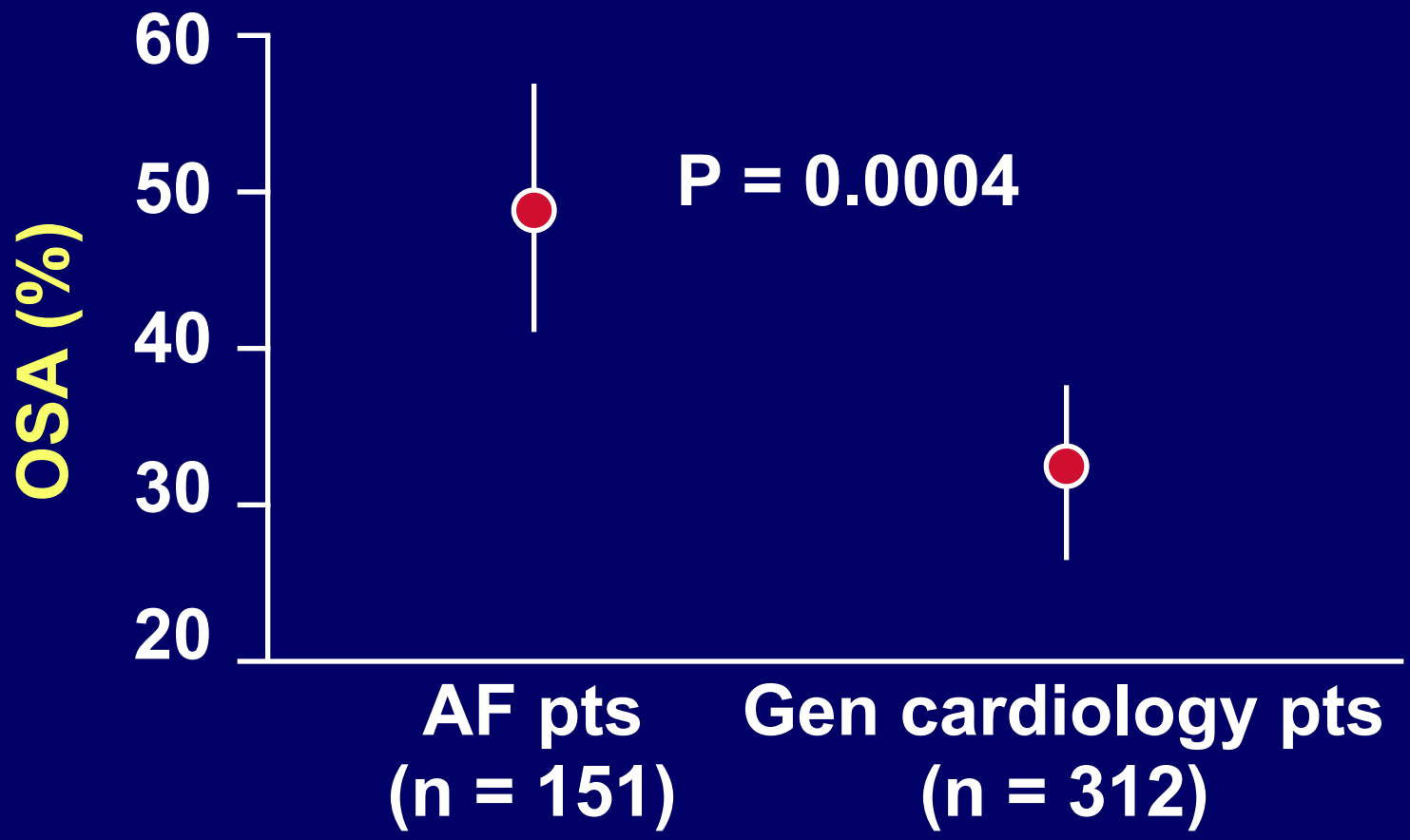
Mehta et al GRACE (Global Registry of Acute Coronary Events)
AJC 2003;92:1031 N = 21,785

