VALVULAR HEART DISEASE: CHANGING LANDSCAPE

Bhaskar Arora, MD, FACC, FASE
Staff Cardiologist, Portland VA Medical Center
Knight Cardiovascular Institute, OHSU

April 9, 2025

Disclosures

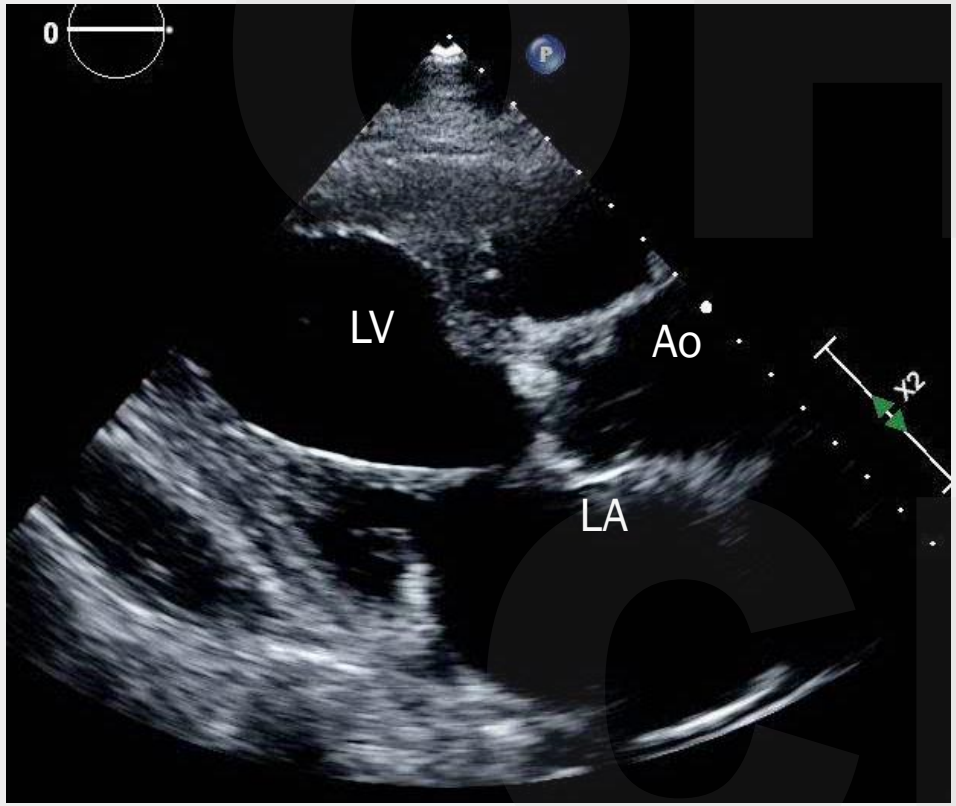
- None

Objectives

1. Recognize High Risk Features of Aortic Stenosis.
2. Know the difference between Primary and Secondary Mitral Regurgitation
3. Management of symptomatic Aortic Stenosis and Mitral regurgitation.

Case 1.

78 y/o M admitted with new heart failure. He has a h/o
CAD, IDDM, CKD IV, HTN, pulmonary fibrosis with chronic O2 dependence.

