



ACC Latin America
Conference 2016



Valvular Guidelines: The Past, the Present, the Future

Robert O. Bonow, MD, MS

Northwestern University Feinberg School of Medicine
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Northwestern Memorial Hospital
Editor-in-Chief, JAMA Cardiology

No Relationships to Disclose



PRACTICE GUIDELINE

2008 Focused Update Incorporated Into the ACC/AHA 2006 Guidelines for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines
(Writing Committee to Revise the 1998 Guidelines for the Management of Patients With Valvular Heart Disease)

*Endorsed by the Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and
Interventions, and Society of Thoracic Surgeons*

**2006 Writing
Committee
Members**

Robert O. Bonow, MD, MACC, FAHA, *Chair*

Blase A. Carabello, MD, FACC, FAHA
Kanu Chatterjee, MB, FACC
Antonio C. de Leon, Jr, MD, FACC, FAHA
David P. Faxon, MD, FACC, FAHA
Michael D. Freed, MD, FACC, FAHA
William H. Gaasch, MD, FACC, FAHA
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Bruce W. Lytle, MD, FACC



European Heart Journal
doi:10.1093/eurheartj/ehs109

ESC/EACTS GUIDELINES



Guidelines on the management of valvular heart disease (version 2012)

Authors/Task Force Members: Alec Vahanian (Chairperson) (France)*, Ottavio Alfieri (Chairperson)* (Italy), Felicita Andreotti (Italy), Manuel J. Antunes (Portugal), Gonzalo Barón-Esquivias (Spain), Helmut Baumgartner (Germany), Michael Andrew Borger (Germany), Thierry P. Carrel (Switzerland), Michele De Bonis (Italy), Arturo Evangelista (Spain), Volkmar Falk (Switzerland), Bernard Iung (France), Patrizio Lancellotti (Belgium), Luc Pierard (Belgium), Susanna Price (UK), Gerhard Schuler (Germany), Janina Stepinska (Poland), Johanna Takkenberg (The Netherlands), Stephan Windecker (Switzerland), Jose Luis Zamorano (Spain)

**The evidence base is limited
by an inadequate number of
randomized clinical trials**

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Hence, virtually all of the
recommendations are based
on expert consensus (**Level C**)

PRACTICE GUIDELINE

2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

Writing Committee Members*

Rick A. Nishimura, MD, MACC, FAHA,
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*Writing committee members are required to recuse themselves from voting on sections to which their specific relationships with industry and other entities may apply; see [Appendix 1](#) for recusal information. [†]ACC/AHA representative. [‡]ACC/AHA Task Force on Performance Measures liaison. [§]ACC/AHA Task Force on Practice Guidelines liaison. [¶]Society of Cardiovascular Anesthesiologists representative. [#]Society for Cardiovascular Angiography and Interventions representative. ^{**}American Association for Thoracic Surgery representative. ^{††}Society of Thoracic Surgeons representative. ^{‡‡}American Society of Echocardiography representative.

ESC/EACTS GUIDELINES



Management of valvular heart

Chairperson (France)*, Ottavio Alfieri (Chairperson) (Italy), General Andolfi (Italy), Manuel J. Antunes (Portugal), Gonzalo Barón-Esquivias (Spain), Helmut Baumgartner (Germany), Michael Andrew Borger (Germany), Thierry P. Carrel (Switzerland), Michele De Bonis (Italy), Arturo Evangelista (Spain), Volkmar Falk (Switzerland), Bernard Iung (France), Patrizio Lancellotti (Belgium), Luc Pierard (Belgium), Susanna Price (UK), Hans-Joachim Schäfers (Germany), Gerhard Schuler (Germany), Janina Stepinska (Poland), Karl Swedberg (Sweden), Johanna Takkenberg (The Netherlands), Ulrich Otto Von Oppell (UK), Stephan Windecker (Switzerland), Jose Luis Zamorano (Spain), Marian Zembala (Poland)

Stages of Valvular Heart Disease



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Stage	Definition
A	Risk of valve disease (BAV, MVP, RF, CHF)
B	Mild - moderate asymptomatic disease
C	Severe valve disease but asymptomatic C1: Normal LV function C2: Depressed LV function
D	Severe, symptomatic valve disease

Mitral regurgitation

Degenerative MR: primary valve disease

Functional MR: primary myocardial disease

Mitral regurgitation



Degenerative MR: primary valve disease

Functional MR: primary myocardial disease

Mitral regurgitation



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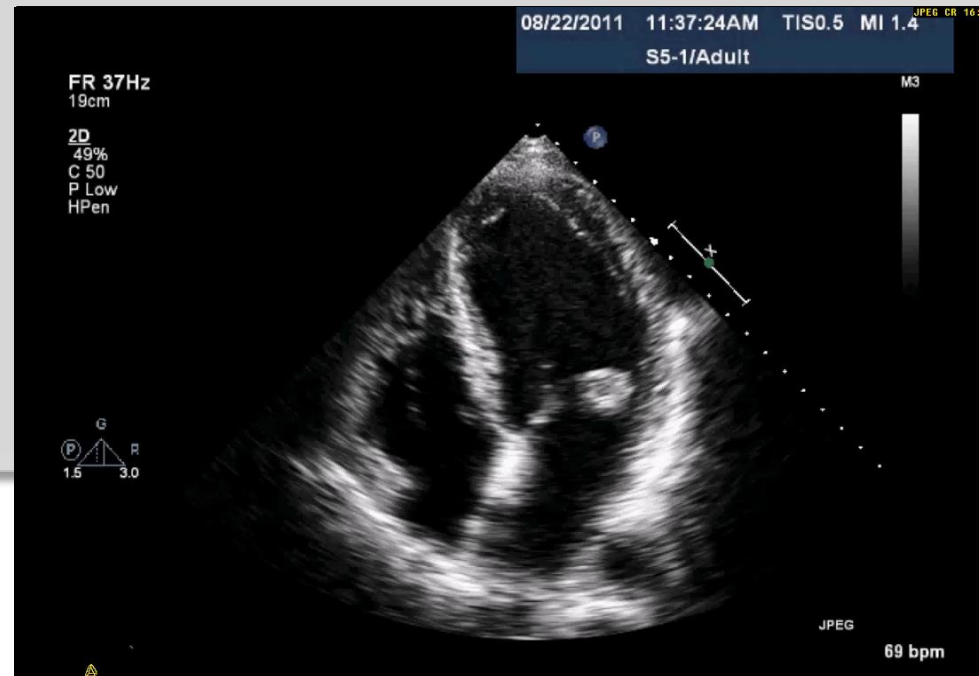
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Indications for mitral valve surgery for degenerative MR?



Mitral regurgitation



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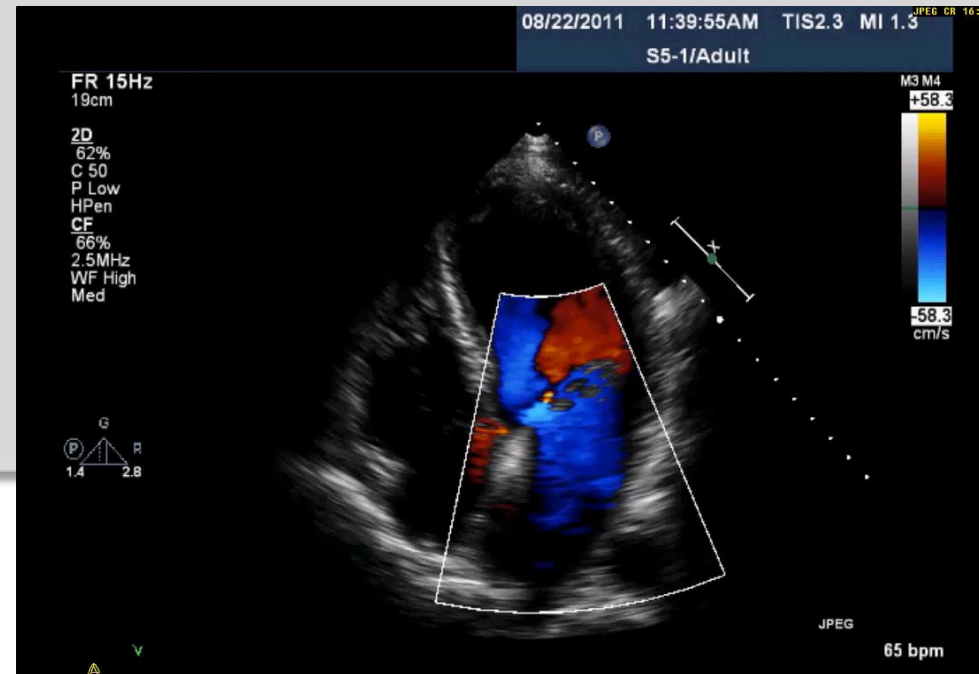
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Indications for mitral valve surgery for degenerative MR?



Mitral regurgitation



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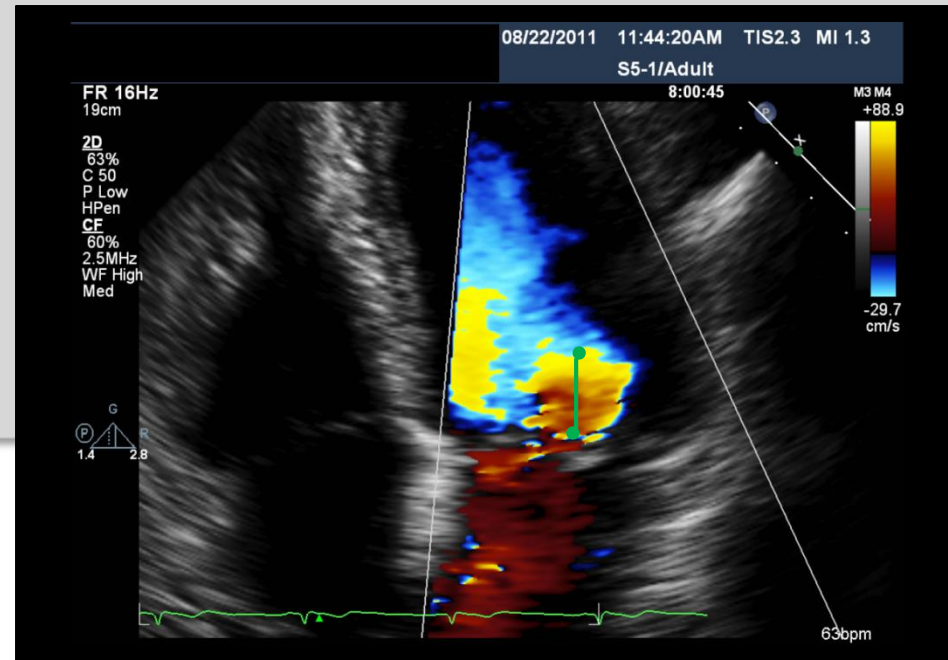
MR Severity:

RV = 68 ml

RF = 60%

ERO = 0.48 cm²

Indications for mitral valve surgery for degenerative MR?



Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

MR Severity:

RV = 68 ml

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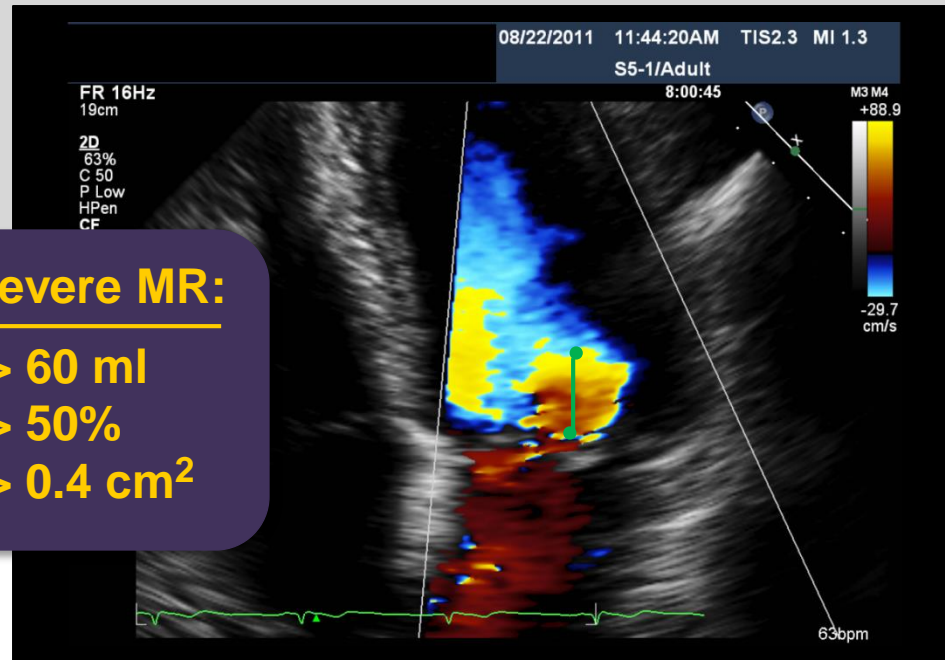
ERO = 0.48 cm²

Severe MR:

> 60 ml

> 50%

> 0.4 cm²



Mitral regurgitation



Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients

class I

Mitral regurgitation



Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction

class I

class I

Mitral regurgitation



Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction

class I

class I

LVEF <60%

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction

class I

class I

LVEF <60%
LVSD >40mm

Mitral regurgitation



Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension

class I

class I

class IIa

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension

class I

class I

class IIa

PASP >50 mmHg at rest

Mitral regurgitation



Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension
 - Atrial fibrillation

class I

class I

class IIa

class IIa

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension
 - Atrial fibrillation
 - *Normal LV function, repair feasible?*

class I

class I

class IIa

class IIa

?

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension
 - Atrial fibrillation
 - *Normal LV function, repair feasible?*

class I

class I

class IIa

class IIa

?

MV repair to improve survival?

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension
 - Atrial fibrillation
 - *Normal LV function, repair feasible?*

class I

class I

class IIa

class IIa

?

*MV repair to improve survival?
What is the natural history?*

Mitral regurgitation



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Indications for mitral valve surgery for degenerative MR?

- Symptomatic patients
- Asymptomatic patients
 - LV systolic dysfunction
 - Pulmonary hypertension
 - Atrial fibrillation
 - *Normal LV function, repair*

class I

class I

class IIa

class IIa

Asymptomatic severe degenerative MR:

- 66% come to surgery in 5 years because of symptoms, LV dysfunction, pulmonary hypertension or AF
- Long-term postoperative survival is worse if surgery is performed after patients become symptomatic

Surgery for Acquired Cardiovascular Disease

Late outcomes of mitral valve repair for floppy valves: Implications for asymptomatic patients

Tirone E. David, MD
Joan Ivanov, PhD
Susan Armstrong, MSc
Harry Rakowski, MD

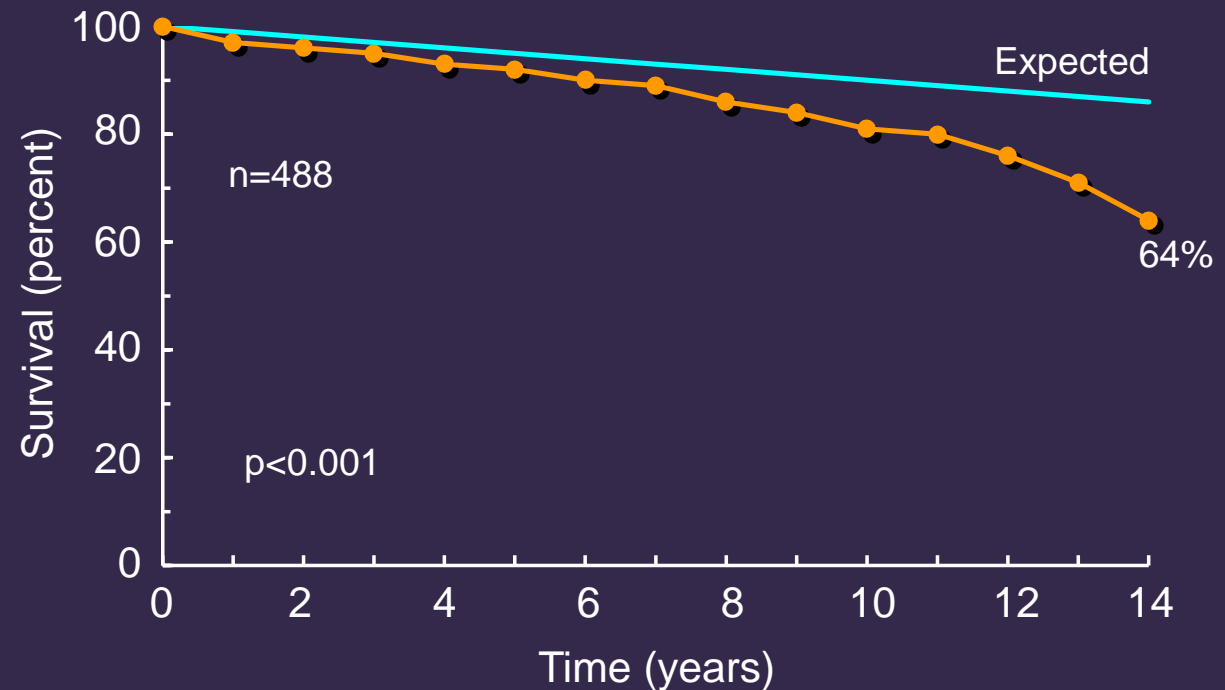
J Thorac Cardiovasc Surg 2003;125:1143-1152