INFLAMMATION AS A RISK FACTOR FOR AF



Aviles et al Circulation 2003;108:3006 N = 5806
Cardiovascular Health Study (5% AF at baseline)

PREVALENCE OF OSA IN AF PATIENTS



Gami et al (Mayo) Circulation 2004; 110:364
49% OSA in AF pts; 32% OSA in non-AF pts

AF DURING ACUTE MI

Incidence: 11% on entry
11% during hospitalization

Correlations: Age
Anterior MI
Killip IV
Prior MI
CHF*

Outcomes:

Higher death rates (indep. predictor)
- In hospital* 25% (vs 16% no AF)
- 30 days* 29% (vs 19%)
- 1 yr 48% (vs 33%)

Reinfarction

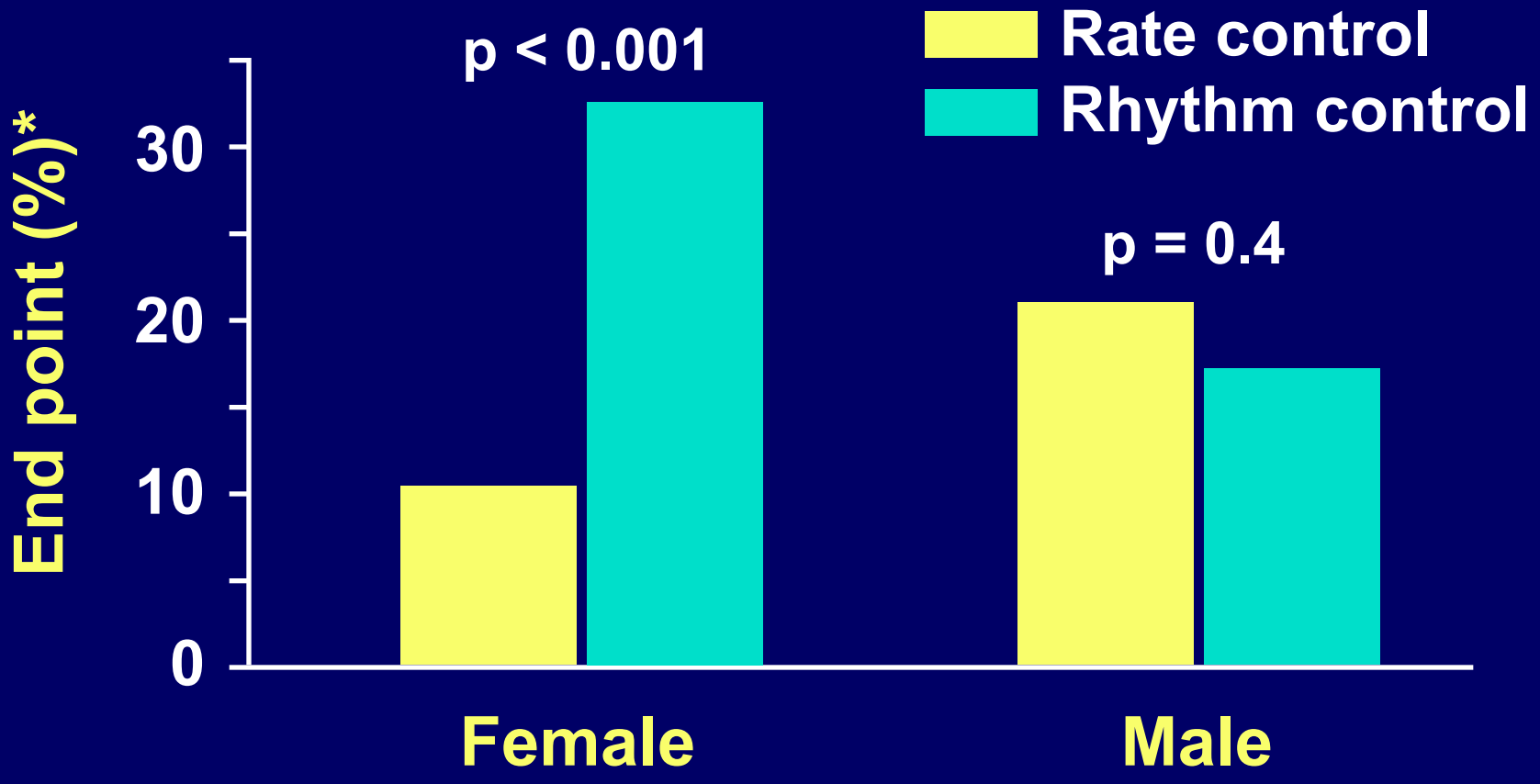
* Higher in AF developing during MI

