

Spotlight on Valvular Heart Disease Guidelines

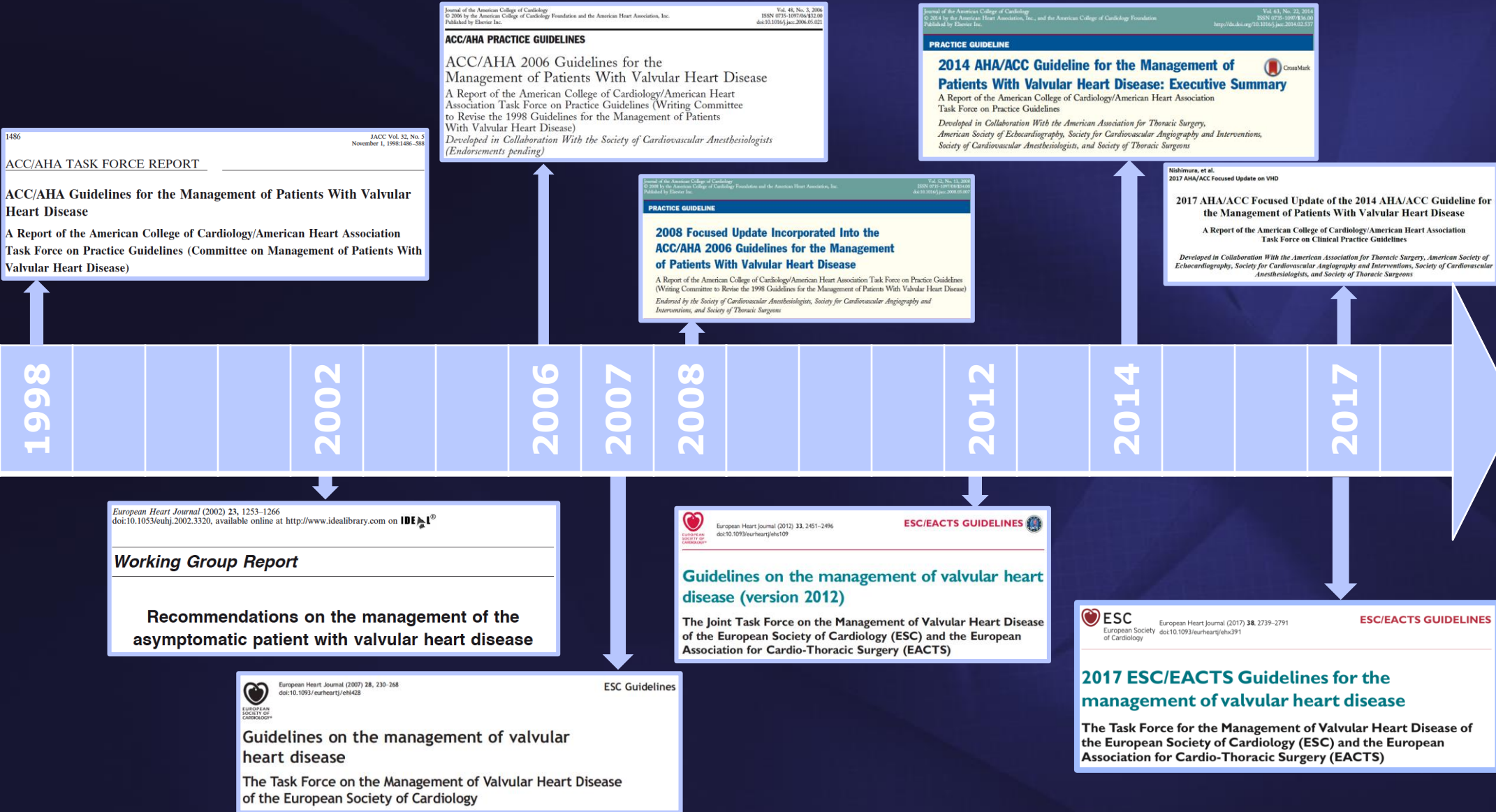
Aortic Valve Disease

Raphael Rosenhek

Department of Cardiology
Medical University of Vienna

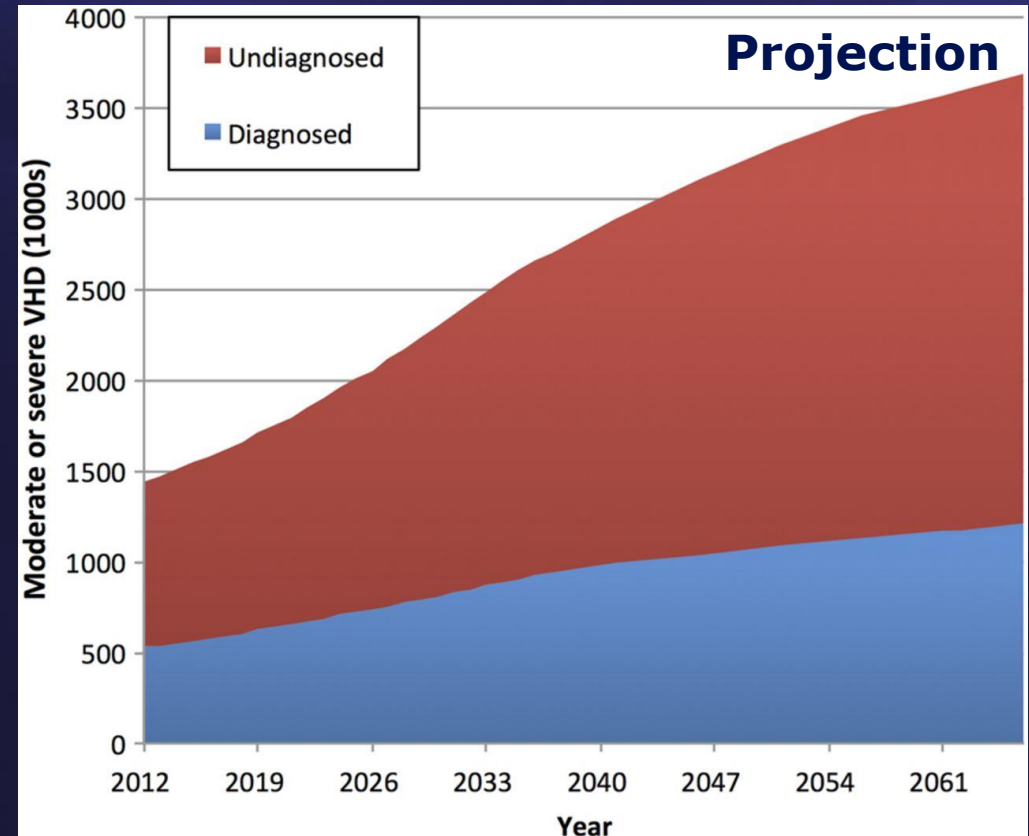
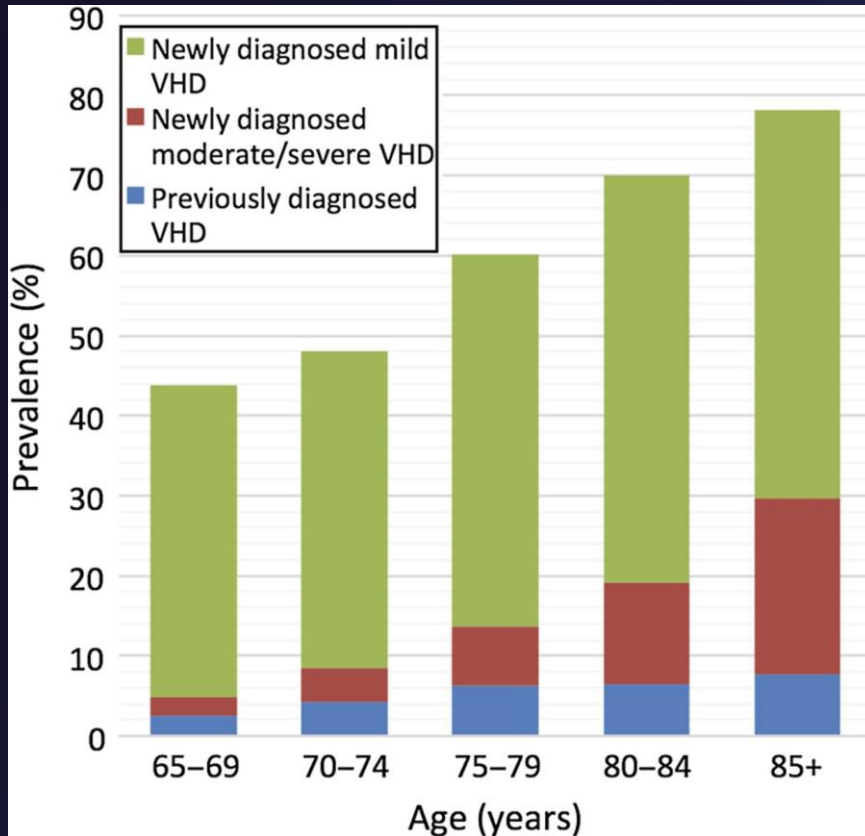
Palermo, April 26th 2018

