Valvular heart disease: a decade of progress
15 minutes

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Professor of Medicine
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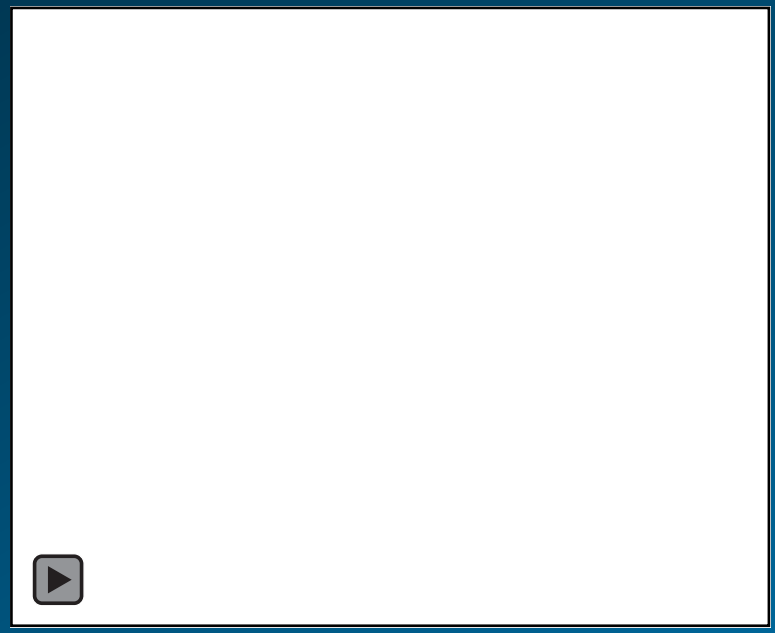
Disclosures

Advisory Board Member: Edwards Lifesciences, Philips, Bracco

Core Lab Contracts: Edwards Lifesciences, Medtronic, Abbott

Will mention some investigational devices

Aortic Stenosis



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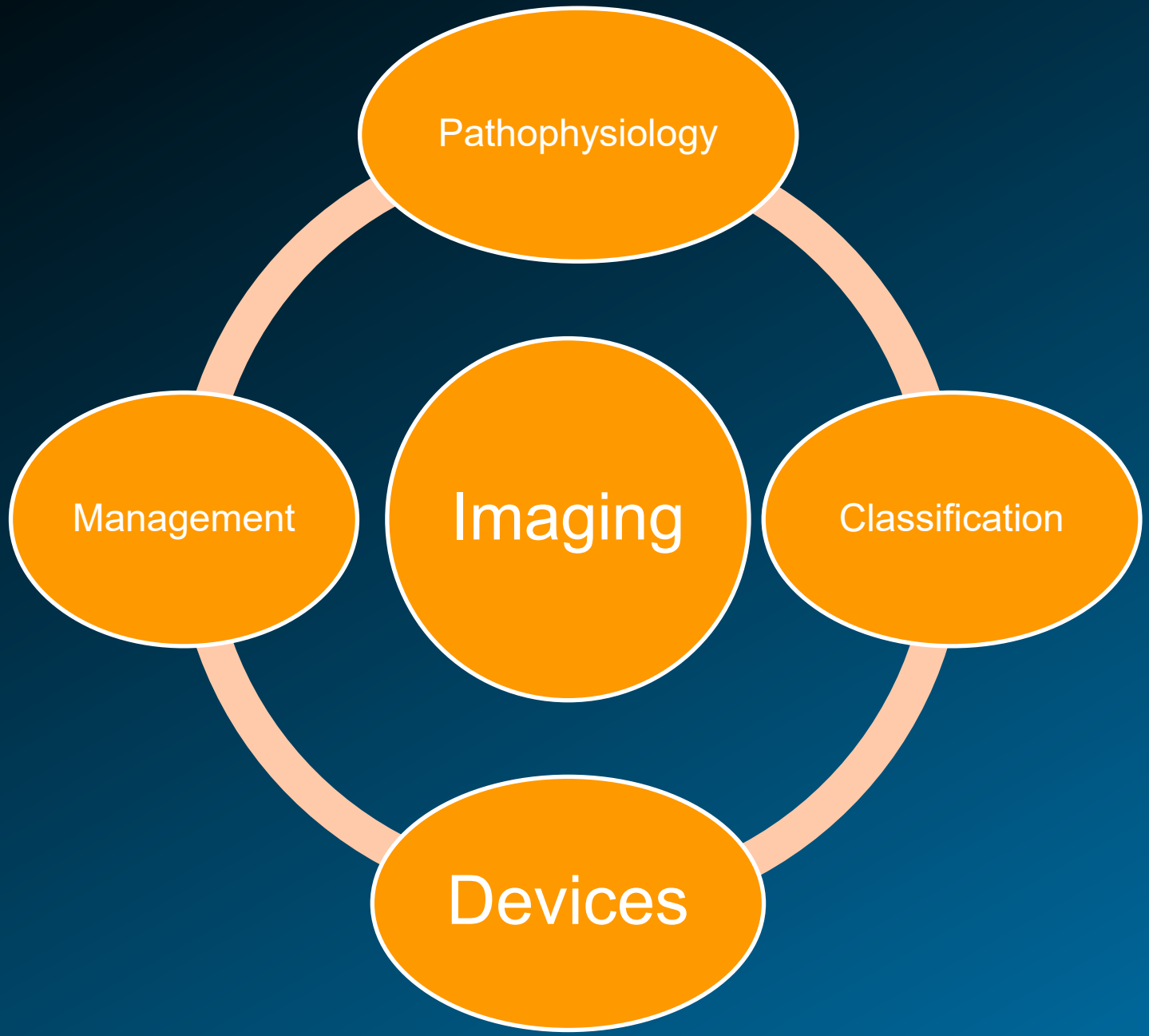

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Pathophysiology

- Multipronged approaches at basic science level

ESC European Society of Cardiology
European Heart Journal (2020) **41**, 3913–3920
doi:10.1093/eurheartj/ehaa070

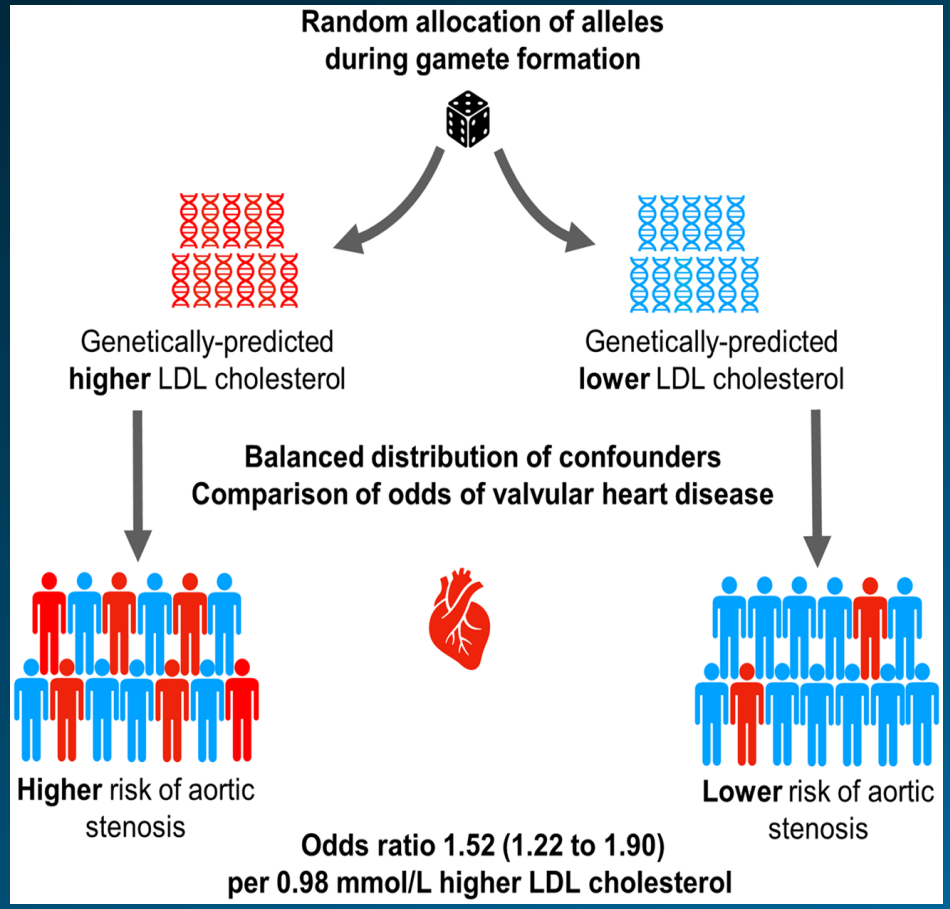
CLINICAL RESEARCH
Dyslipidaemias

Plasma lipids and risk of aortic valve stenosis: a Mendelian randomization study

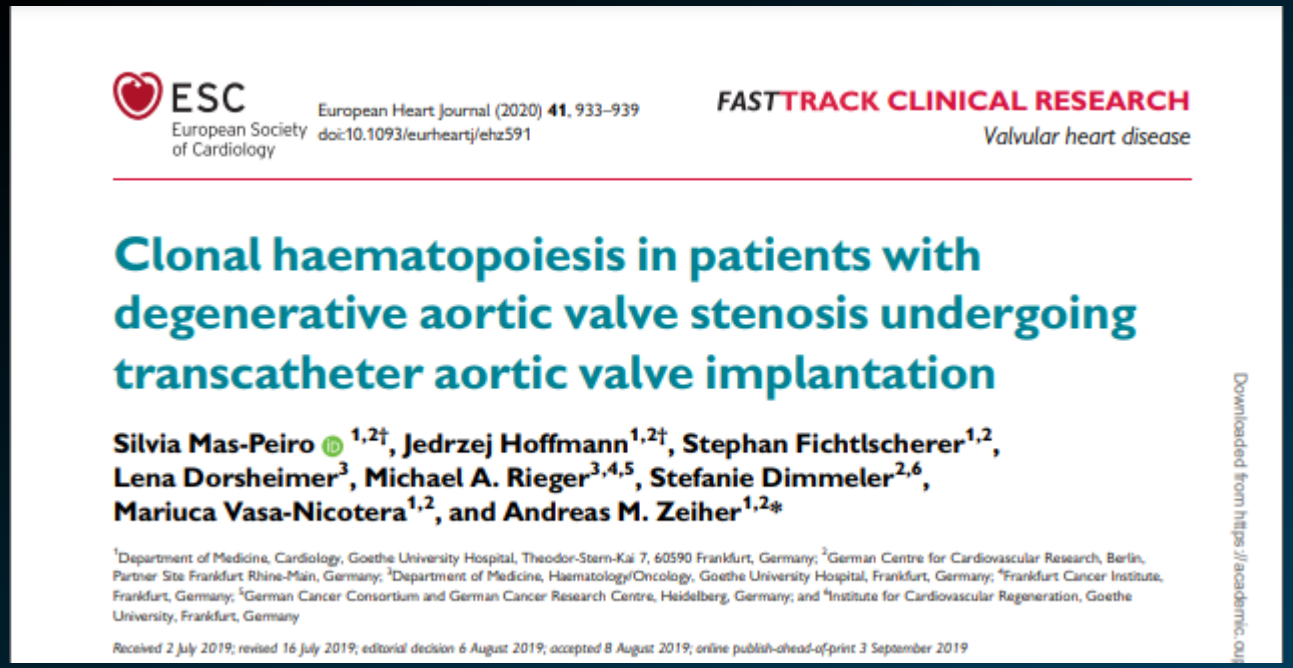
Milad Nazarzadeh [1,2,3], Ana-Catarina Pinho-Gomes [1,2], Zeinab Bidel[1,2,3], Abbas Dehghan [4], Dexter Canoy [1,2,5,6], Abdelaali Hassaine [1,2], Jose Roberto Ayala Solares [1,2], Gholamreza Salimi-Khorshidi [1,2], George Davey Smith [7], Catherine M. Otto [8], and Kazem Rahimi[1,2,5]*

[1]The George Institute for Global Health, University of Oxford, 1st Floor, Hayes House, 75 George Street, Oxford OX1 2BQ, UK; [2]Deep Medicine, Oxford Martin School, University of Oxford, Oxford, UK; [3]The Collaboration Center of Meta-Analysis Research, School of Health, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran; [4]Department of Biostatistics and Epidemiology, School of Public Health, Imperial College London, London, UK; [5]NIHR Oxford Biomedical Research Centre, Oxford University Hospitals NHS Foundation Trust, Oxford, UK; [6]Faculty of Medicine, University of New South Wales, Sydney, Australia; [7]MRC Integrative Epidemiology Unit, University of Bristol, Bristol, UK; and [8]University of Washington, Seattle, WA, USA

Received 10 July 2019; revised 9 October 2019; editorial decision 13 January 2020; accepted 29 January 2020; online publish-ahead-of-print 20 February 2020



Analysis of genetic variants ass'd with lipid levels~ 190K pts in UK Biobank



ESC European Society of Cardiology

European Heart Journal (2020) **41**, 933–939
doi:10.1093/eurheartj/ehz591

FASTTRACK CLINICAL RESEARCH
Valvular heart disease

Clonal haematopoiesis in patients with degenerative aortic valve stenosis undergoing transcatheter aortic valve implantation

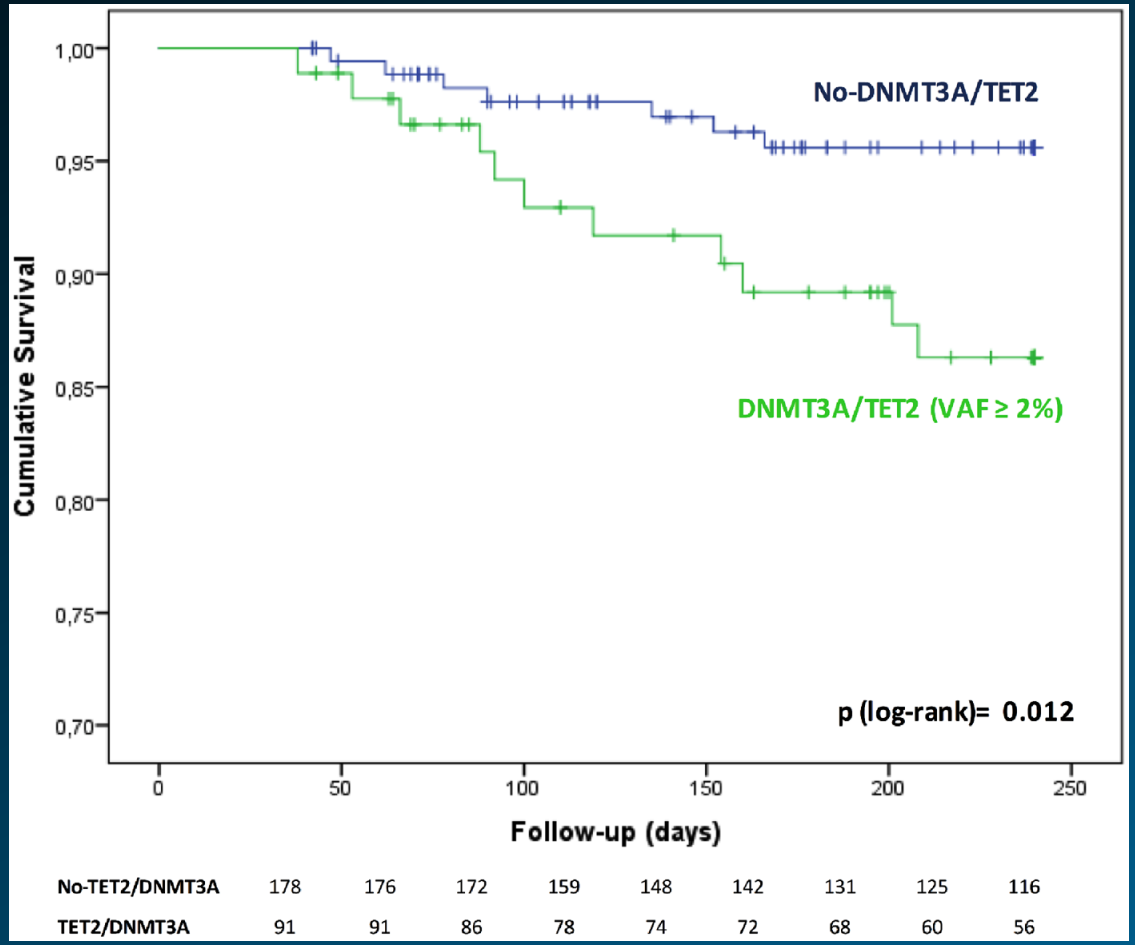
Silvia Mas-Peiro [1,2†], Jedrzej Hoffmann[1,2†], Stephan Fichtlscherer[1,2], Lena Dorsheimer[3], Michael A. Rieger[3,4,5], Stefanie Dimmeler[2,6], Mariuca Vasa-Nicotera[1,2], and Andreas M. Zeiher[1,2*]

[1]Department of Medicine, Cardiology, Goethe University Hospital, Theodor-Stern-Kai 7, 60590 Frankfurt, Germany; [2]German Centre for Cardiovascular Research, Berlin, Partner Site Frankfurt Rhine-Main, Germany; [3]Department of Medicine, Haematology/Oncology, Goethe University Hospital, Frankfurt, Germany; [4]Frankfurt Cancer Institute, Frankfurt, Germany; [5]German Cancer Consortium and German Cancer Research Centre, Heidelberg, Germany; and [6]Institute for Cardiovascular Regeneration, Goethe University, Frankfurt, Germany

Received 2 July 2019; revised 16 July 2019; editorial decision 6 August 2019; accepted 8 August 2019; online publish-ahead-of-print 3 September 2019

Acquired somatic mutations in the most commonly mutated clonal hematopoiesis of indeterminate potential (CHIP) - driver genes occur frequently in patients with severe AS, and confer a profound increase in mortality following successful TAVI.