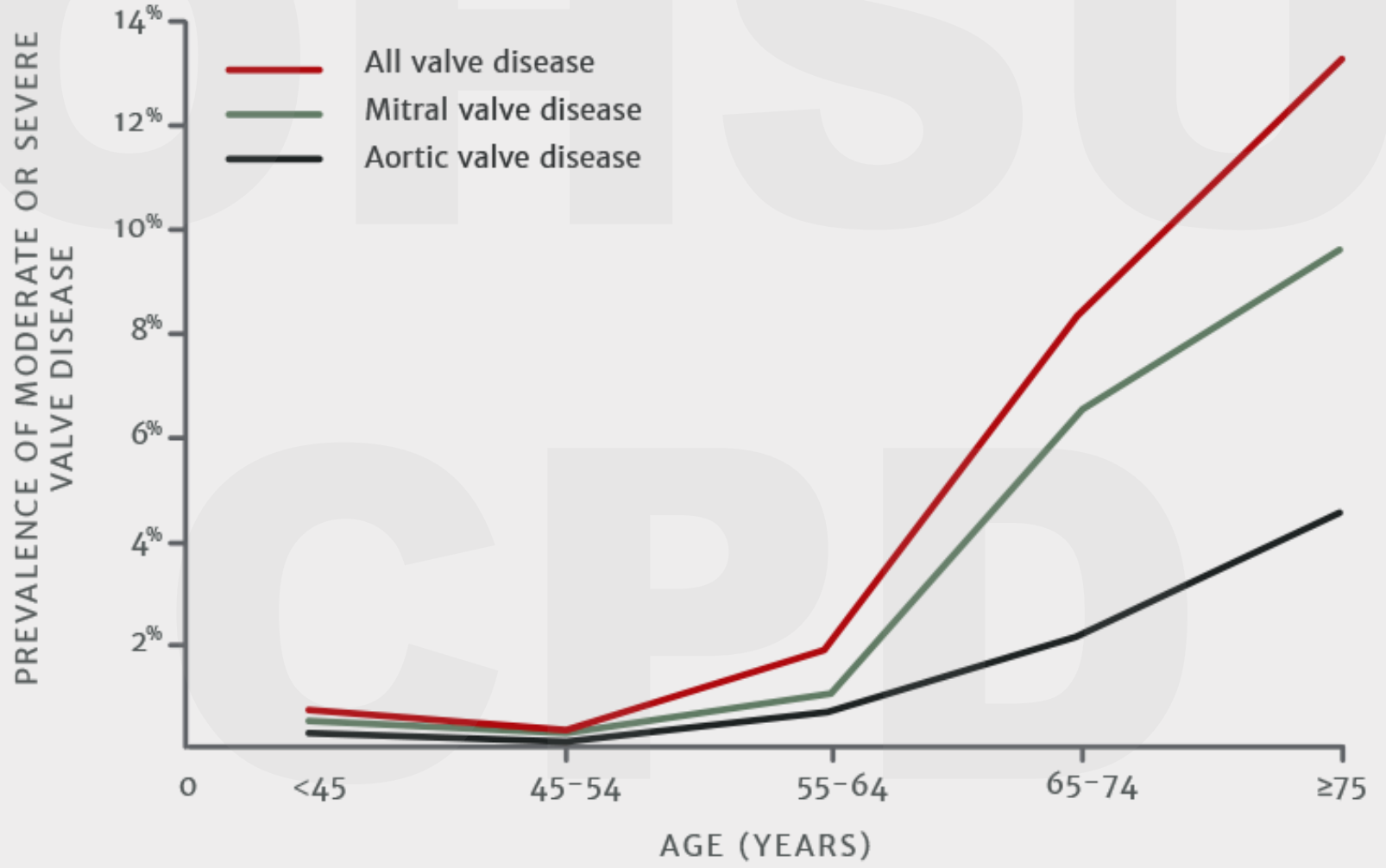


LV systolic dysfunction

Reduced leaflet excursion

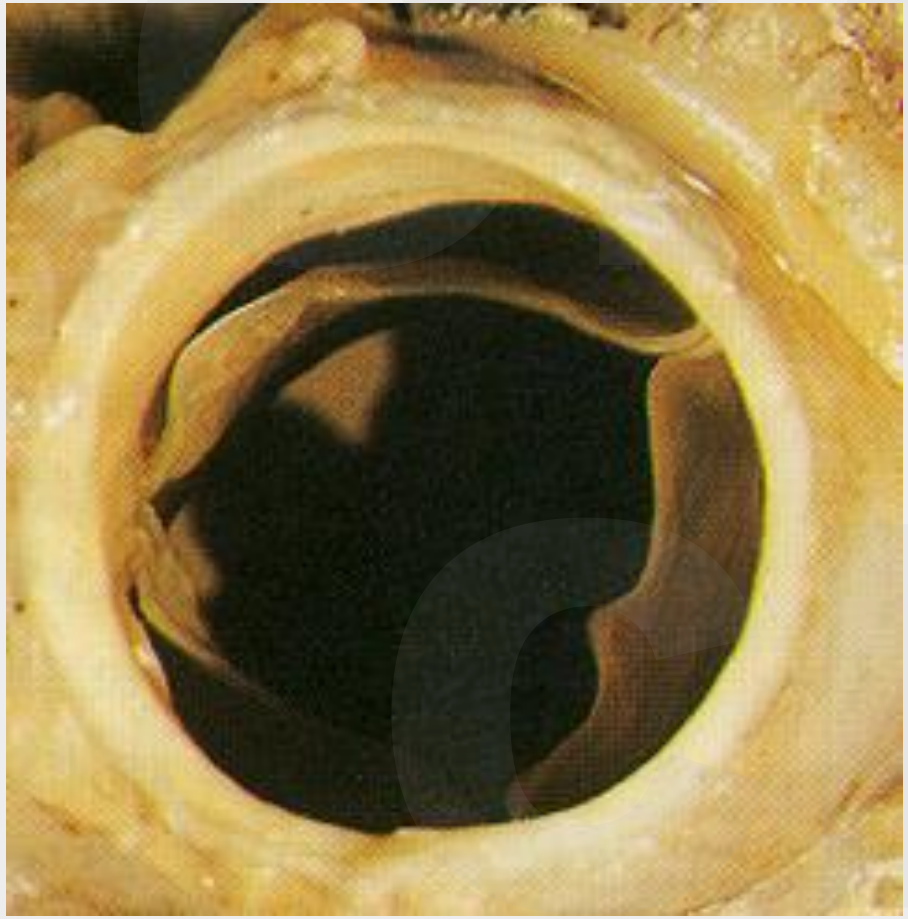
Severe AS, AV area 0.8 cm2, peak velocity 4 m/s