Valvular Heart Disease Recommendations



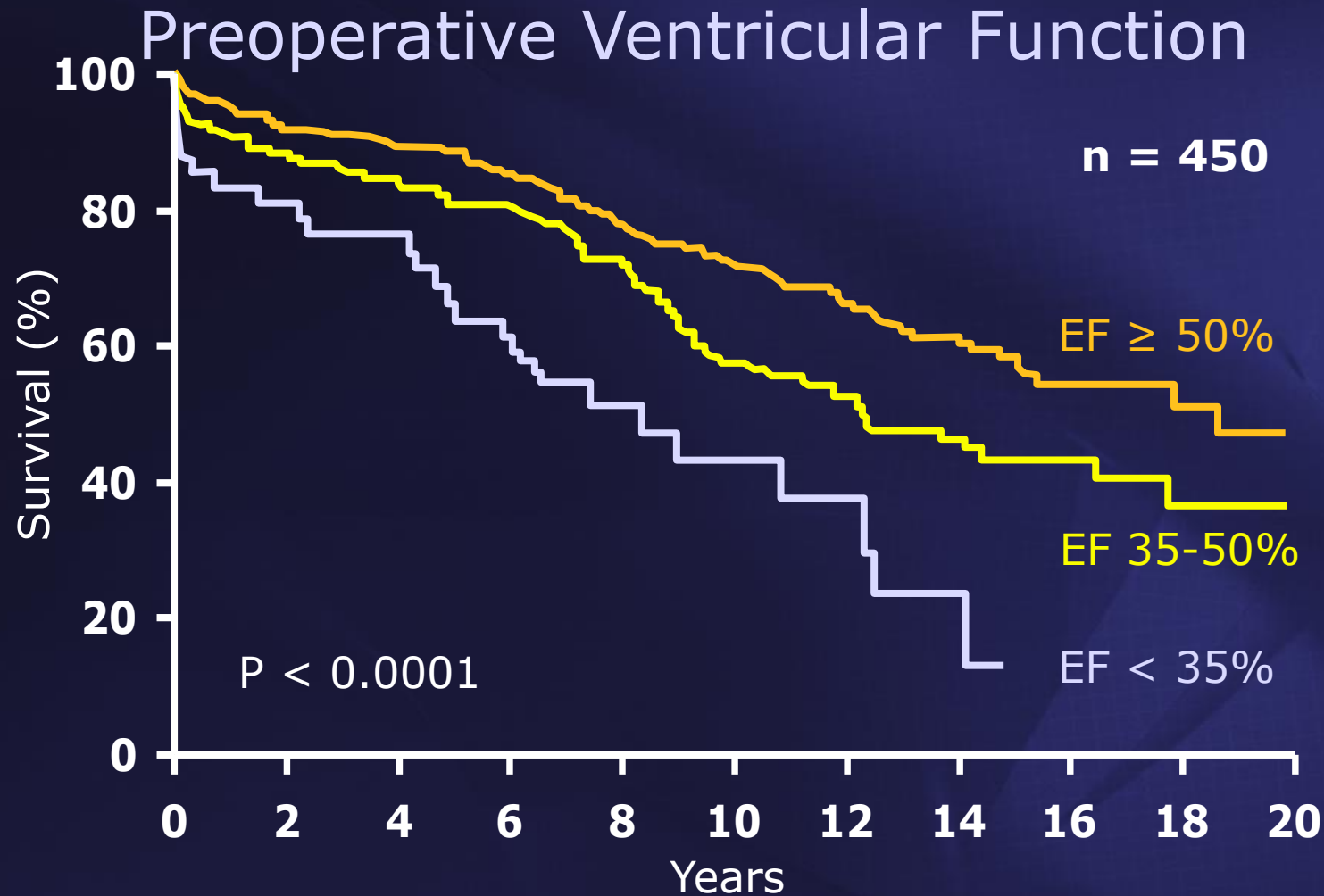
Valvular Heart Disease

A Frequent Disease



Severe Aortic Regurgitation

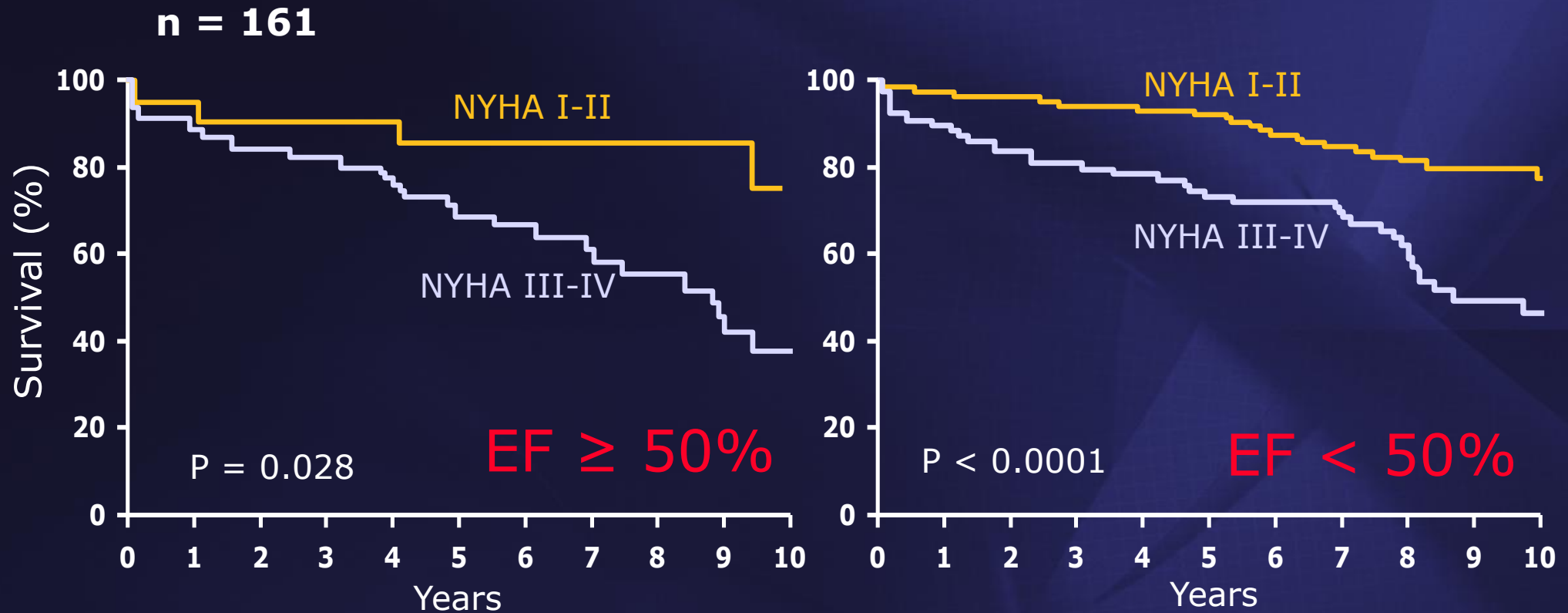
Postoperative Survival:



Chaliki et al, Circulation. 2002;106:2687-2693.

Severe Aortic Regurgitation

Predicting Postoperative Survival: Preoperative Functional Class

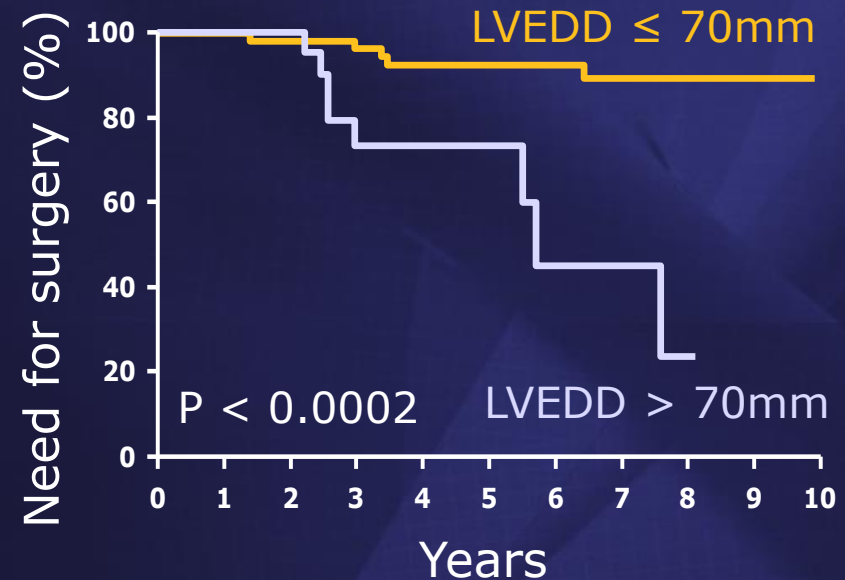
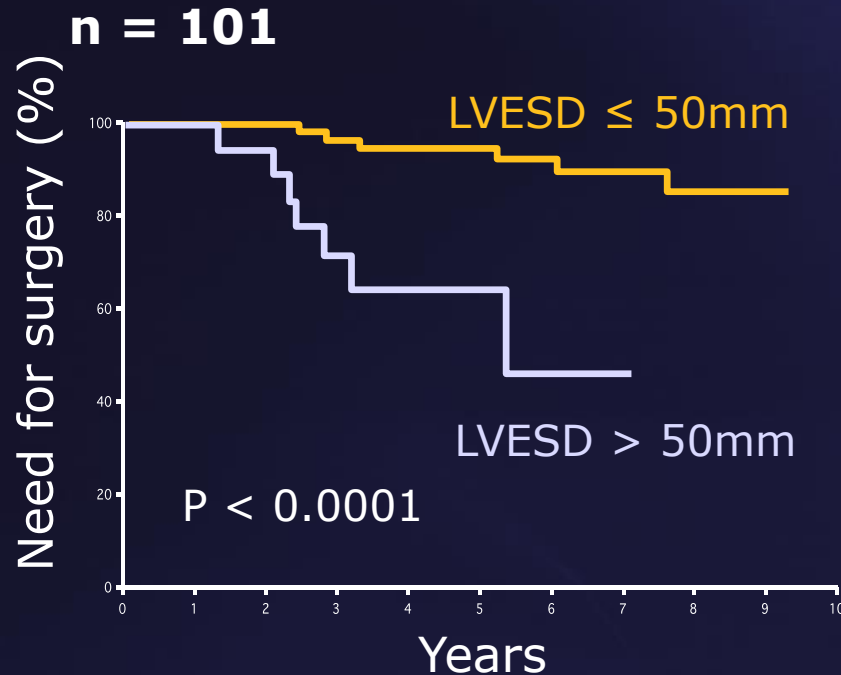


Klodos, E. et al. J Am Coll Cardiol 1997;30:746-752.

Severe Aortic Regurgitation

Predictors of Need for Surgery

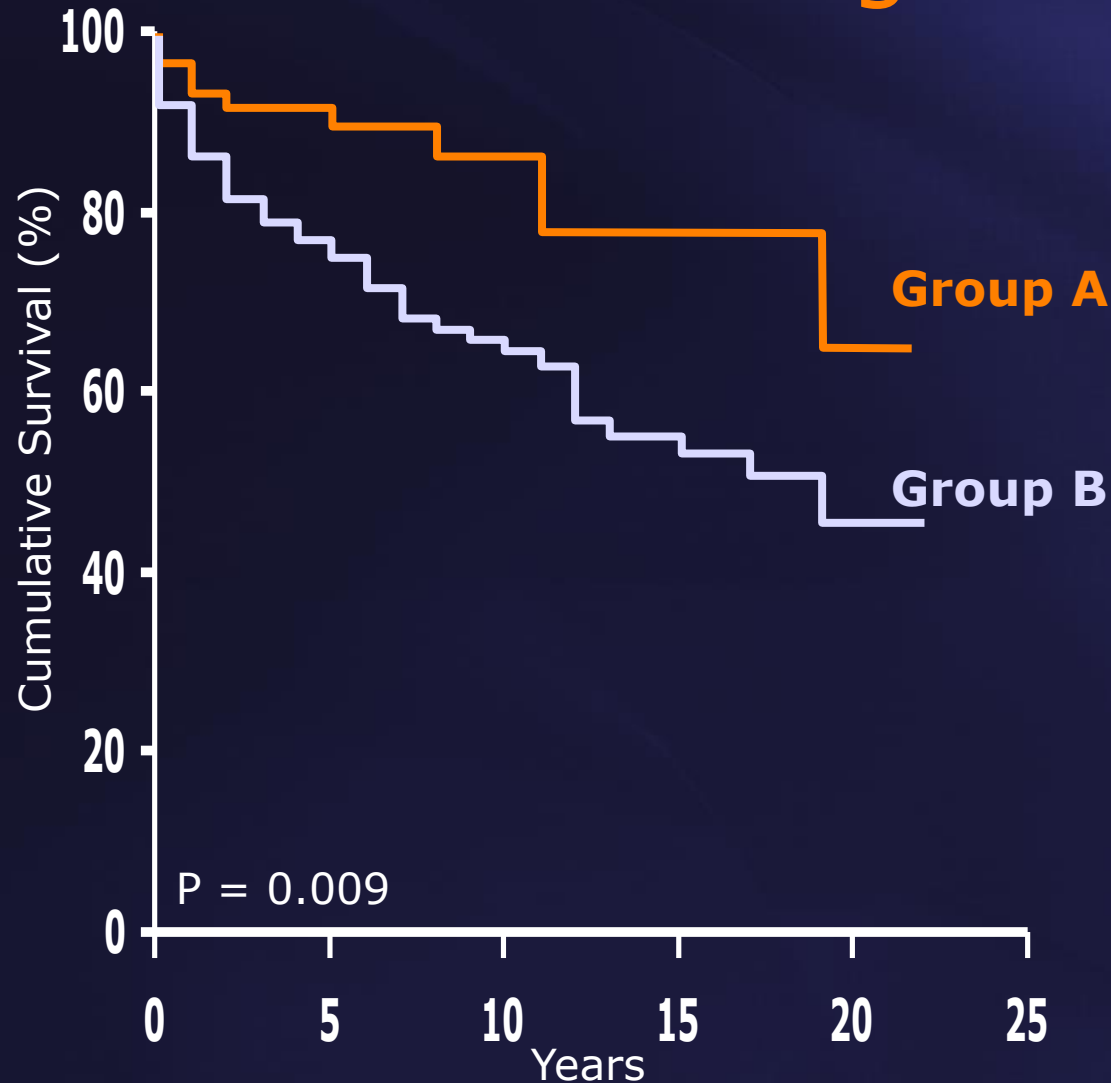
Surgery indicated by LV-dysfunction or development of symptoms



Tornos, P. et al, Am Heart J. 1995;130:333-339.

Aortic Regurgitation

Outcome According to Guidelines Strategy



	Group A Early Surgery	Group B Late surgery
n	60	110
NYHA	I-II	III-IV
EF	45-50	< 45
ESD	50-55	> 55

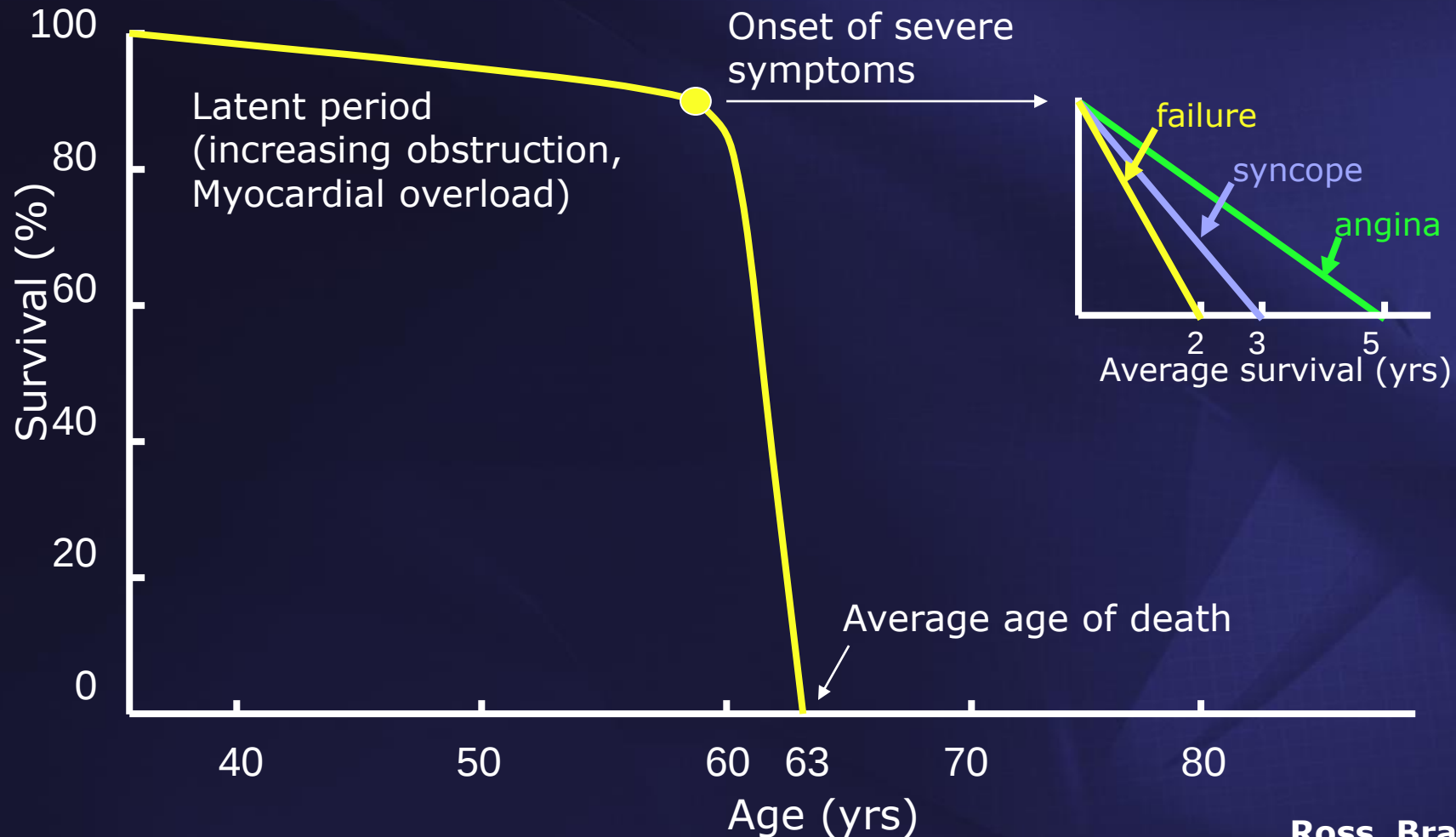
Timing of Surgery in Aortic Regurgitation