Rathmore et al, Circulation 3.00, N = 106,780 medicare pts ≥ 65 yo ((79)

AF IN WOMEN

- Although risk is higher in men, 53% of all AF pts are women
- Women with CHF have 14x risk of AF,
  8.5x risk in men
- Suggestion that embolism in women > men
- More sx, higher VR
- Higher proarrhythmia risk with AARx

GENDER AND AF Rx: RACE STUDY



* Composite: CV death, HF, embolism, bleed, AARx adverse effect, pacemaker

Rienstra et al JACC 2005; 46:1298 192 O+ (of 522 pts)

GENDER AND AF Rx: RACE STUDY

Overall outcomes similar in men and women

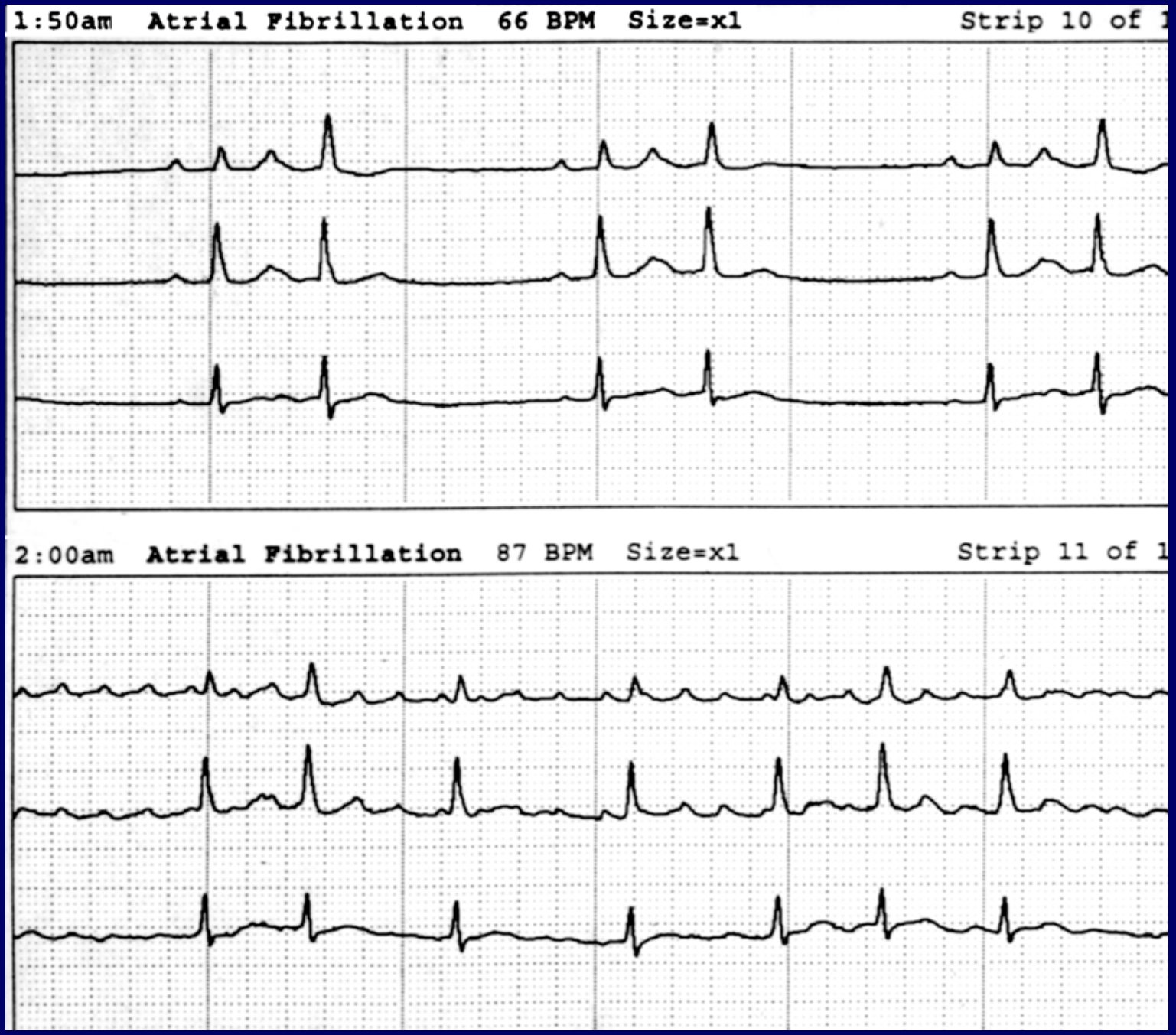
Treatment strategy outcomes similar in men; significantly different in women