Surgery for Acquired Cardiovascular Disease

Late outcome Implications

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Harry Rakowski, MD

Mitral Regurgitation Survival After Mitral Valve Surgery

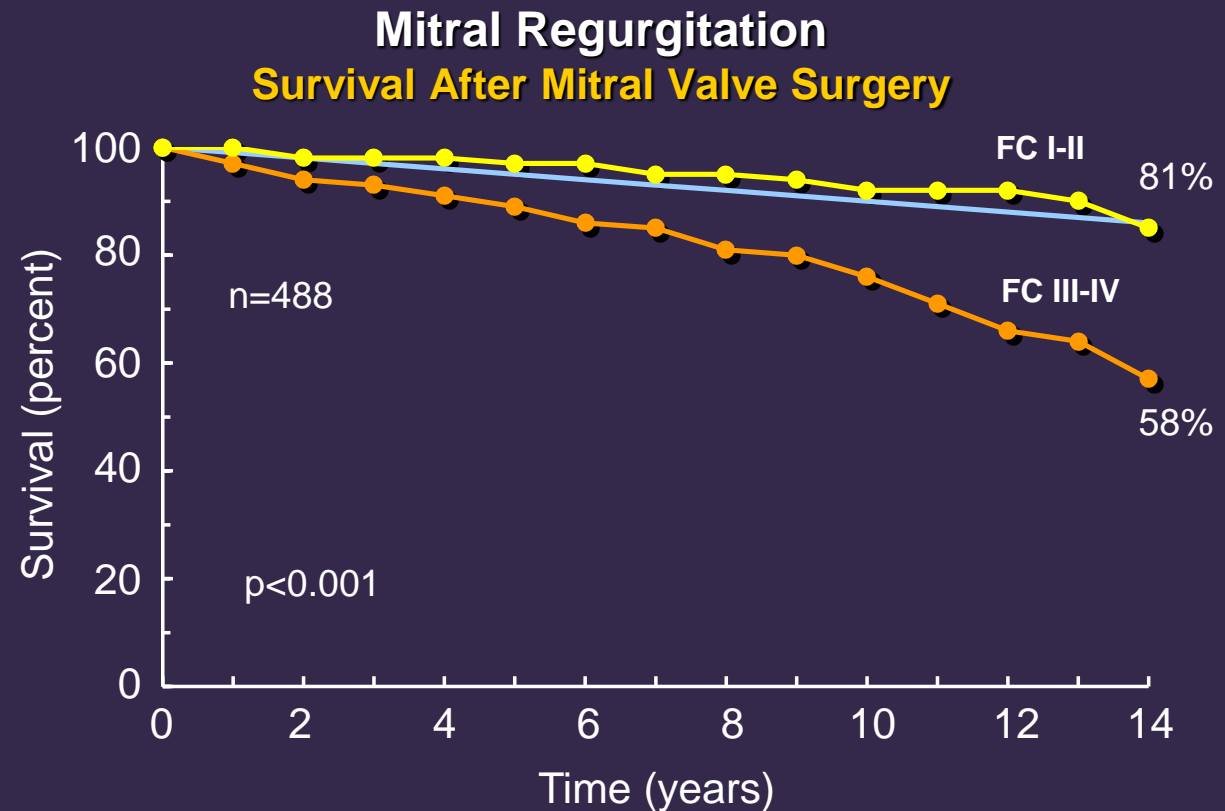


David et al, *J Thorac Cardiovasc Surg* 2003;126:1143-1152

Surgery for Acquired Cardiovascular Disease

Late outcome Implications

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David et al, *J Thorac Cardiovasc Surg* 2003;126:1143-1152

Mitral regurgitation

Indications for MV repair for asymptomatic degenerative MR:



- Chronic severe MR
- Preserved LV function
- Experienced surgical center
- Likelihood of durable repair without residual MR > 95%

class IIa

Mitral regurgitation

Indications for MV repair for asymptomatic degenerative MR:



- Chronic severe MR
- Preserved LV function
- Experienced surgical center
- Likelihood of durable repair without residual MR > 95%

class IIa



- Preserved LV function
 - Likelihood of durable repair and low risk for surgery, **and**
 - LA dilatation >60 ml/m2
- **or** --
- Exercise PAP >60 mmHg

class IIb

Mitral regurgitation

Indications for MV repair for asymptomatic degenerative MR:



- Chronic severe MR
- Preserved LV function
- Experienced surgical center
- Likelihood of durable repair without residual MR > 95%.

class IIa

- Repair better than mitral valve replacement
- Patients should be referred to centers experienced in repair

class I

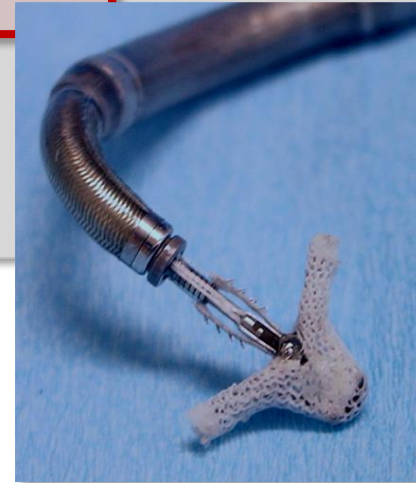
Mitral regurgitation

Indications for transcatheter MV repair for severe degenerative MR:



- Chronic severe MR
- Severely symptomatic
- Prohibited surgical risk
- Reasonable life expectancy

class IIb

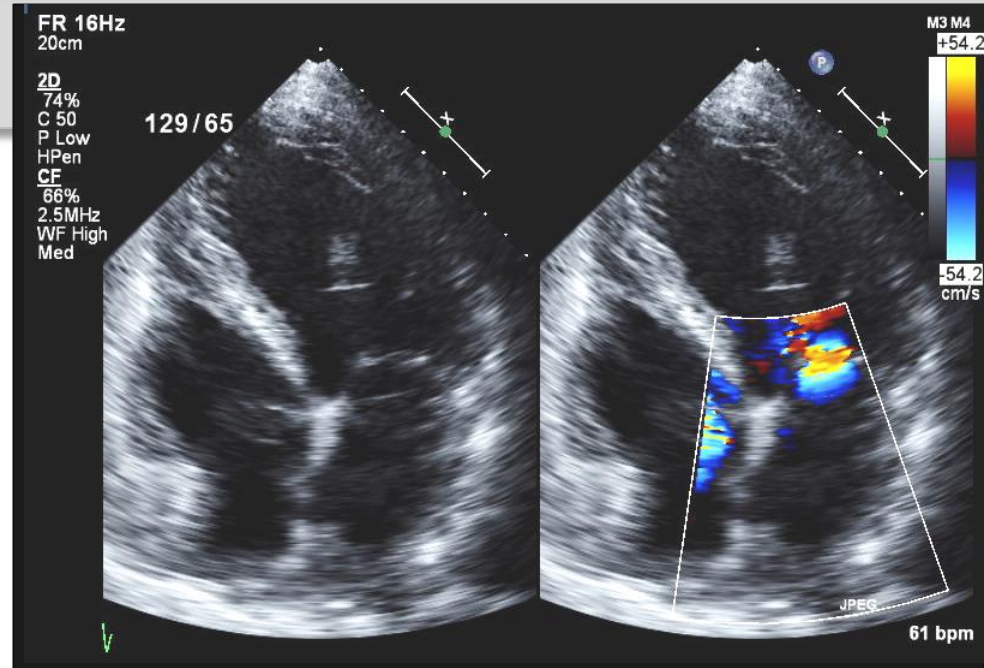


Mitral regurgitation

Primary MR: primary valve disease



Secondary MR: primary myocardial disease



Mitral regurgitation

Primary MR: primary valve disease



Secondary MR: primary myocardial disease

- **Diagnostic dilemmas**
- **Therapeutic dilemmas**

Imprecision in grading severity of secondary MR

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<http://dx.doi.org/10.1016/j.jacc.2014.10.016>

REVIEW TOPIC OF THE WEEK

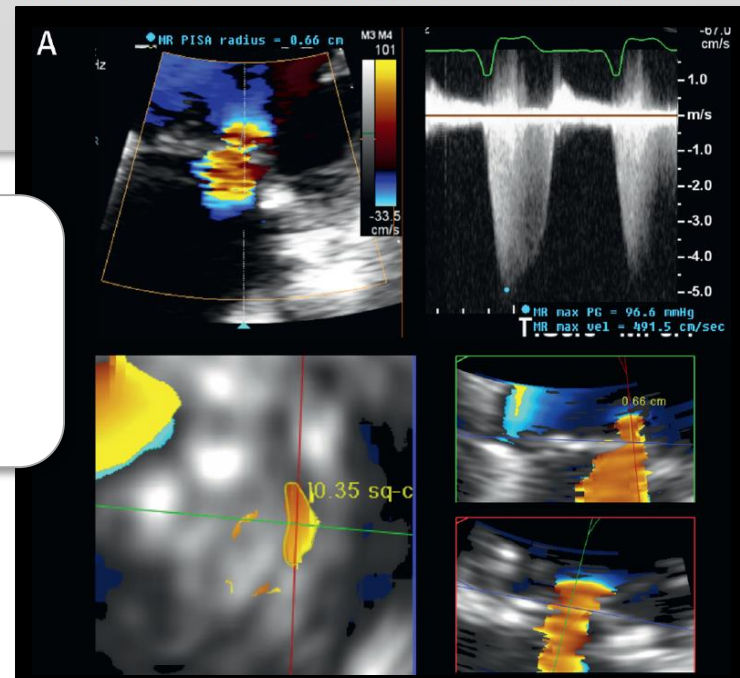
Defining “Severe” Secondary Mitral Regurgitation

Emphasizing an Integrated Approach

Paul A. Grayburn, MD,*† Blasé Carabello, MD,‡ Judy Hung, MD,§ Linda D. Gillam, MD,|| David Liang, MD,¶
Michael J. Mack, MD,# Patrick M. McCarthy, MD,** D. Craig Miller, MD,†† Alfredo Trento, MD,‡‡ Robert J. Siegel, MD,‡‡

J Am Coll Cardiol 2014;54:2792-2801

What is “severe” secondary MR?

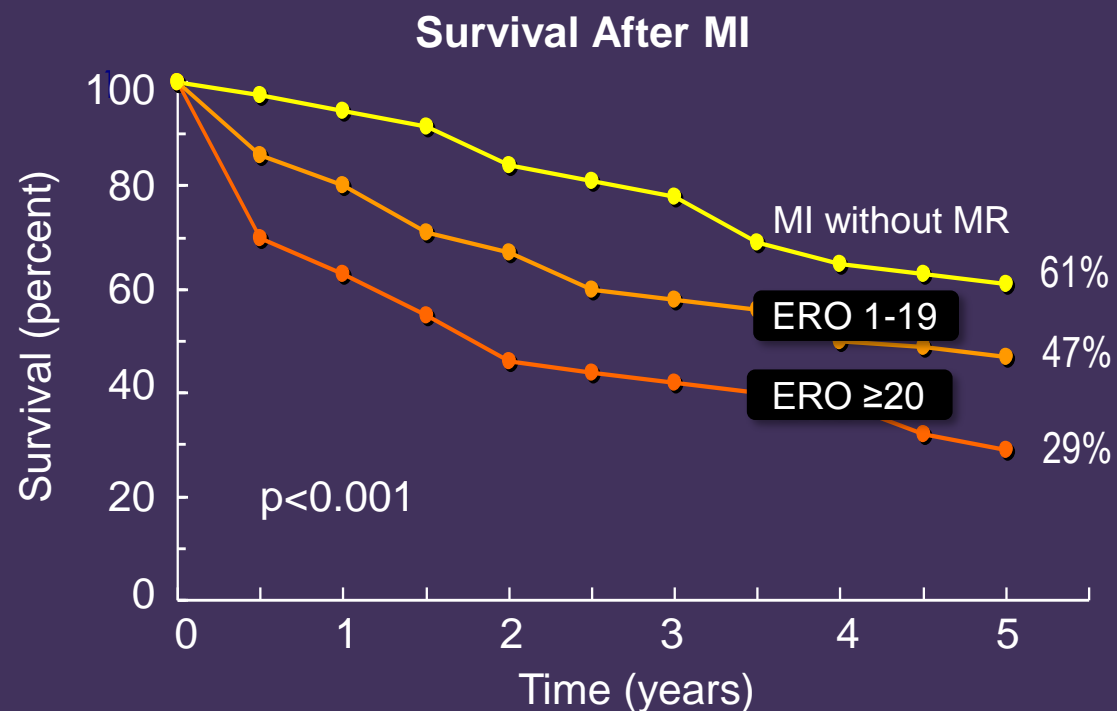


Ischemic Mitral Regurgitation

Long-Term Outcome and Prognostic Implications With Quantitative Doppler Assessment

Francesco Grigioni, MD; Maurice Enriquez-Sarano, MD; Kenton J. Zehr, MD;
Kent R. Bailey, PhD; A. Jamil Tajik, MD

Circulation. 2001;103:1759-1764.



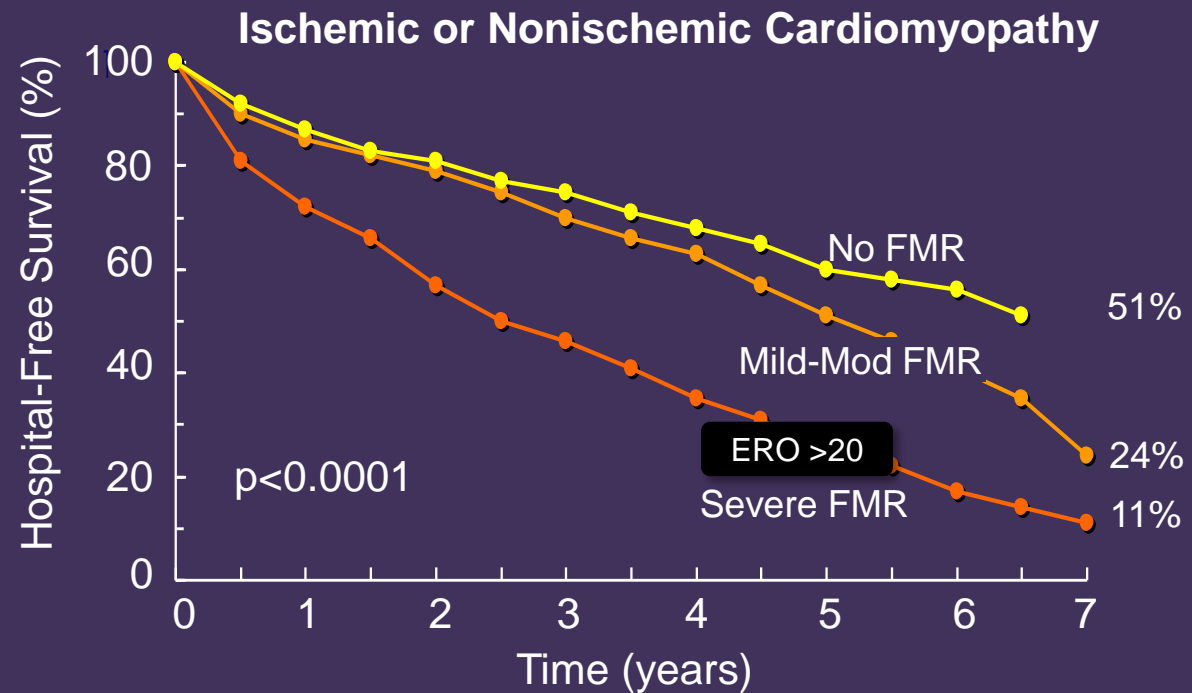
Grigioni et al. *Circulation* 2001;103:1759-1764

ORIGINAL ARTICLE

Independent prognostic value of functional mitral regurgitation in patients with heart failure. A quantitative analysis of 1256 patients with ischaemic and non-ischaemic dilated cardiomyopathy

Andrea Rossi,¹ Frank L Dini,²
Mariantonietta Cicoira,¹ Silvia
Stefano Ghio,⁵ Maurice Enriq