Indications for Surgery in Severe AR

	ESC/EACTS	ACC/AHA
Symptomatic patients	I	I
Asymptomatic and LVEF < 50%	I	I
Asymptomatic undergoing other cardiac surgery	I	I
Asymptomatic and LVESD > 50 mm	IIa	IIa
Asymptomatic and LVEDD ≥ 70 mm	IIa	
Asymptomatic progressive LV dilatation with LVEDD ≥ 65 mm if surgical risk is low		IIb

Severe Aortic Stenosis

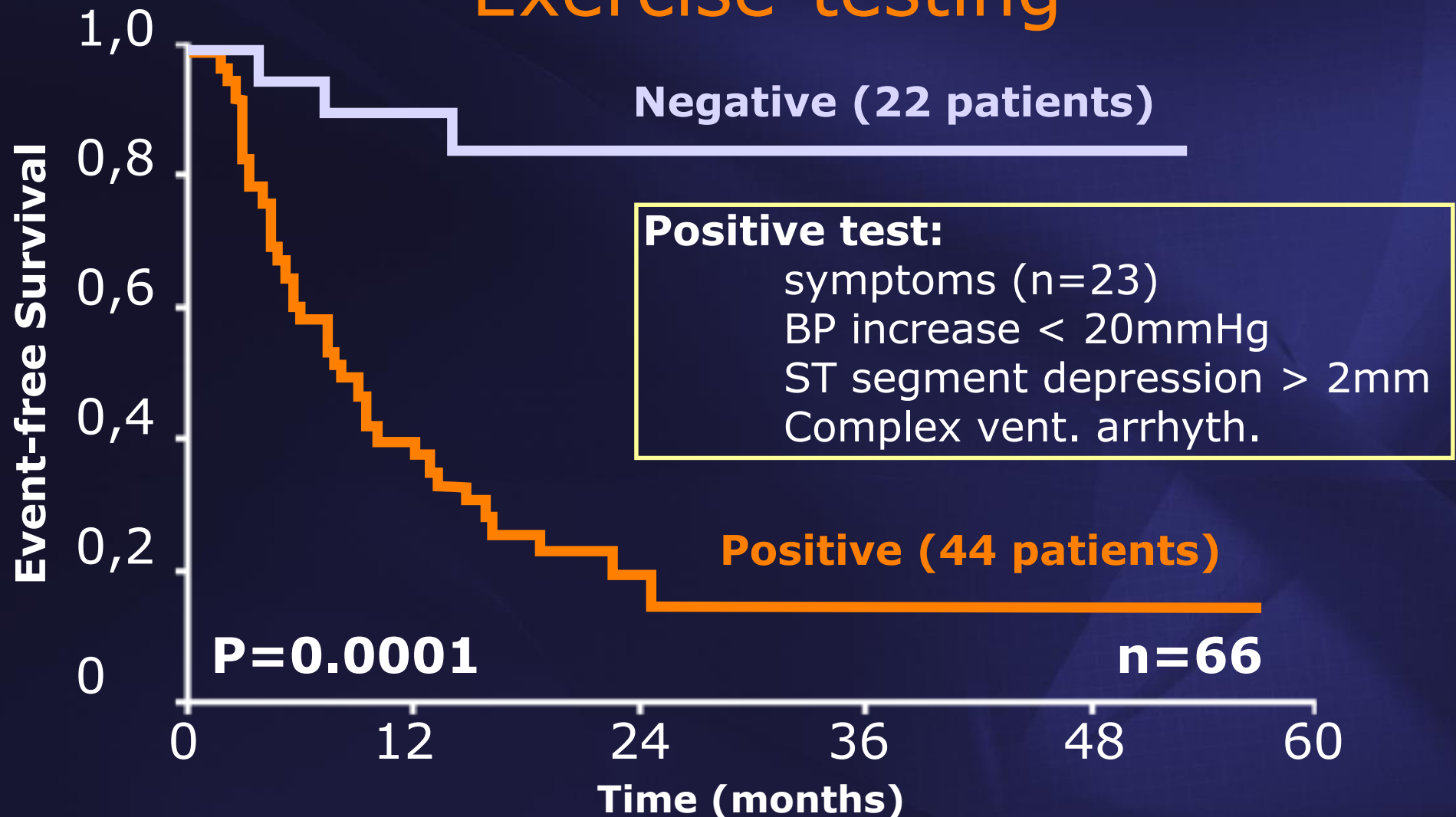
Prognosis of Symptomatic Patients



**Ross, Braunwald
Circulation 1968**

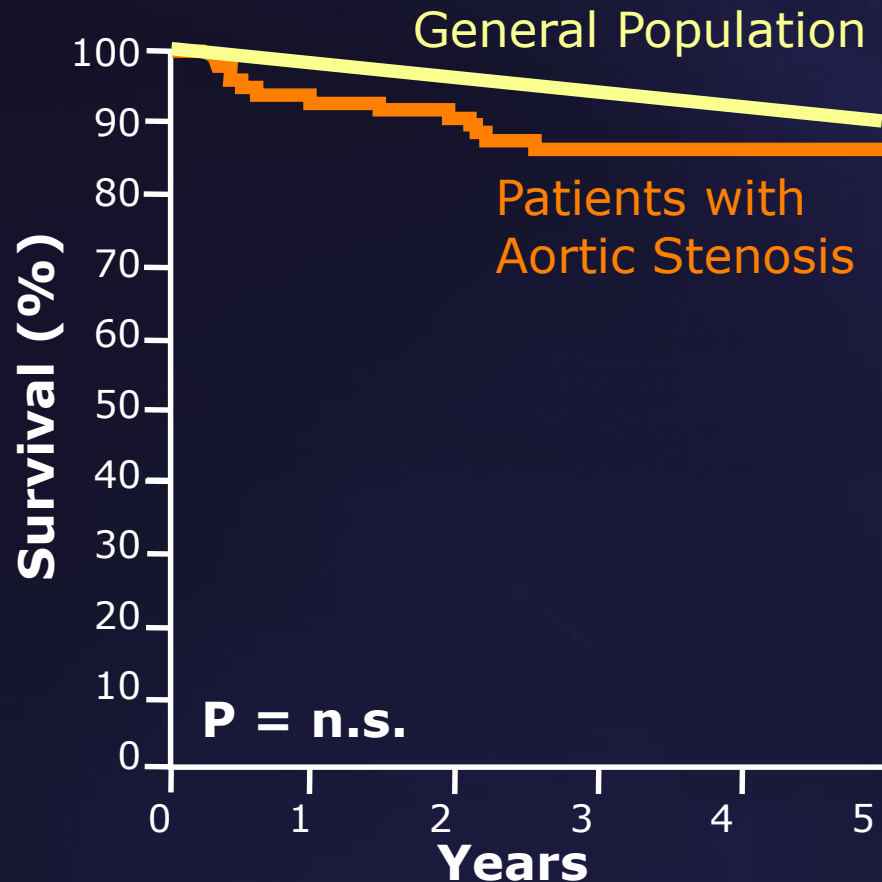
Severe „asymptomatic“ Aortic Stenosis

Exercise-testing



Asymptomatic Severe Aortic Stenosis

Overall Outcome: Wait for Symptoms Strategy



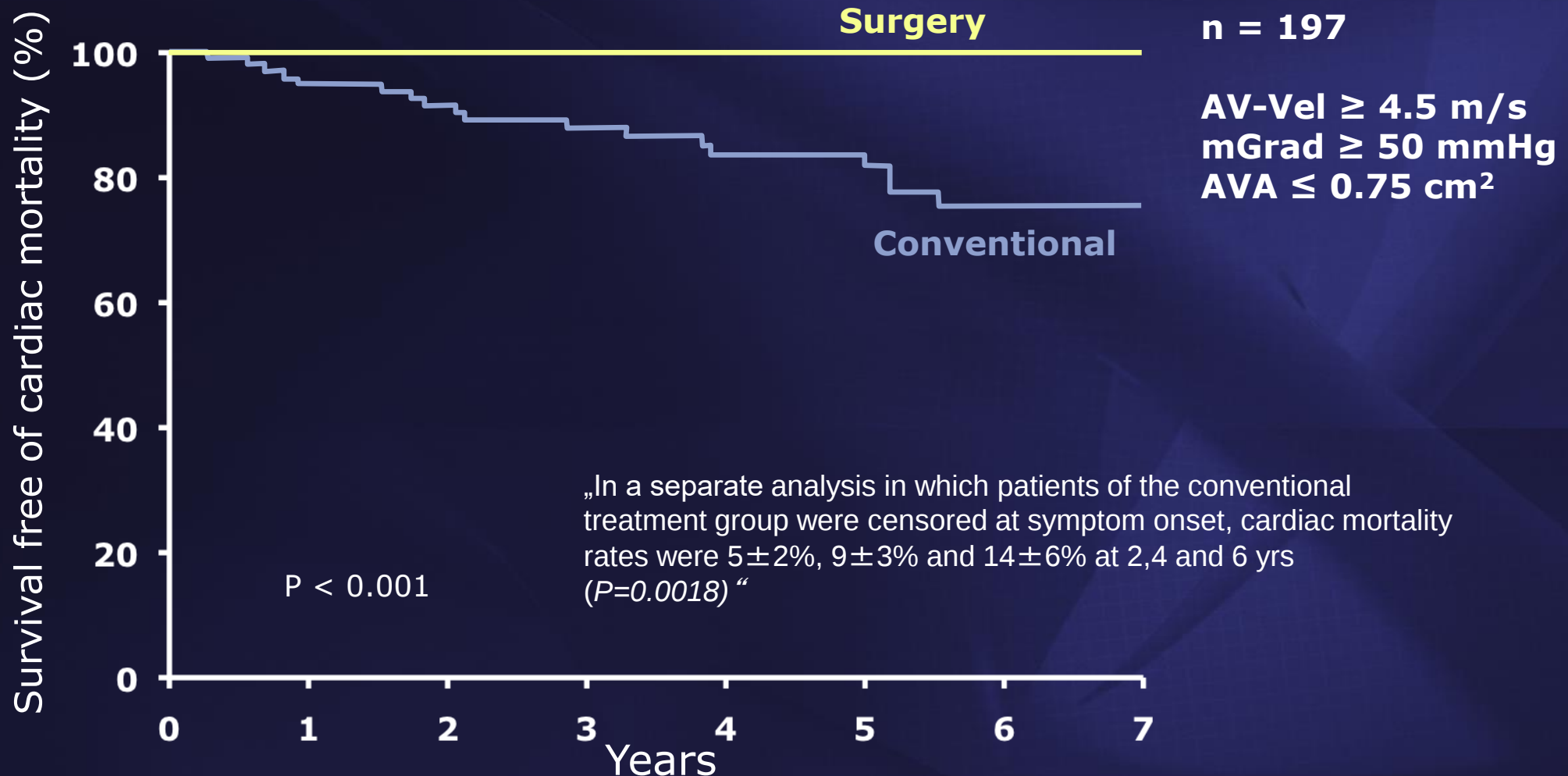
126 Patients
Severe AS (AV-Vel ≥ 4 m/s)
Asymptomatic