Women had more adverse AARx effects (palpitations, pacemakers for bradycardia), HF, and embolism (more under anticoagulation?), and worse QOL

Rienstra et al
JACC 2005; 46:1298

VAGALLY MEDIATED AF

- Low incidence (< 15%)
- Male incidence (4:1)
- Usual onset after age 35
- Usually unassociated with structural heart disease ('lone')
- Usually paroxysmal
- Ventricular rate often less than 120 / min
- Relationship to pauses or slowing of sinus rate, eating, nighttime
- β-blockers may aggravate
- Sinus node function studies usually normal
- Can respond to atrial pacing


1:50am Atrial Fibrillation 66 BPM Size=x1
Strip 10 of
2:00am Atrial Fibrillation 87 BPM Size=x1
Strip 11 of

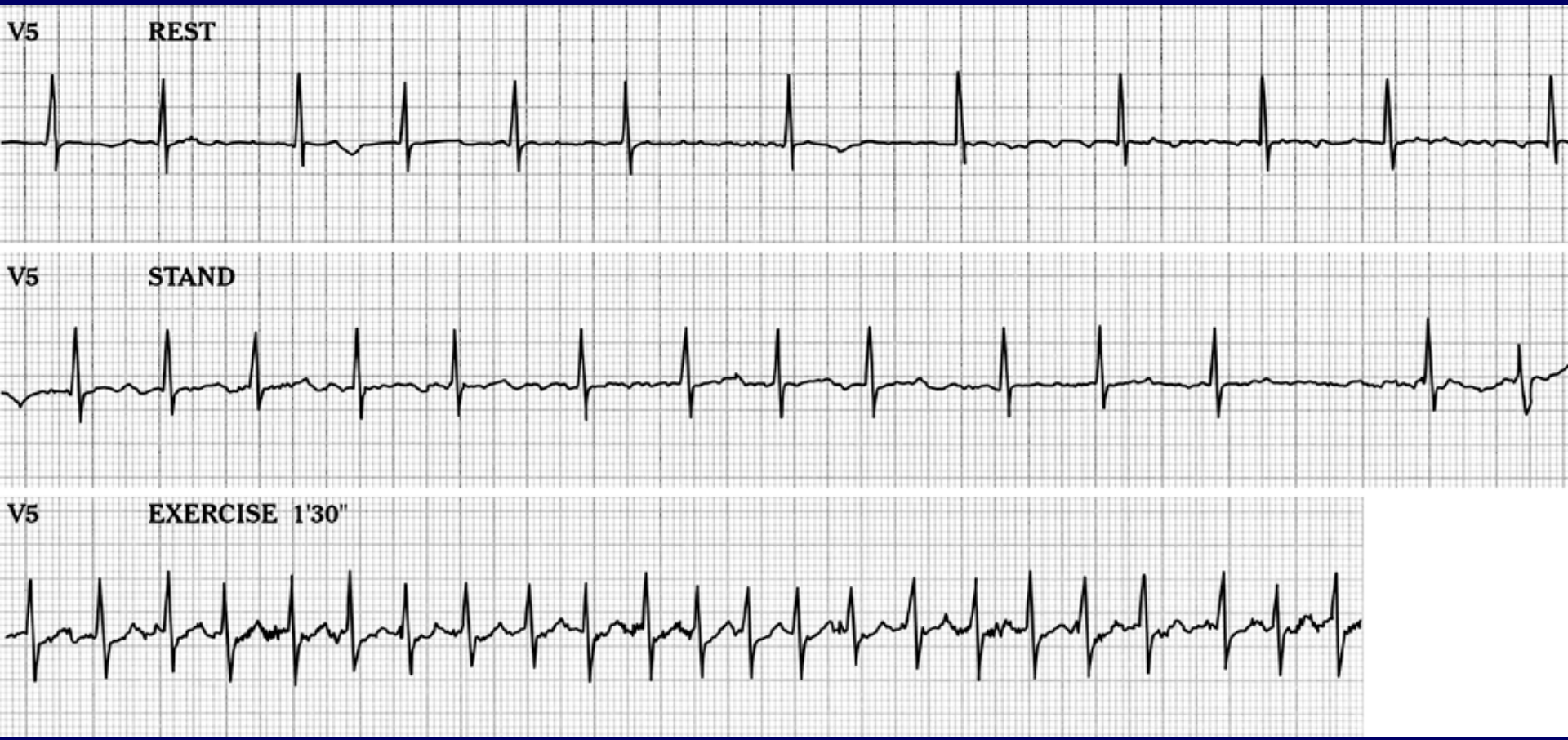
ADRENERGICALLY MEDIATED AF

- AM hrs
- Relation to effort, stress, cardiac surgery
  (↑ β-receptor density)
- Seen in thyrotoxicosis, DCM
- Often preceded by acceleration of sinus rate
- Can be provoked by β-agonists