Heart 2011;**97**:1675–1680



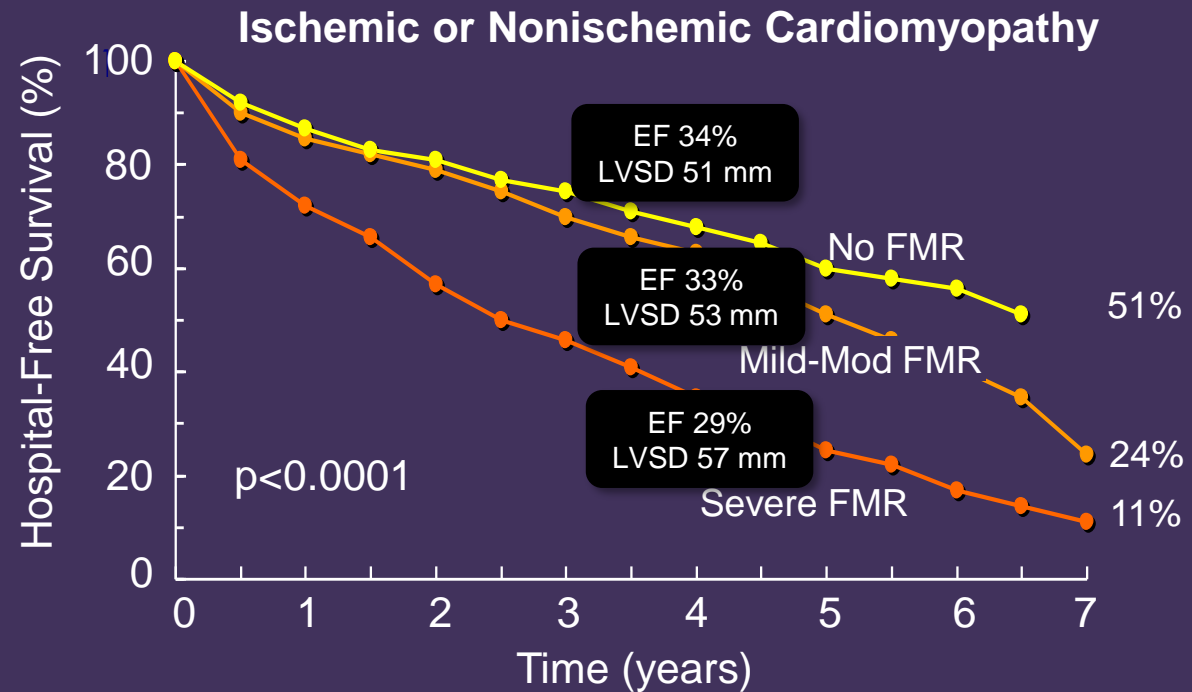
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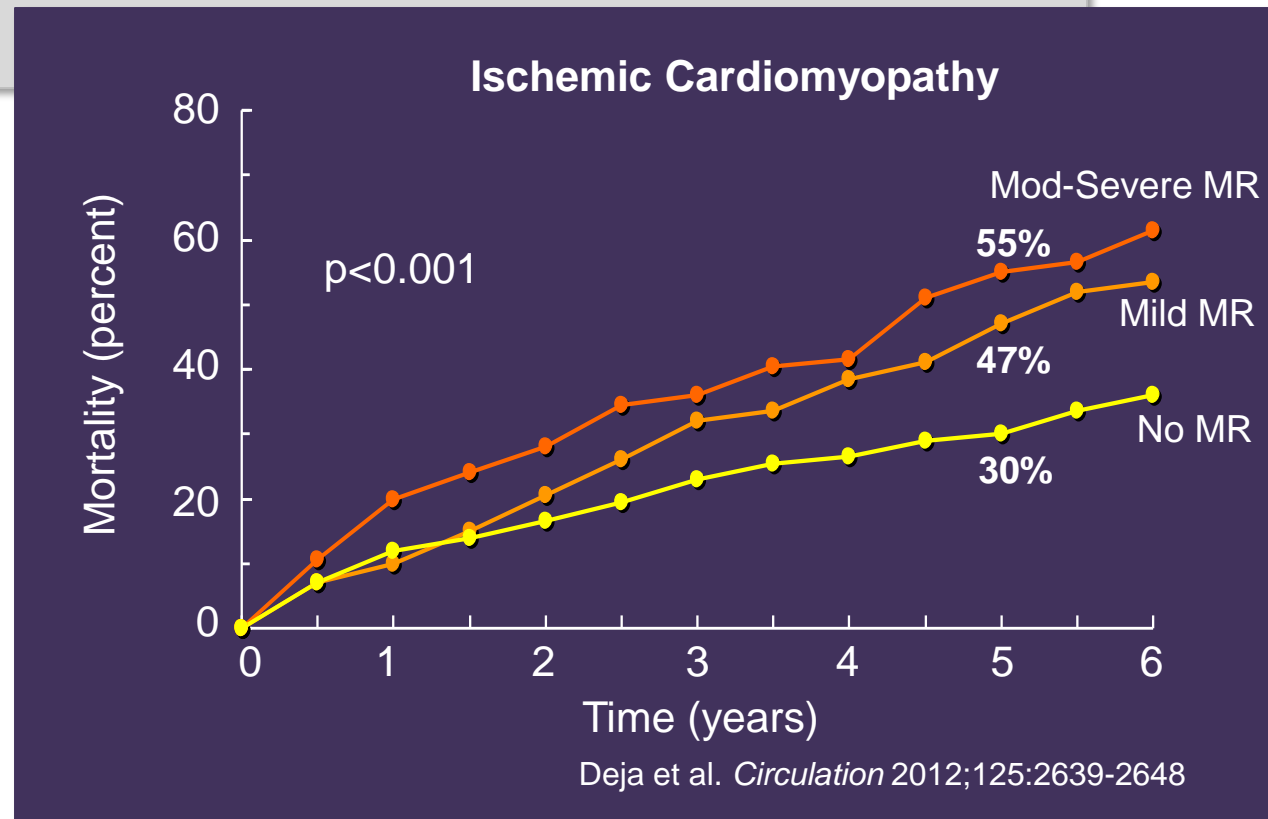
Valvular Heart Disease

Influence of Mitral Regurgitation Repair on Survival in the Surgical Treatment for Ischemic Heart Failure Trial

Marek A. Deja, Paul A. Grayburn, Benjamin Sun, Vivek Rao, Lilin She, Michal Krejca, Anil R. Jain, Yeow Leng Chua, Richard Daly, Michele Senni, Krzysztof Mokrzycki, Lorenzo Menicanti, Jae K. Oh, Robert Michler, Krzysztof Wróbel, Andre Lamy, Eric J. Velazquez, Kerry L. Lee and Robert H. Jones



Circulation. 2012;125:2639-2648



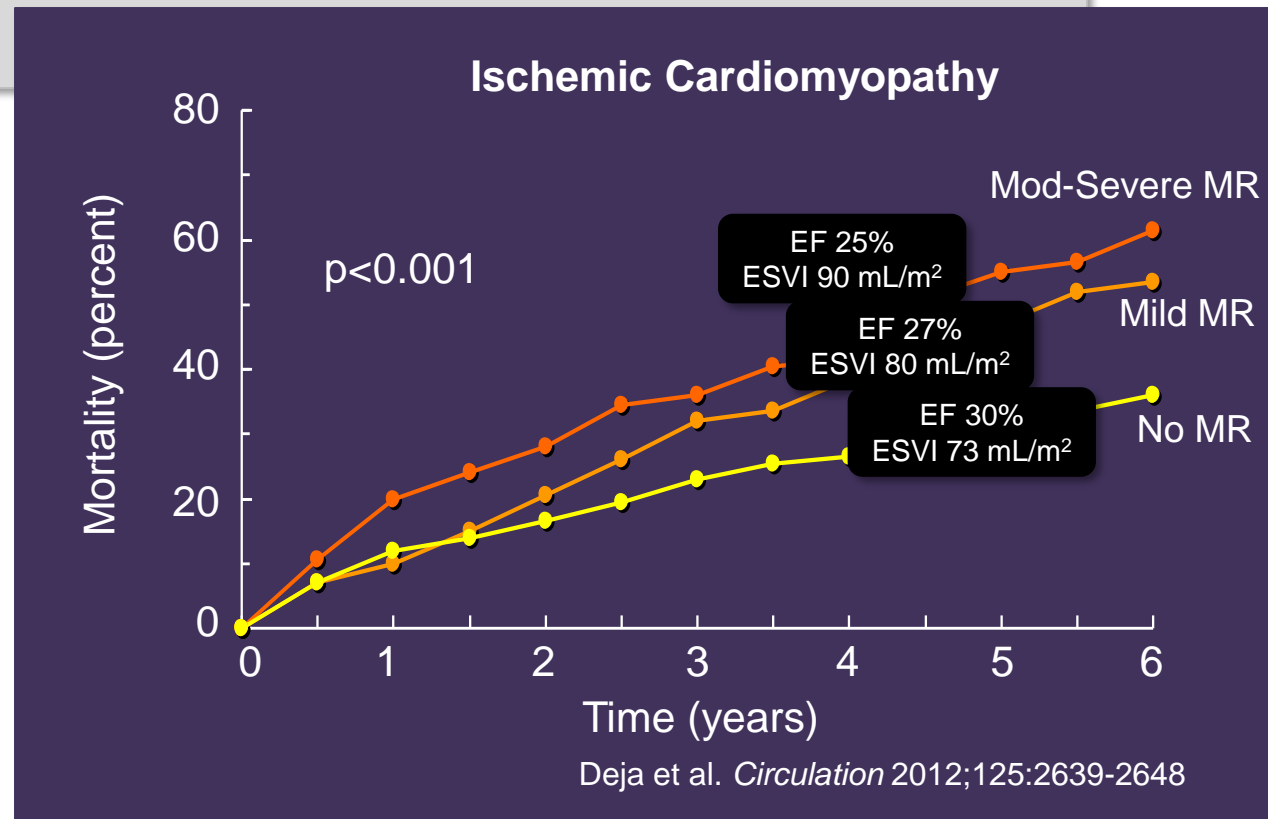
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Circulation. 2012;125:2639-2648



Prevalence of MR in Patients with LV Dysfunction

		N	Prevalence MR
Yiu et al	<i>Circulation</i> 2000	128	63%
Grigioni et al	<i>Circulation</i> 2001	303	64%
Koelling et al	<i>Am Heart J</i> 2002	1436	49% *
Trichon et al	<i>Am J Cardiol</i> 2003	2057	56%
Robbins et al	<i>Am J Cardiol</i> 2003	221	59%
Cleland et al	<i>N Engl J Med</i> 2004	605	50% *
Grayburn et al	<i>J Am Coll Cardiol</i> 2005	336	77%
Bursi et al	<i>Circulation</i> 2005	303	50%
Acker et al	<i>J Thorac CV Surg</i> 2006	300	66%
Di Mauro et al	<i>Ann Thorac Surg</i> 2006	239	75%
Rossi et al	<i>Heart</i> 2011	1300	74%
Deja et al	<i>Circulation</i> 2012	599	63%
Onishi et al	<i>Circ Heart Fail</i> 2013	277	48% *

*Patients with moderate to severe MR

Secondary mitral regurgitation:
...a marker of a sicker LV
- or -
...a contributor to a sicker LV?

Secondary mitral regurgitation:
...a marker of a sicker LV
- or -
...a therapeutic target?

**Therapies that produce beneficial
reverse remodeling also reduce
severity of functional MR**

Secondary mitral regurgitation



**Guideline-directed medical
therapy for heart failure,
including CRT**

class I

Secondary mitral regurgitation



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**Guideline-directed medical
therapy for heart failure,
including CRT**

class I

Indications for mitral valve surgery:

- **Patients with severe MR
undergoing CABG or AVR**

class IIa

Secondary mitral regurgitation



Guideline-directed medical therapy for heart failure, including CRT

class I

Indications for mitral valve surgery:

- **Patients with severe MR undergoing CABG or AVR**
- **Severe MR, persistent symptoms despite optimal medical therapy, including CRT**

class IIa

class IIb

Secondary mitral regurgitation



Guideline-directed medical therapy for heart failure, including CRT

class I

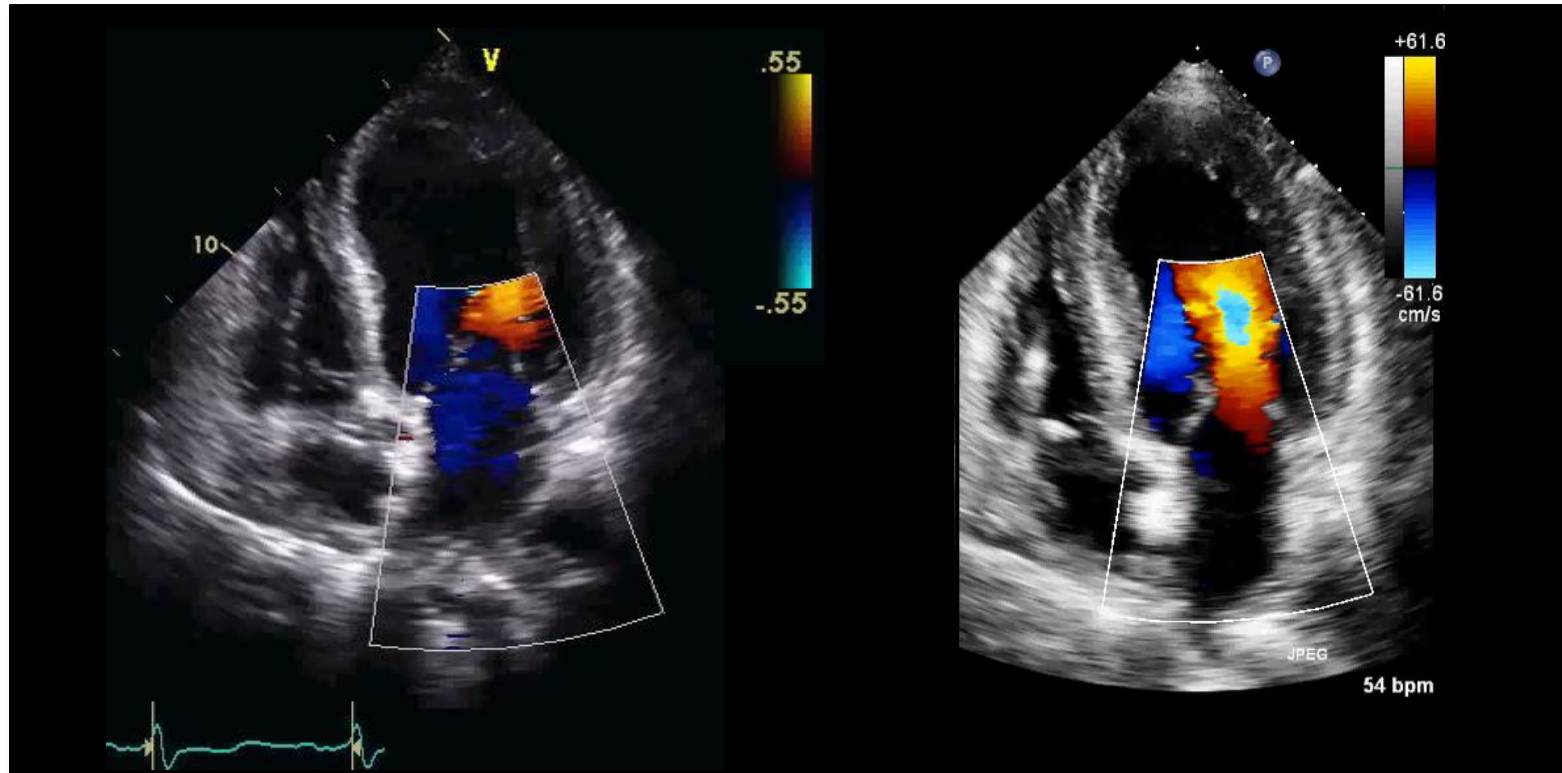
Indications for mitral valve surgery:

- **Patients with severe MR undergoing CABG or AVR**
- **Severe MR, persistent symptoms despite optimal medical therapy, including CRT**
- **Patients with moderate MR undergoing CABG or AVR**

class IIa

class IIb

class IIb



Baseline

**Optimized Medical Therapy
and Biventricular Pacing**

FOCUS ISSUE: STRUCTURAL HEART DISEASE

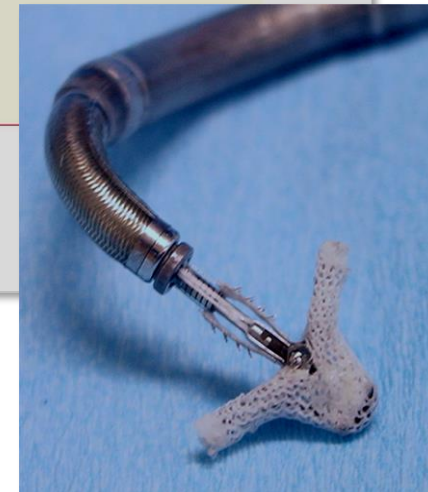
Clinical Research

Correction of Mitral Regurgitation in Nonresponders to Cardiac Resynchronization Therapy by MitraClip Improves Symptoms and Promotes Reverse Remodeling

Angelo Auricchio, MD, PhD,* Wolfgang Schillinger, MD,† Sven Meyer, MD,‡
Francesco Maisano, MD,§ Rainer Hoffmann, MD,|| Gian Paolo Ussia, MD,¶
Giovanni B. Pedrazzini, MD,* Jan van der Heyden, MD,# Simona Fratini, MD, PhD,**
Catherine Klersy, MD, MSc,†† Jan Komtebedde, DVM,* Olaf Franzen, MD,‡
on behalf of the PERMIT-CARE Investigators

*Lugano, Switzerland; Göttingen, Hamburg, and Aachen, Germany;
Milan, Catania, L'Aquila, and Pavia, Italy; and Nieuwegein, the Netherlands*