Compared to Age-, Gender-
Matched General Population

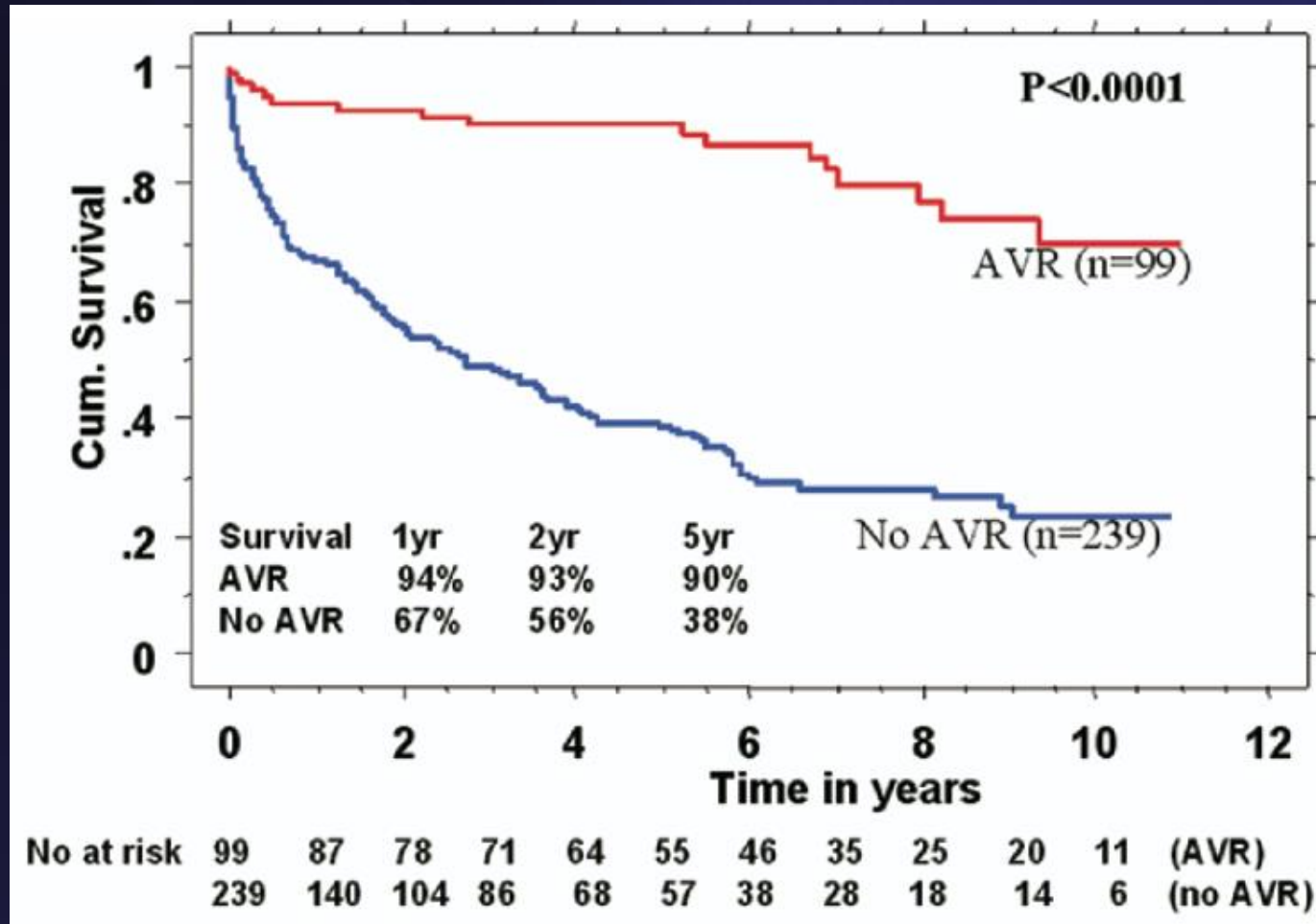
Regular Control exams

**Rosenhek, R. et al.
N Engl J Med 2000;343:611-617**

Early Surgery vs. “Conventional Treatment” Very Severe Aortic Stenosis



Early Surgery vs. “Conventional Treatment” Aortic Stenosis

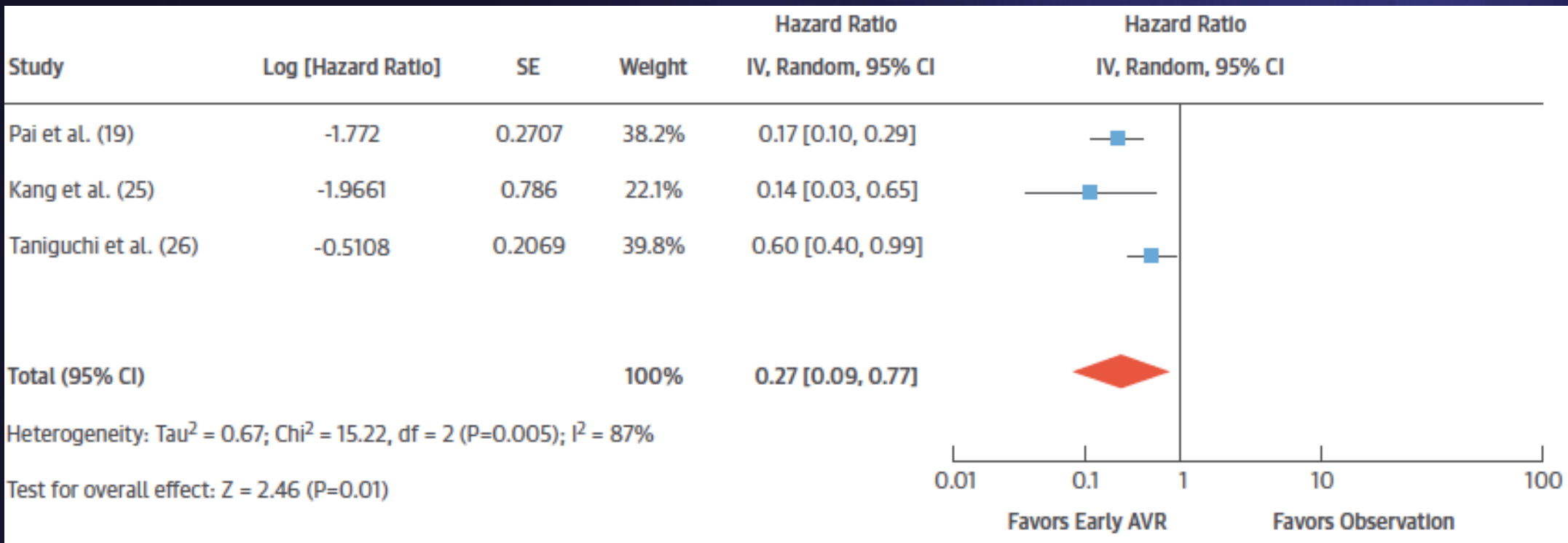


Early Surgery vs. “Conventional Treatment” Aortic Stenosis

Variables	No AVR (n = 239)	AVR (n = 99)	p Value
Clinical variables:			
Age	73 ± 14	67 ± 15	0.0008
Males	54%	43%	0.08
Hypertension	27%	52%	<0.0001
Diabetes	8%	17%	0.02
Coronary artery disease	21%	16%	0.32
Renal insufficiency	5%	4%	0.59
Chronic obstructive pulmonary disease	9%	8%	0.83
Previous stroke	8%	8%	0.92
Echocardiography:			
Ejection fraction	0.57 ± 0.18	0.65 ± 0.14	<0.0001
LV end-diastolic dimension (mm)	49 ± 9	48 ± 8	0.25
LV end-systolic dimension (cm)	32 ± 10	29 ± 8	0.01
Ventricular septum thickness (mm)	14 ± 2	14 ± 2	0.65
LV posterior wall thickness (mm)	13 ± 2	13 ± 2	0.93
AV area (cm ²)	0.72 ± 0.17	0.73 ± 0.17	0.72
AV area index (cm ² /m ²)	0.39 ± 0.09	0.40 ± 0.10	0.25
Peak aortic gradient (mm Hg)	68 ± 23	74 ± 24	0.03
Mean aortic gradient (mm Hg)	42 ± 15	45 ± 16	0.08
Pulmonary artery systolic pressure (mm Hg)	44 ± 14	38 ± 12	0.005
3 or 4+ mitral regurgitation	16%	12%	0.32
Drug therapy:			
Aspirin	17%	39%	<0.0001
Beta blocker	12%	40%	<0.0001
ACE inhibitor	12%	22%	0.01
Statin	9%	20%	<0.005
Digoxin	7%	29%	<0.0001

Early Surgery vs. “Conventional Treatment” Very Severe Aortic Stenosis

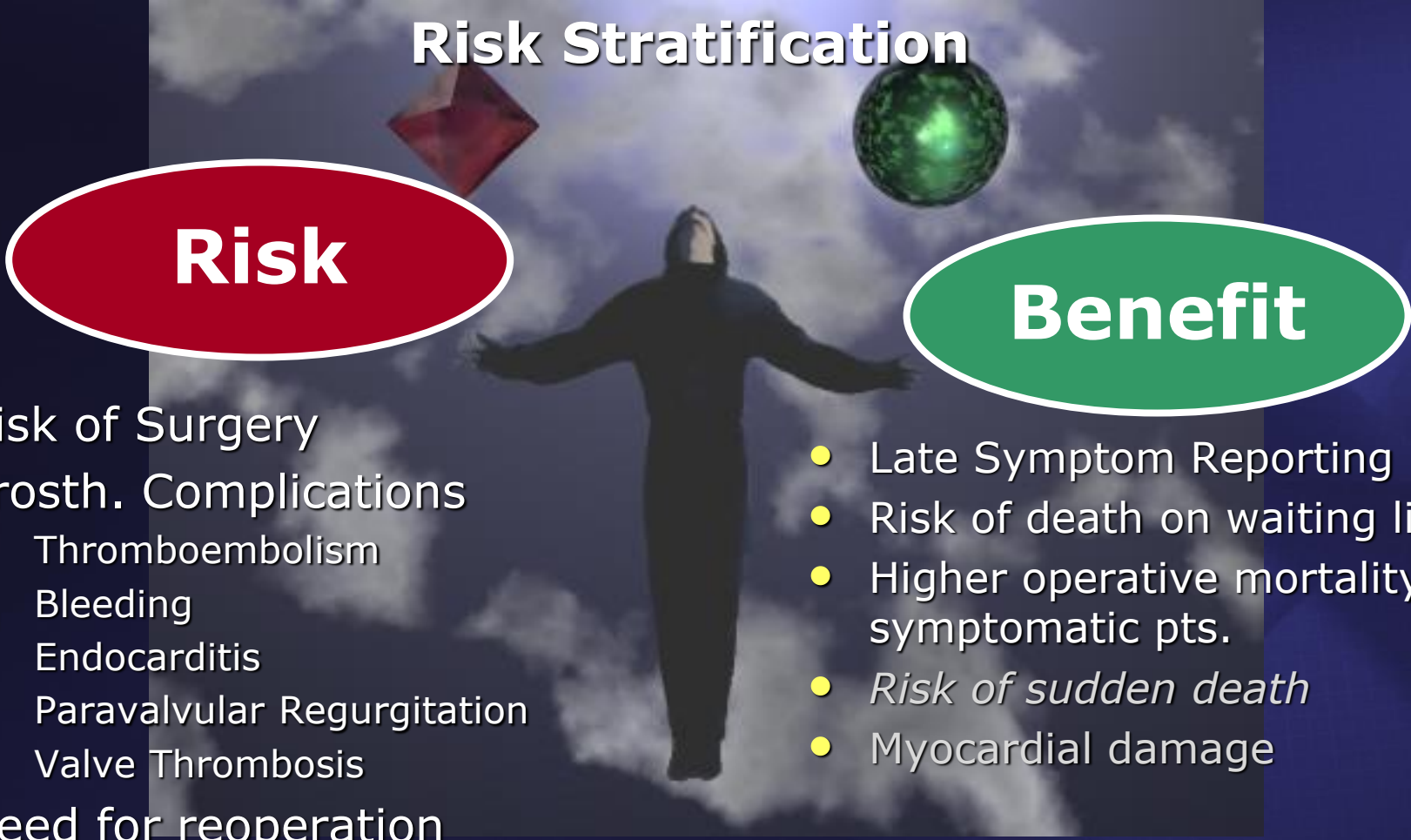
Metanalysis: All-cause Mortality



Valvular Heart Disease

Elective Surgery?

Risk Stratification



Risk

Benefit

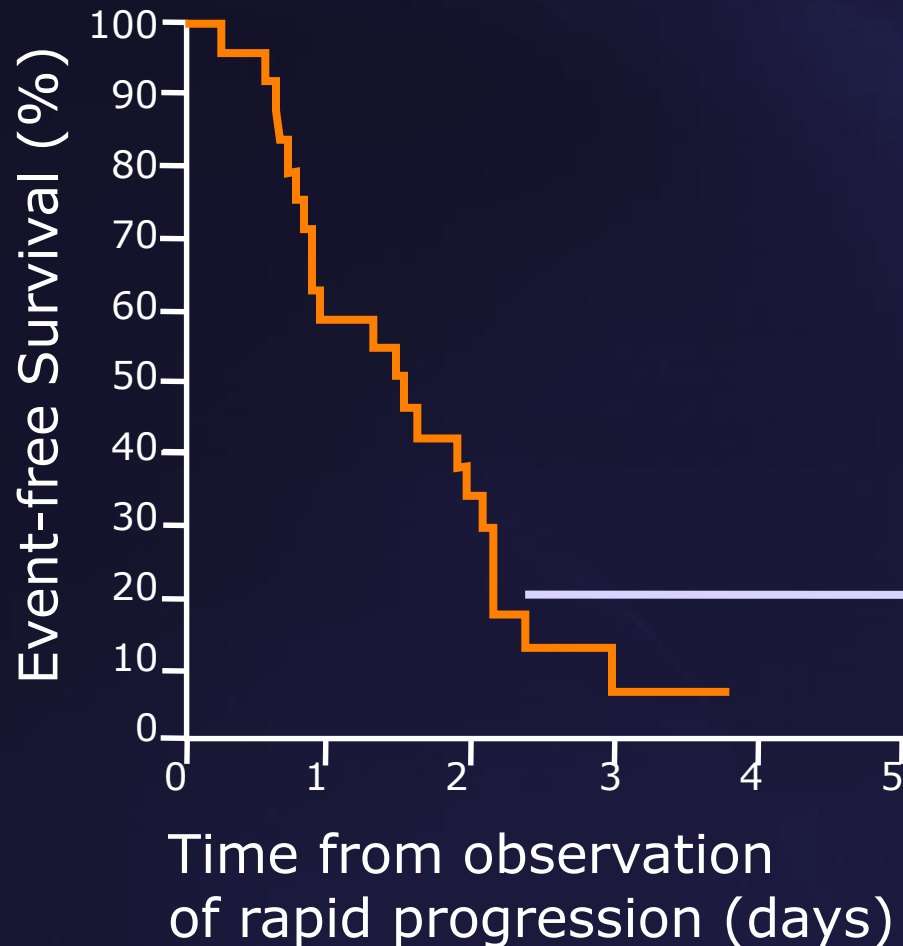
- Risk of Surgery
- Prosth. Complications
 - Thromboembolism
 - Bleeding
 - Endocarditis
 - Paravalvular Regurgitation
 - Valve Thrombosis
- Need for reoperation