Take home figure Overall survival of patients with DNMT3A- or TET2-CHIP-driver mutations



Eur Heart J, Volume 41, Issue 8, 21 February 2020, Pages 933–939, https://doi.org/10.1093/eurheartj/ehz591

ESC European Society of Cardiology

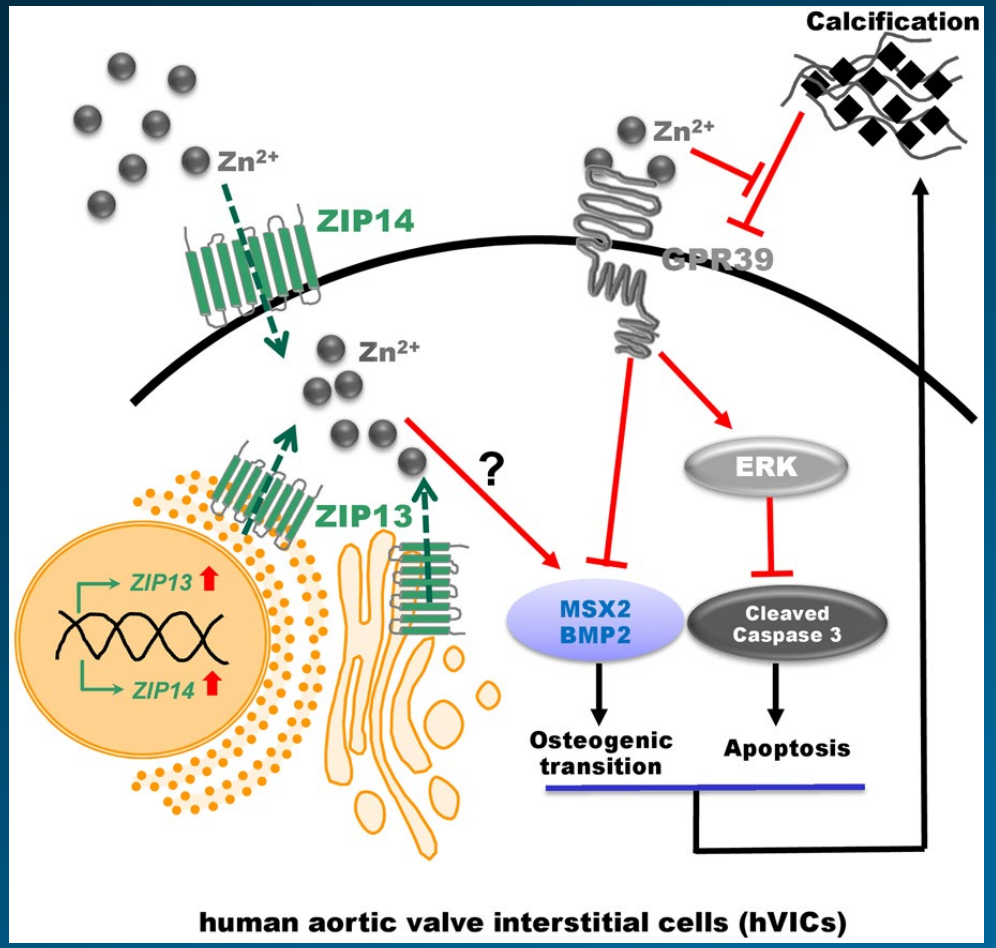
Cardiovascular Research (2021) **117**, 820–835
doi:10.1093/cvr/cvaa090

Zinc ameliorates human aortic valve calcification through GPR39 mediated ERK1/2 signalling pathway

Ziying Chen[1†], Flora Gordillo-Martinez[1†], Lei Jiang[2†], Pengcheng He[3], Wanzi Hong[3], Xuebiao Wei[3], Katherine A. Staines [4], Vicky E. Macrae[5], Chunxiang Zhang[6], Danqing Yu[3]*, Xiaodong Fu[1]*, and Dongxing Zhu [1]*

[1]Guangzhou Institute of Cardiovascular Disease, Guangdong Key Laboratory of Vascular Diseases, State Key Laboratory of Respiratory Disease, The Second Affiliated Hospital, Guangzhou Medical University, Guangzhou, Guangdong 510260, China; [2]Guangdong Geriatric Institute, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou 510080, China; [3]Department of Cardiology, Guangdong Cardiovascular Institute, Guangdong Provincial Key Laboratory of Coronary Heart Disease Prevention, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou 510100, China; [4]School of Applied Sciences, Edinburgh Napier University, Edinburgh EH11 4BN, UK; [5]The Roslin Institute, RDSVS, Easter Bush Campus, University of Edinburgh, Midlothian EH25 9RG, UK; and [6]Department of Biomedical Engineering, School of Medicine, The University of Alabama at Birmingham, Birmingham, AL 35233, USA

Received 5 December 2019; revised 11 February 2020; editorial decision 31 March 2020; accepted 1 April 2020; online publish-ahead-of-print 7 April 2020



AS Severity

	Mild	Moderate	Severe
Mean Gradient mmHg	<20	20-39	≥40
AVA cm^2	1.5 – 2.0	1-1.5	≤1.0
Peak gradient mmHg	<36	36-63	≥64

Normal aortic valve area = 3-4 cm^2

Mismatch between Gradient and AVA (AVAi) estimates of AS Severity are common

- Low “Flow” Low Gradient
  - Reduced EF
  - Preserved EF (Paradoxical)
- Low Gradient Normal “Flow”

- Flow captured by stroke volume
  - Cut-off 35 cc/m^2

Learn a new language or 2 or 3……

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JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

PUBLISHED BY ELSEVIER

CLINICAL PRACTICE GUIDELINE: FULL TEXT

2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease

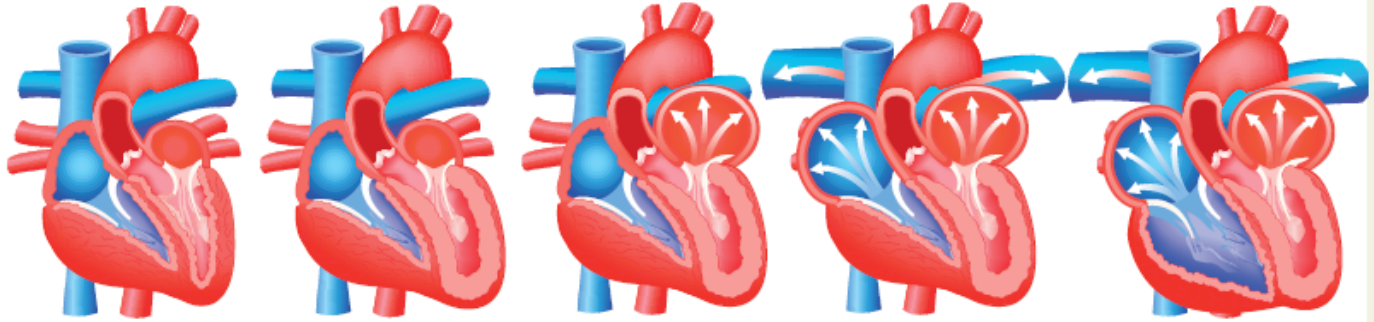
D: Symptomatic severe AS					
D1	Symptomatic severe high-gradient AS	Severe leaflet calcification/fibrosis or congenital stenosis with severely reduced leaflet opening	■ Aortic V_{max} ≥4 m/s or mean ΔP ≥40 mm Hg ■ AVA typically ≤1.0 cm^2 (or AVAi ≤0.6 cm^2/m^2) but may be larger with mixed AS/AR	■ LV diastolic dysfunction ■ LV hypertrophy ■ Pulmonary hypertension may be present	■ Exertional dyspnea, decreased exercise tolerance, or HF ■ Exertional angina ■ Exertional syncope or presyncope
D2	Symptomatic severe low-flow, low-gradient AS with reduced LVEF	Severe leaflet calcification/fibrosis with severely reduced leaflet motion	■ AVA ≤1.0 cm^2 with resting aortic V_{max} <4 m/s or mean ΔP <40 mm Hg ■ Dobutamine stress echocardiography shows AVA <1.0 cm^2 with V_{max} ≥4 m/s at any flow rate	■ LV diastolic dysfunction ■ LV hypertrophy ■ LVEF <50%	■ HF ■ Angina ■ Syncope or presyncope
D3	Symptomatic severe low-gradient AS with normal LVEF or paradoxical low-flow severe AS	Severe leaflet calcification/fibrosis with severely reduced leaflet motion	■ AVA ≤1.0 cm^2 (indexed AVA ≤0.6 cm^2/m^2) with an aortic V_{max} <4 m/s or mean ΔP <40 mm Hg AND ■ Stroke volume index <35 mL/m^2 ■ Measured when patient is normotensive (systolic blood pressure <140 mm Hg)	■ Increased LV relative wall thickness ■ Small LV chamber with low stroke volume ■ Restrictive diastolic filling ■ LVEF ≥50%	■ HF ■ Angina ■ Syncope or presyncope

1	B-NR	4. In symptomatic patients with low-flow, low-gradient severe AS with reduced LVEF (Stage D2), AVR is recommended (17–24).
1	B-NR	5. In symptomatic patients with low-flow, low-gradient severe AS with normal LVEF (Stage D3), AVR is recommended if AS is the most likely cause of symptoms (25–27).

ESC European Society of Cardiology
European Heart Journal (2017) 38, 3351–3358
doi:10.1093/eurheartj/ehx381

Staging classification of aortic stenosis based on the extent of cardiac damage

Philippe Généreux[1,2,3], Philippe Pibarot[4], Björn Redfors[1,5], Michael J. Mack[6], Raj R. Makkar[7], Wael A. Jaber[8], Lars G. Svensson[8], Samir Kapadia[8], E. Murat Tuzcu[8], Vinod H. Thourani[9], Vasilis Babaliaros[9], Howard C. Herrmann[10], Wilson Y. Szeto[10], David J. Cohen[11], Brian R. Lindman[12], Thomas McAndrew[1], Maria C. Alu[13], Pamela S. Douglas[14], Rebecca T. Hahn[1,13], Susheel K. Kodali[1,13], Craig R. Smith[13], D. Craig Miller[15], John G. Webb[16], and Martin B. Leon[1,13]*



Stages/Criteria	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
	No Cardiac Damage	LV Damage	LA or Mitral Damage	Pulmonary Vasculature or Tricuspid Damage	RV Damage
Echocardiogram		Increased LV Mass Index >115 g/m² (Male) >95 g/m² (Female)	Indexed left atrial volume >34mL/m²	Systolic Pulmonary hypertension ≥60 mmhg	Moderate-Severe right ventricular dysfunction
		E/e' >14	Moderate-Severe mitral regurgitation	Moderate-Severe tricuspid regurgitation	
		LV Ejection Fraction <50%	Atrial Fibrillation		

Figure 1 Cardiac stratification of aortic stenosis based on the extent of cardiac damage. LA, left atrial; LV, left ventricular; RV, right ventricular.

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The Journal of Thoracic and Cardiovascular Surgery
Volume 133, Issue 5, May 2007, Pages 1226-1233

Surgery for acquired cardiovascular disease

A classification system for the bicuspid aortic valve from 304 surgical specimens

Hans-H. Sievers MD, Claudia Schmidtke MD, MBA

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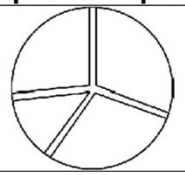
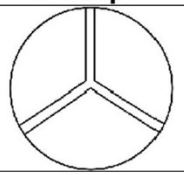
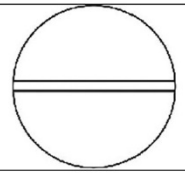
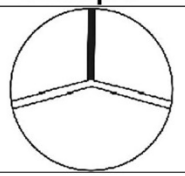
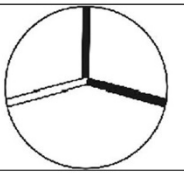
Commonly used terms		quadricuspid	tricuspid	bicuspid		
Scheme of morphological appearance						
functional characteristics	No of cusps	4	3	2	2	2
morphological characteristics	No of raphes	0	0	0	1	2
	No of cusps	4	3	purely bicuspid*	potentially tricuspid*	
				2	3 anlagen, (2 under- and 1 fully developed)	3 anlagen, (2 under- and 1 fully developed)
	Size of cusps	non-equal	equal	equal	non-equal	non-equal
	No of commissures	4	3	2	1 under- and 2 fully developed	2 under- and 1 fully developed

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Treatment

The decade of TAVR

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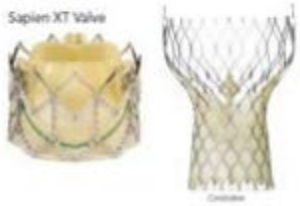
Partner 1 and CoreValve

High Risk / Inoperable

2007

Partner 2 and SURTAVI



Intermediate Risk

2011

FDA Approval:

High Risk / Inoperable

2011

FDA approval:

Intermediate Risk

2016

Partner 3 and Evolute Trials

Low Risk FDA Approval

2019

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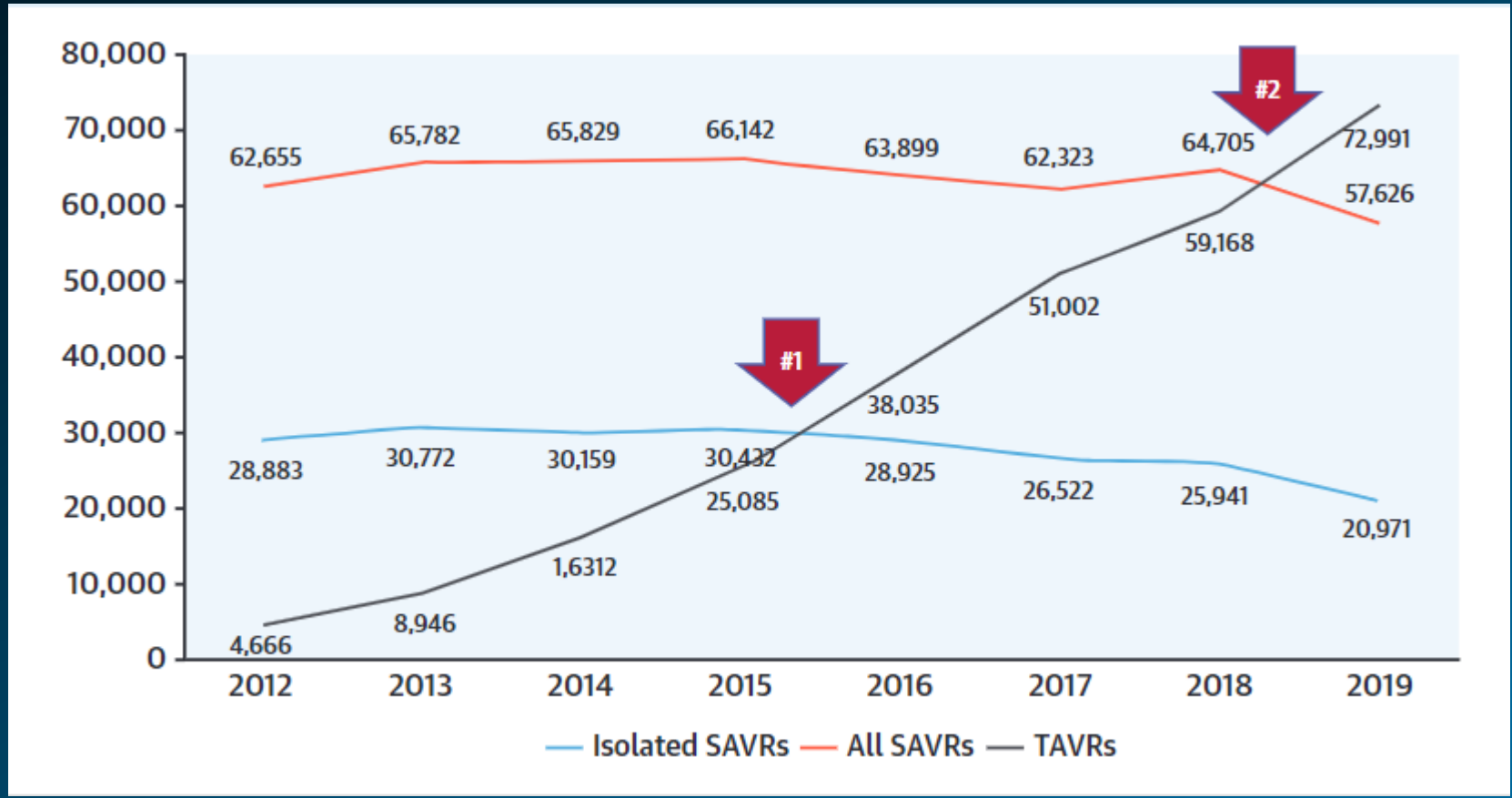
TAVR Has Now Passed Isolated and All SAVRs in the US Market



Carroll J, et all. JACC 2020

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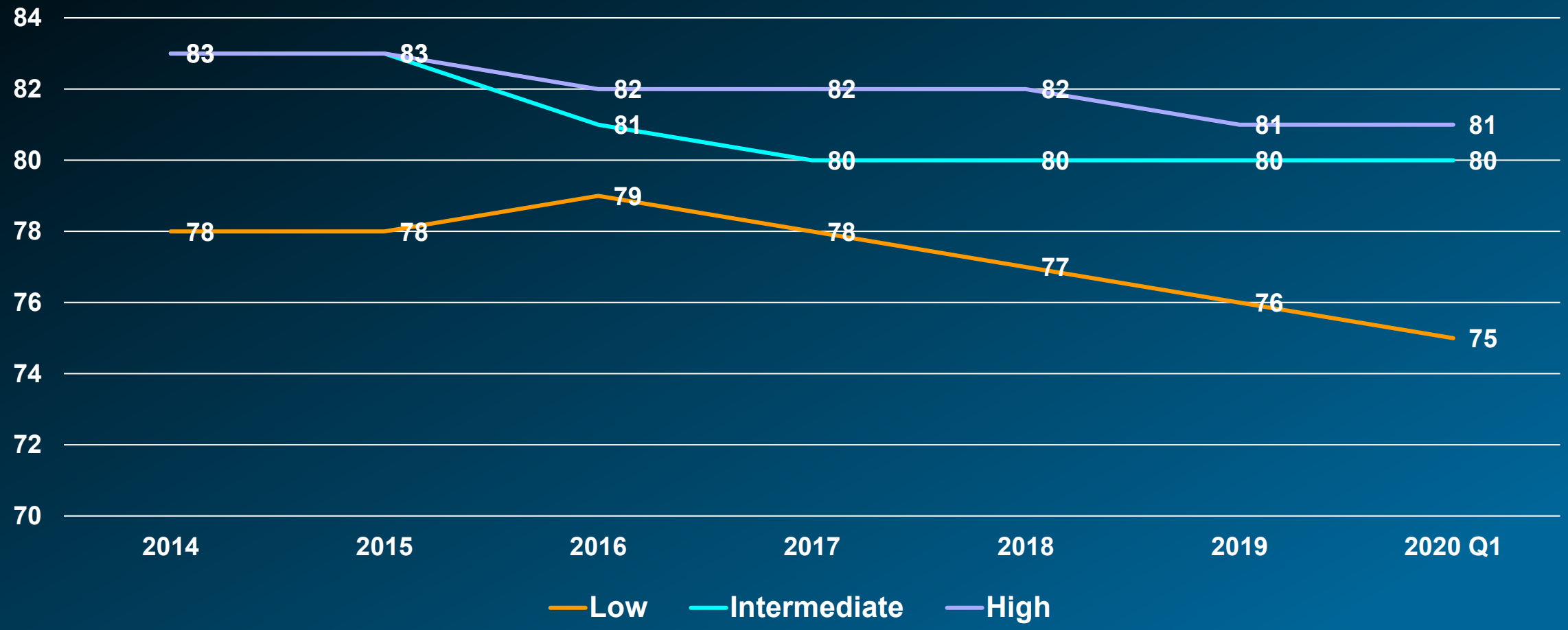
TAVR: Median Age



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When to treat

Asymptomatic severe AS?, Symptomatic moderate AS?