J Am Coll Cardiol 2011;58:2183–9



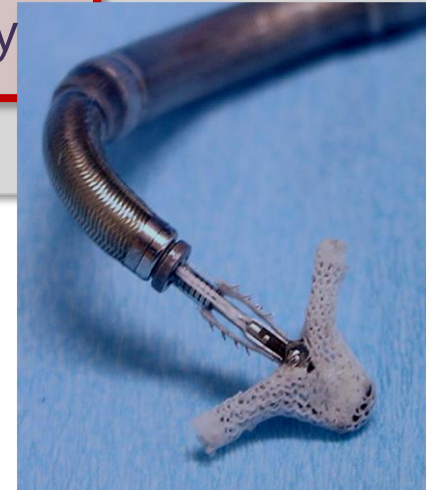
Secondary mitral regurgitation

Indications for transcatheter MV repair for severe secondary MR:



- Severe secondary MR
- Severely symptomatic
- Prohibited or high surgical risk
- Reasonable life expectancy

class IIb



Prevalence of MR in Patients with LV Dysfunction

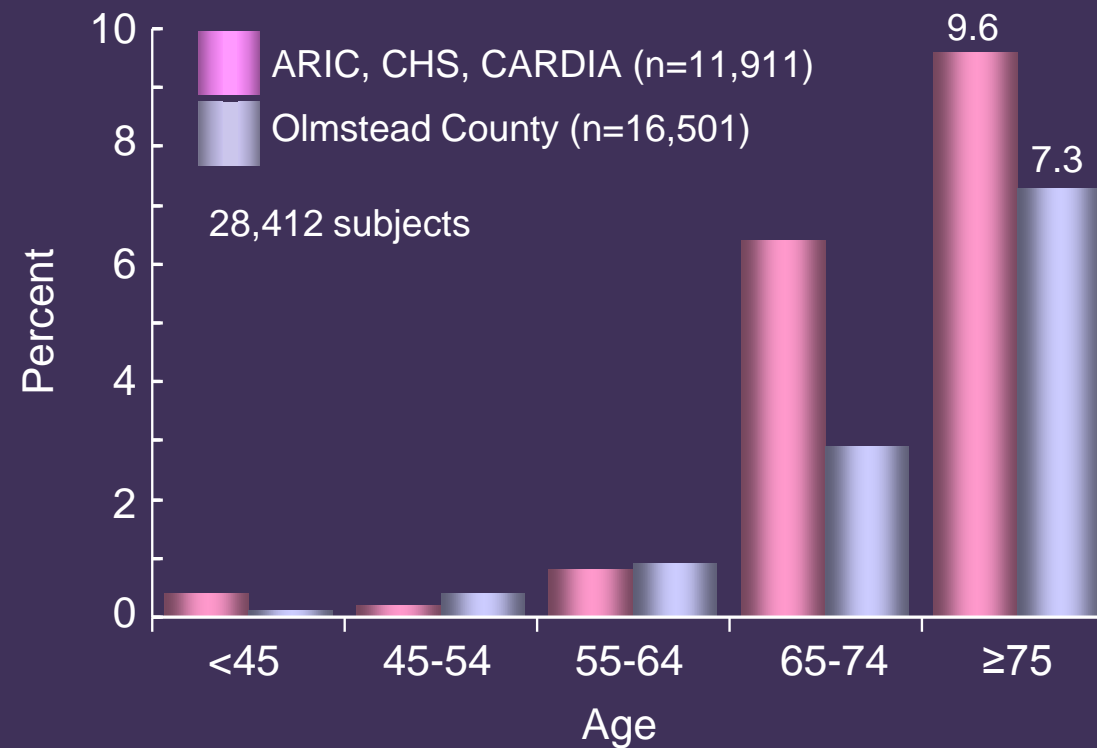
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Onishi et al	<i>Circ Heart Fail</i> 2013	277	48% *

*Patients with moderate to severe MR

Burden of valvular heart diseases: a population-based study

Vuyisile T Nkomo, Julius M Gardin

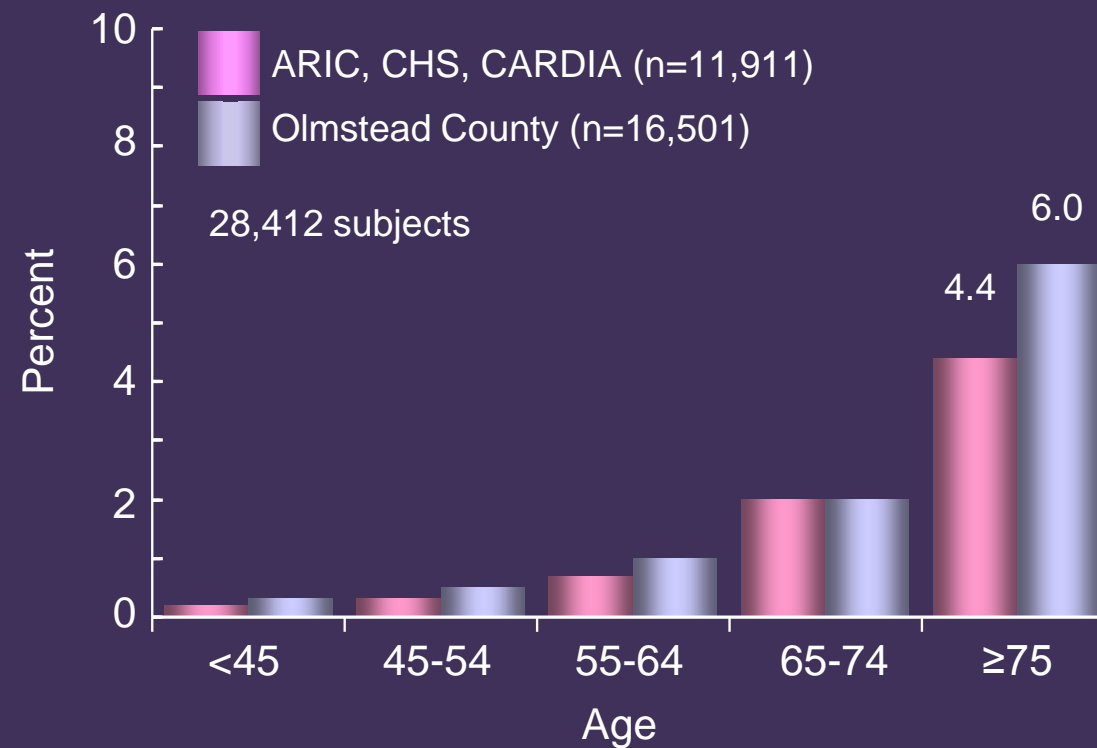
Moderate-Severe Mitral Valve Disease



Burden of valvular heart diseases: a population-based study

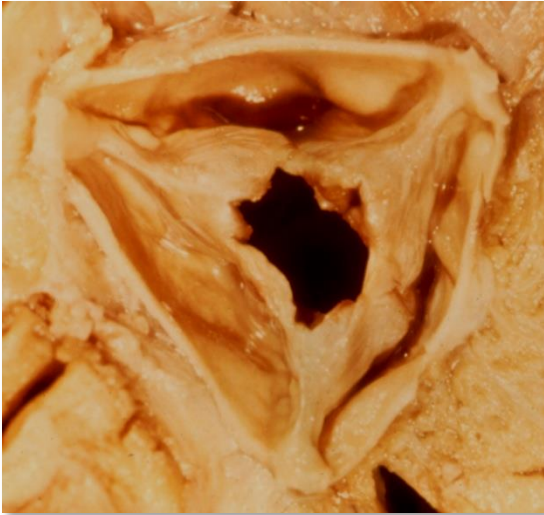
Vuyisile T Nkomo, Julius M Gardin

Moderate-Severe Aortic Valve Disease



Nkomo et al, *Lancet* 2006;368:1005-1011

Aortic Stenosis



Rheumatic AS

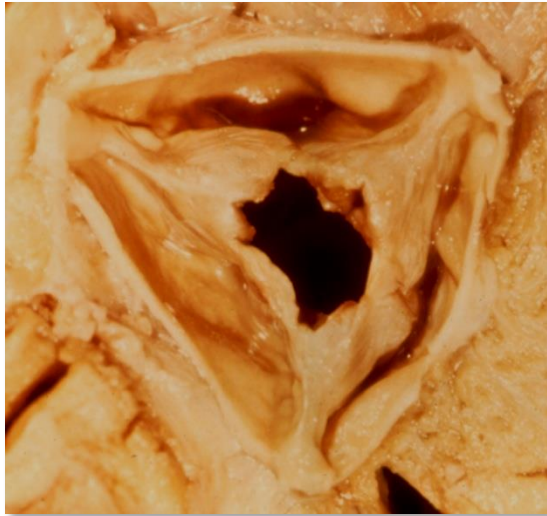


Congenital AS



Calcific AS

Aortic Stenosis



Rheumatic AS



Congenital AS



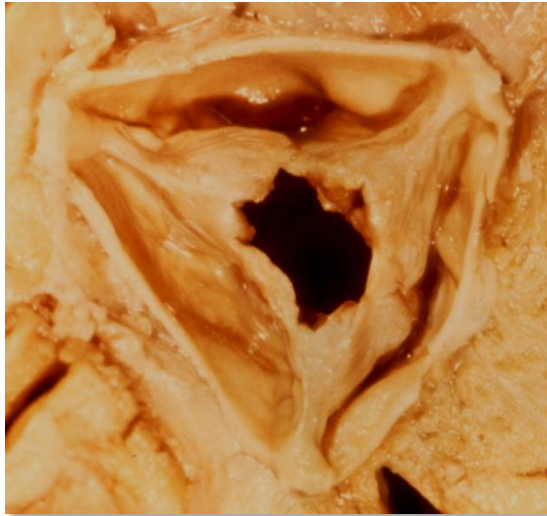
Calcific AS

Age >60

All patients 47%
Men 51%

Roberts and Ko, *Circulation*
2005;111:920-925

Aortic Stenosis



Rheumatic AS



Congenital AS



Calcific AS

Age >80

All patients	28%
Men	32%

Roberts and Ko, *Circulation*
2005;111:920-925



The NEW ENGLAND JOURNAL of MEDICINE

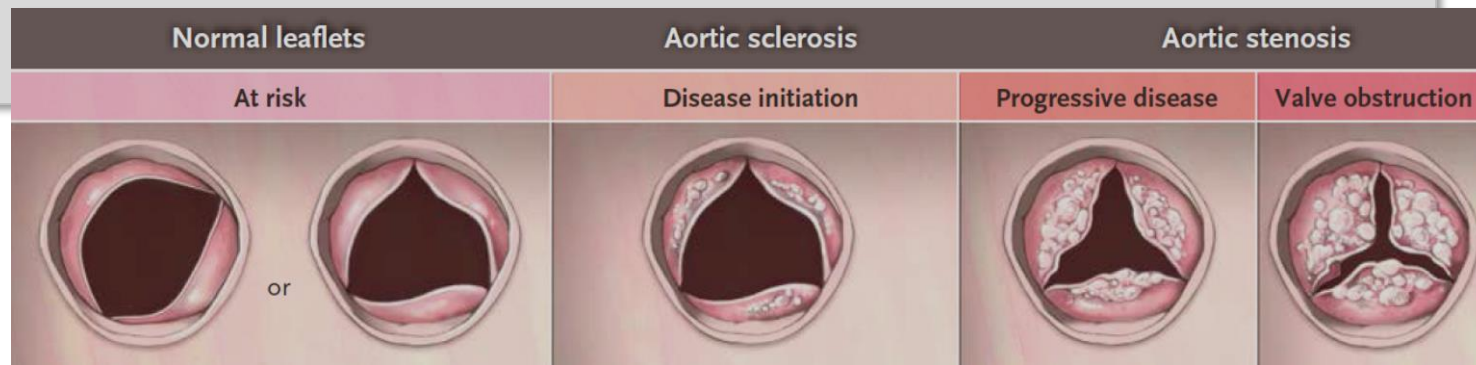
REVIEW ARTICLE

John A. Jarcho, M.D., *Editor*

Aortic-Valve Stenosis — From Patients at Risk to Severe Valve Obstruction

Catherine M. Otto, M.D., and Bernard Prendergast, D.M.

N Engl J Med 2014;371:744-56.



Aortic Stenosis

By JOHN ROSS, JR., M.D. AND EUGENE BRAUNWALD, M.D.

THE ADVENT of corrective operations for various forms of heart disease has placed increasing emphasis upon the need for accurate information concerning the natural history of patients with potentially correctible lesions. An understanding of the natural course assumes particular importance in the case of aortic stenosis because of the significant incidence of sudden death associated with this disease and the grave prognosis that appears to accompany the onset of certain symptoms,

patients with isolated valvular aortic stenosis of rheumatic etiology and patients without a history of rheumatic fever who have isolated calcific aortic stenosis; many of the latter patients are now considered to have developed calcification and stenosis of a congenitally bicuspid valve.¹ The review will focus primarily on the prognostic significance of three major symptoms—angina pectoris, syncope, and symptoms related to left ventricular failure

From the Cardiology Branch, National Heart Institute, Bethesda, Maryland.

Supplement V to Circulation, Vols. XXXVII and XXXVIII, July 1968

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From the Cardiology Branch, National Institutes of Health, Bethesda, Maryland.
Supplement V to Circulation, Vols.

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Aortic Stenosis

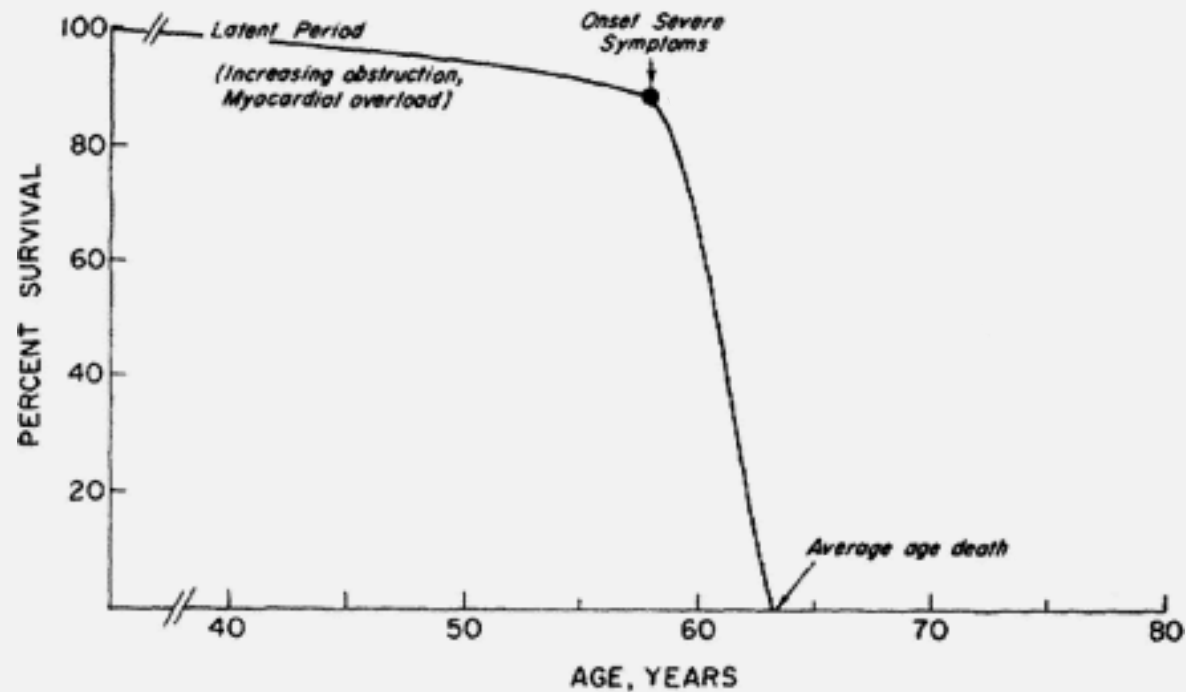
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Supplement V to *Circulation*, Vols. XXXV