- Late Symptom Reporting
- Risk of death on waiting list
- Higher operative mortality for more symptomatic pts.
- *Risk of sudden death*
- Myocardial damage

Modified from Rosenhek, R. et al. Eur Heart J 2002;23:1417-21

Severe Aortic Stenosis

Valve Calcification and Rapid Progression



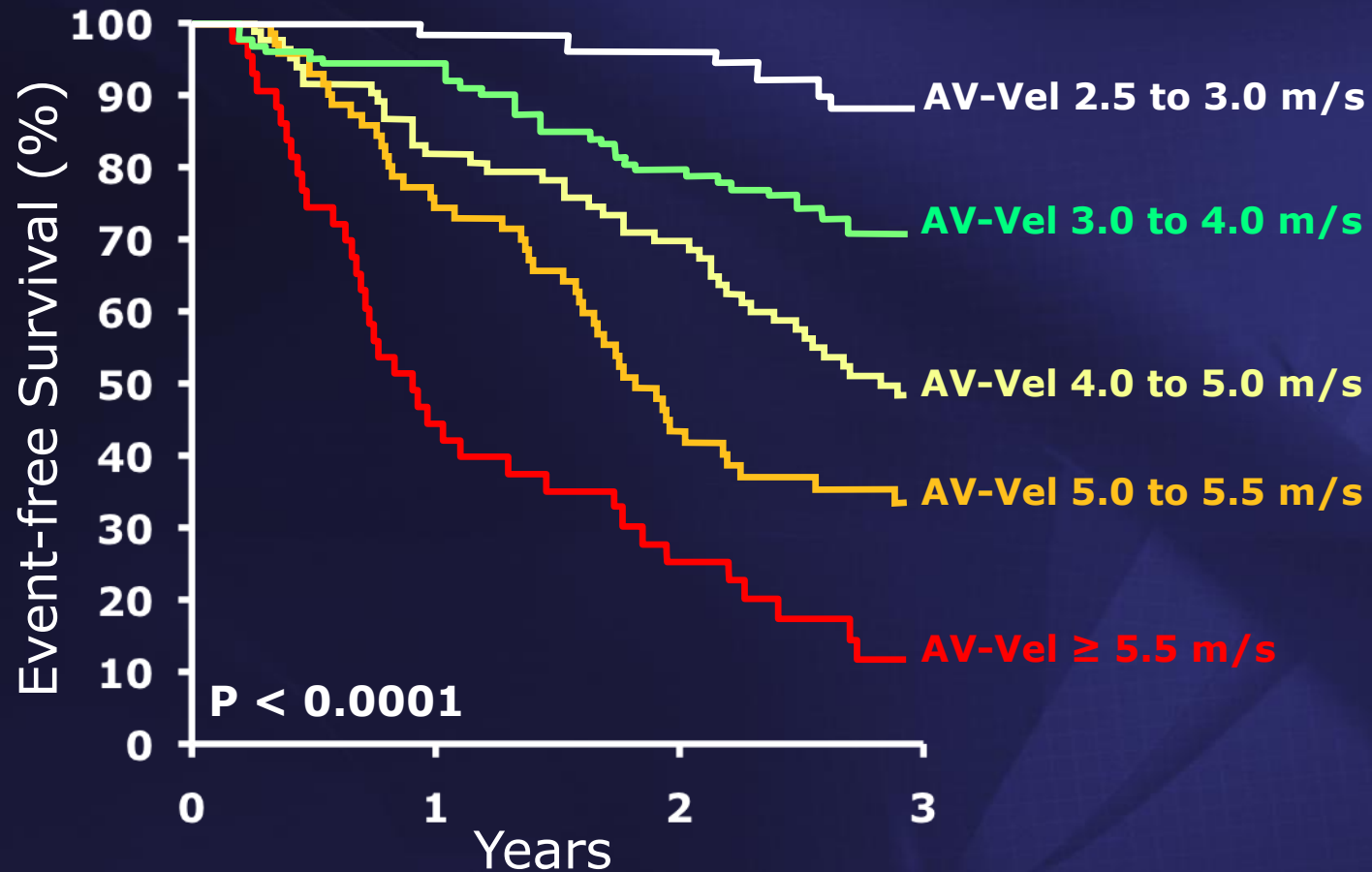
Patients with moderate or severe aortic valve calcification and aortic jet velocity increase > 0.3 m/s within 12 months

2 year event-rate: 80%

**Rosenhek, R. et al.
N Engl J Med 2000;343:611-617**

The Spectrum of Aortic Stenosis

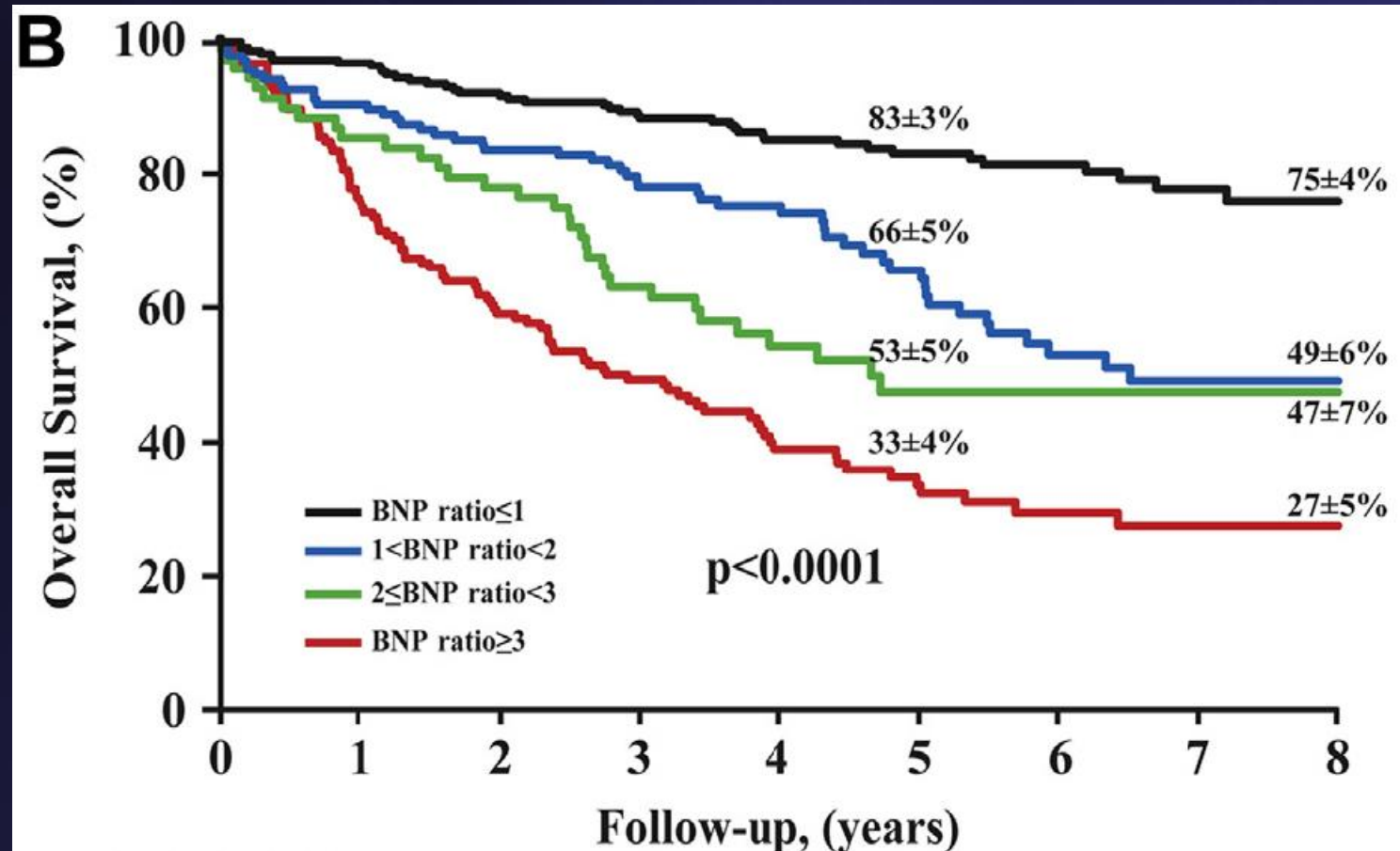
Natural History



Rosenhek R et al. Eur Heart J 2004;25:199-205
Rosenhek R et al. N Engl J Med 2000;343:611-617
Rosenhek R et al. Circulation 2010;121:151-156

Aortic Stenosis

Survival: **BNP ratio**



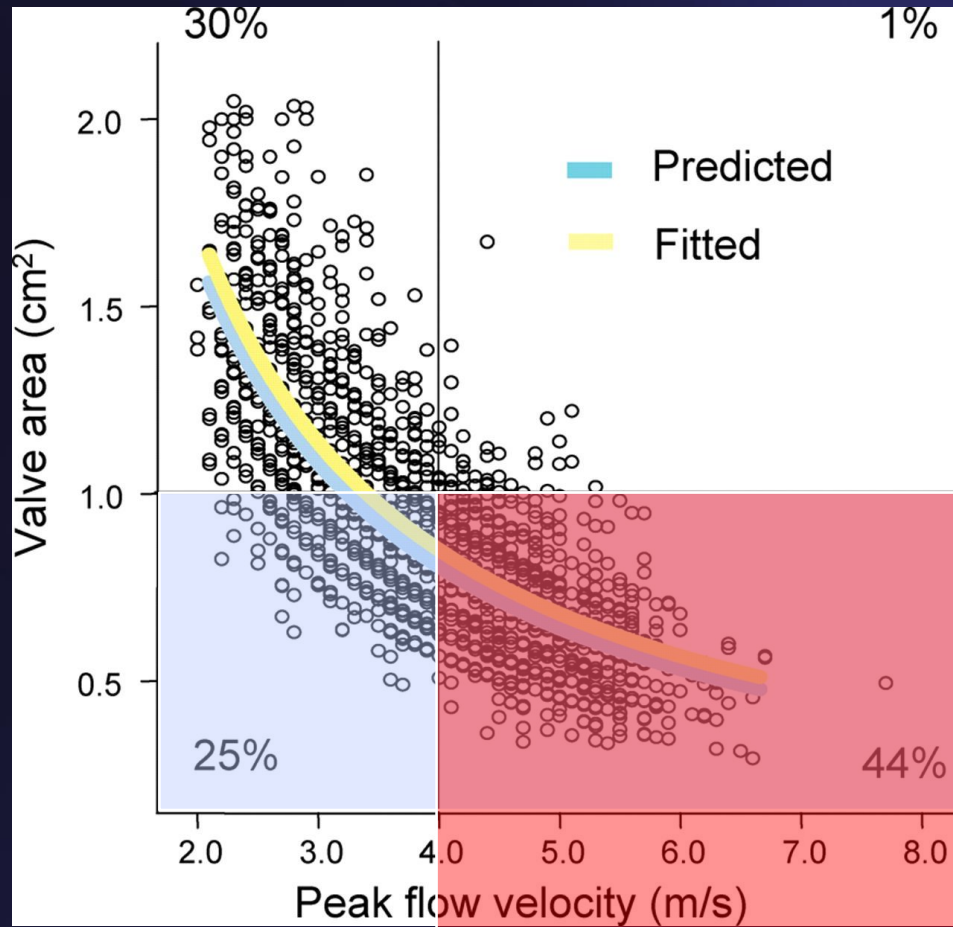
Surgery in Severe Aortic Stenosis

Evolution of the Guidelines

		ACC/AHA 1998	ESC 2002	ACC/AHA 2006	ESC 2007	ACC/AHA 2008	ESC/EACTS 2012	ACC/AHA 2014	ESC/EACTS 2017
Asymptomatic / SAVR	Symptoms	I	I	I	I	I	I	I	I
	Symptoms during exercise testing		IIa	IIb	I	IIb	I	I	I
	LVEF < 50%	IIa	IIa	I	I	I	I	I	I
	Undergoing other cardiac surgery	I	I	I	I	I	I	I	I
	Very severe AS (ESC 5.5 m/s, ACC 5.0 m/s)			IIb		IIb	IIa	IIa	IIa
	Exercise test: Blood pressure drop	IIa	IIa	IIb	IIa	IIb	IIa	IIa	IIa
	Calcified valve + rapid progression (≥ 0.3 m/s/yr)		IIa	IIb	IIa	IIb	IIa	IIb	IIa
	Elevated BNP (3x age/gender corrected)						IIb		IIa
	Severe pulmonary hypertension (sPAP > 60mmHg)								IIa
	Exercise echo: $\nearrow$ mGrad ≥ 20 mmHg						IIb		
	Excessive LVH – no hypertension	IIb	IIb				IIb		
	Ventricular Arrhythmias	IIb	IIb						