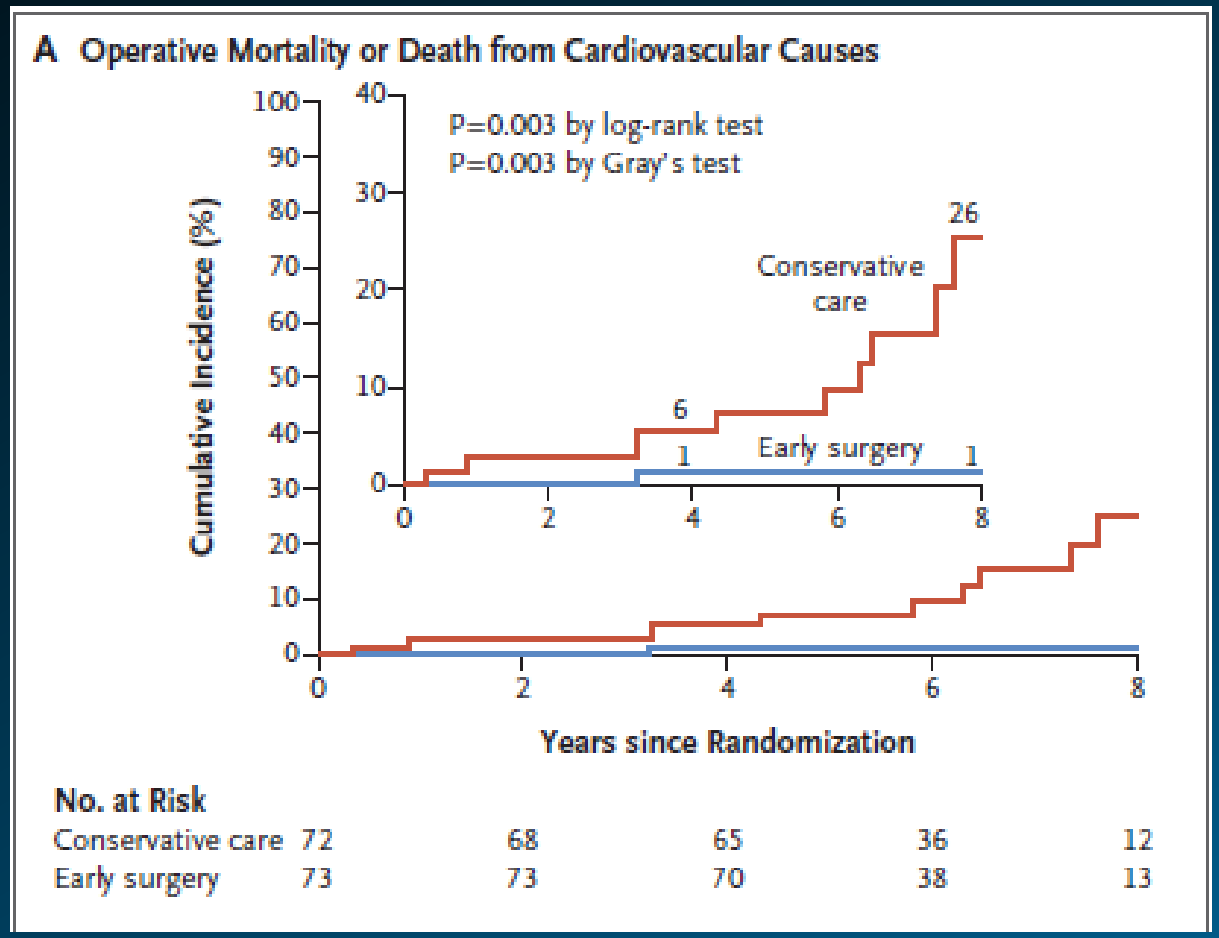
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 9, 2020 VOL. 382 NO. 2

Early Surgery or Conservative Care for Asymptomatic Aortic Stenosis

Duk-Hyun Kang, M.D., Ph.D., Sung-Ji Park, M.D., Ph.D., Seung-Ah Lee, M.D., Sahmin Lee, M.D., Ph.D., Dae-Hee Kim, M.D., Ph.D., Hyung-Kwan Kim, M.D., Ph.D., Sung-Cheol Yun, Ph.D., Geu-Ru Hong, M.D., Ph.D., Jong-Min Song, M.D., Ph.D., Cheol-Hyun Chung, M.D., Ph.D., Jae-Kwan Song, M.D., Ph.D., Jae-Won Lee, M.D., Ph.D., and Seung-Woo Park, M.D., Ph.D.

- RECOVERY trial: randomized prospective
  - n= 145 with very severe AS
  - SAVR vs medical management
  - Severe asymptomatic AS (no stress test)
    - AVA ≤0.75 cm2 peak velocity ≥4.5mps, mean ≥50mmHg
  - Intention to treat



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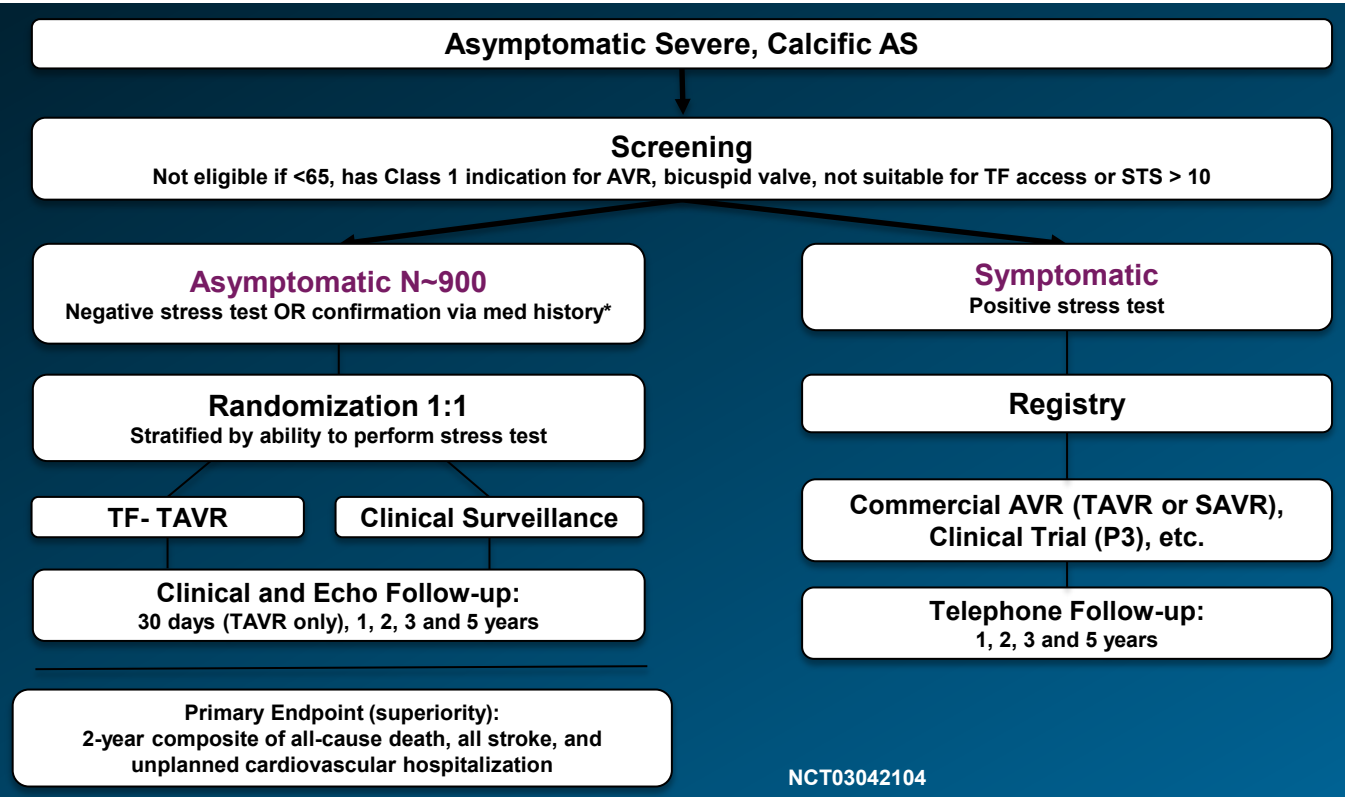
Severe AS No Symptoms: Ongoing Randomized Trials

- EARLY-TAVR trial TAVR or medical management (stress testing)
- EVOLVED trial (fibrosis, TAVR or SAVR)
- AVATAR trial (Serbia SAVR)
- ESTIMATE trial (SAVR)

THE EARLY TAVR TRIAL



NCT03042104

Principal Investigator: Philippe Généreux, MD,
Chair: Martin B. Leon, MD

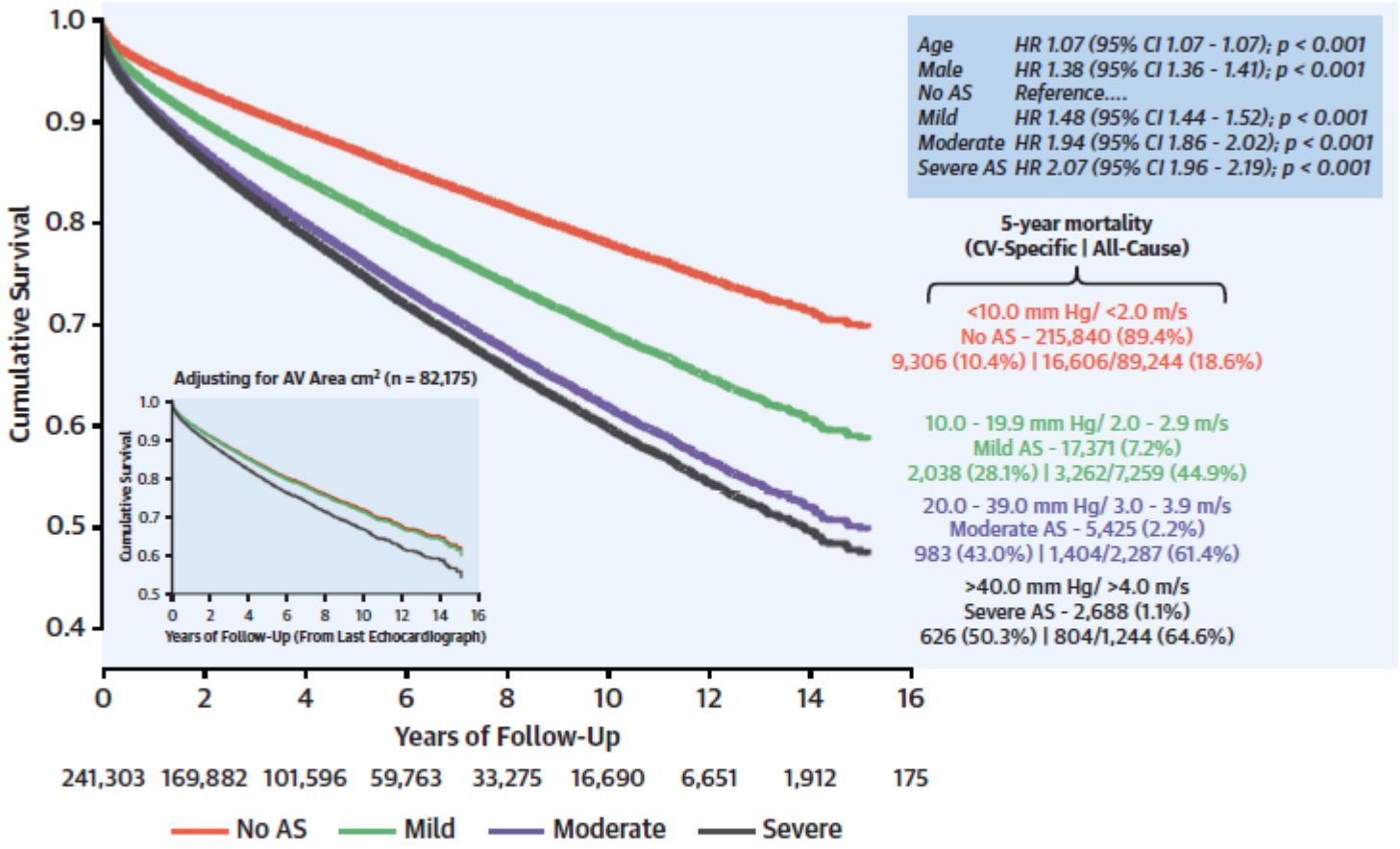
Enrollment Completed

ORIGINAL INVESTIGATIONS

Poor Long-Term Survival in Patients With Moderate Aortic Stenosis

Geoff Strange, PhD,[a] Simon Stewart, PhD,[b] David Celermajer, MD, PhD,[c] David Prior, MBBS, PhD,[d] Gregory M. Scalia, MBBS (Hons), MMedSc,[e] Thomas Marwick, MBBS, PhD,[f] Marcus Ilton, MD,[g] Majo Joseph, MBBS,[h] Jim Codde, PhD,[i] David Playford, MBBS, PhD,[a] on behalf of the National Echocardiography Database of Australia contributing sites

FIGURE 3 Adjusted Long-Term Survival According to Severity of AS Derived From Mean AV Gradient and Peak AV Velocity Levels

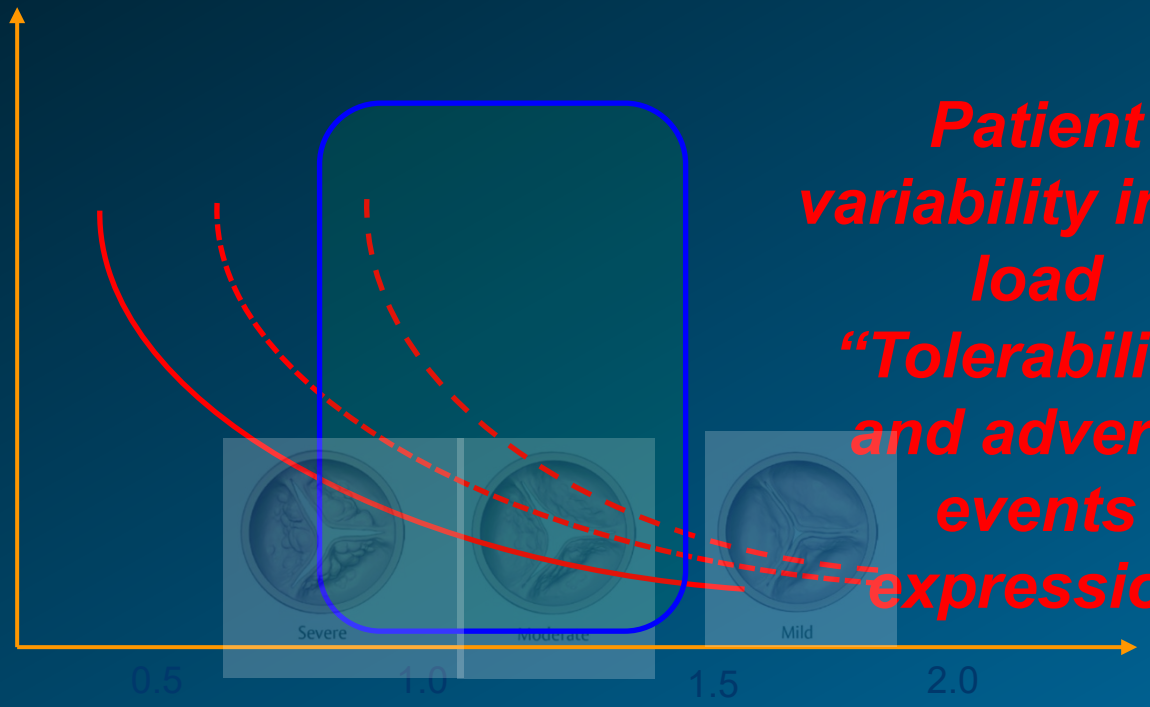


This graph compares the adjusted survival curves of individuals with increasing categories of aortic stenosis (AS). The **inset** shows those survival curves derived from the same model but with the aortic valve (AV) area added as a continuous variable (data were available in 82,175 individuals – adjusted hazard ratio (HR): 0.76; 95% confidence interval (CI): 0.74 to 0.77 per unit decrease; $p < 0.001$. An additional model with stroke volume index data added (available in 52,151 individuals – adjusted hazard ratio: 0.97; 95% confidence interval: 0.97 to 0.98 per unit decrease; $p < 0.001$) did not substantially change initial observations. CV = cardiovascular; Q = quintile.

Why Targeting Moderate AS Patient for Treatment?

At What Severity of Aortic Stenosis do Adverse Cardiac Events Occur?