Aortic Stenosis

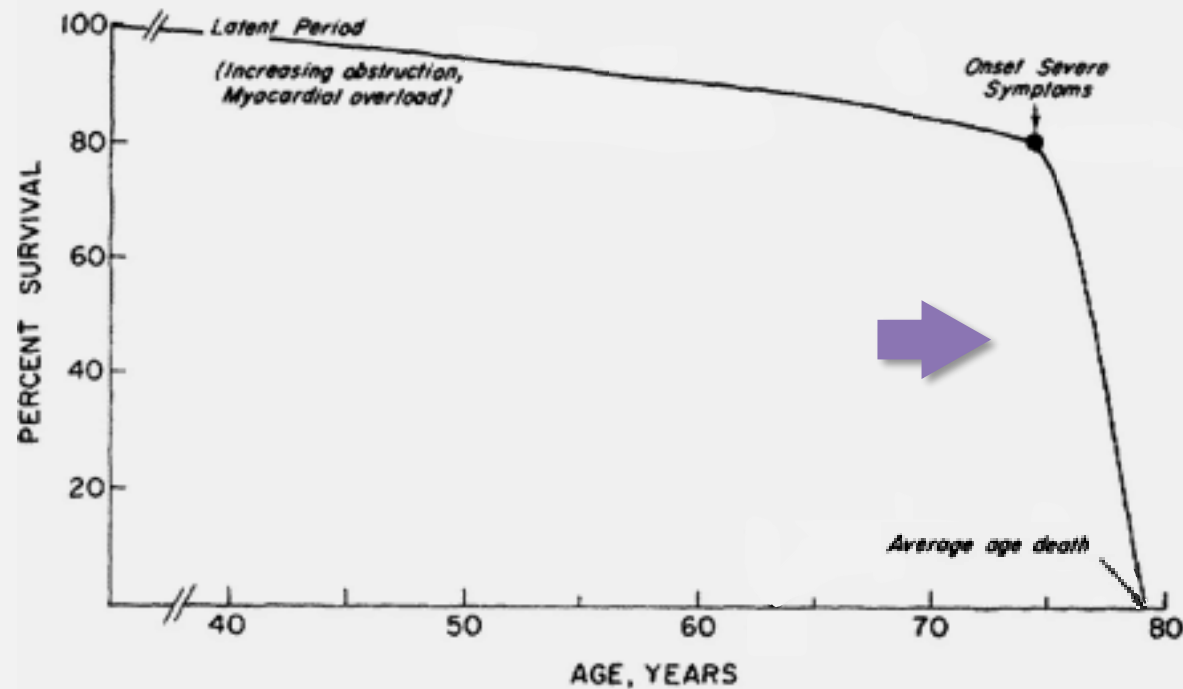
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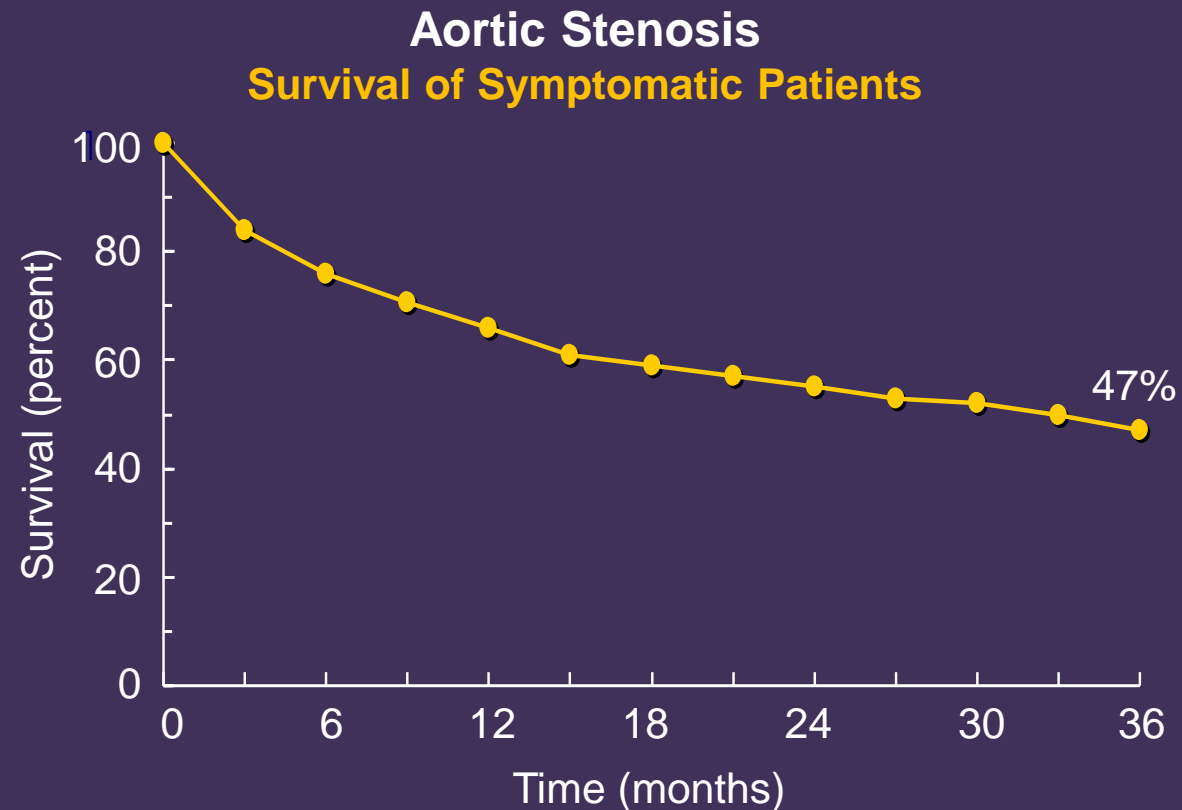
Supplement V to *Circulation*, Vols. XXXV



Evaluation of Patients With Severe Symptomatic Aortic Stenosis Who Do Not Undergo Aortic Valve Replacement

The Potential Role of Subjectively Overestimated Operative Risk

David S. Bach, MD; Derrick Siao, MD; Steven E. Girard, MD, PhD; Claire Duvernoy, MD;
Benjamin J. W. Kim, MD



Bach et al, *Circ Cardiovasc Qual Outcomes* 2009;2:533-539

Aortic Stenosis



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Association®

Indications for AVR

- Symptomatic patients with severe AS

class I

...if it is likely that the symptoms are cardiac in origin

Aortic Stenosis

Management challenges:

- **The asymptomatic patient with severe AS**
- **Low-flow, low gradient severe AS**
- **Indications for TAVR**

Aortic Stenosis

Management challenges:



- **The asymptomatic patient with severe AS**
- **Low-flow, low gradient severe AS**
- **Indications for TAVR**

Aortic Stenosis

Management challenges:



- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS

Are asymptomatic patients with severe AS *really* asymptomatic?

Aortic stenosis

Indications for valve replacement

Exercise test results:

- Symptoms **class I**
- Hypotension **class IIa**



How are **symptoms** determined?

- Everyone has symptoms on stress test
- Are the symptoms cardiac in origin?
- What level of exercise?

How is **hypotension** defined?

- Less than 20 mmHg increase (?)

Aortic stenosis

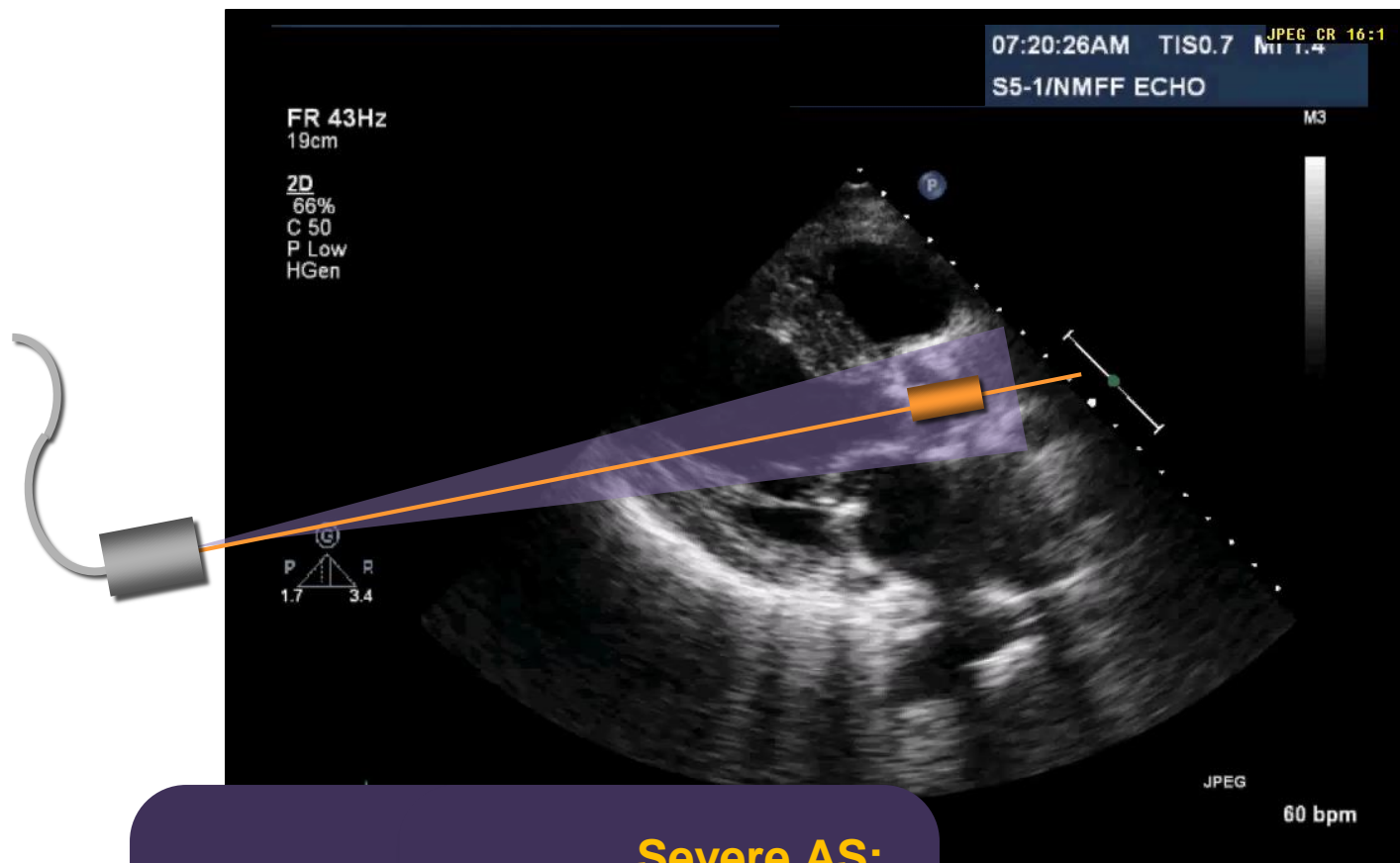
Indications for valve replacement

Exercise test results:

- Symptoms **class I**
- Hypotension **class IIa**



Should **asymptomatic** patients
with severe AS undergo AVR?
...when they are **really** asymptomatic?




Severe AS:

Vmax:	4.6 m/s	>4.0 m/s
Mean Δ :	52 mmHg	>40 mmHg
AVA:	0.7 sq cm	<1.0 sq cm

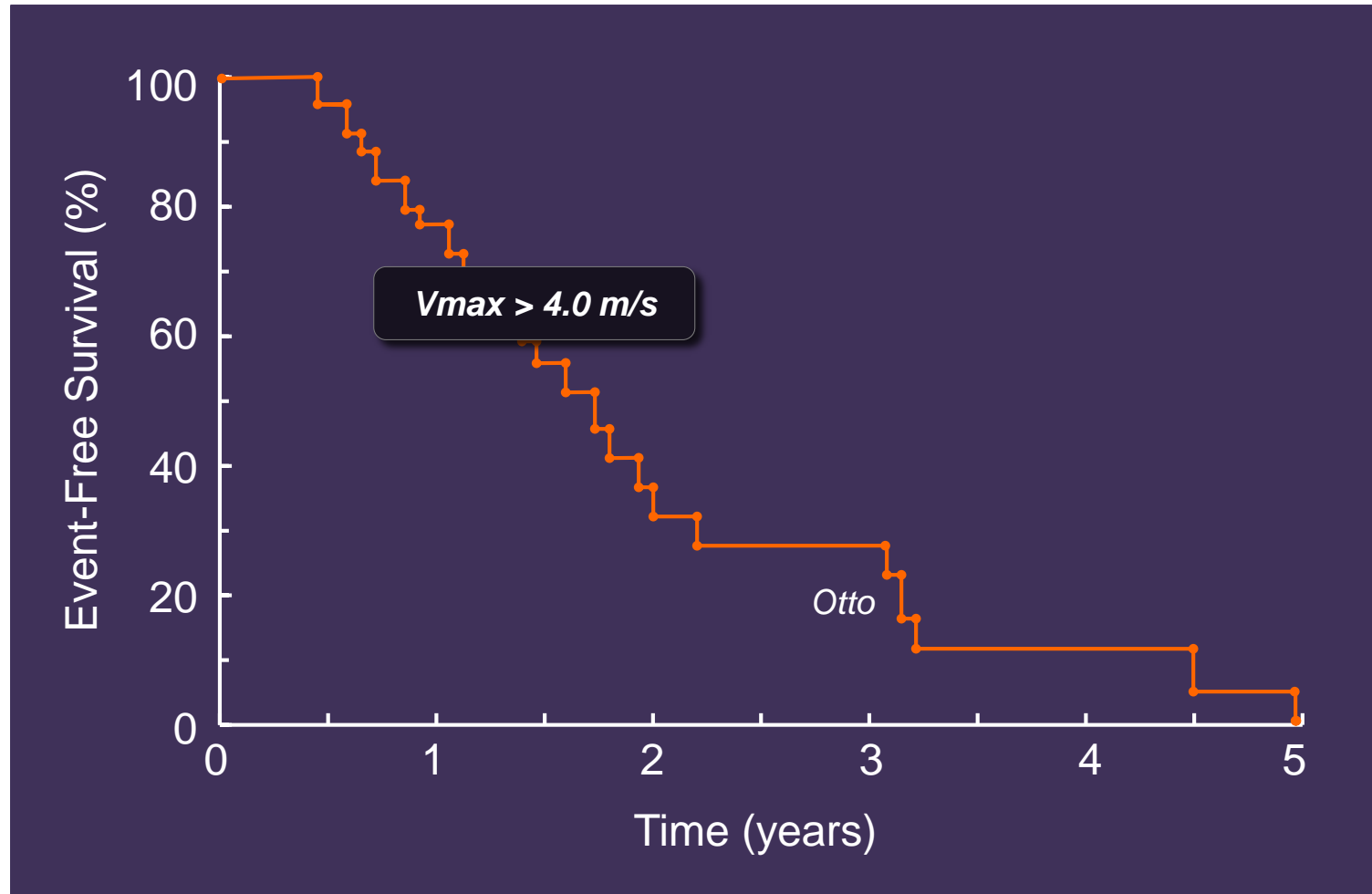
Aortic Stenosis

84 year old man with severe AS

- Watchful waiting? *
 - More data (more testing)?
 - Aortic valve replacement?
- 

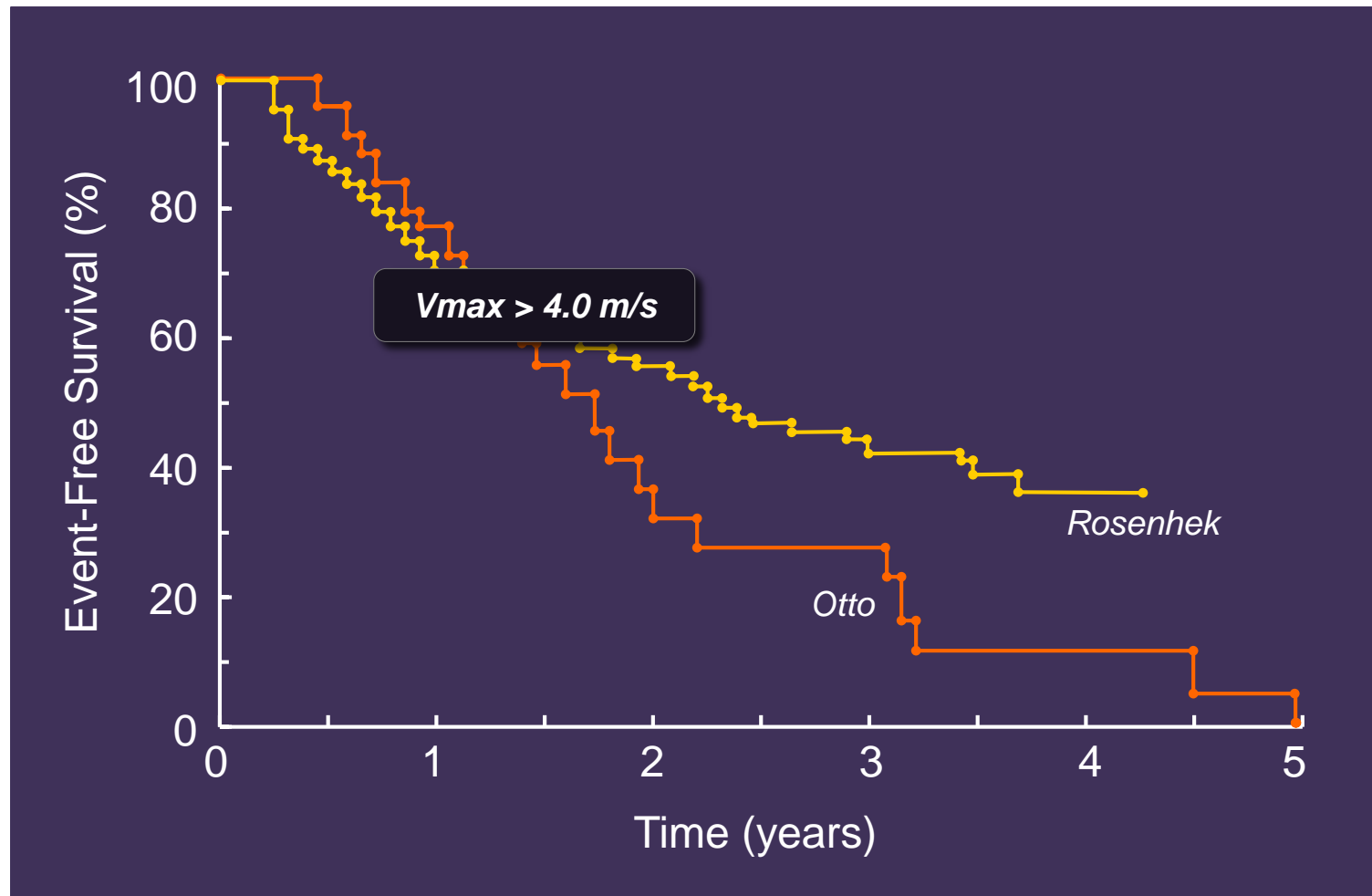
* Wait until he develops symptoms in 5-6 years and then recommend TAVR?