Natural History

Velocity vs. Valve Area



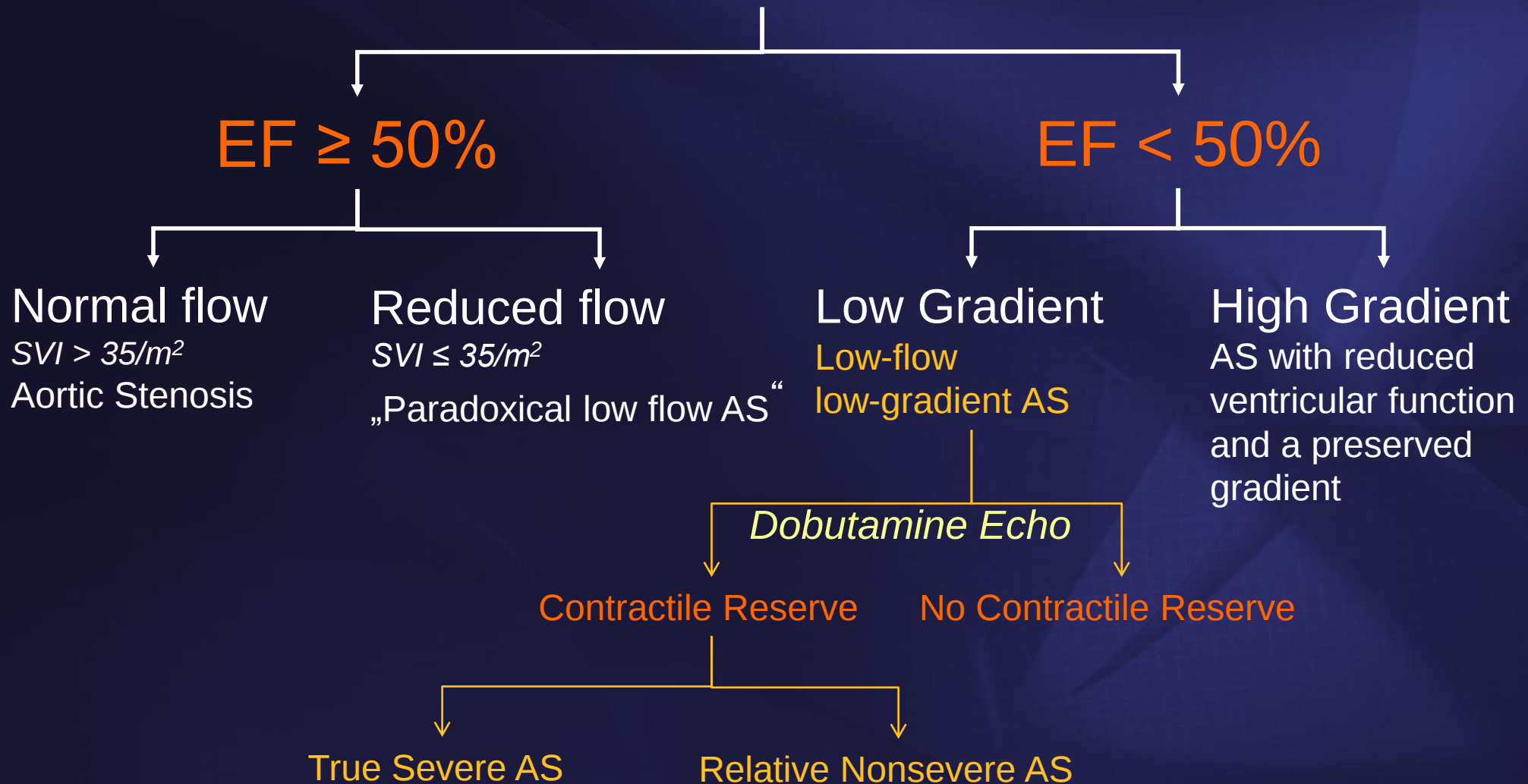
AVA < 1 cm²
Sensitive

AV-Vel ≥ 4.0 m/s
Specific

Minners, J. et al.
Eur Heart J 2008 29:1043-1048

Aortic Stenosis

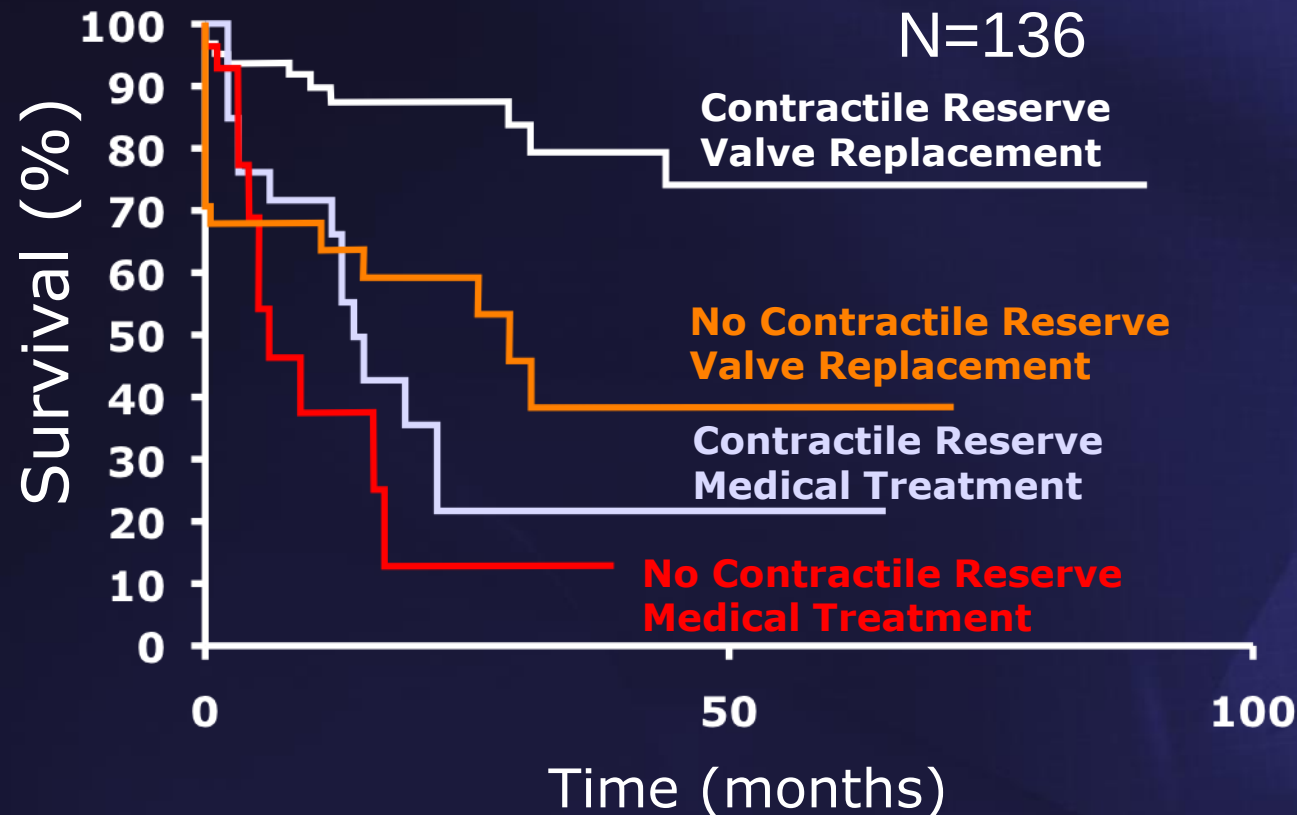
$$AVA \leq 1.0 \text{ cm}^2$$



Low Flow Low Gradient AS

Contractile Reserve

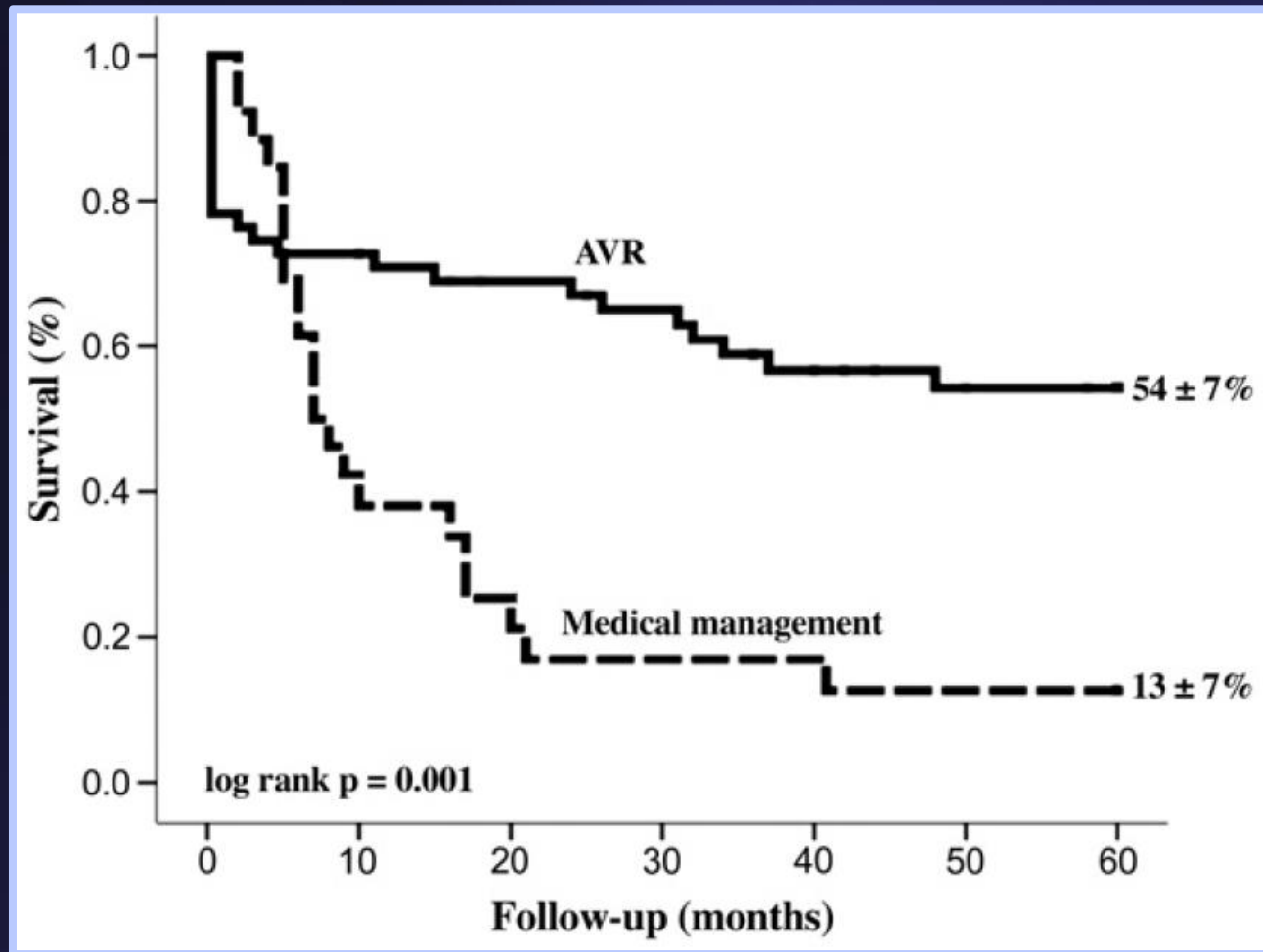
Contractile Reserve (n=92) - Stroke Volume Increase $\geq 20\%$
No Contractile Reserve (n=44)