Adverse Events
- Mortality
- Valve-related symptoms
- Cardiac damage



Patient variability in AS load "Tolerability" and adverse events expression

Aortic Valve Area (AVA cm^2)

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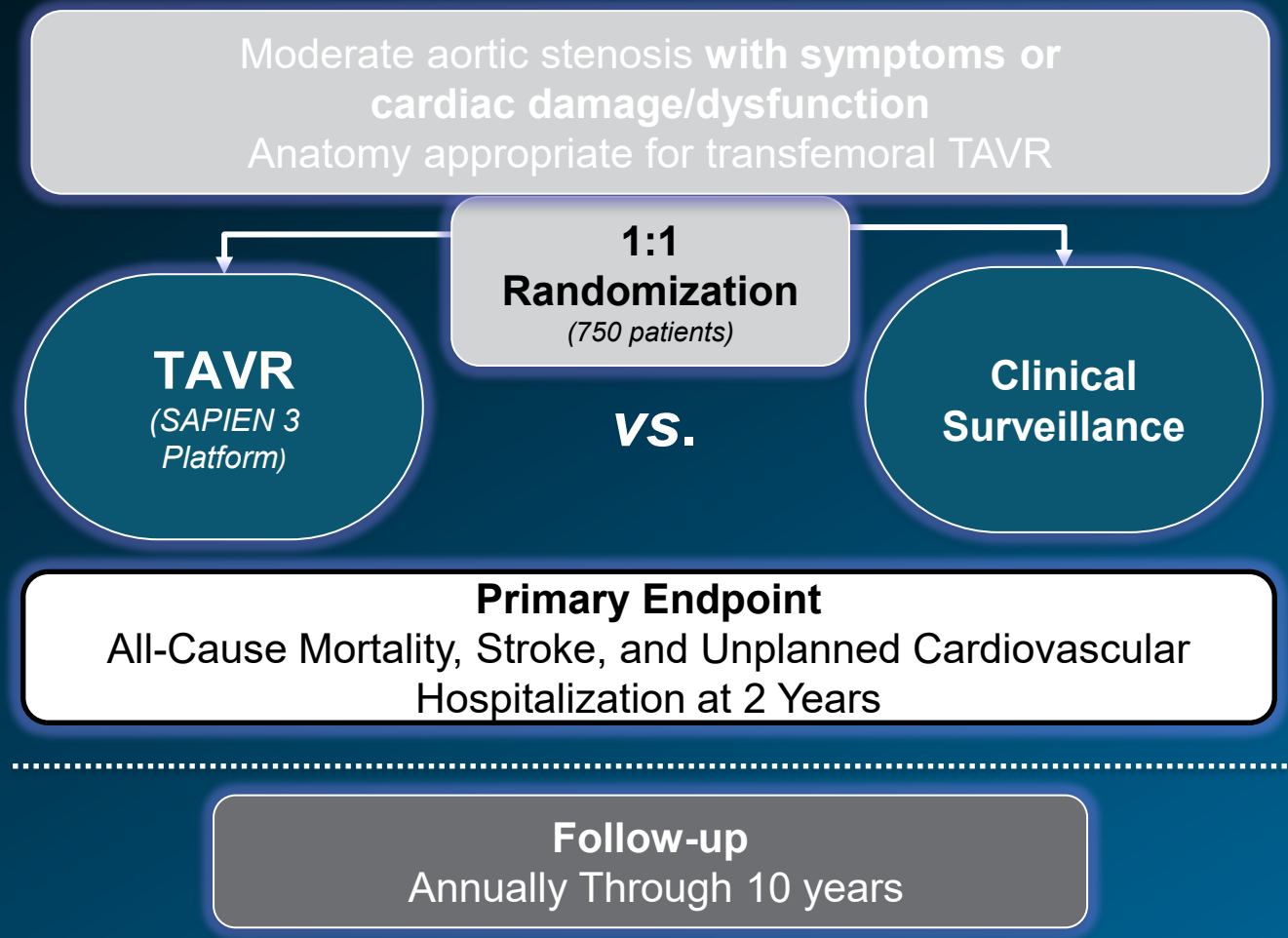
Study Design

Study Design

THE PROGRESS TRIAL



Global PI: Philippe Genereux, MD
National PI: Raj Makkar MD, Jeroen Bax, MD
Chairman: Martin Leon, MD

Enrollment Started Nov 2021

Aortic Stenosis Spectrum:
Future TAVR Indications

Mild AS	Moderate AS Symptoms -	Moderate AS Symptoms +	Severe AS Symptoms -	Severe AS Symptoms +
				TAVR vs. SAVR Trials

~2023

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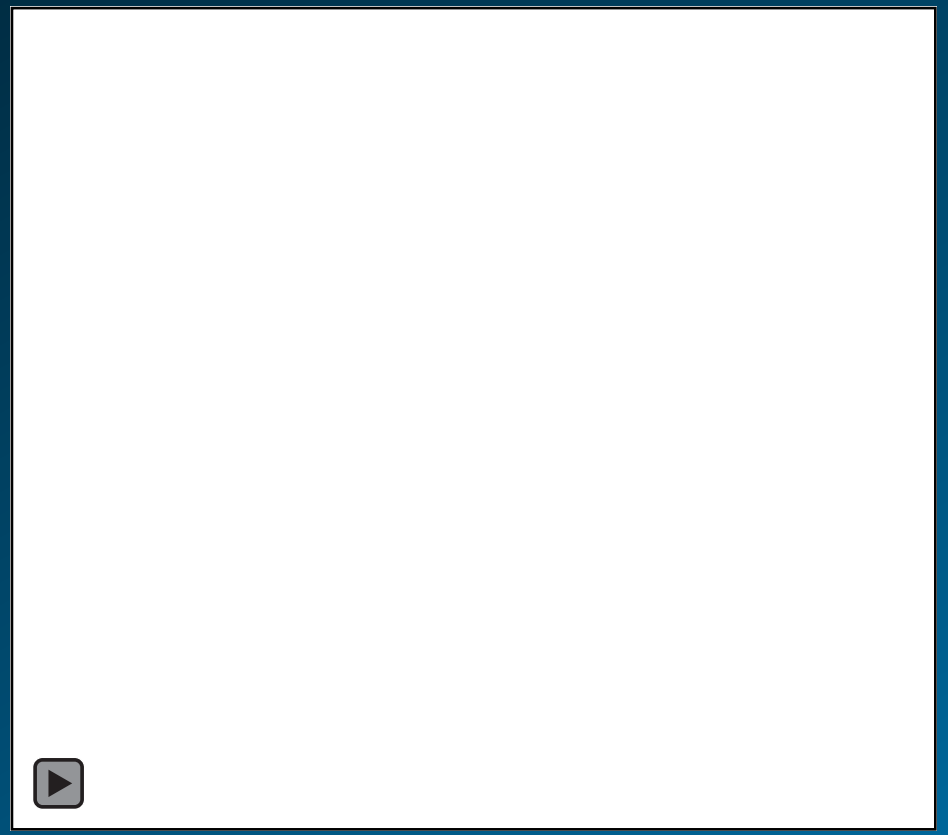
Mitral Regurgitation



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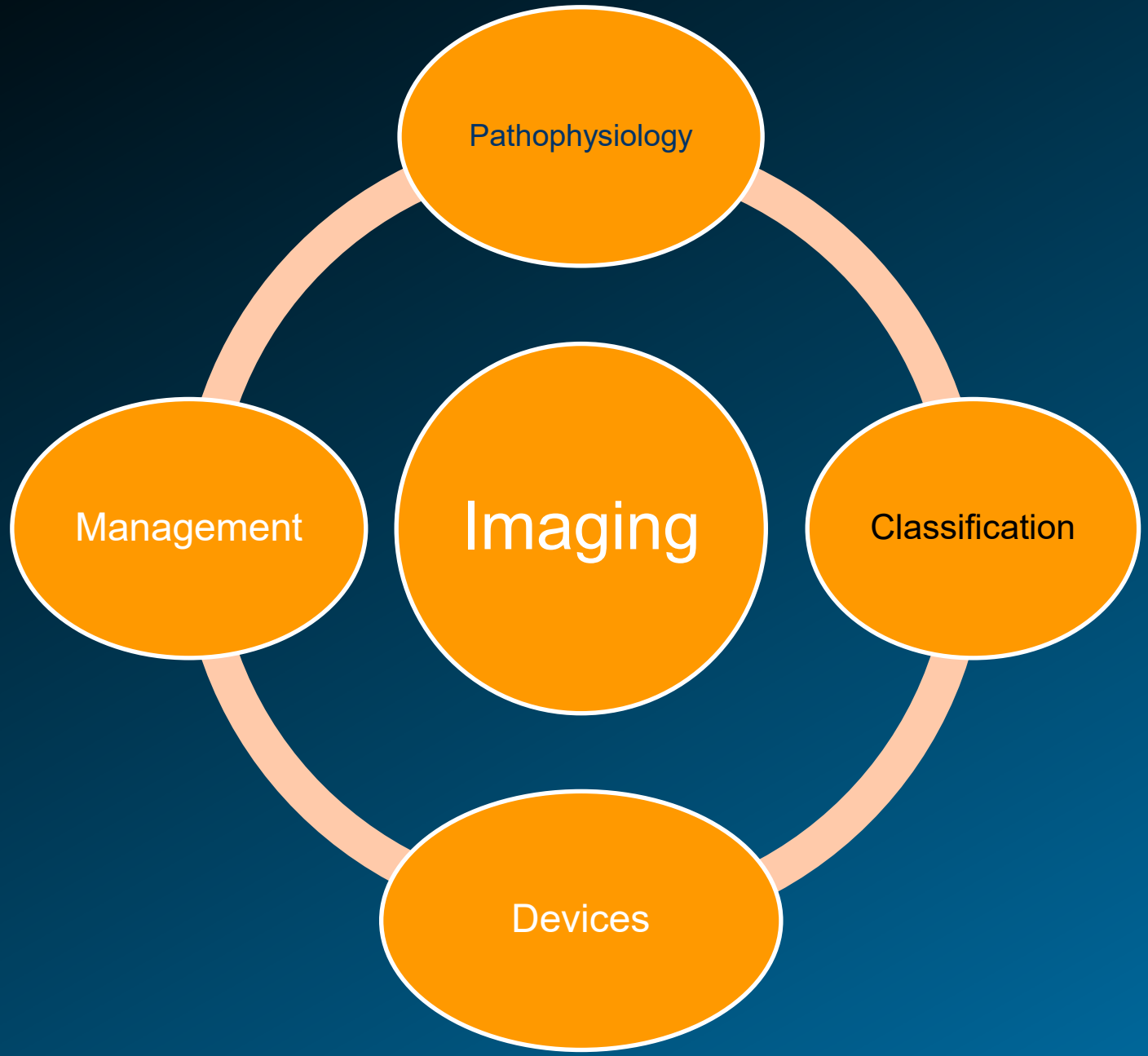

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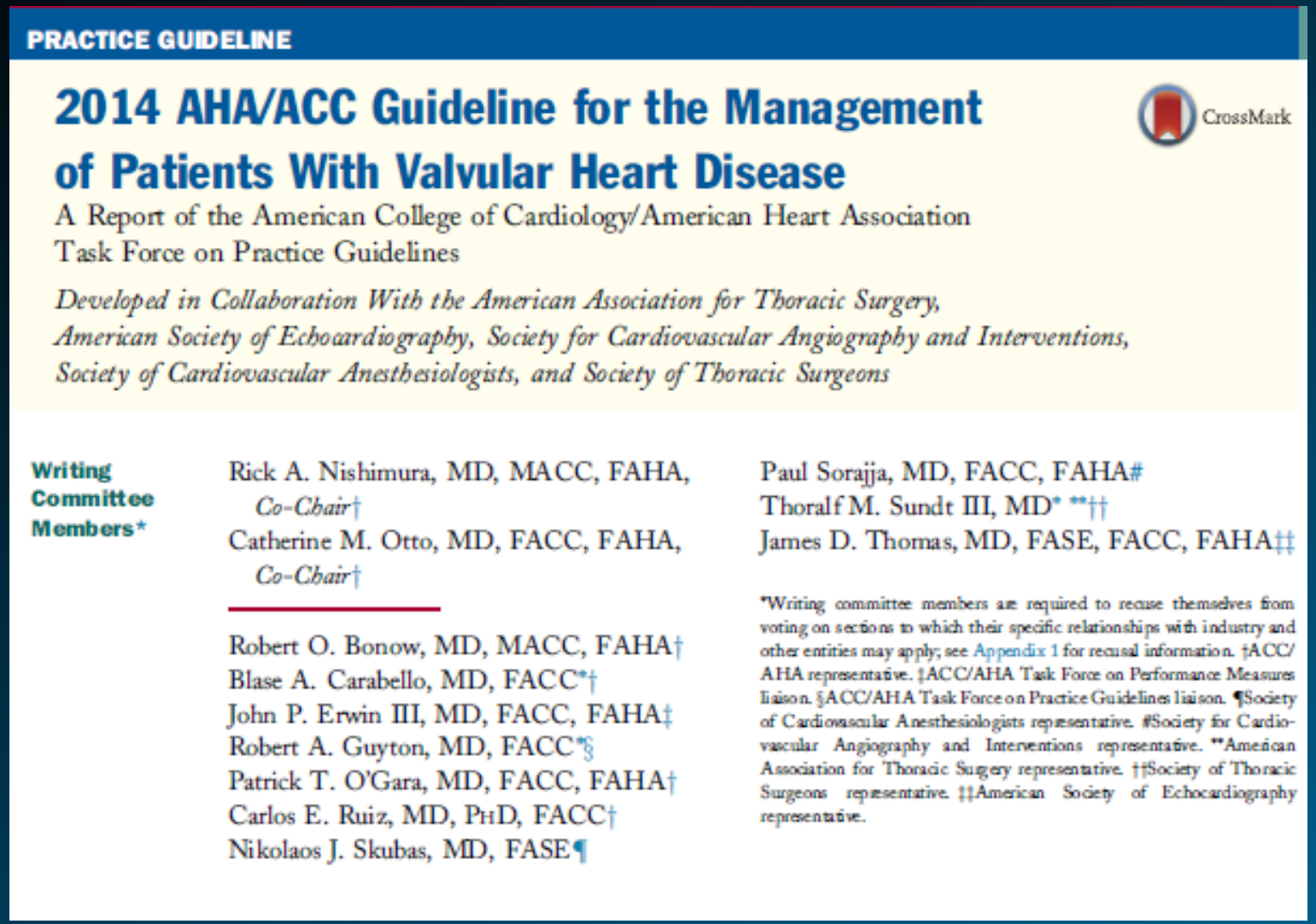

PRACTICE GUIDELINE

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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Introduced primary and secondary (functional) MR

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Primary MR is a disease of the valve

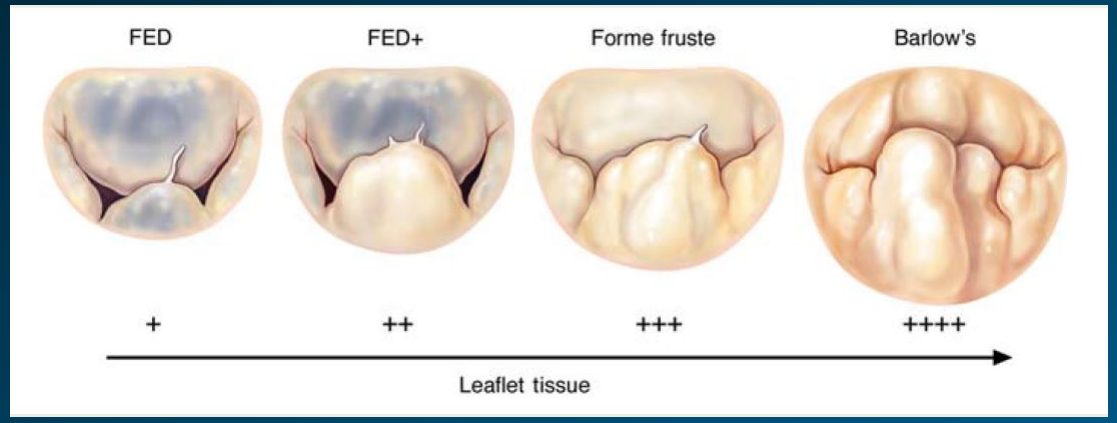
Secondary MR is a disease of the ventricle (or the atrium)

- Primary and secondary mitral regurgitation are fundamentally different diseases
  - Pathophysiology
  - Prognosis
  - Approaches to Management

Primary

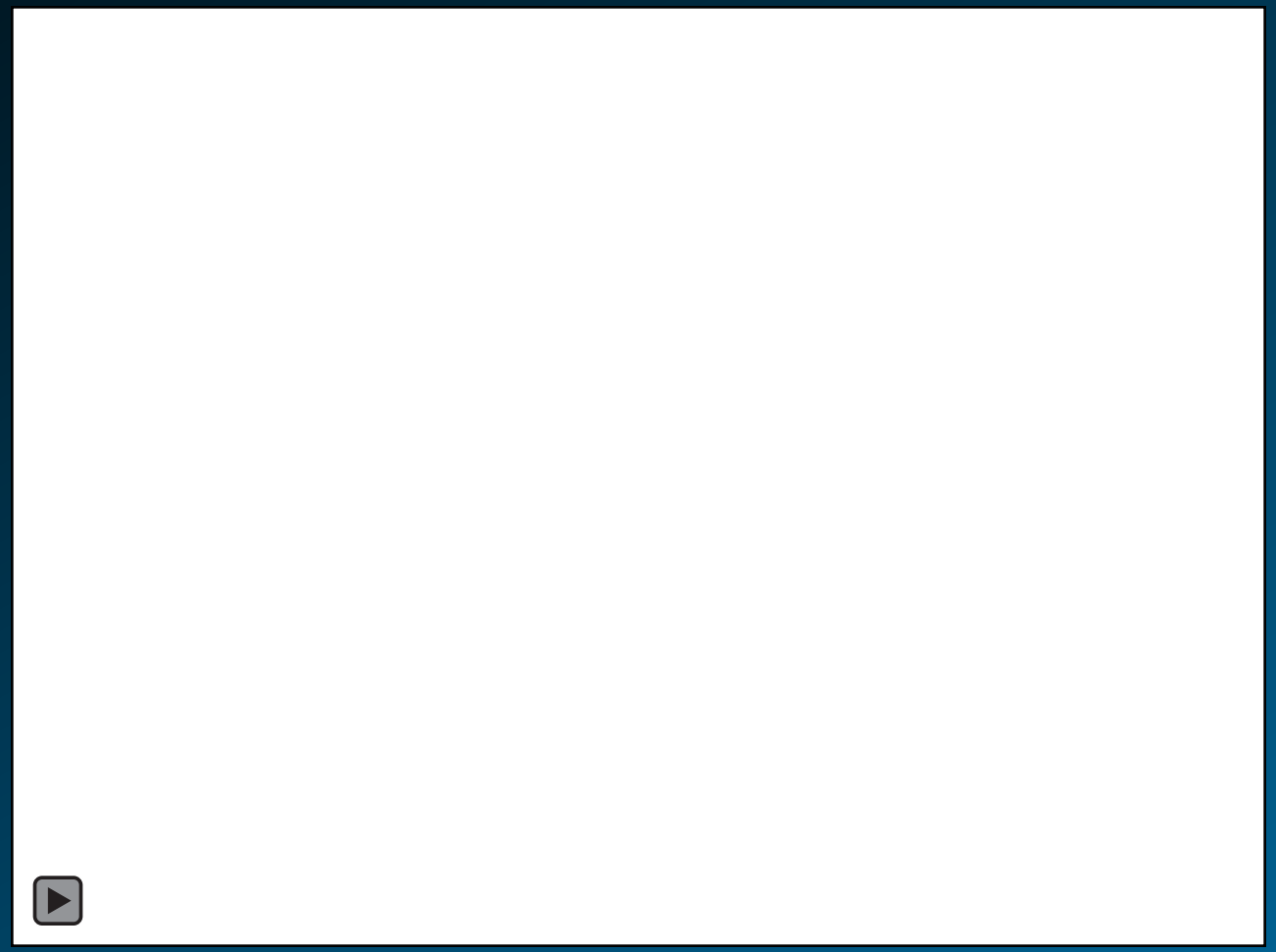
- Degenerative (mitral prolapse/flail)
- Rheumatic
- Mitral annular calcification
- Endocarditis etc.