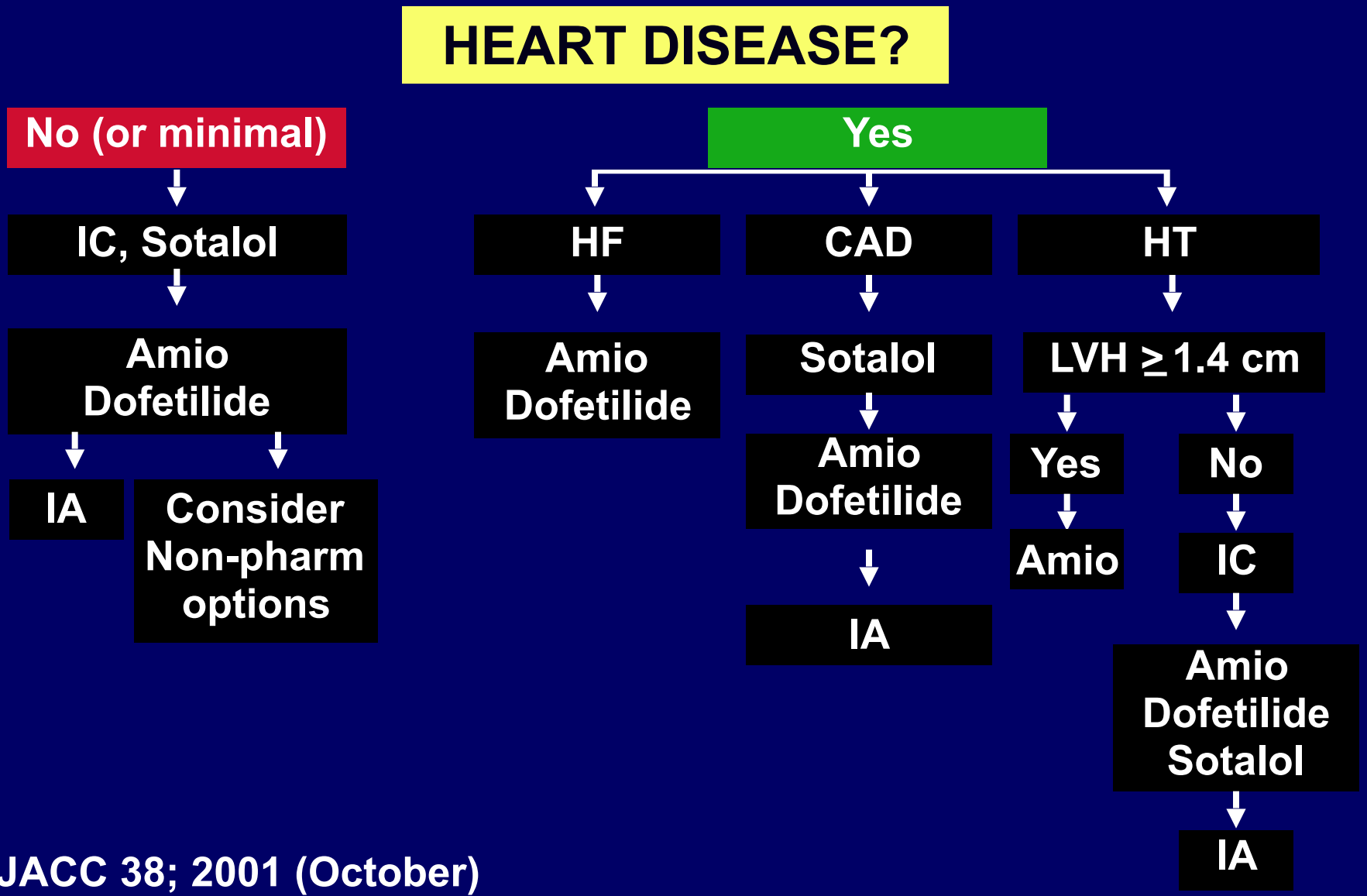
MANAGEMENT OPTIONS IN AF

- Ventricular rate control
  - CA^{++} -blockers
  - β-blockers
  - Digoxin
  - AVN ablation
- Restoration of NSR
  - Electrical conversion
  - Antiarrhythmic drugs

- Maintenance of NSR
  - Antiarrhythmic drugs
  - Dual chamber pacing
  - Atrial overdrive pacing
  - Dual site atrial pacing
  - AF ablation


V5
REST
V5
STAND
V5
EXERCISE 1'30"

ACC / AHA / ESC GUIDELINES FOR MANAGEMENT OF AF



JACC 38; 2001 (October)

RISK STRATIFICATION FOR ANTICOAGULATION IN AF: CHADS2 Score

	Points
• *C*ongestive heart failure	1
• *H*ypertension	1
• *A*ge 75 years or older	1
• *D*iabetes mellitus	1
• *S*troke or TIA history	2

Gage BF et al *JAMA* 285: 2864-2870; 2001

DERIVATION OF CHADS2 SCORE IN NATIONAL REGISTRY OF AF

$CHADS_2$ Score	No. Pts (n= 1733)	No. Strokes (n= 94)	Crude Stroke Rate 100 Pt - Yrs	Adjusted Stroke Rate
0	120	2	1.2	1.0
1	463	17	2.8	2.8
2	523	23	3.6	4.0
3	337	25	6.4	5.9
4	220	19	8.0	8.5
5	65	6	7.7	12.5
6	5	2	44.0	18.2

Gage BF et al *JAMA* 285: 2864-2870; 2001

ANTICOAGULATION RECOMMENDATIONS BY CHADS2 SCORE

- CHADS2 0
  - Low risk (0.5%/yr)
  - ECASA 325 mg qd
- CHADS2 1-2
  - Intermediate risk (1.5-2.5%/yr)
  - Warfarin (INR 2.0-3.0) > ECASA 325 mg qd
- CHADS2 $\geq$ 3
  - High risk (5.3-6.9%/yr)
  - Warfarin (INR 2.0-3.0) unless contraindicated