Only 7 of 136 pts.
fulfilled the criteria for
relative (nonsevere) AS

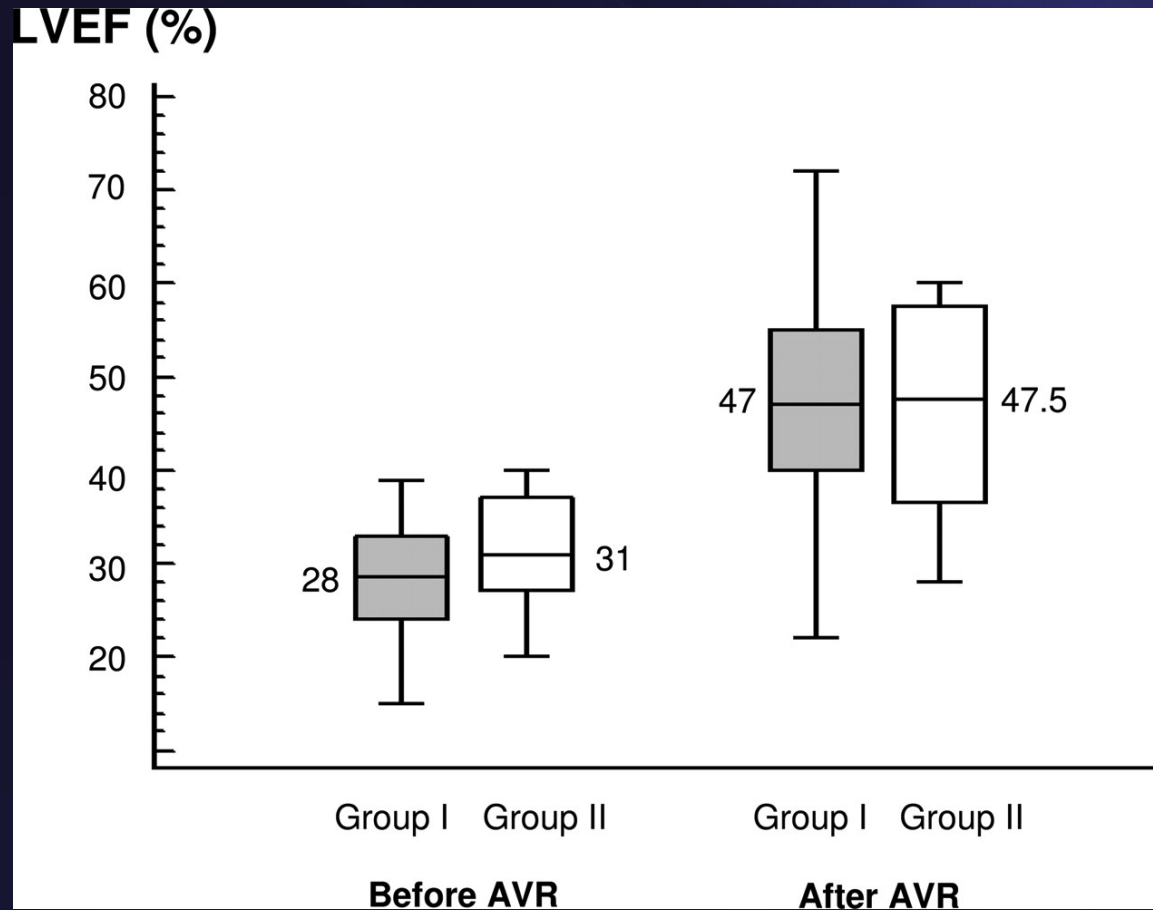
LFLG AS: Outcome after AVR

Absence of Contractile Reserve



Change in LVEF after AVR

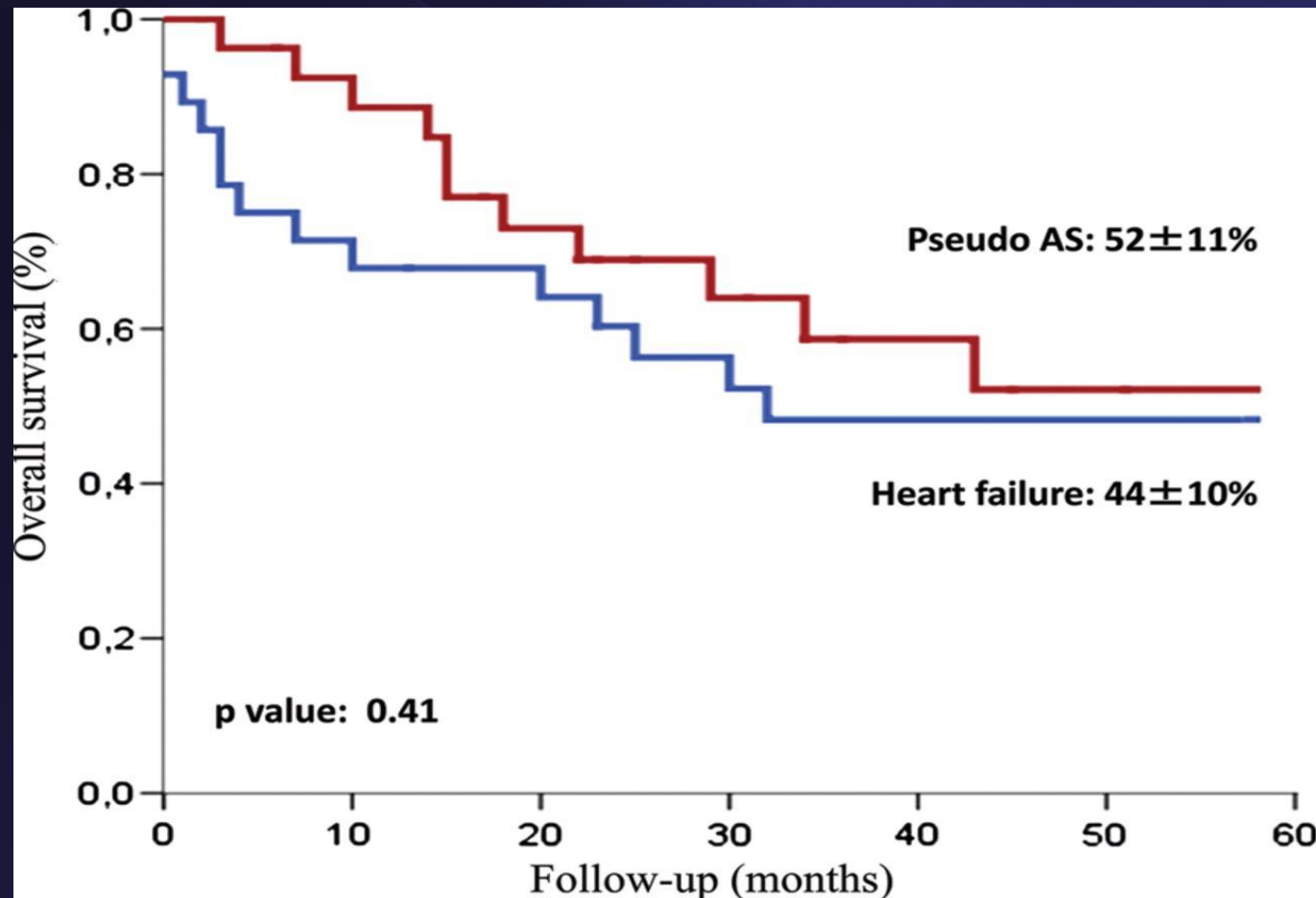
Effect of Contractile Reserve



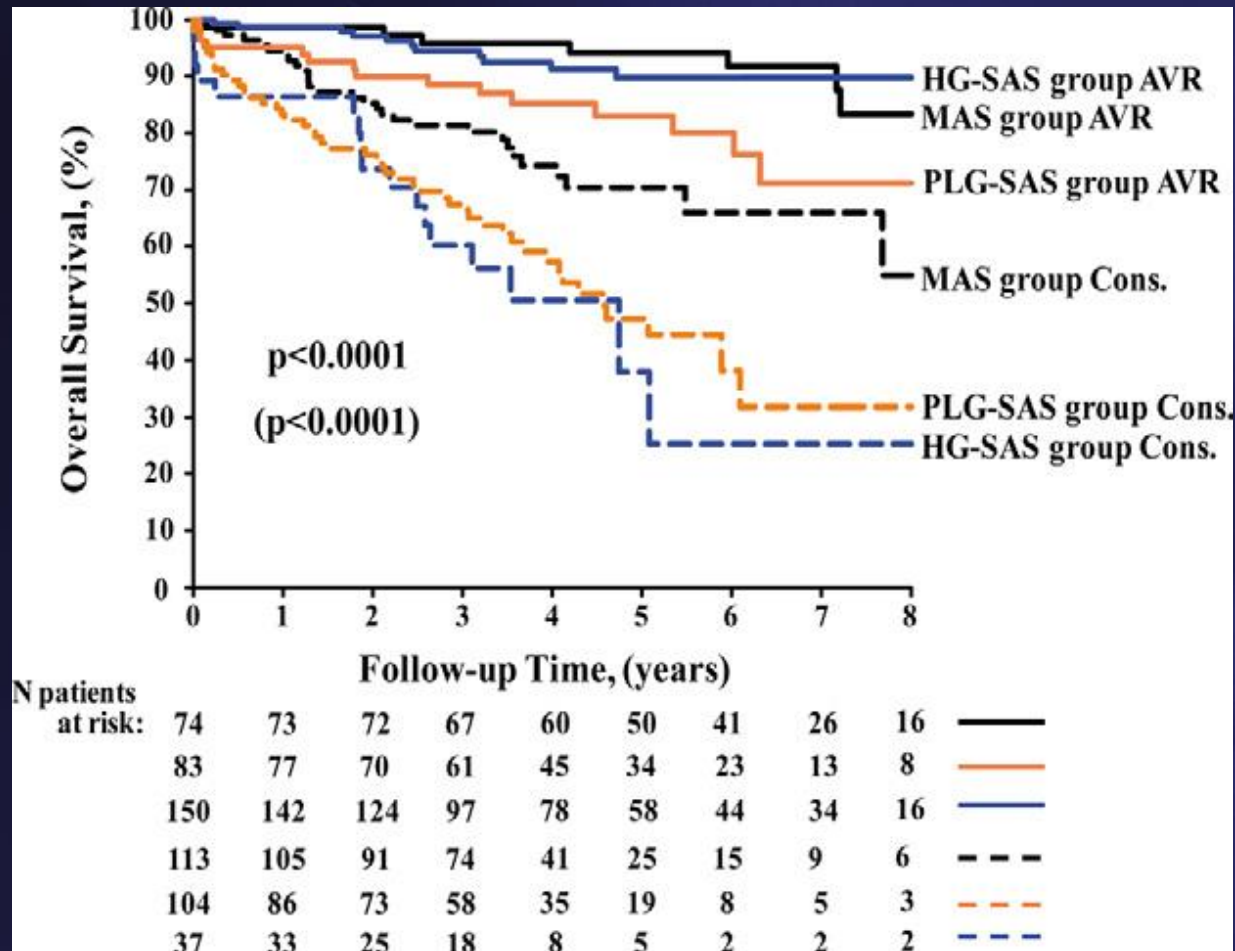
Group I (n=38)
contractile reserve
Group II (n=13)
no contractile reserve

Low Flow Low Gradient AS (Pseudosevere)