Spectrum of degenerative MR



Adams EHJ 2010

Fibroelastic Deficiency



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Barlow's

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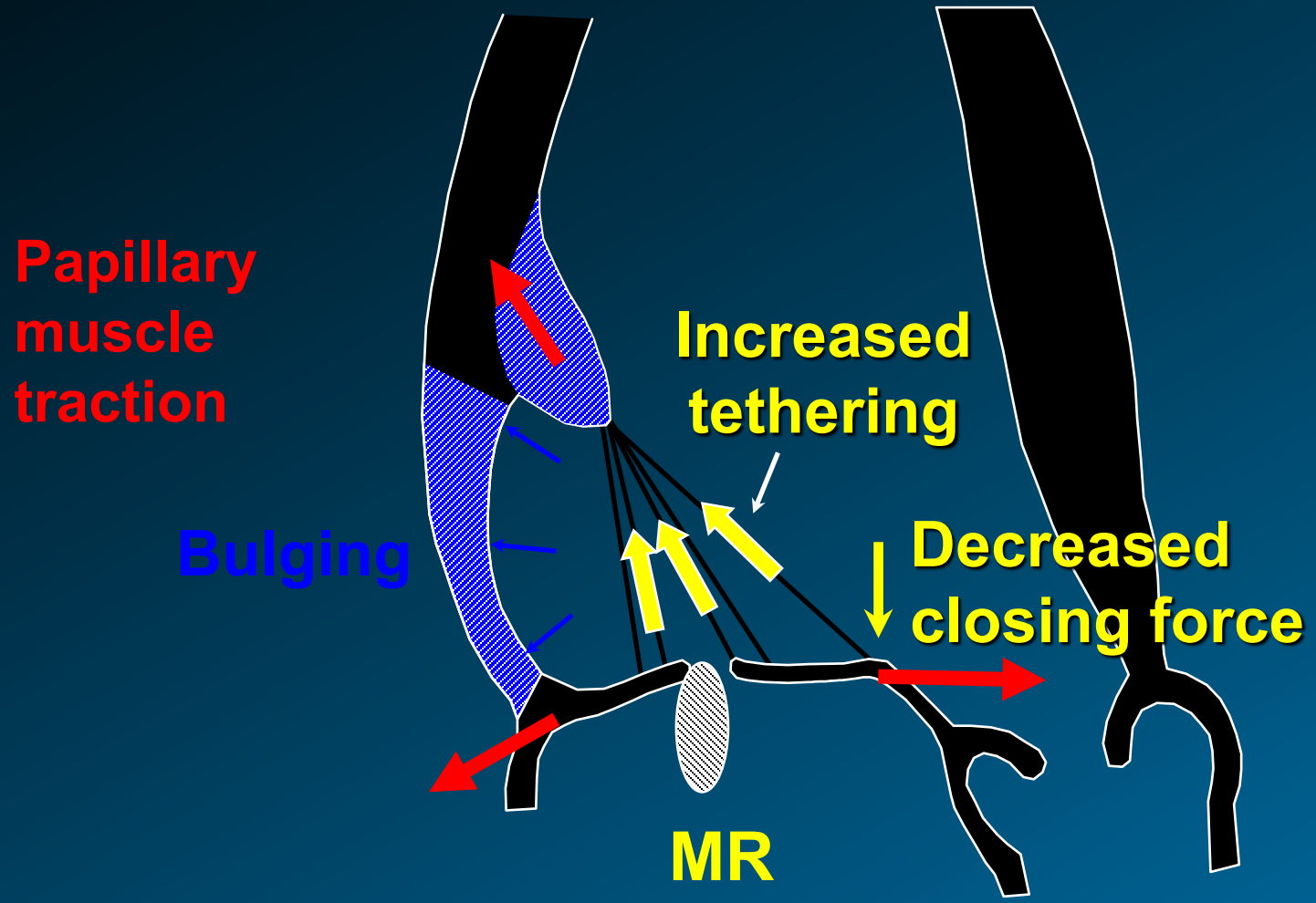
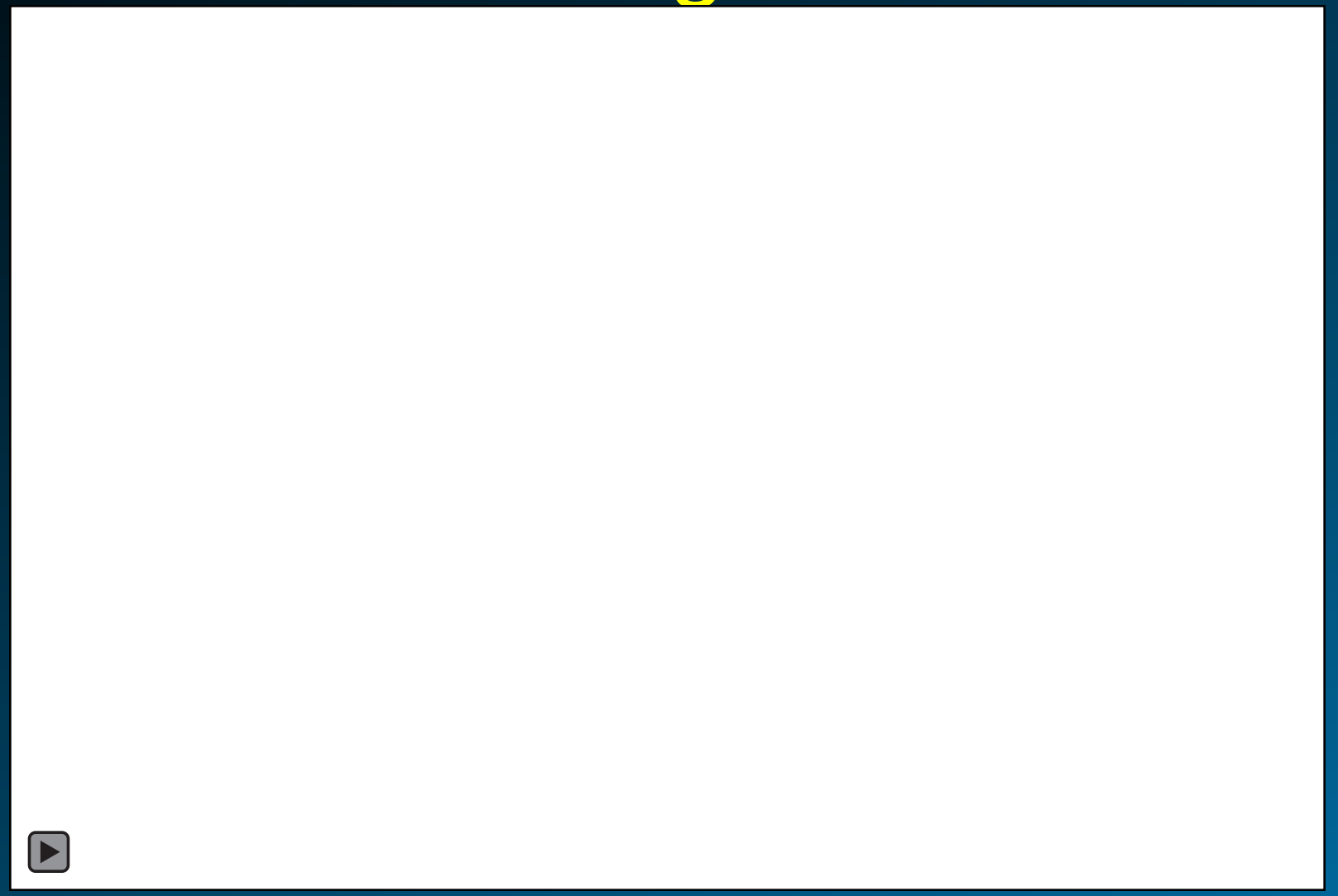
Secondary (Functional) MR

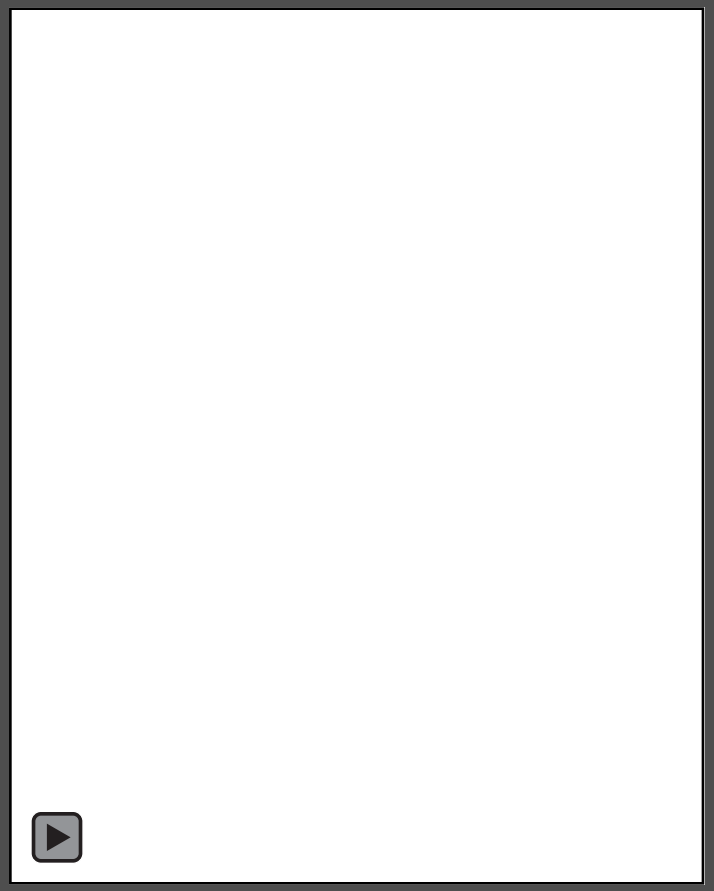
- Left ventricular dysfunction and/or remodeling (ventriculogenic)
  - Ischemic
  - Non-ischemic
- Atrial functional MR (atriogenic) e.g. chronic atrial fibrillation

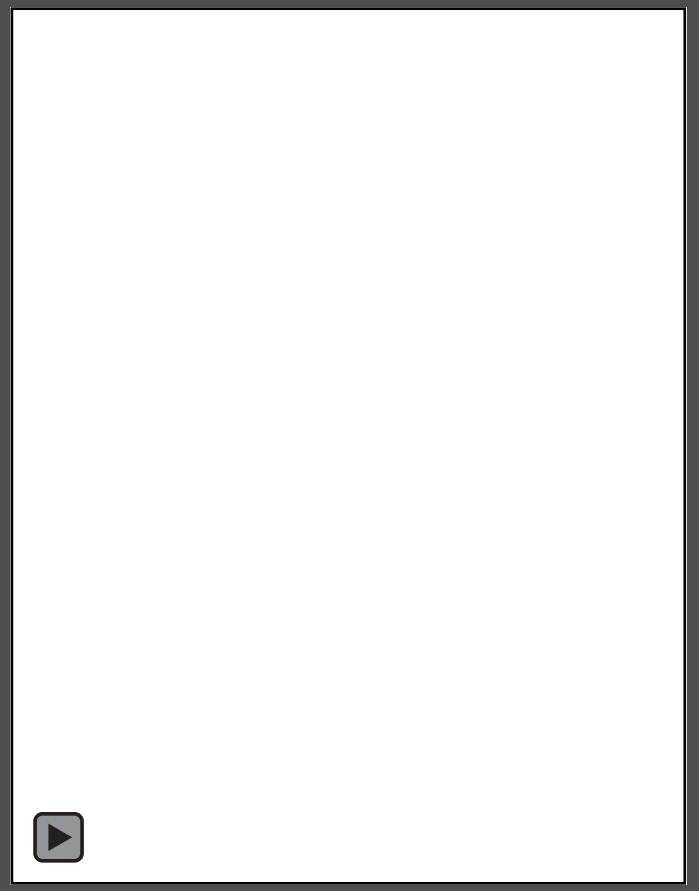
Mechanisms of Secondary Mitral Regurgitation



Ventriculogenic FMR







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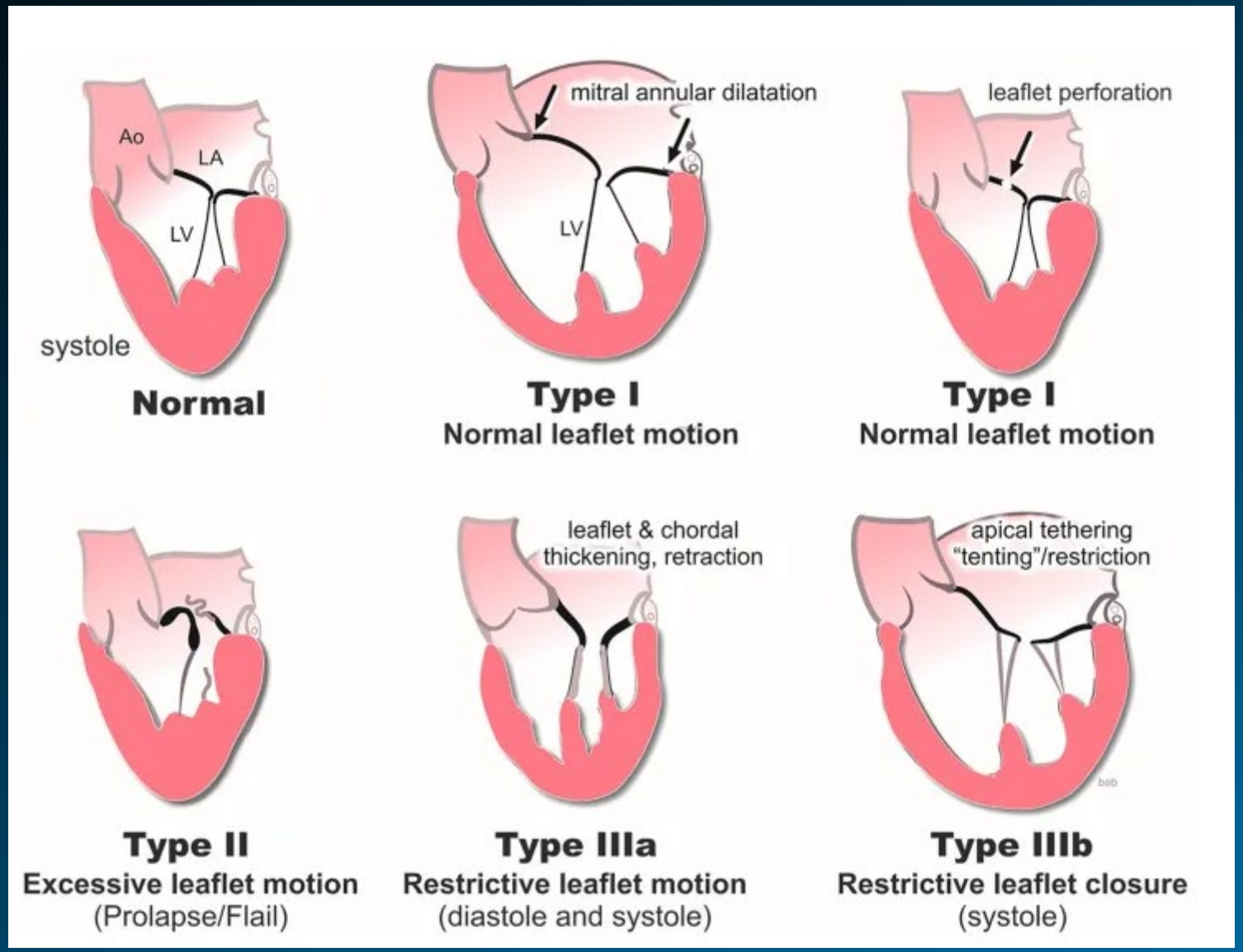
Mitral Regurgitation 200

The Carpentier pathophysiologic classification based on leaflet motion



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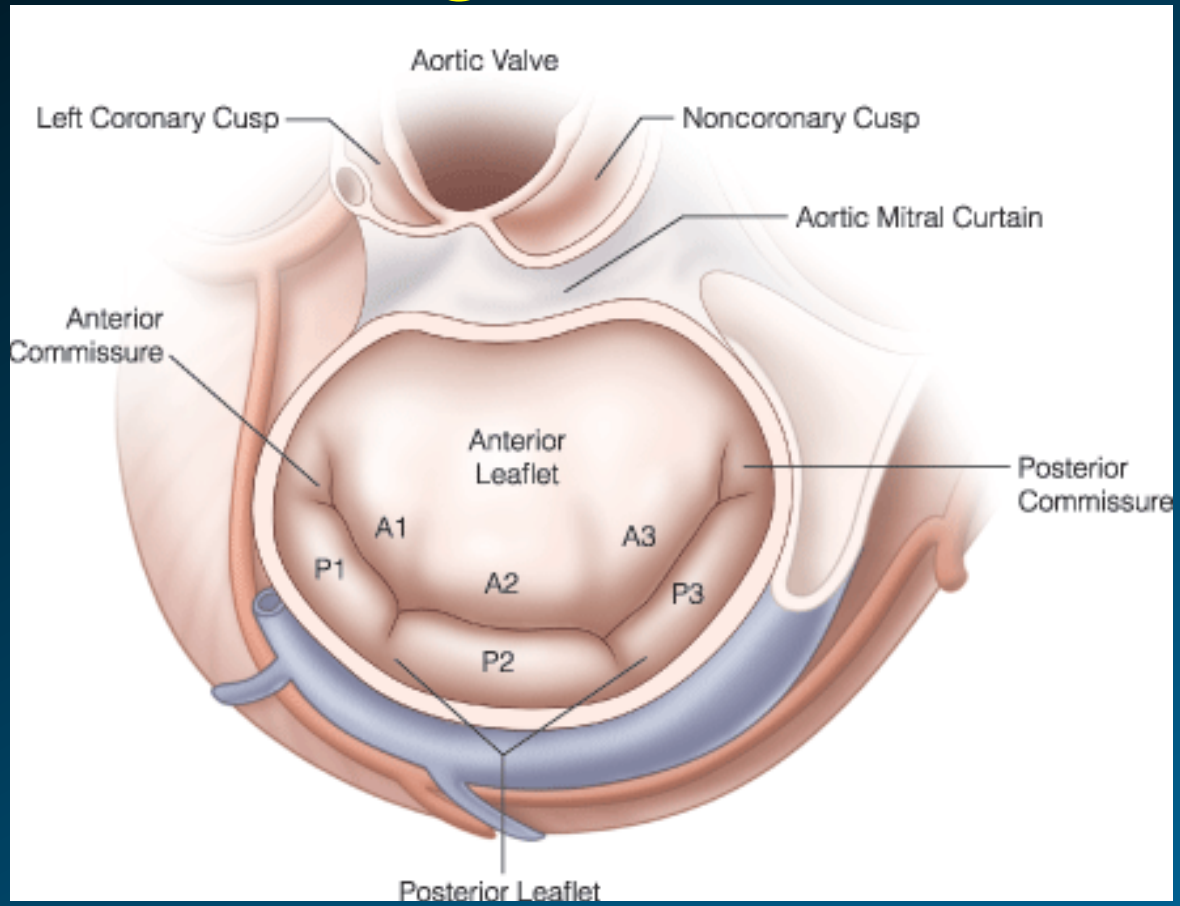
Anatomic Nomenclature 100

Surgical View



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Important because of implications for repair

Classification based on severity

- Echocardiography is the work horse
  - Expanding understanding of core measures
- Expanding role for cardiac MRI

Use an Integrated Approach
2017 ASE Guidelines

ASE GUIDELINES AND STANDARDS

Recommendations for Noninvasive Evaluation of Native Valvular Regurgitation

A Report from the American Society of Echocardiography Developed in Collaboration with the Society for Cardiovascular Magnetic Resonance

William A. Zoghbi, MD, FASE (Chair), David Adams, RCS, RDCS, FASE, Robert O. Bonow, MD, Maurice Enriquez-Sarano, MD, Elyse Foster, MD, FASE, Paul A. Grayburn, MD, FASE, Rebecca T. Hahn, MD, FASE, Yuchi Han, MD, MMSc,* Judy Hung, MD, FASE, Roberto M. Lang, MD, FASE, Stephen H. Little, MD, FASE, Dipan J. Shah, MD, MMSc,* Stanton Shernan, MD, FASE, Paaladinesh Thavendiranathan, MD, MSc, FASE,* James D. Thomas, MD, FASE, and Neil J. Weissman, MD, FASE, *Houston and Dallas, Texas; Durham, North Carolina; Chicago, Illinois; Rochester, Minnesota; San Francisco, California; New York, New York; Philadelphia, Pennsylvania; Boston, Massachusetts; Toronto, Ontario, Canada; and Washington, DC*