Natural History of Severe Asymptomatic AS



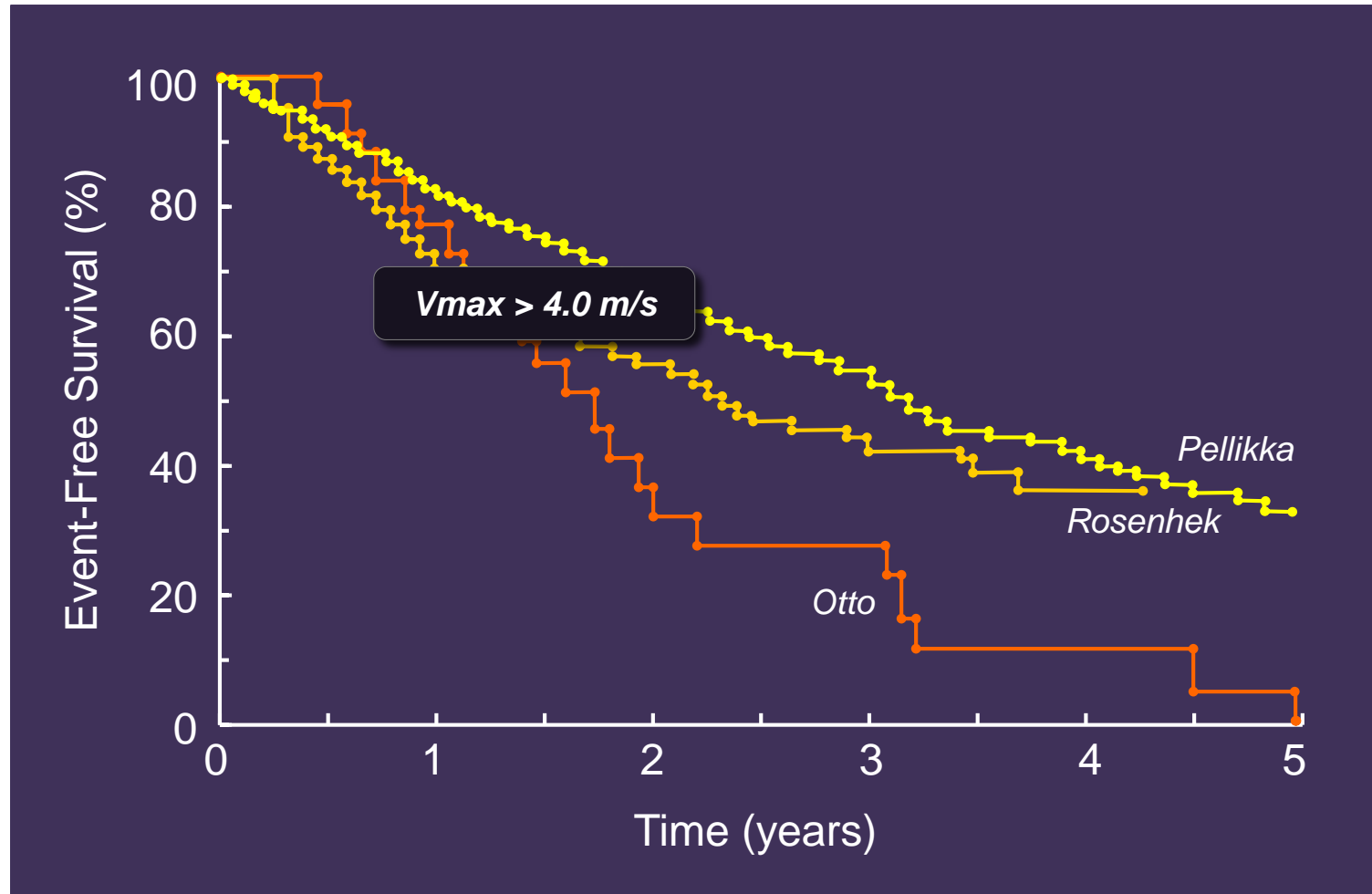
Otto et al. *Circulation* 1997;95:2262-2270

Natural History of Severe Asymptomatic AS



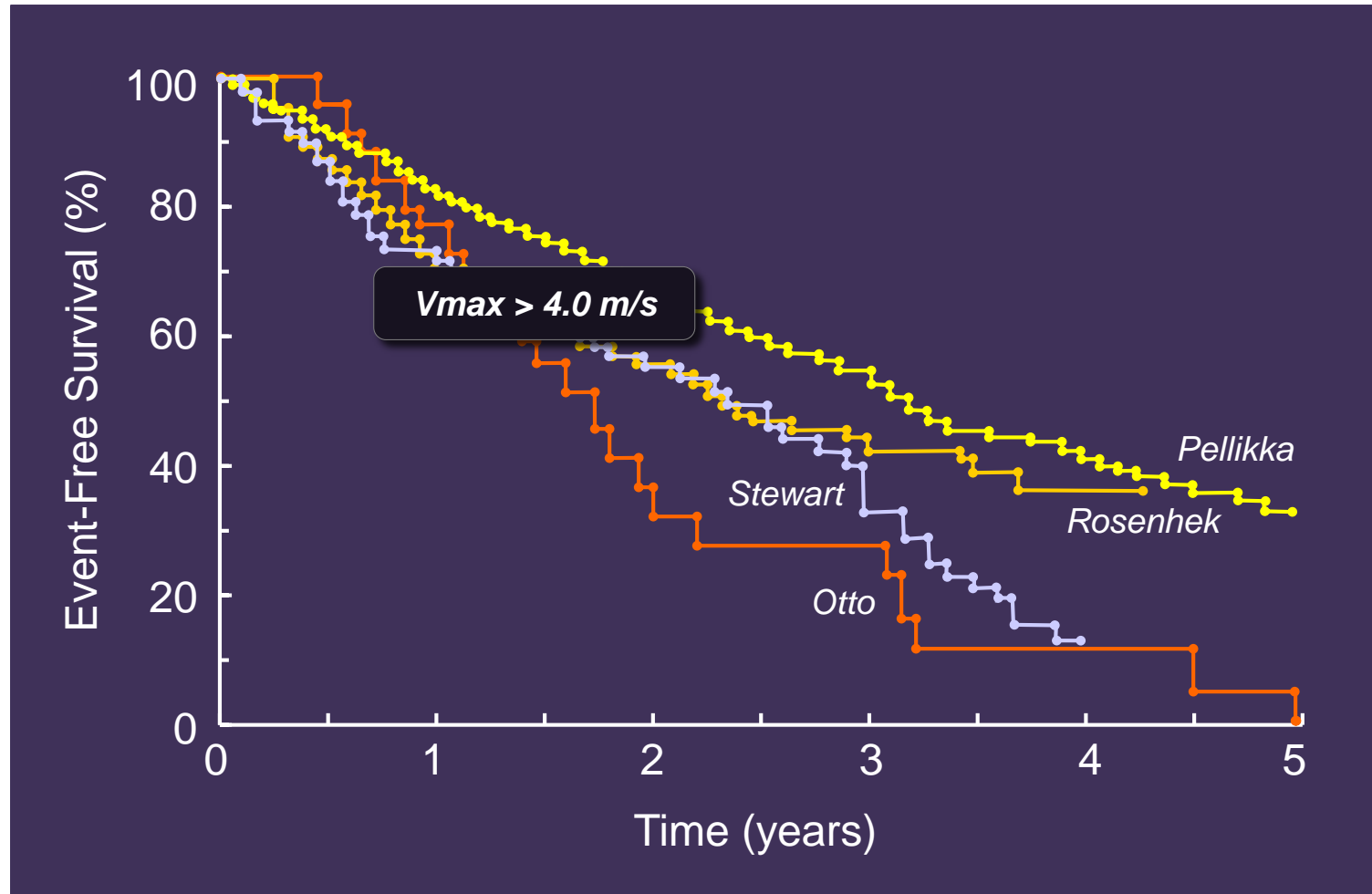
Otto et al. *Circulation* 1997;95:2262-2270
Rosenhek et al. *N Engl J Med* 2000;343:611-617

Natural History of Severe Asymptomatic AS



Otto et al. *Circulation* 1997;95:2262-2270
Rosenhek et al. *N Engl J Med* 2000;343:611-617
Pellikka et al. *Circulation* 2005;111:3290-2395

Natural History of Severe Asymptomatic AS



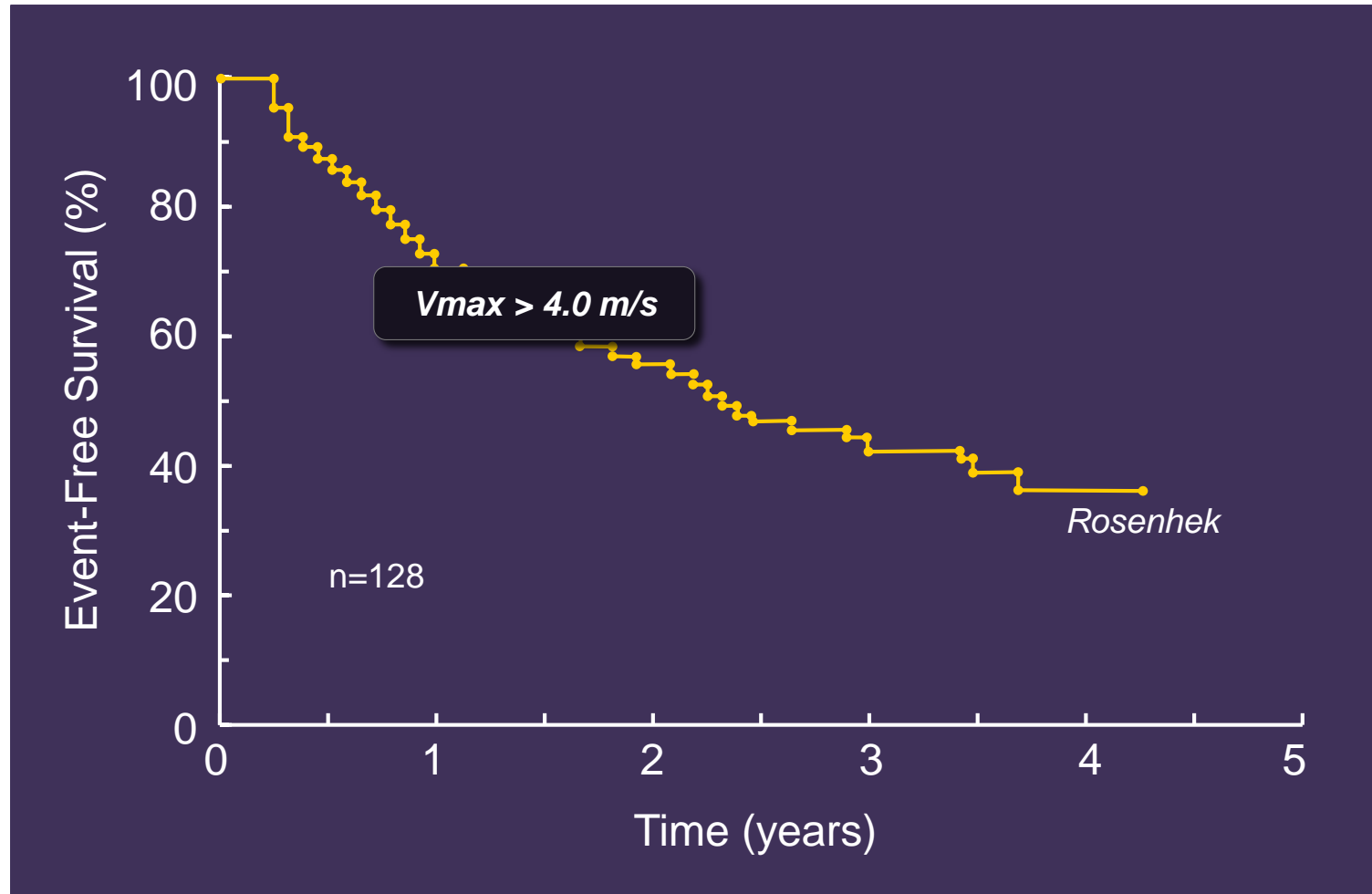
Otto et al. *Circulation* 1997;95:2262-2270

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

Pellikka et al. *Circulation* 2005;111:3290-2395

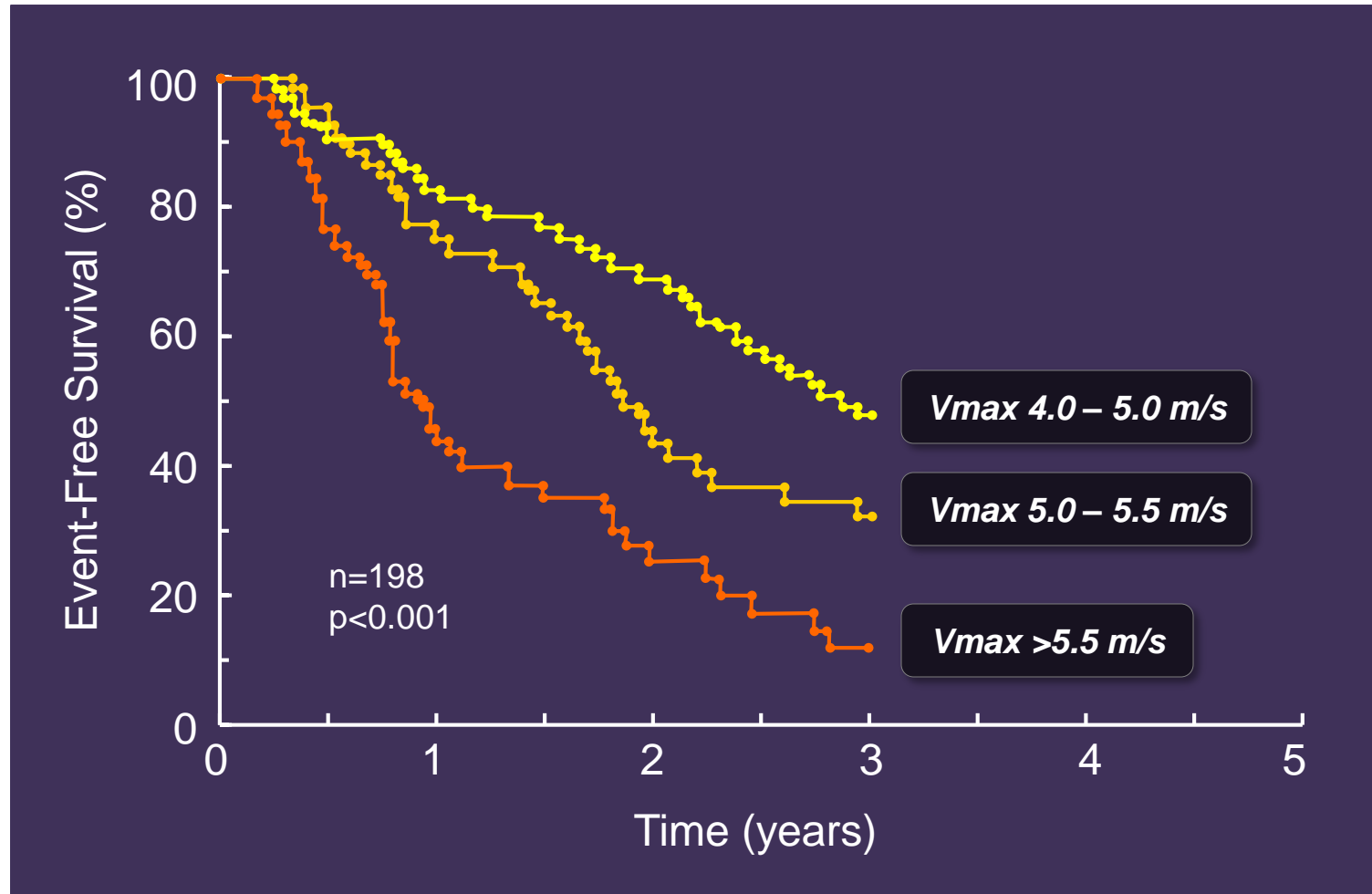
Stewart et al. *Eur Heart J* 2010;31:2216-2222