Conservative Management

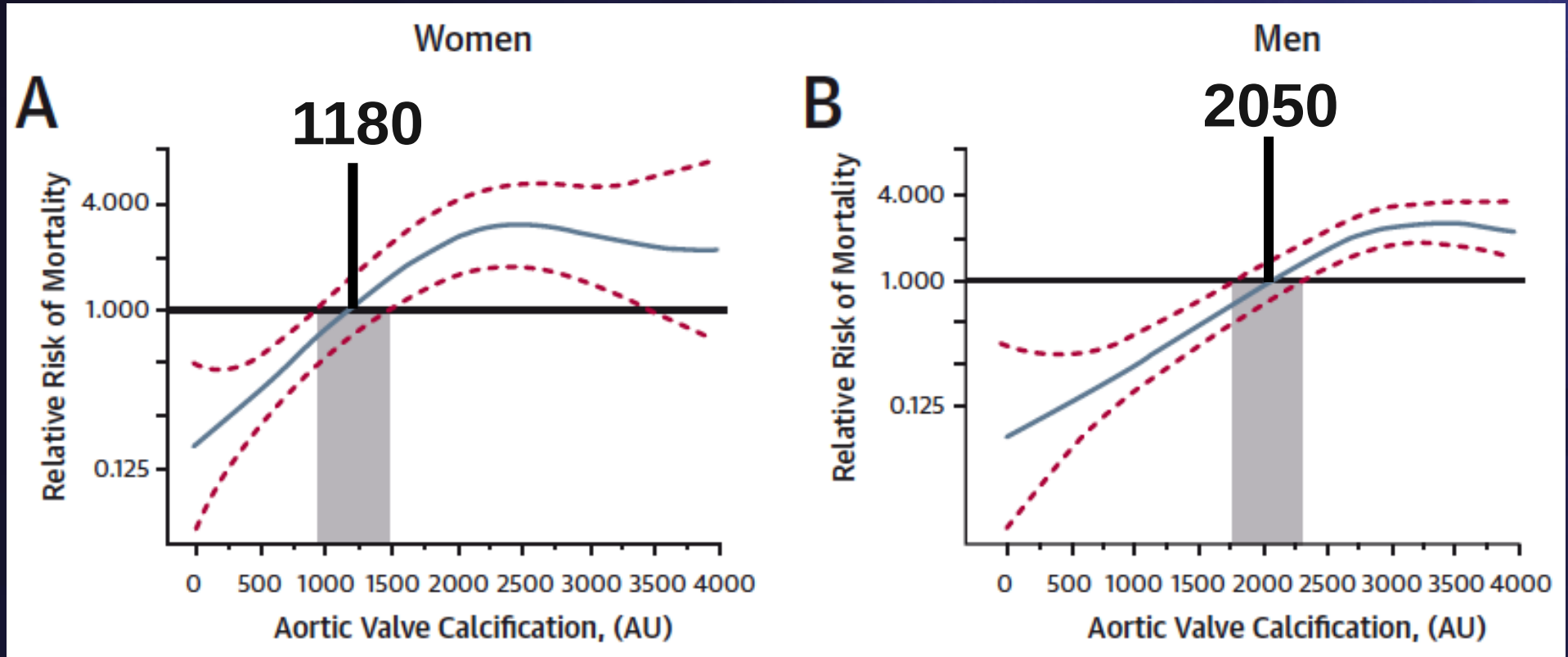


Paradoxical LFLG Aortic Stenosis Outcome



Aortic Stenosis and Calcification

Impact on Survival



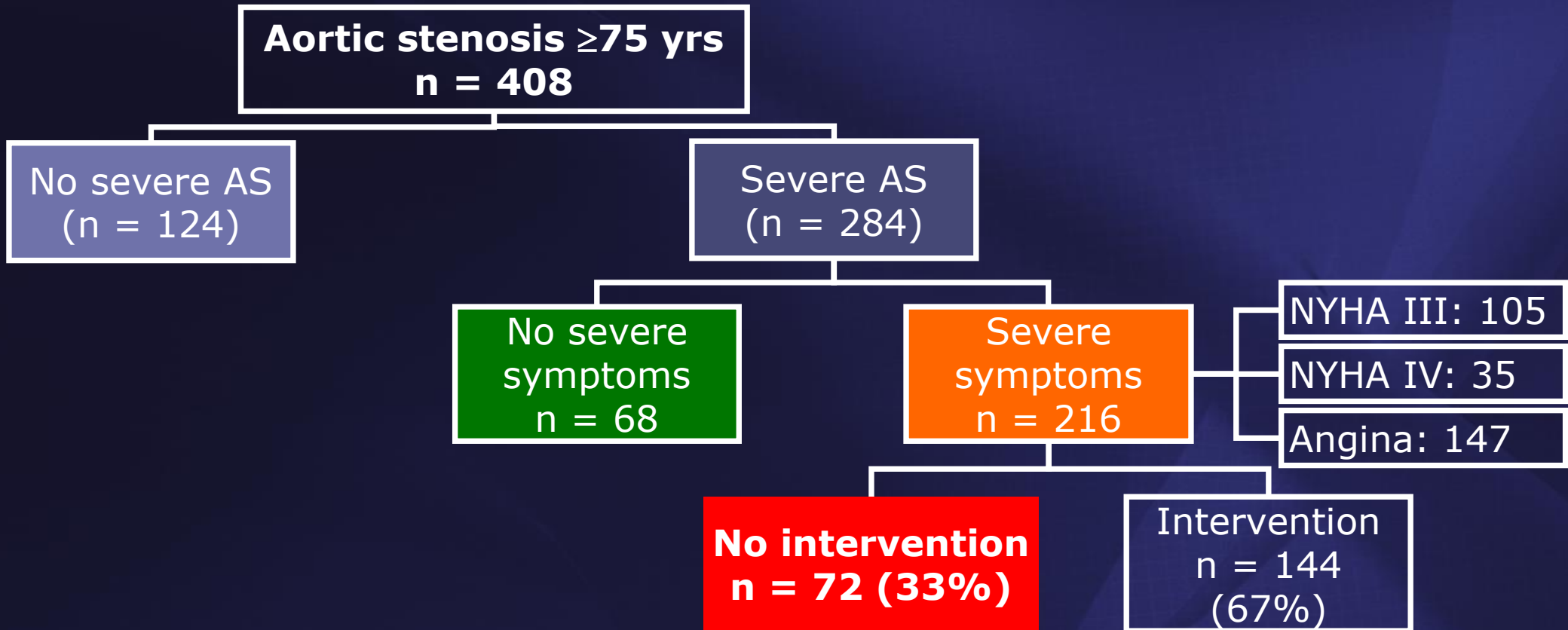
ESC/EACTS Valve Guidelines 2017

Indications for Intervention in Low Gradient AS

Recommendation	Class	Level
Intervention is indicated in symptomatic patients with severe low-flow, low-gradient (<40 mmHg) aortic stenosis with reduced ejection fraction and evidence of flow (contractile) reserve excluding pseudosevere aortic stenosis.	I	C
Intervention should be considered in symptomatic patients with low-flow, low-gradient aortic stenosis and reduced ejection fraction without flow (contractile) reserve, particularly when CT calcium scoring confirms severe aortic stenosis.	IIa	C
Intervention should be considered in symptomatic patients with low-flow, low-gradient (<40 mmHg) aortic stenosis with normal ejection fraction after careful confirmation of severe aortic stenosis	IIa	C

Aortic Stenosis

Undertreatment EU



Iung, B et al. Eur Heart J 2005;26:2714-20

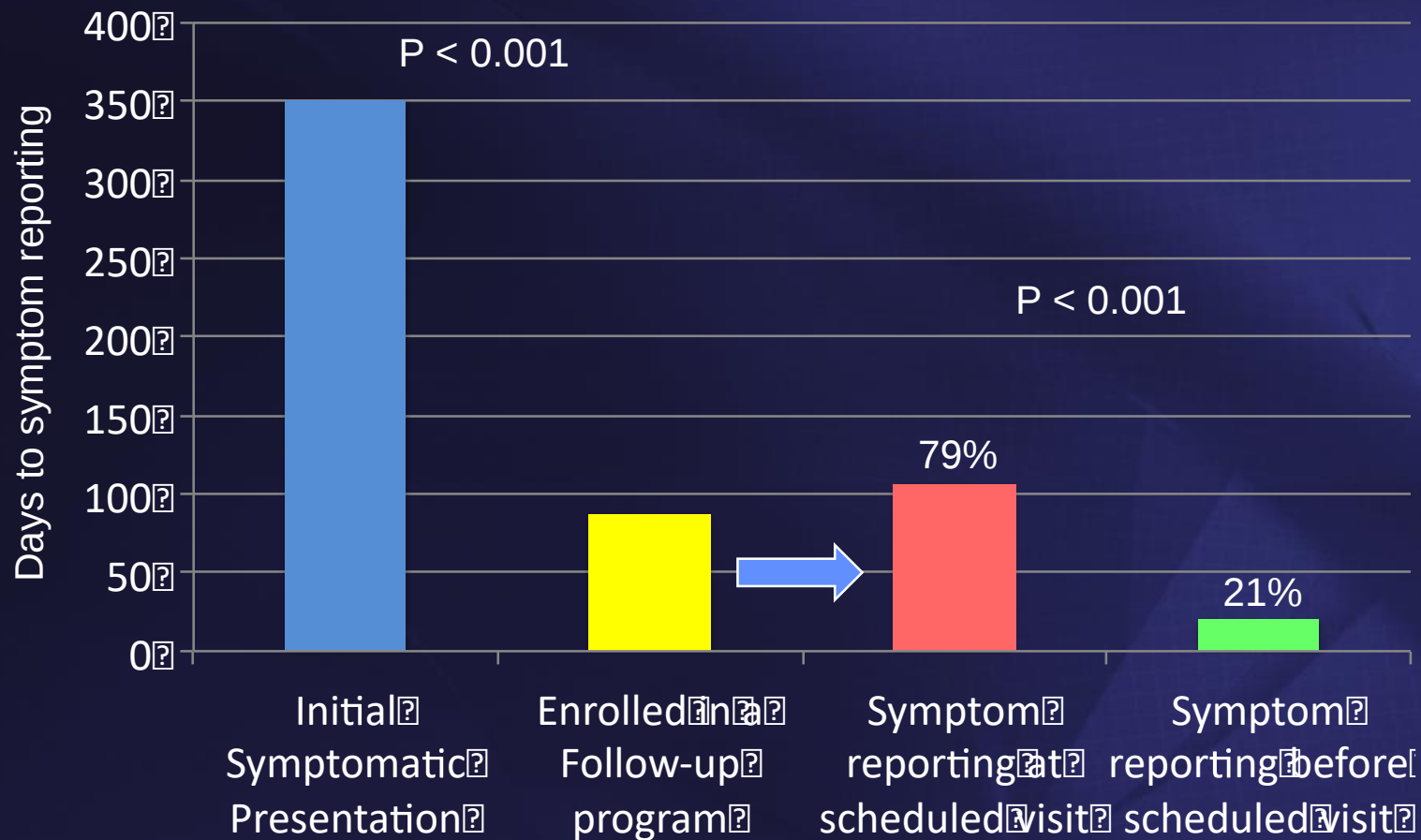
Severe Aortic Stenosis

Risk of Delay in Referral and Symptom Reporting

- 422 patients undergoing aortic valve replacement
- 48% were in NYHA class III and IV
- Mean time from referral to AVR was 112 days

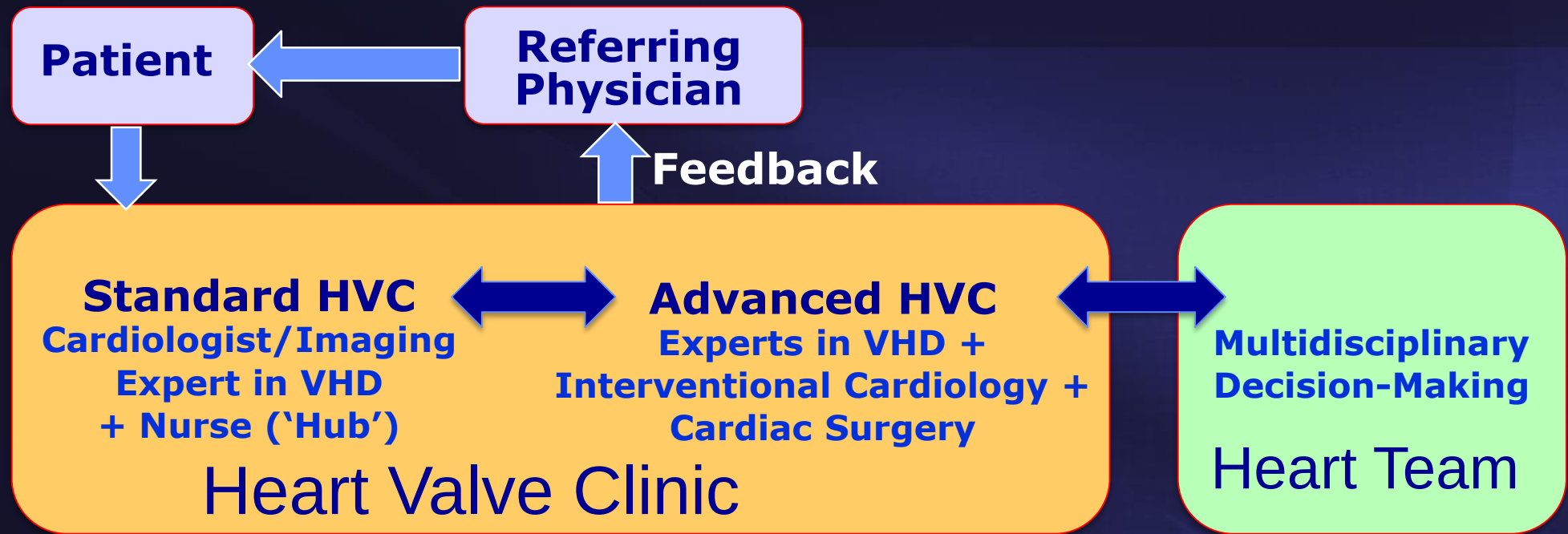
Symptom Reporting in Aortic Stenosis

Valve Clinic Impact – Vienna Experience



Zilberszac R et al. Eur Heart J Cardiovasc Imaging 2017;18:138-144.

Heart Valve Clinic Concept



Optimized Management

- Workup for Intervention
- Patient Education
- Setting for Follow-up
- Increased Referral

Education

- Expertise
- Translation of knowledge
- Training of physicians

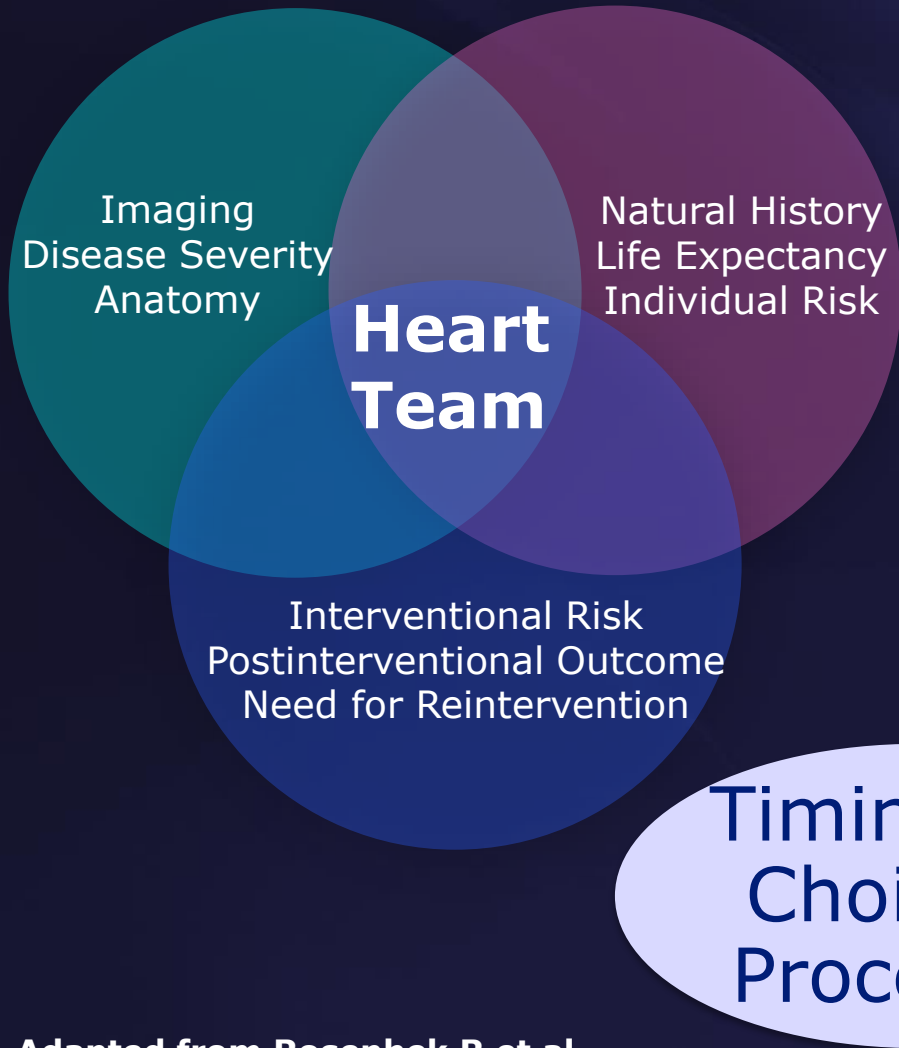
Research

- Local Databases
- Scientific Cooperation
- Translational Research

High-Quality Care in Valve Disease

Integrative Approach

Concept of Valve Centers



- **Multidisciplinary Teams**
 - **Volume**
 - **Quality Assessment (robust audit)**
 - **Excellence in**
 - Imaging**
 - Intervention**
 - Surgery**
- Heart Valve Clinic**