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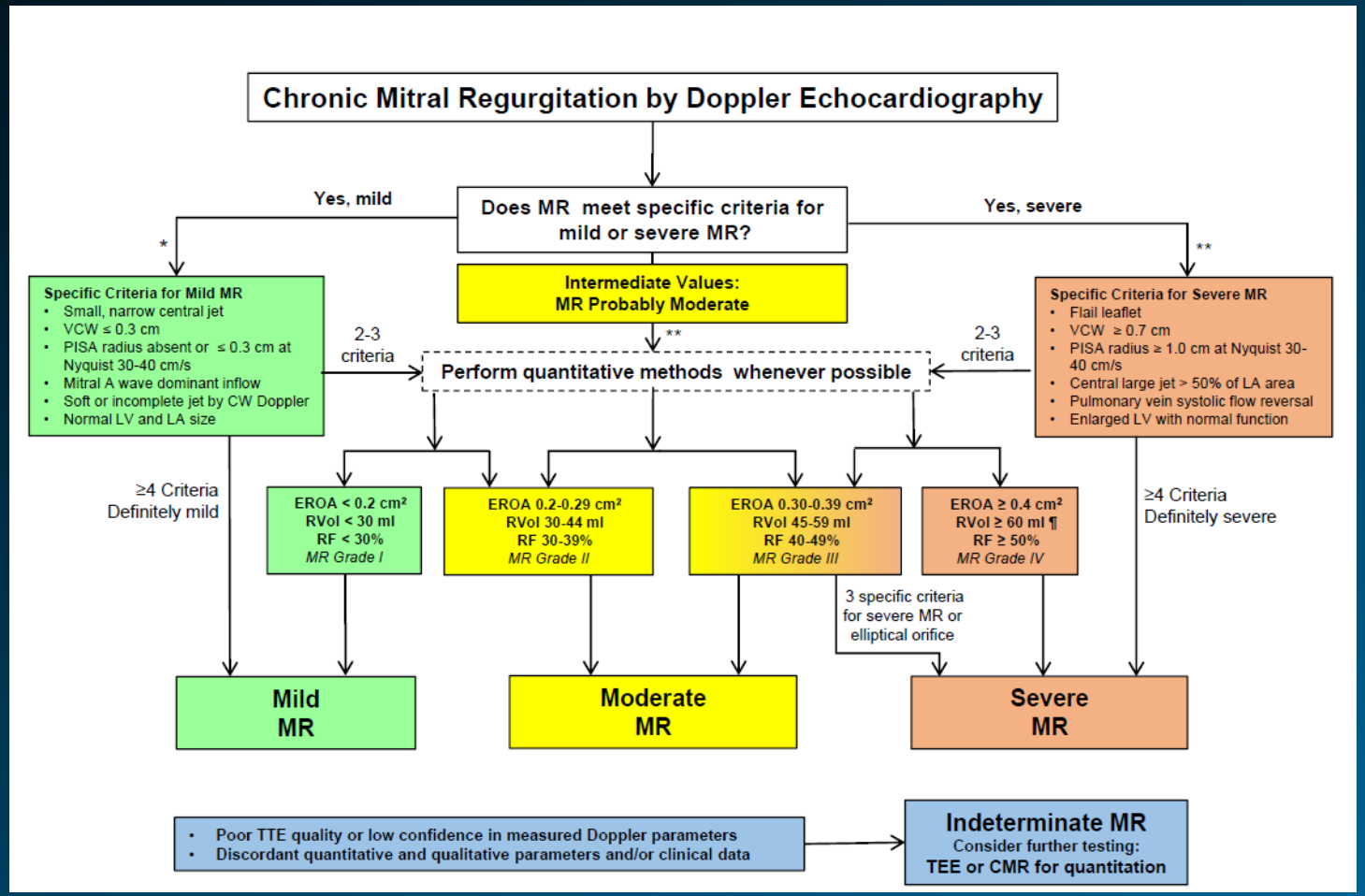

Same broad approaches for primary and secondary MR

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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‡‡

ABSTRACT

Secondary mitral regurgitation (MR) is associated with poor outcomes, but its correction does not reverse the underlying left ventricular (LV) pathology or improve the prognosis. The recently published American Heart Association/American College of Cardiology guidelines on valvular heart disease generated considerable controversy by revising the definition of severe secondary MR from an effective regurgitant orifice area (EROA) of 0.4 to 0.2 cm^2, and from a regurgitant volume (RVol) of 60 to 30 ml. This paper reviews hydrodynamic determinants of MR severity, showing that EROA and RVol values associated with severe MR depend on LV volume. This explains disparities in the evidence associating a lower EROA threshold with suboptimal survival. Redefining MR severity purely on EROA or RVol may cause significant clinical problems. As the guidelines emphasize, defining severe MR requires careful integration of all echocardiographic and clinical data, as measurement of EROA is imprecise and poorly reproducible. (J Am Coll Cardiol 2014;64:2792–801)

Discordance Between Echocardiography and MRI in the Assessment of Mitral Regurgitation Severity

A Prospective Multicenter Trial

Seth Uretsky, MD,* Linda Gillam, MD, MPH,* Roberto Lang, MD,† Farooq A. Chaudhry, MD,‡ Edgar Argulian, MD, MPH,§ Azhar Supariwala, MD,§ Srinivasa Gurram, MD,§ Kavya Jain, MD,§ Marjorie Subero, MD,§ James J. Jang, MD,‖ Randy Cohen, MD,§ Steven D. Wolff, MD, PhD¶

(J Am Coll Cardiol 2015;65:1078–88)

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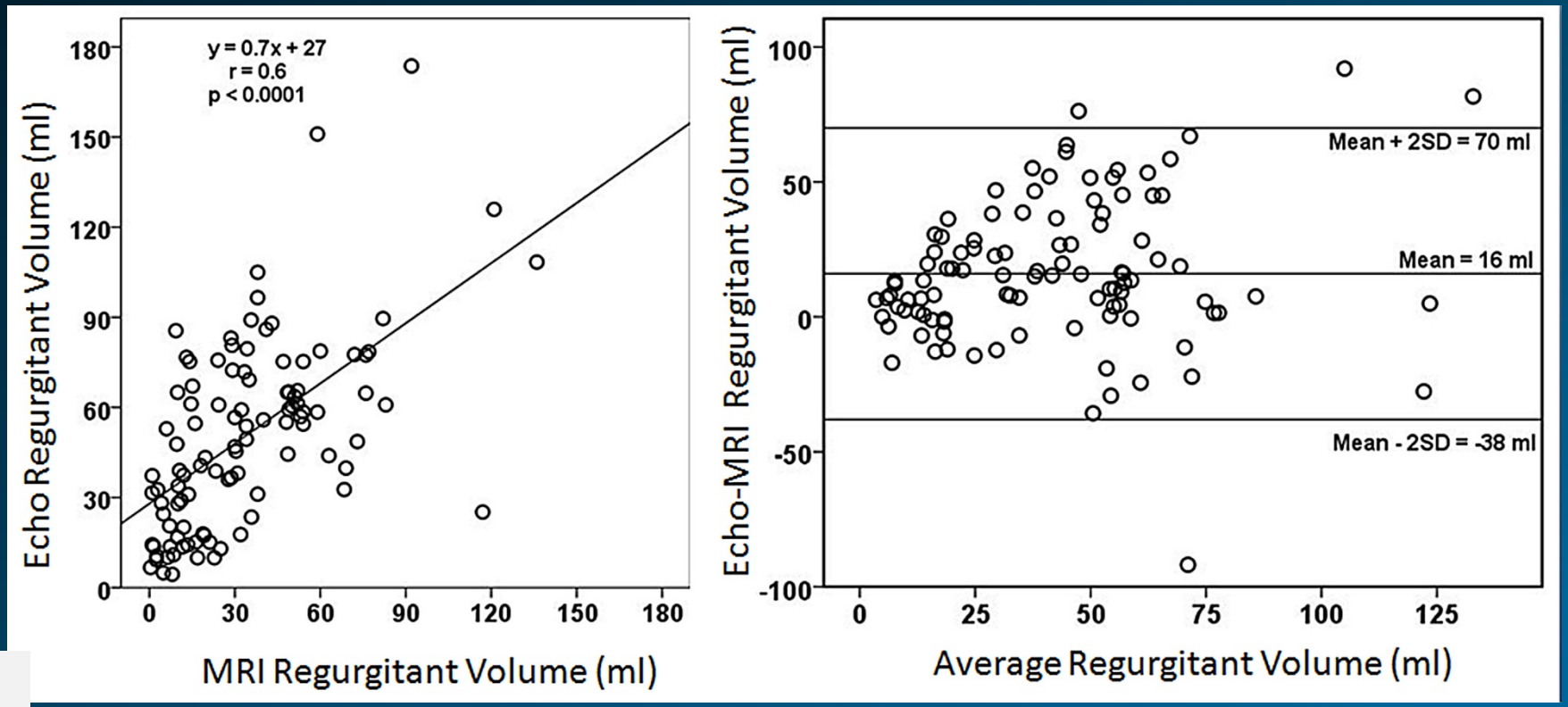
MR Rvol: Comparison of Echo and MRI



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MRI and Echo: Is there a reference standard?

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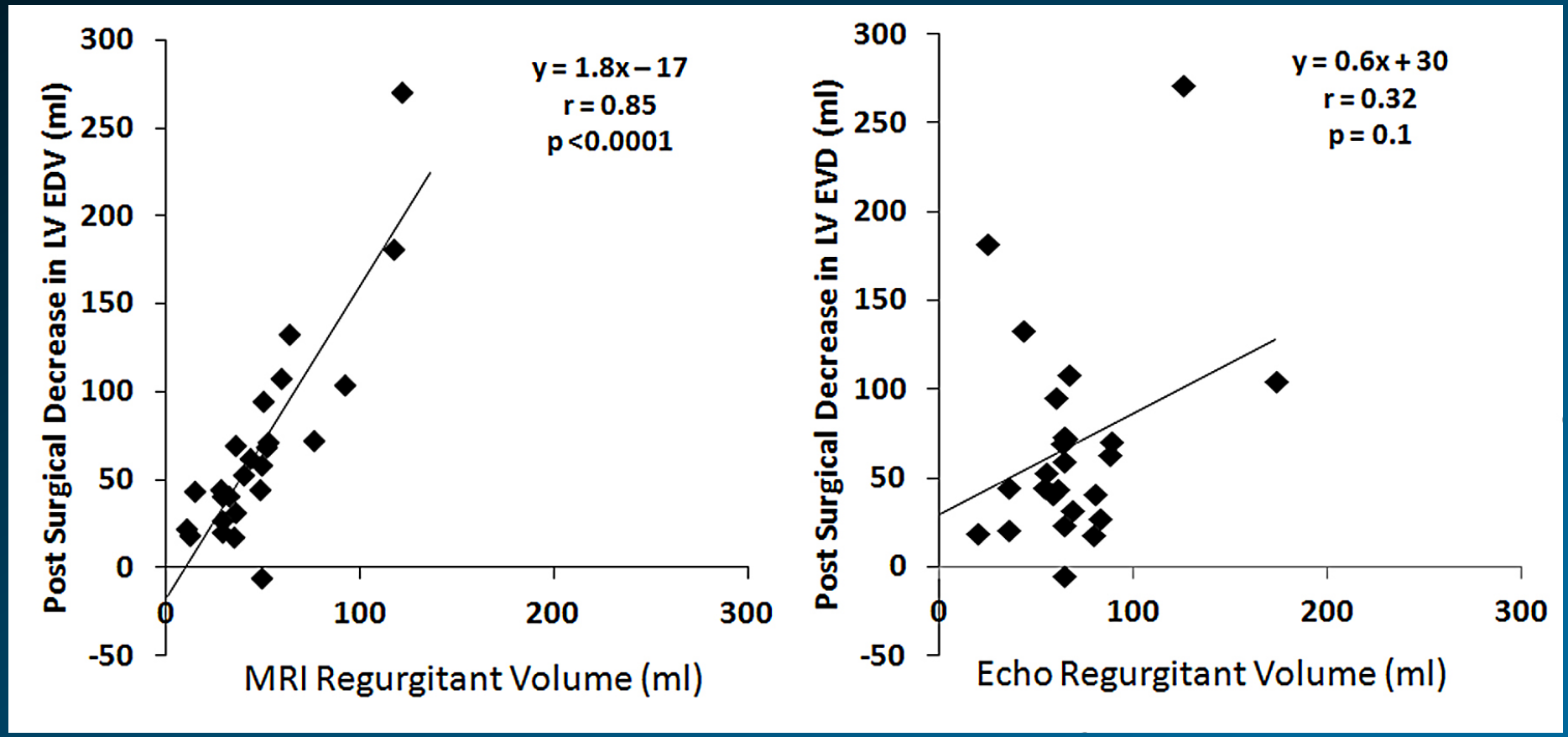
MR Regurgitant Vol. and Post Surgical LV Remodeling



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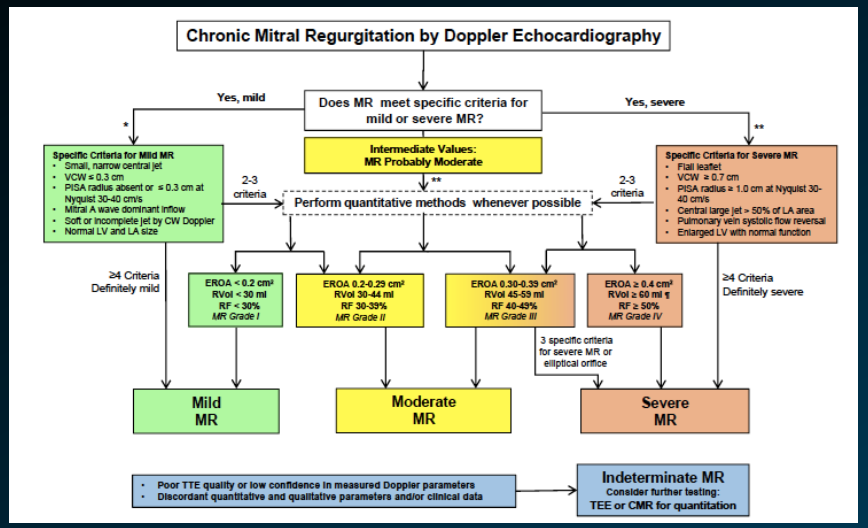
CMR vs. ASE Algorithm



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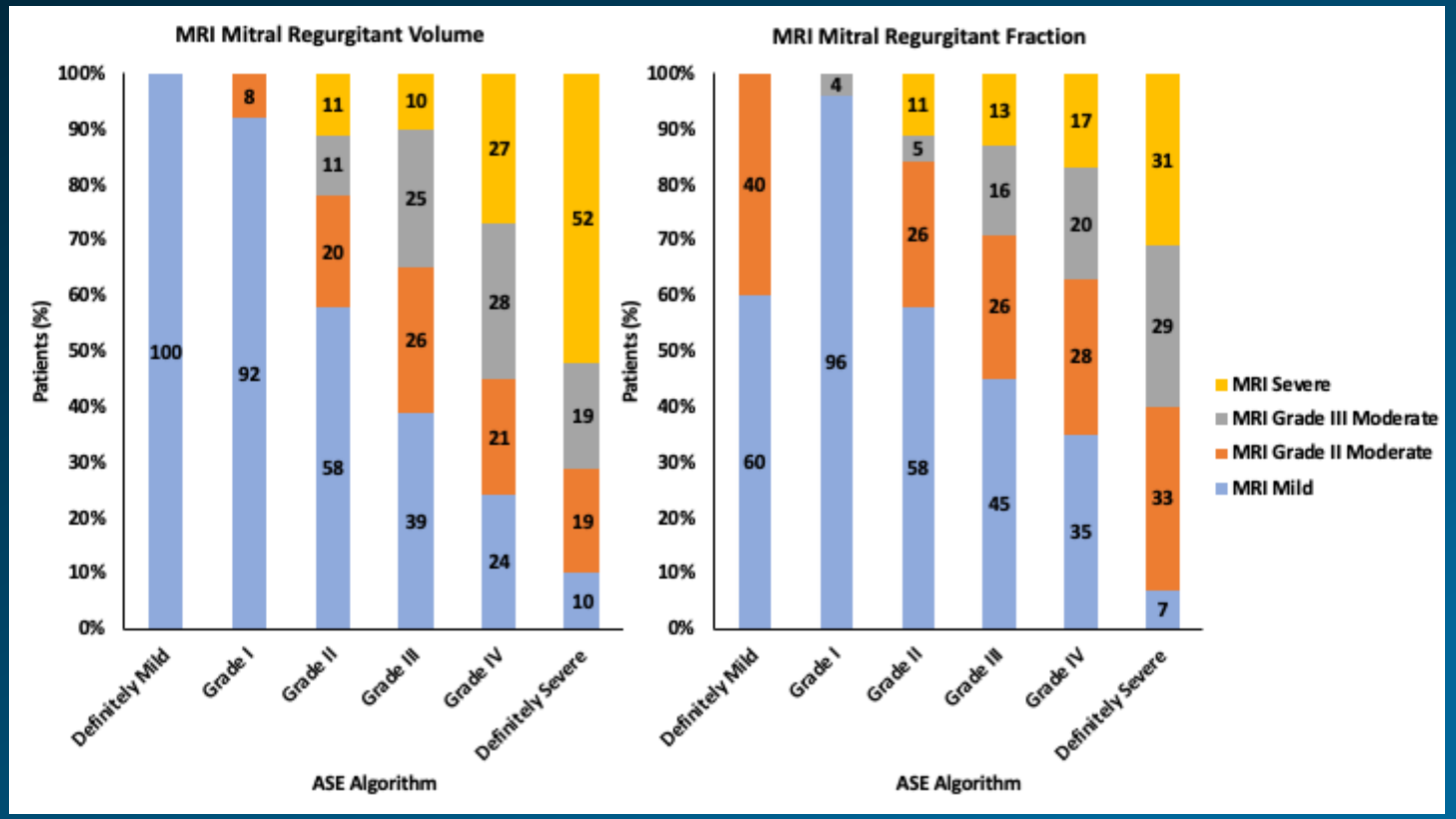