Natural History of Severe Asymptomatic AS



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

Natural History of Severe Asymptomatic AS



Rosenhek et al. *Circulation* 2010;121:151-156

Aortic Stenosis

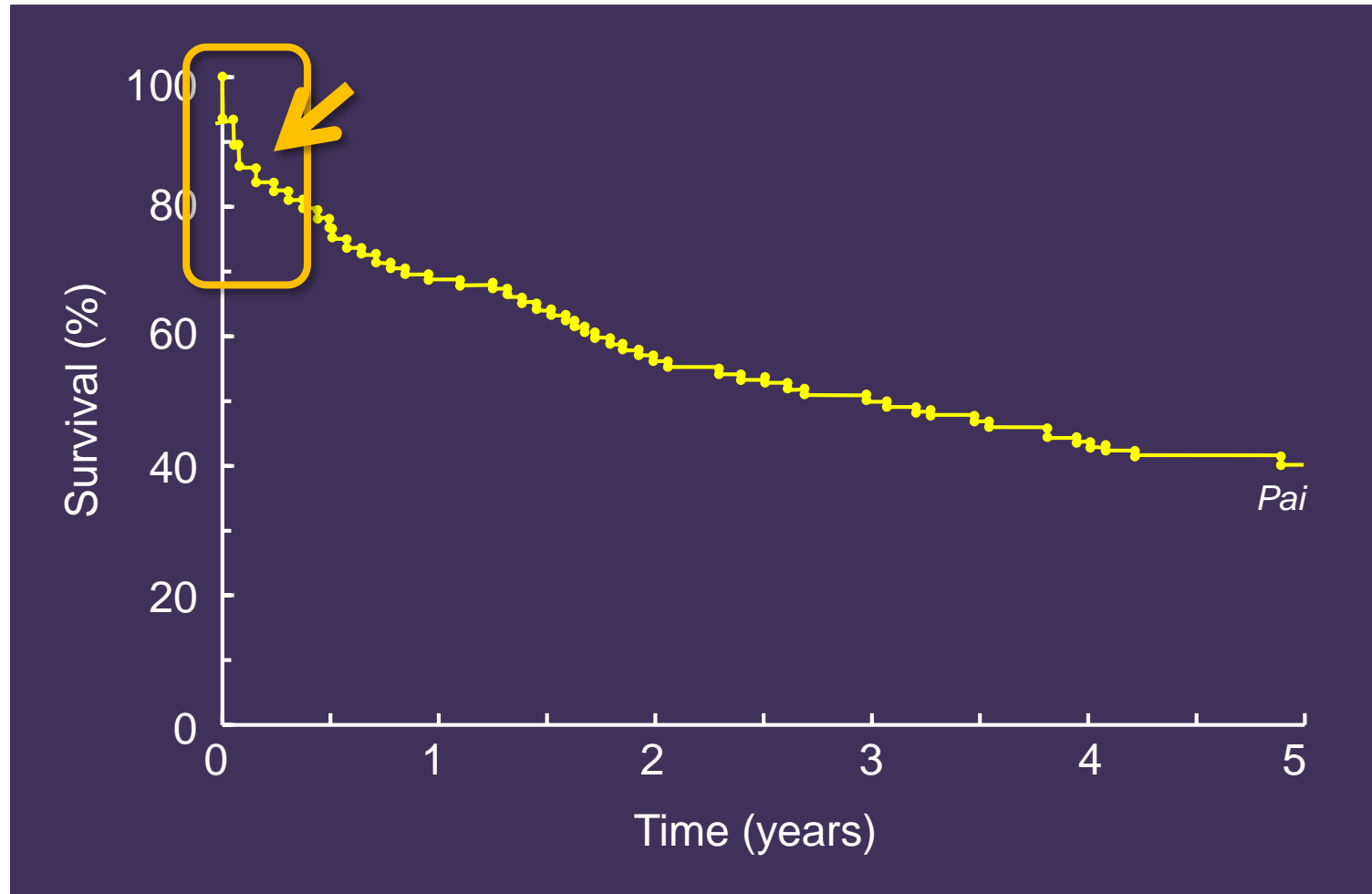
Management challenges:



- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS

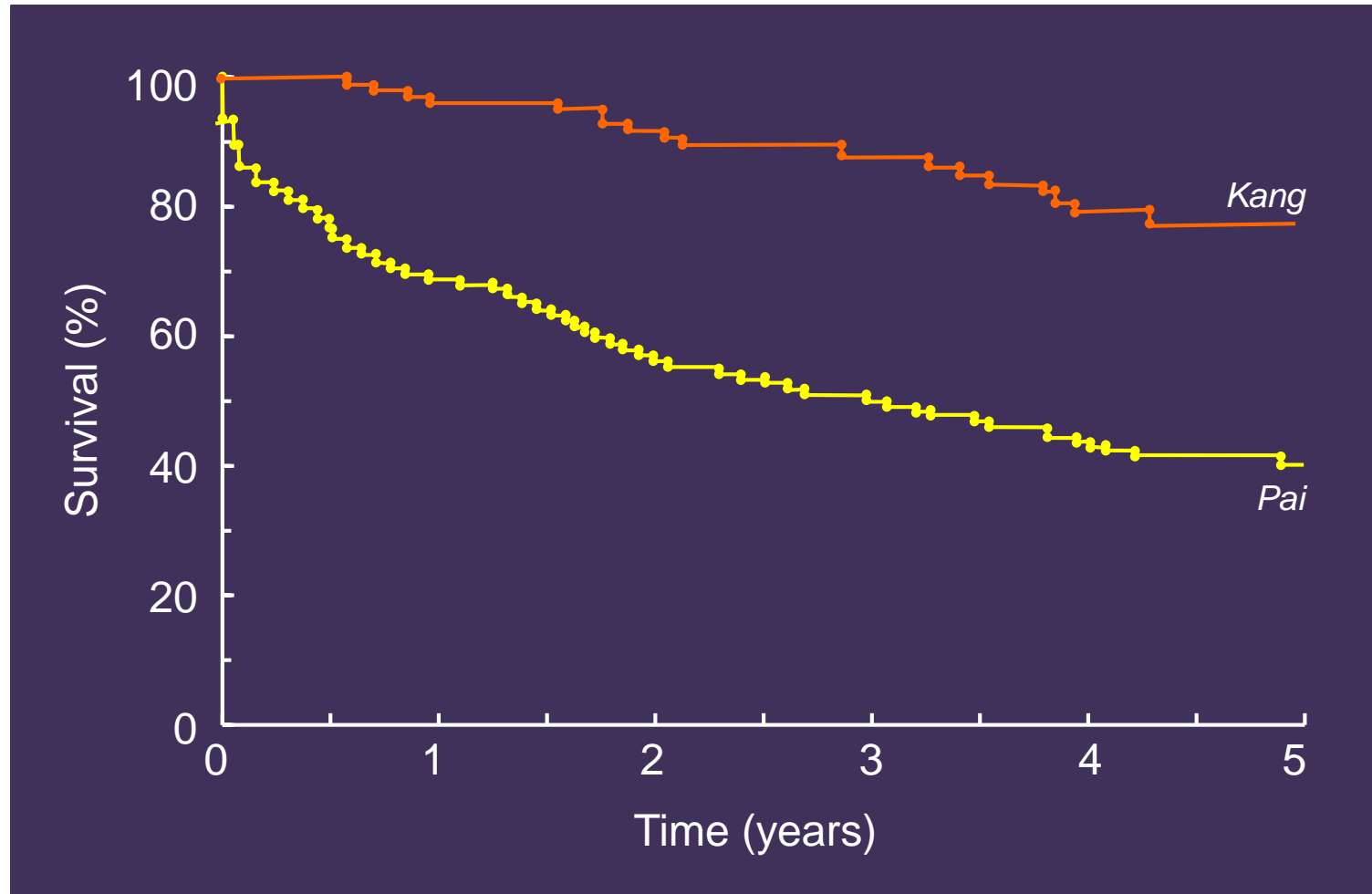
What is the risk of death while waiting for symptoms to trigger AVR?

Natural History of Severe Asymptomatic AS



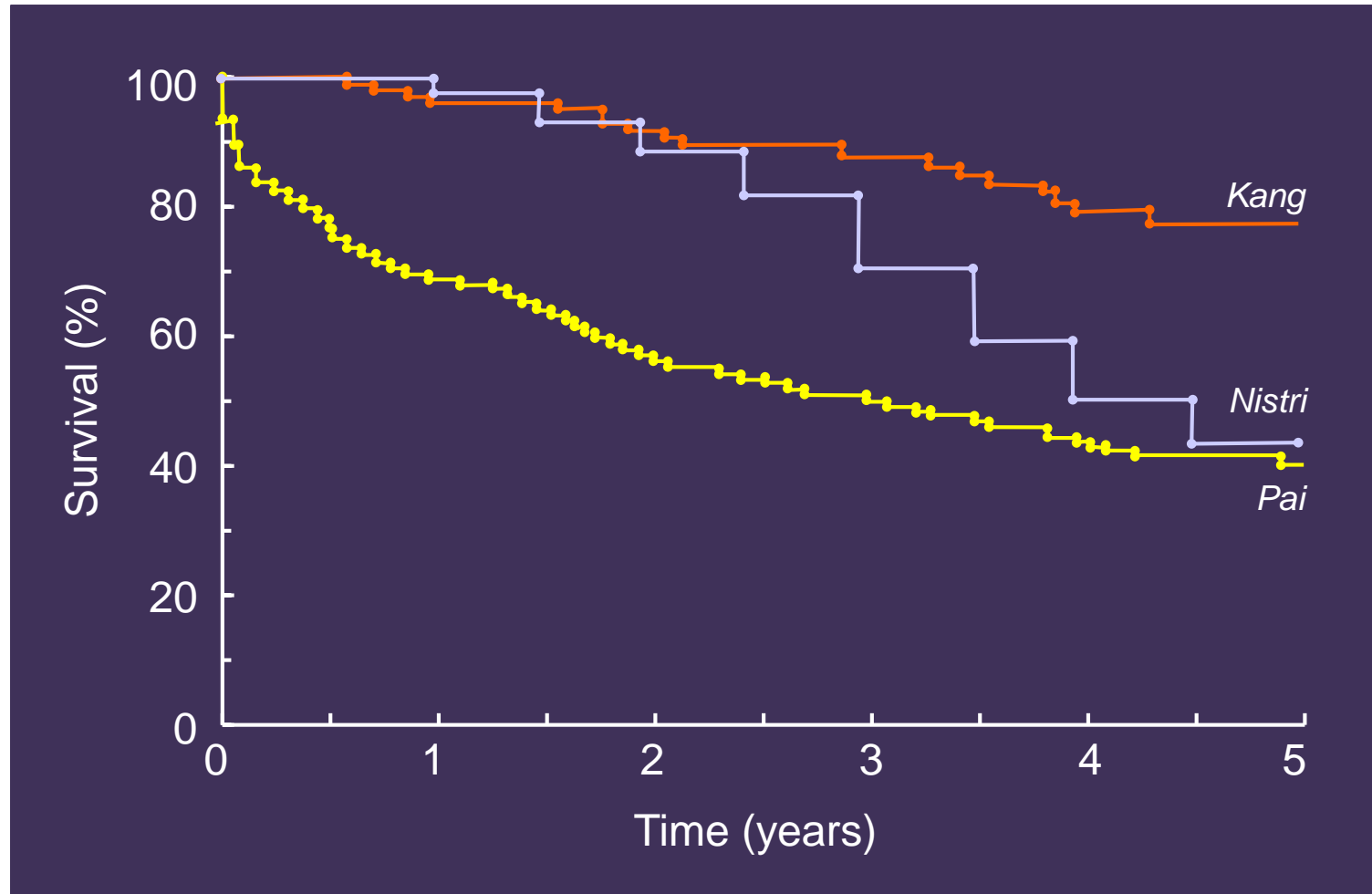
Pai et al. *Ann Thorac Surg* 2006;82:116-122

Natural History of Severe Asymptomatic AS



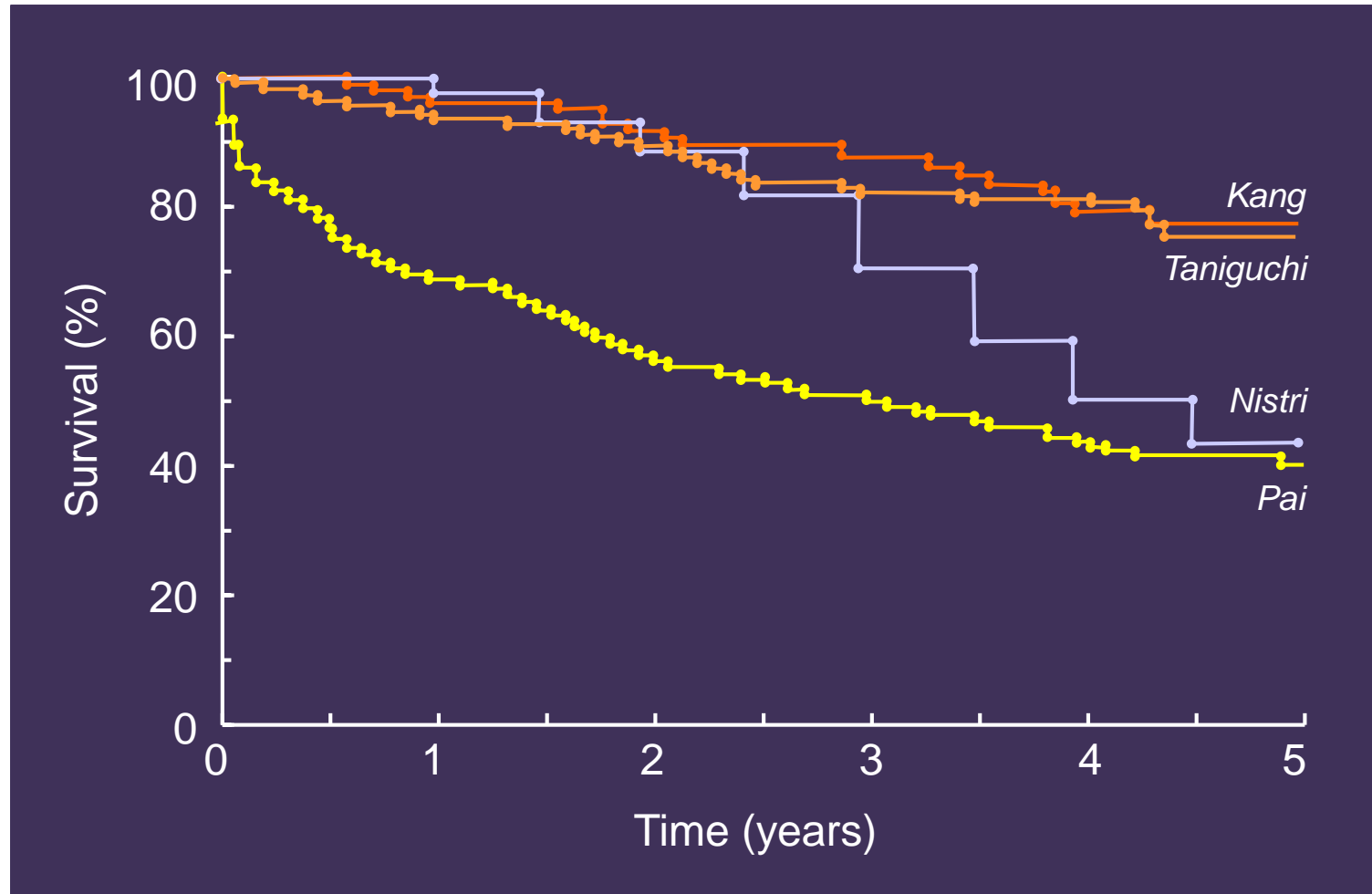
Pai et al. *Ann Thorac Surg* 2006;82:116-122
Kang et al. *Circulation* 2010;121:1502-1509

Natural History of Severe Asymptomatic AS



Pai et al. *Ann Thorac Surg* 2006;82:116-122
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Nistri et al. *Am J Cardiol* 2012;109:718-723