Uretsky S et al, JACC Img In press

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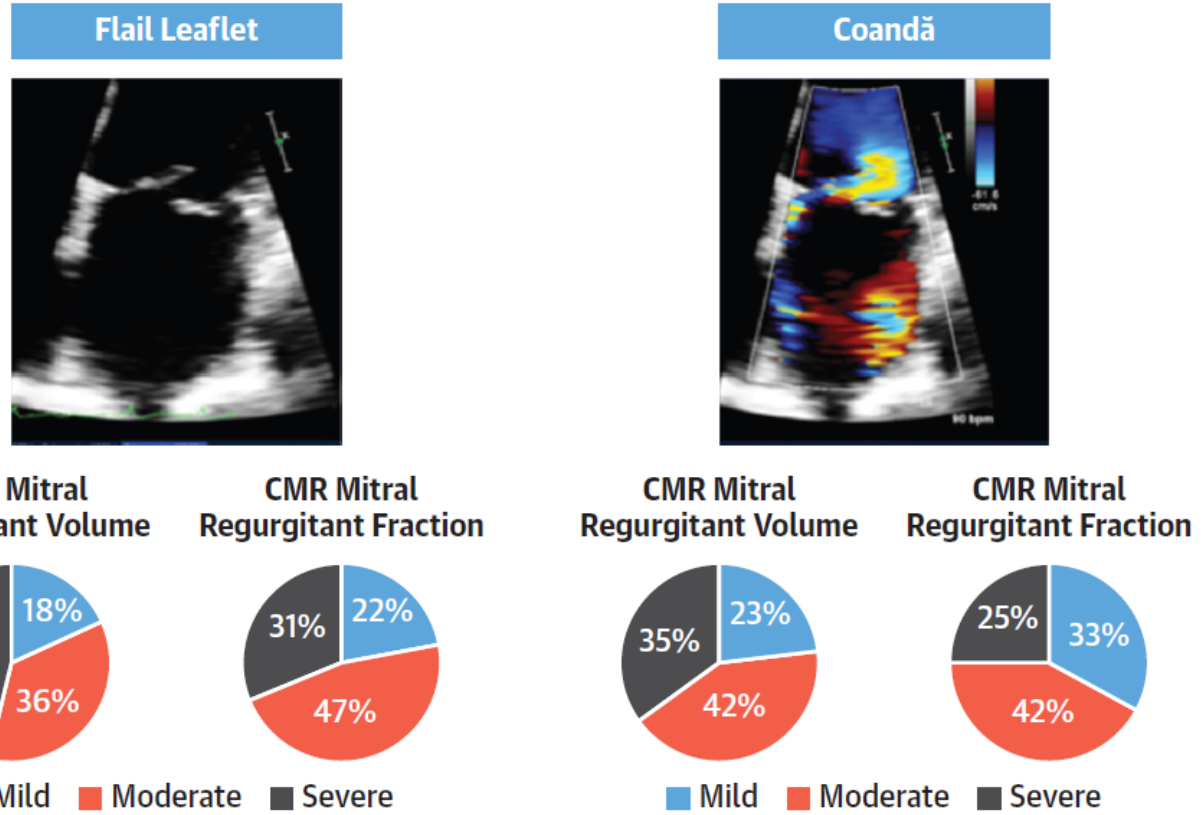
VOL. 78, NO. 25, 2021

Characterization of Primary Mitral Regurgitation With Flail Leaflet and/or Wall-Impinging Flow

Seth Uretsky, MD,[a] Donna Chelle V. Morales, MD,[a] Lillian Aldaia, MD,[a] Anuj Mediratta, MD,[a] Konstantinos Koulogiannis, MD,[a] Leo Marcoff, MD,[a] Sakul Sakul, MD,[a] Steven D. Wolff, MD, PhD,[b] Linda D. Gillam, MD, MPH[a]

CENTRAL ILLUSTRATION Severity of Cardiovascular Magnetic Resonance Imaging-Mitral Regurgitation and a Flail Leaflet or Coandă



Uretsky, S. et al. J Am Coll Cardiol. 2021;78(25):2537-2546.

Apical 4-chamber echocardiogram shows flail posterior mitral leaflet and associated Coandă effect with a wall-hugging jet encircling the posterior wall of the left atrium. Neither flail nor Coandă were associated with severe MR by CMR in the majority of patients, and patients with these features cannot be assumed to have severe MR, particularly if intervention is contemplated. CMR = magnetic resonance imaging; MR = mitral regurgitation.

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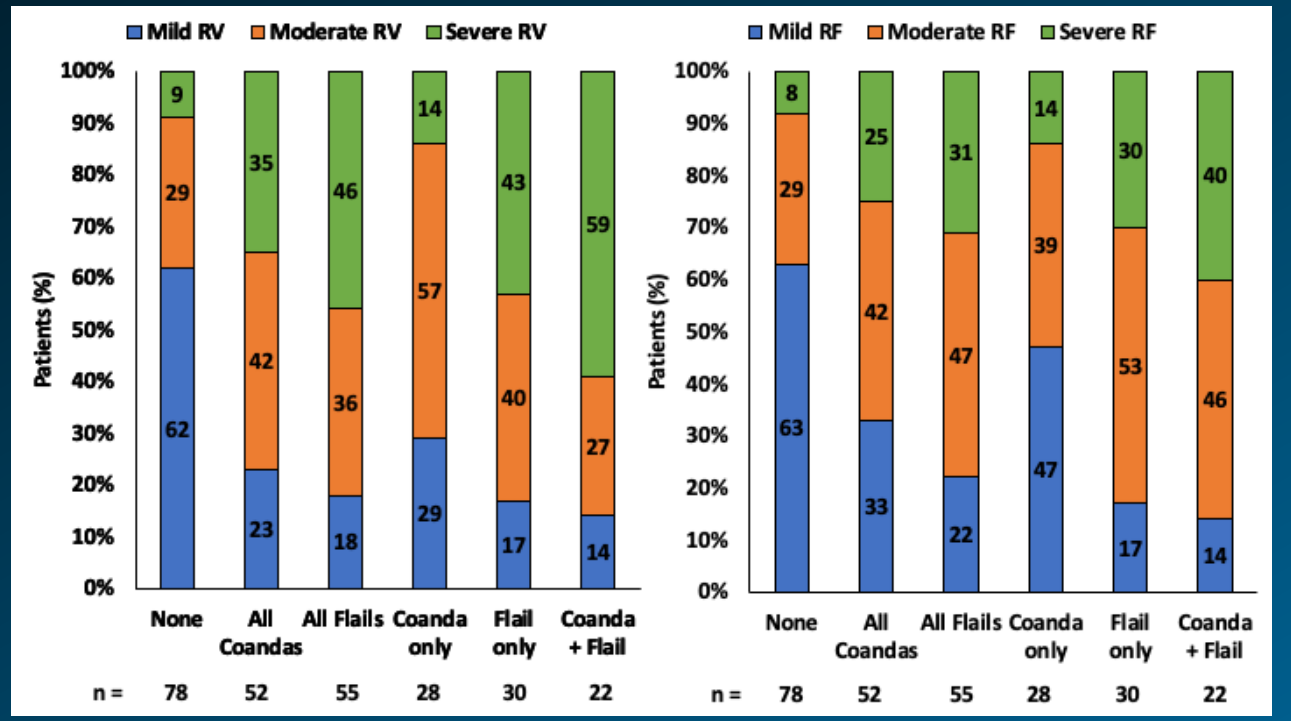
Coanda and Flail is not always associated with severe MR by CMR



Uretsky … Gillam JACC 2021

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Devices

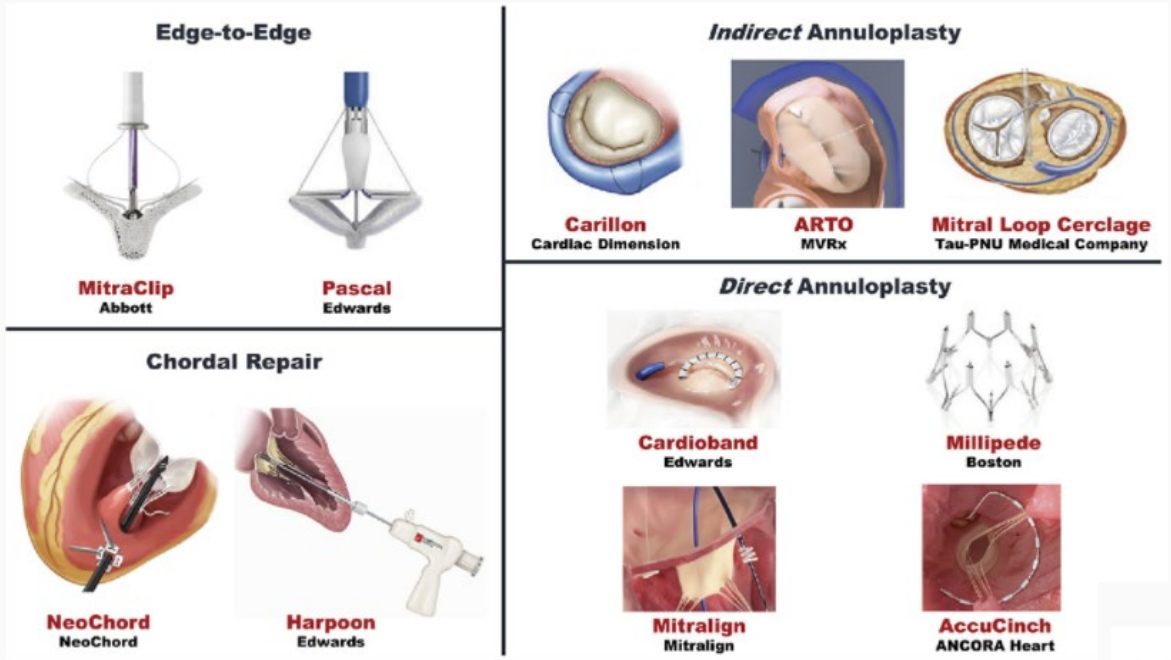
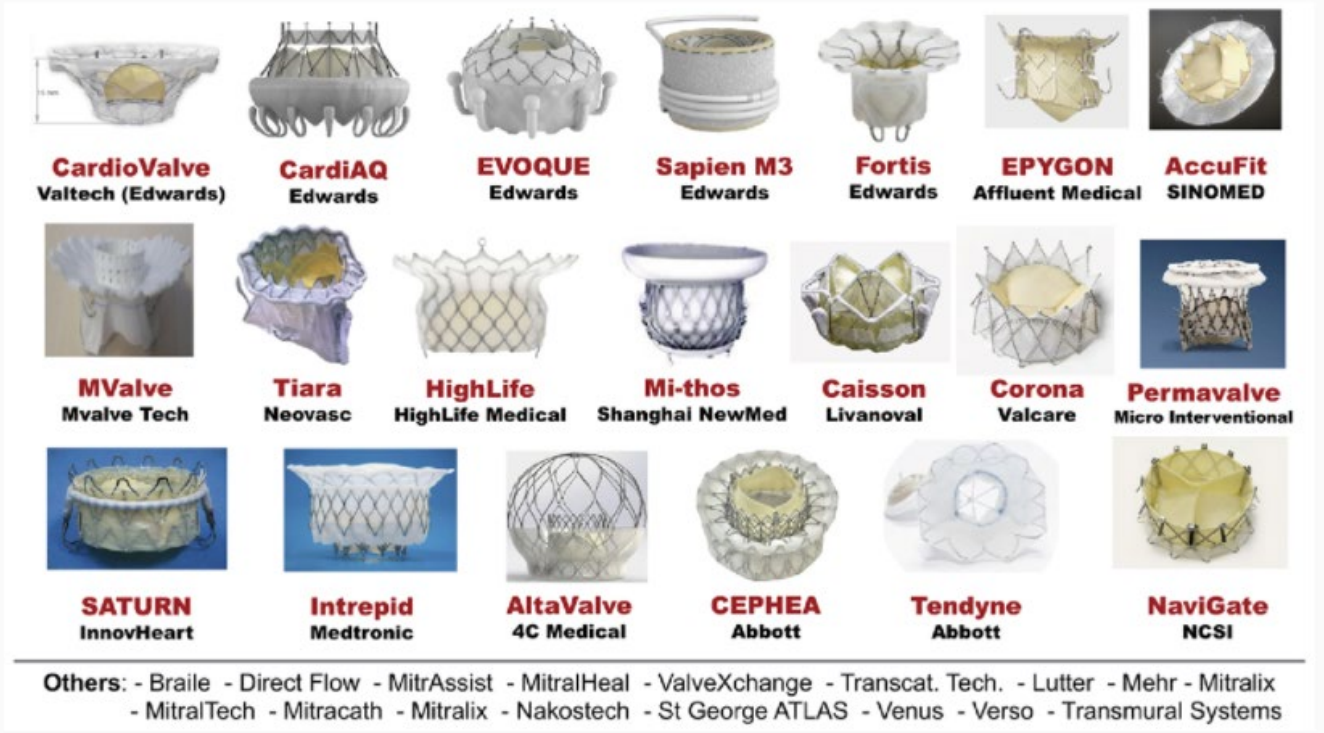


Figure 1. Transcatheter mitral valve repair devices

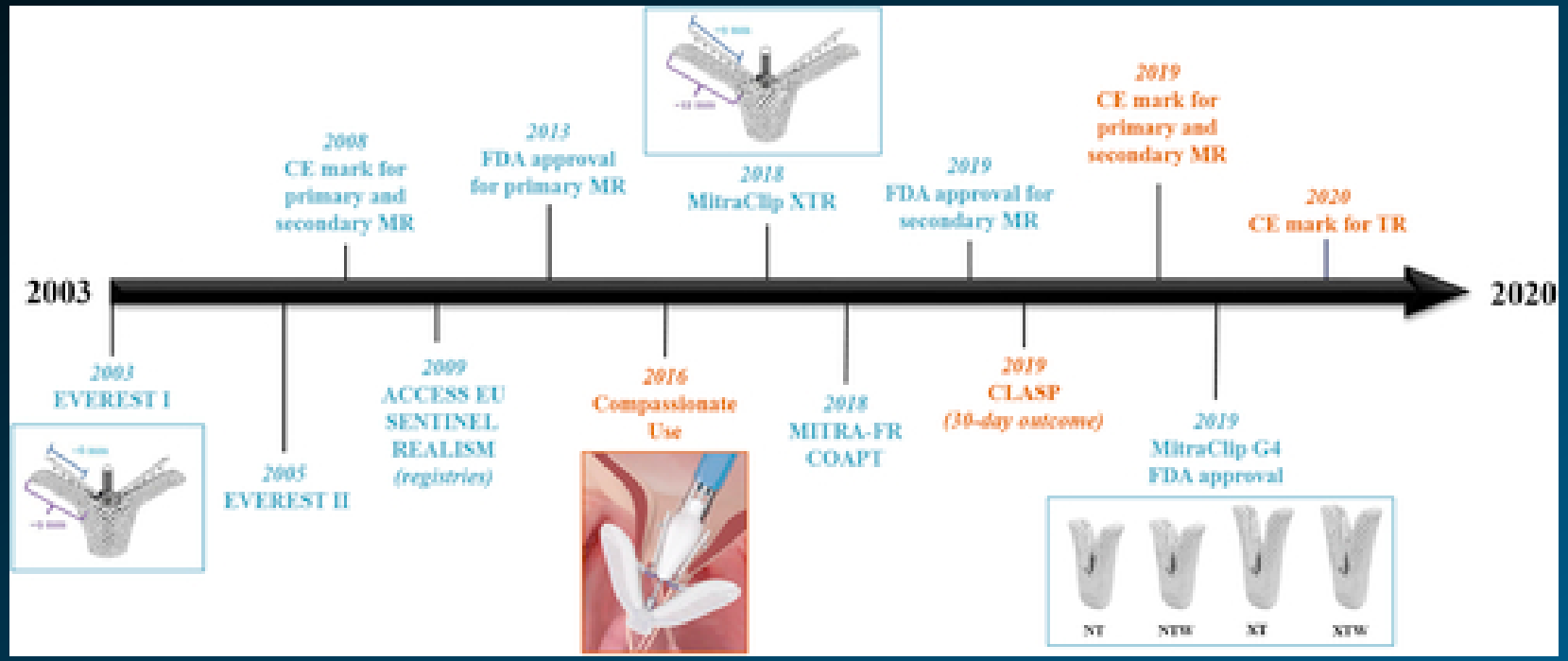
Only Mitra-Clip FDA approved



Open Access | Review
Vessel Plus 2021;5:6
10.20517/2574-1209.2020.69

Patient selection for trans-catheter mitral valve repair *vs.* replacement: ongoing indications and glimpse to the future

Andrea Scotti[1], Michele Galasso[2], Alberto Margonato[2], Cosmo Godino[2]
[1]Department of Cardiac Thoracic Vascular Sciences and Public Health, University of Padua Medical School, Padua 35128, Italy.
[2]Cardio-Thoracic-Vascular Department, San Raffaele Scientific Institute, Milan 20132, Italy.



Stephan Windecker et al. *J Am Coll Cardiol Intv* 2020; 13:2358-2360.

JACC Cardiovascular Interventions

2 Pivotal trials

Mitra-FR

COAPT

Inclusion Criteria

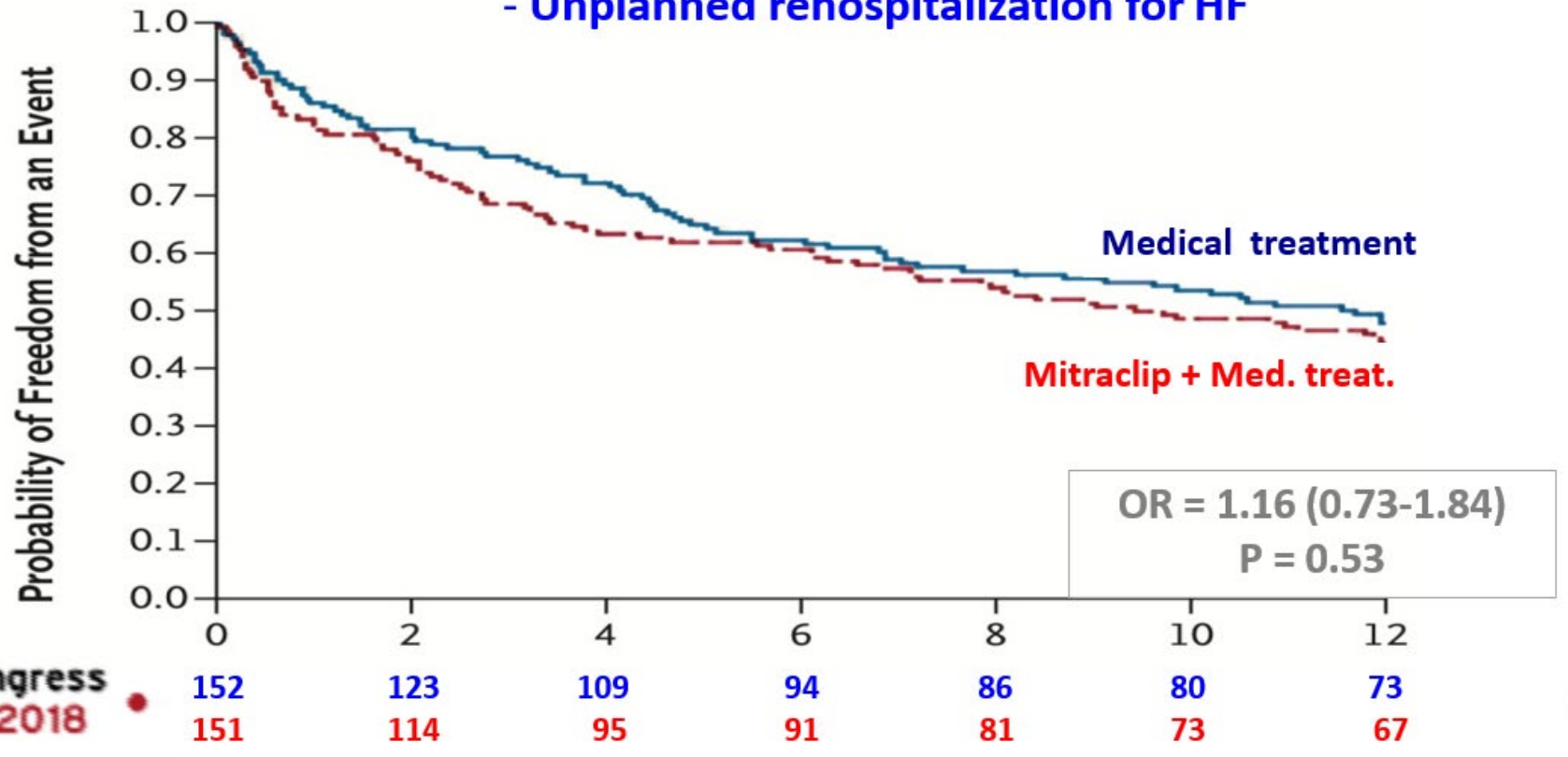
- Symptomatic despite Optimal Treatment (NYHA ≥II).
- At least one hospitalization for HF within 12 months preceding randomization
- Severe Secondary MR different cut-offs
- Reduced EF
- Not eligible for surgery “Heart Team”

Despite similar trial design

Completely different results

Primary composite endpoint *(99% follow-up)*

- All-Cause Death
- Unplanned rehospitalization for HF



ESC Congress Munich 2018

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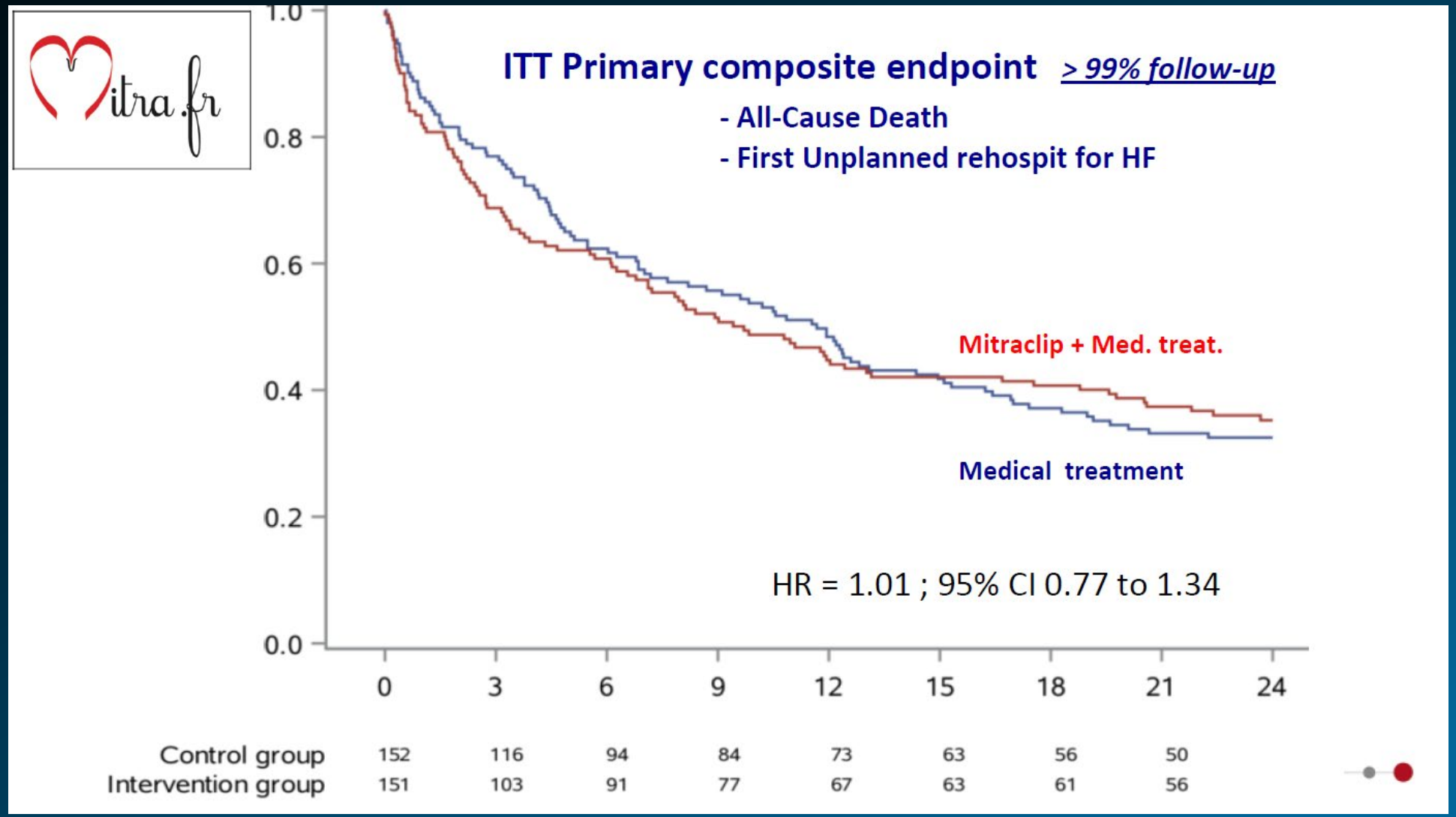

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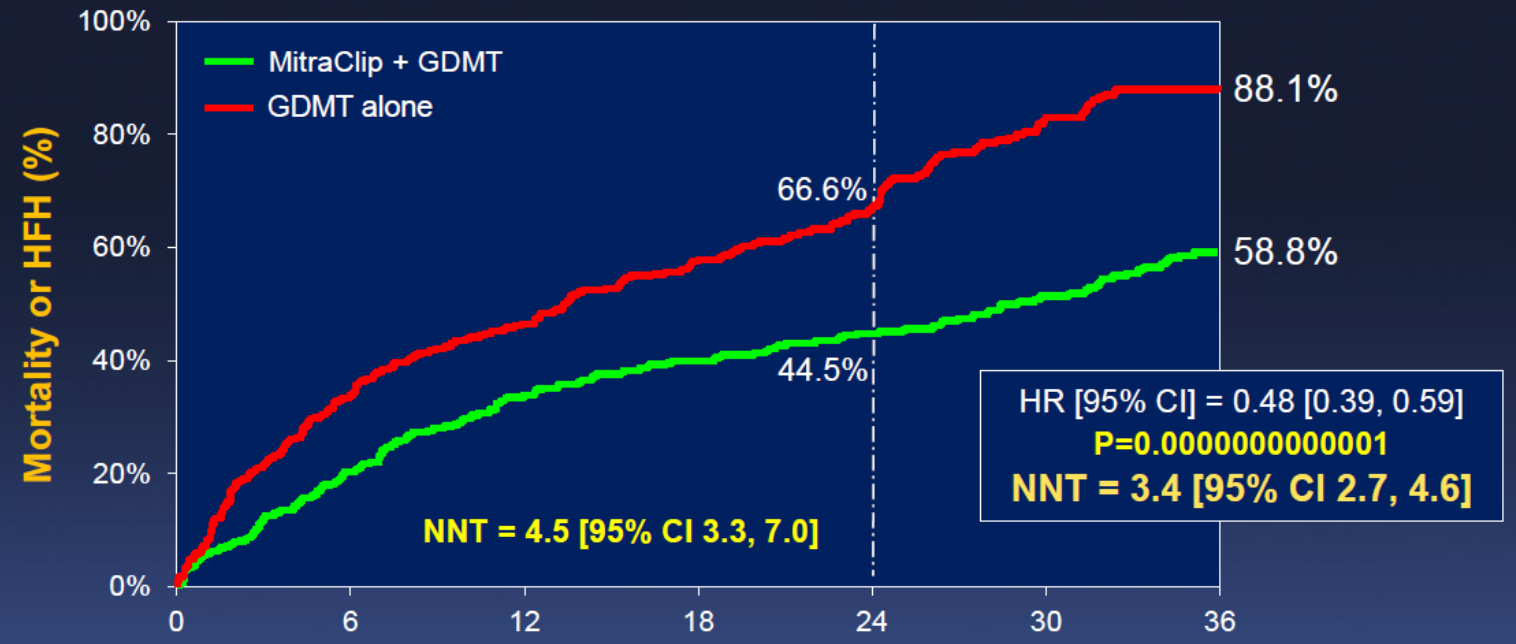
COAPT TRIAL

All-Cause Mortality or HF Hospitalization

All patients, ITT, including crossovers



# at Risk:							
MitraClip + GDMT	302	238	196	176	148	101	66
GDMT alone	312	206	156	120	87	37	20

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Why different results?

- Procedural outcomes
- Medical management
- Patient selection

In Mitra-FR , bigger ventricles with less MR

Thank you to Paul Grayburn and Milton Packer

EDITORIALS AND VIEWPOINTS

Proportionate and Disproportionate Functional Mitral Regurgitation

A New Conceptual Framework That Reconciles the Results of the MITRA-FR and COAPT Trials

Paul A. Grayburn, MD, Anna Sannino, MD, Milton Packer, MD

(J Am Coll Cardiol Img 2019;12:353–62)

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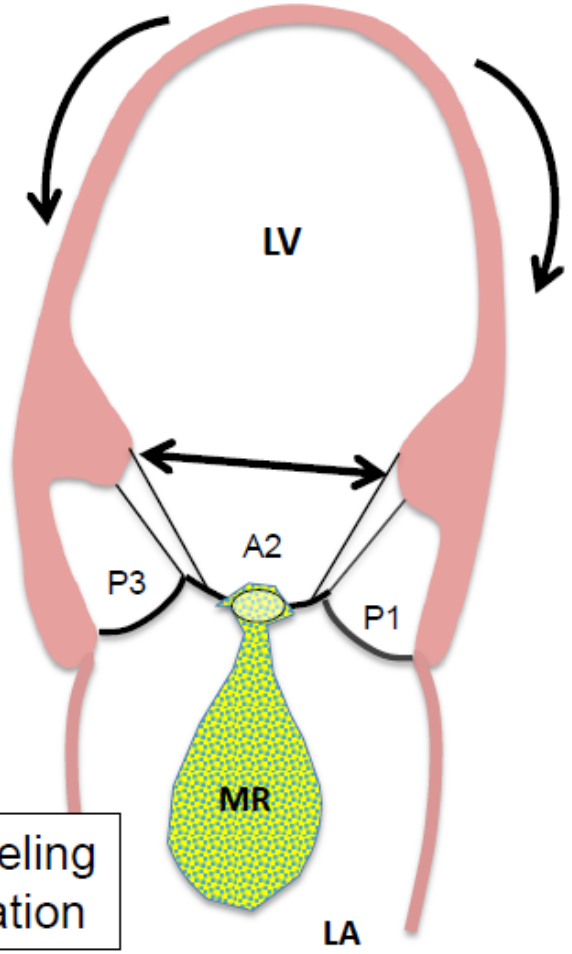
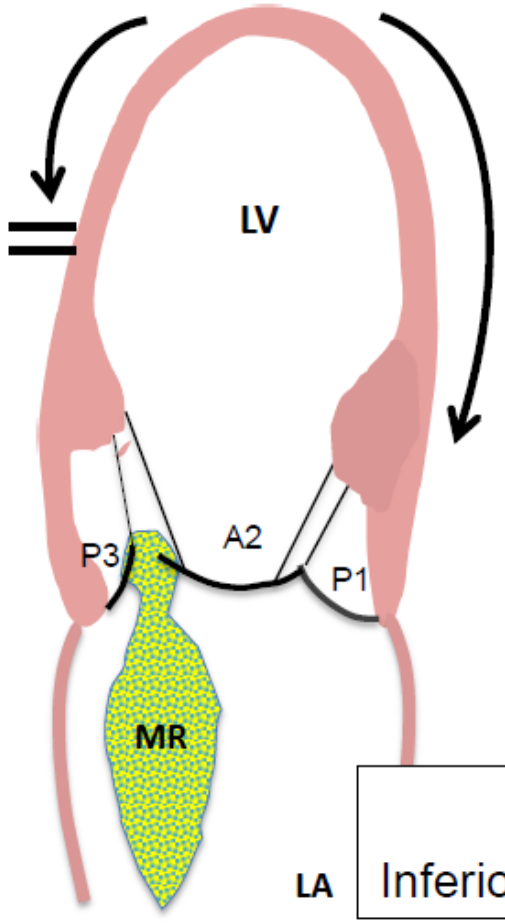
Severe and Proportionate MR



LV remodeling and dilatation

Severe and Disproportionate MR



LBBB

Inferior-posterior MI

As for TEER for FMR….

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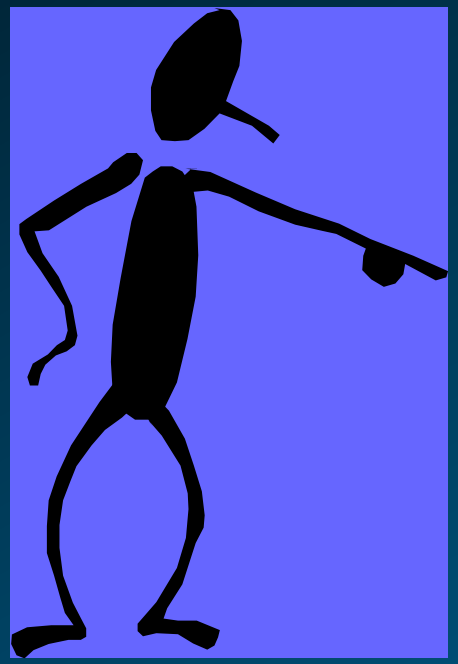
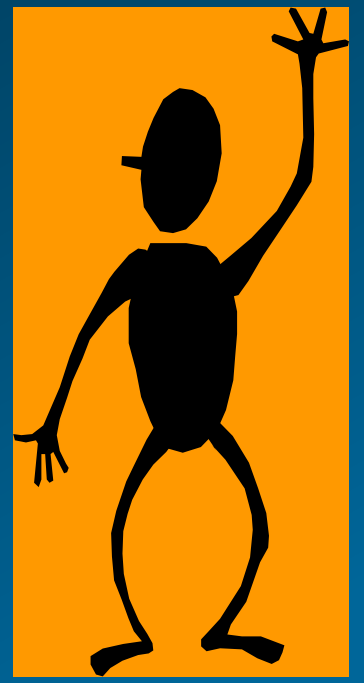
Lifesaving therapy!!!



Results will be more like Mitra-FR



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Time and more real world experience will tell

JACC: CARDIOVASCULAR IMAGING
VOL. 14, NO. 4, 2021

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EDITORIAL COMMENT

Distinguishing Proportionate and Disproportionate Subtypes in Functional Mitral Regurgitation and Left Ventricular Systolic Dysfunction*

Paul A. Grayburn, MD, Anna Sannino, MD, Milton Packer, MD

"....our proposed framework to distinguish patients with proportionate and disproportionate MR is intended primarily to be applied to groups of patients. In clinical practice, echocardiographic assessments of EROA and LVEDV are fraught with considerable inter-observer variability...."

Paul Grayburn, MD

Imaging

- Refinement of echocardiographic tools
  - Recognition of importance of 3D
- Complementary technologies
  - CT: calcium scoring, leaflet thrombosis and degeneration
  - MRI
- AI increasingly valuable tool

Other advances

- Tricuspid valve no longer forgotten
- Prosthetic leaflet degeneration/ thrombosis
- Deep dives into predictors of clinical outcomes post TAVR
- Anticoagulation in mechanical valves

ASE GUIDELINES AND STANDARDS

Recommendations for Noninvasive Evaluation of Native Valvular Regurgitation

A Report from th
Developed in Collal

William A. Zoghbi, MD, F
Maurice Enriquez-Sar
Rebecca T. Hahn, MD, FASE, Yu
Stephen H. Little, MD
Paaladinesh Thavend
Neil J. Weissman, MD, FASE, H
Minnesota; San Francisco, Calif
T

EACVI/ASE CLINICAL RECOMMENDATIONS

Recommendations on the Echocardiographic
Assessment of Aortic Valve
Update from the Europe
Cardiovascular Imaging and
of Echocardi

Helmut Baumgartner, MD, FESC (Chair), Judy Hung
John B. Ch
Patrizi
and Catherine
Kingdom; Oslo,

EXPERT CONSENSUS STATEMENT

EAE/ASE Recommendations for the Use
of E
Ir

GUIDELINES AND STANDARDS

GUIDELINES AND STANDARDS

Recommended Standards for the Performance of Transesophageal Echocardiographic Screening for Structural Heart Intervention: From the American Society of Echocardiography

Rebecca T. Hahn, MD, FASE (Chair), Muhamed Saric, MD, PhD, FASE (Co-Chair), Francesco Fulvio Faletra, MD, Ruchira Garg, MD, FASE, Linda D. Gillam, MD, MPH, FASE, Kenneth Horton, ACS, RCS, FASE, Omar K. Khalique, MD, FASE, Stephen H. Little, MD, FASE, G. Burkhard Mackensen, MD, PhD, FASE, Jae Oh, MD, FASE, Nishath Quader, MD, FASE, Lucy Safi, DO, FASE, Gregory M. Scalia, MBBS, FASE, and Roberto M. Lang, MD, FASE, *New York, New York; Lugano, Switzerland; Los Angeles, California; Morristown, New Jersey; Murray, Utah; Houston, Texas; Seattle Washington; Rochester, Minnesota; St. Louis, Missouri; Hackensack, New Jersey; Brisbane, Australia; and Chicago, Illinois*

GUIDELINES AND STANDARDS

aluation of Valvular
Percutaneous Valve
placement
of Echocardiography Developed in
Cardiovascular Angiography and
Echocardiography, and Society for
gnetic Resonance

Asch, MD, FASE, Charles Bruce, MBChB, FASE,
arn, MD, FASE, Rebecca T. Hahn, MD, FASE,
MPH, FSCAI, Stamatios Lerakis, MD, FASE,
ID, FASE, Nikolaos Skubas, MD, DSc, FASE,
ASE, Paaladinesh Thavendiranathan, MD, MSc, FASE,
, SJSUM, and Karen G. Zimmerman, BS, ACS, RDCS,
ict of Columbia; Rochester, Minnesota; Morristown, New
ssachusetts; Los Angeles, California; Cleveland, Ohio;
gano, Japan; and Morgantown, West Virginia

Summary

- A momentous decade for valvular heart disease
  - Fruitful collaboration between medicine and industry, surgery and cardiology, clinical and basic science
- While TAVR has emerged as disruptive technology, important developments in the mitral and tricuspid space have also occurred
- Look for important developments to follow
- ASE tools will continue to be essential

Thank you