Natural History of Severe Asymptomatic AS



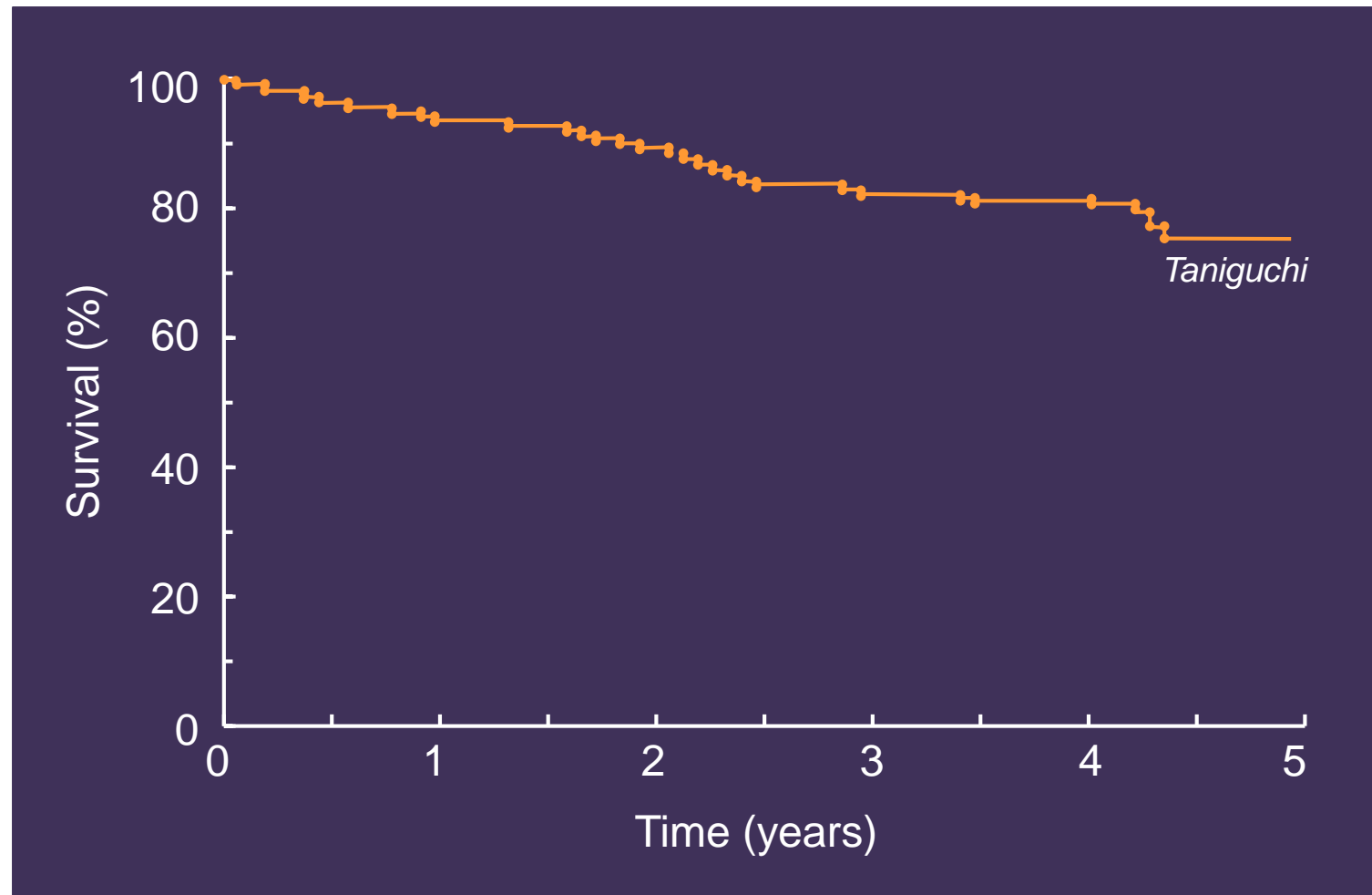
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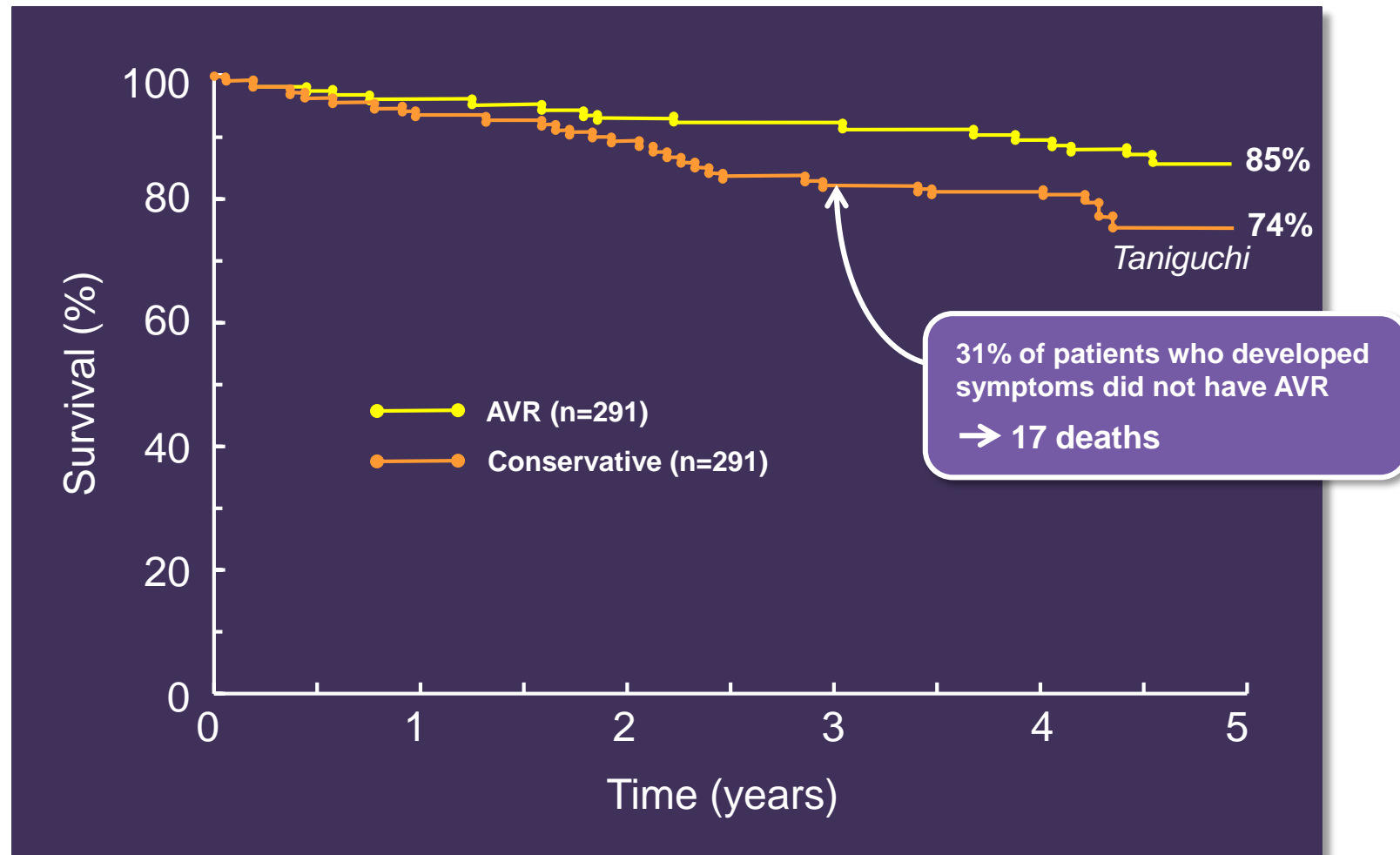
Nistri et al. *Am J Cardiol* 2012;109:718-723

Taniguchi et al. *J Am Coll Cardiol* 2105;66:2827-2838

Natural History of Severe Asymptomatic AS



Natural History of Severe Asymptomatic AS



Asymptomatic Aortic Stenosis

Indications for valve replacement:



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- **Very severe AS:
 $V_{\max} \geq 5$ m/s**

class IIa

Asymptomatic Aortic Stenosis

Indications for valve replacement:



AMERICAN
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CARDIOLOGY



American
Heart
Association®

- Very severe AS:
 $V_{\max} \geq 5$ m/s

class IIa

- Rapid progression and low surgical risk

class IIb

Asymptomatic Aortic Stenosis

Indications for valve replacement:



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COLLEGE of
CARDIOLOGY



American
Heart
Association®



EUROPEAN
SOCIETY OF
CARDIOLOGY®



- Very severe AS:
 $V_{max} \geq 5$ m/s

class IIa

- Rapid progression and low surgical risk

class IIb

- Very severe AS:
 $V_{max} > 5.5$ m/s

class IIa

Asymptomatic Aortic Stenosis

Indications for valve replacement:



AMERICAN
COLLEGE of
CARDIOLOGY



American
Heart
Association®



EUROPEAN
SOCIETY OF
CARDIOLOGY®



- Very severe AS:
 $V_{max} \geq 5$ m/s

class IIa

- Rapid progression and low surgical risk

class IIb

- Very severe AS:
 $V_{max} > 5.5$ m/s

class IIa

- Severe valve calcification and rate of progression ≥ 0.3 m/s / year

class IIa

Asymptomatic Aortic Stenosis

Indications for valve replacement:



AMERICAN
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American
Heart
Association®



EUROPEAN
SOCIETY OF
CARDIOLOGY®



- Very severe AS:
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class IIa

- Rapid progression and low surgical risk

class IIb

- Very severe AS:
 $V_{max} > 5.5$ m/s

class IIa

- Severe valve calcification and rate of progression ≥ 0.3 m/s / year

class IIa

- Markedly elevated BNP
- Increase in gradient with exercise > 20 mmHg
- Excessive LVH

class IIb

Asymptomatic Aortic Stenosis

Indications for valve replacement:



The ACC/AHA and ESC/EACTS guidelines have lowered the threshold for surgery in asymptomatic patients with AS

- **Severity of AS**
- **Severity of calcification**
- **Left ventricular function**
- **Exercise response**

Asymptomatic Aortic Stenosis

Indications for valve replacement:



The ACC/AHA and ESC/EACTS guidelines have lowered the threshold for surgery in asymptomatic patients with AS

- Severity of AS
- Severity of calcification
- Left ventricular function
- Exercise response
- **BNP?**

Heart Valve Disease

B-Type Natriuretic Peptide Clinical Activation in Aortic Stenosis

Impact on Long-Term Survival

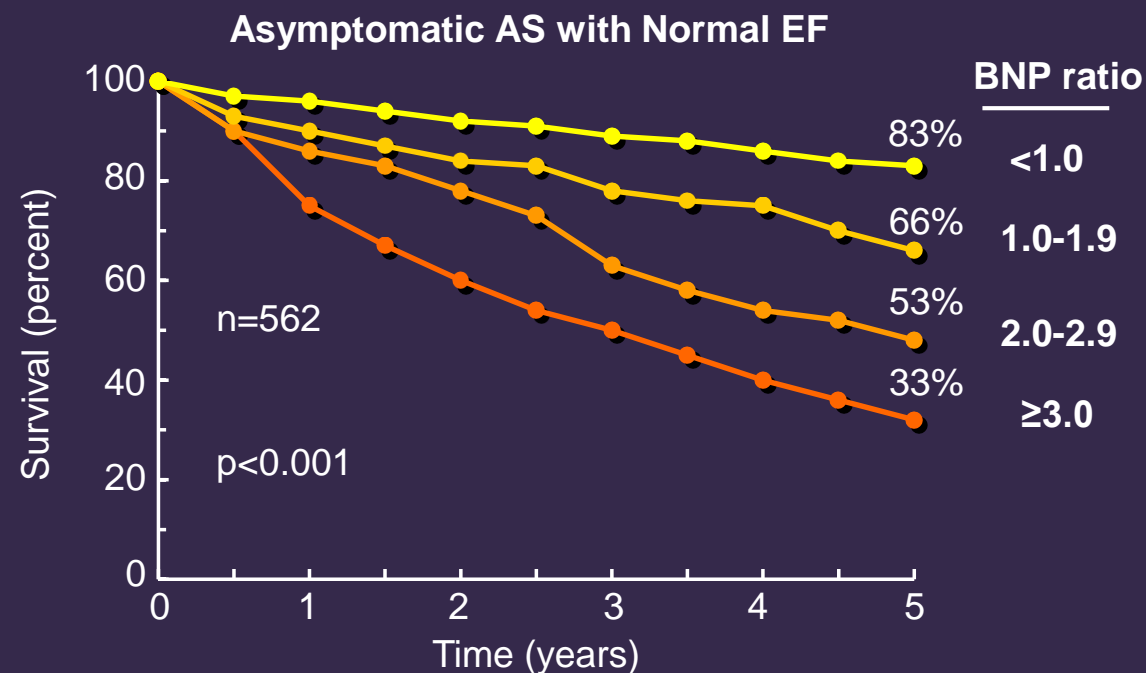
Marie-Annick Clavel, DVM, PhD, Joseph Malouf, MD, Hector I. Michelena, MD,

Rakesh M. Suri, MD, DPHIL, All

Maurice Enriquez-Sarano, MD

Rochester, Minnesota

J Am Coll Cardiol 2014;63:2016-2



Clavel et al, J Am Coll Cardiol 2014;63:2016-2025

Aortic stenosis

Management challenges:

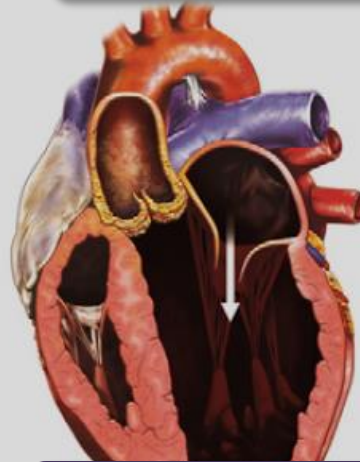
- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS
- Indications for TAVR

Low Gradient Aortic Stenosis

Diastole

LV Dysfunction

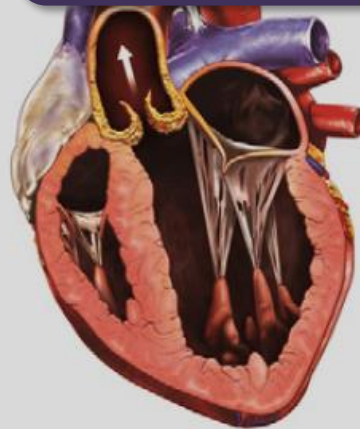
Normal LV Function



Dobutamine:
Echocardiography
or
Catheterization

- Treat hypertension
- Catheterization
- Valve calcification
- Advanced imaging
- **Clinical skills**

Systole



Low Flow, Low Gradient Aortic Stenosis

Indications for valve replacement:



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Reduced EF:

- Dobutamine study showing:
Vmax >4 m/s or
Mean Δ >40 mmHg or
AVA \leq 1 sq cm

class IIa



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Reduced EF:

- With contractile reserve

class IIa

Low Flow, Low Gradient Aortic Stenosis

Indications for valve replacement:



AMERICAN
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American
Heart
Association®

Reduced EF:

- Dobutamine study showing:
Vmax >4 m/s or
Mean Δ >40 mmHg or
AVA \leq 1 sq cm

class IIa

Normal EF:

- Only if clinical, anatomic
and hemodynamic data
support severe AS

class IIa



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Reduced EF:

- With contractile reserve

class IIa

Low Flow, Low Gradient Aortic Stenosis

Indications for valve replacement:



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American
Heart
Association®

Reduced EF:

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class IIa

Normal EF:

- Only if clinical, anatomic
and hemodynamic data
support severe AS

class IIa



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Reduced EF:

- With contractile reserve

class IIa

Normal EF:

- Only after thorough
confirmation of severe AS

class IIa

Aortic stenosis

Management challenges:

- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS

→ • **Indications for TAVR**



Intervention for Severe AS

Indications for TAVR vs surgical AVR:

- Evaluation by a Heart Team

class I



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Intervention for Severe AS

Indications for TAVR vs surgical AVR:



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- **Evaluation by a Heart Team**

class I

- **Surgical AVR for patients at low or intermediate risk**

class I

Intervention for Severe AS

Indications for TAVR vs surgical AVR:



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- Evaluation by a Heart Team
- Surgical AVR for patients at low or intermediate risk
- TAVR for patients with prohibitive surgical risk and life expectancy >12 months

class I

class I

class I

Intervention for Severe AS

Indications for TAVR vs surgical AVR:



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- Evaluation by a Heart Team

class I



Surgical AVR for patients at low or intermediate risk

class I

TAVR as alternative?

- TAVR for patients with prohibitive surgical risk and life expectancy >12 months


class I



TAVR alternative for patients at high surgical risk

class IIa

class I?



Series

Valvular heart disease 1

Management strategies and future challenges for aortic valve disease

Robert O Bonow, Martin B Leon, Darshan Doshi, Neil Moat

Lancet 2016; 387: 1312-23

TAVR Now

- TAVR has been truly transformative
- Surgical AVR remains the standard with proven durability and safety for most patients
- TAVR provides treatment options for patients who previously had no options other than a predictably very poor short term outcome
- TAVR is an alternative to SAVR in patients at high or intermediate surgical risk
- The threshold for TAVR is declining in clinical trials, registries and clinical practice
- All patients want this
- Determining when to withhold TAVR is difficult

TAVR in the Future

- Guidelines will need to adapt to the rapidly evolving TAVR evidence base

TAVR in intermediate and low risk surgical patients

- Availability of TAVR is likely to inform new indications for valve replacement
 - Moderate AS in primary cardiomyopathy
 - Asymptomatic severe AS?
- Judgment of the Heart Team remains essential in patient selection for TAVR
- Appropriate use criteria and performance measures are needed to define quality

Clinical Studies

Aortic Stenosis*

PAUL WOOD, O.B.E., M.D., F.R.C.P.

London, England

AORTIC stenosis is a simple mechanical fault, which, if severe enough, imposes a heavy burden on the left ventricle and sooner or later overcomes it. An obstructive lesion of this sort presents a surgeon. To describe just what it is, to meet, and on a point of view

definition of severe stenosis is one with sufficient hypertrophy of the left ventricle to cause inversion of the T wave of the electrocardiogram in left ventricular surface leads or their

Aortic stenosis is a simple mechanical fault which, if severe enough, imposes a heavy burden on the left ventricle and sooner or later overcomes it.

studied during the aortic mitral

The 1958 Morris H. Nathanson Lecture, University of Southern California, Los Angeles.

...it's not simple any more

PRACTICE GUIDELINE

2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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European Heart Journal
doi:10.1093/eurheartj/ehs109

ESC/EACTS GUIDELINES



Guidelines on the management of valvular heart disease (version 2012)

Authors/Task Force Members: Alec Vahanian (Chairperson) (France)*, Ottavio Alfieri (Chairperson)* (Italy), Felicita Andreotti (Italy), Manuel J. Antunes (Portugal), Gonzalo Barón-Esquivias (Spain), Helmut Baumgartner (Germany),

Michele De Bonis
Bernard Lung
Anna Price (UK),
Anna Stepinska
(Netherlands),
Luis Zamorano

**Valvular heart disease:
Have the guidelines filled the gap?**