VHD: A public health crisis



Lancet 2006;368:1005-11.

Normal Aortic Valve



Tri leaflet AV: open

Tri leaflet AV: closed

Aortic Stenosis

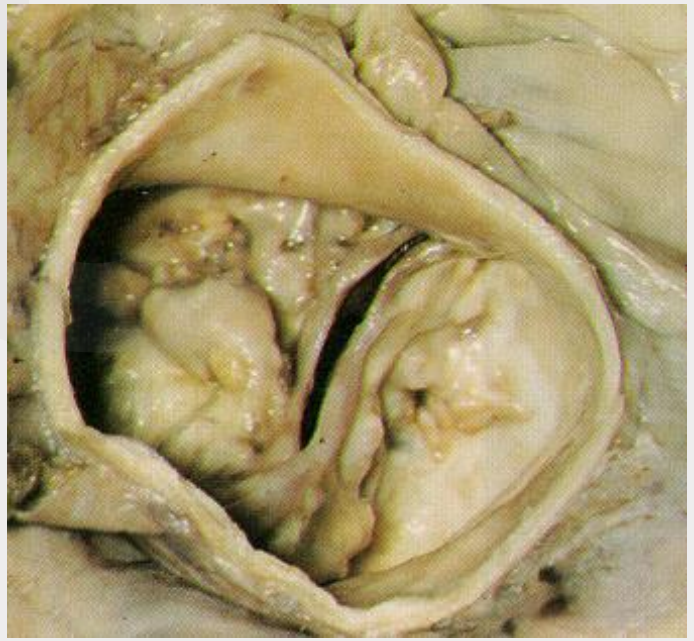
Heavily Calcified AV

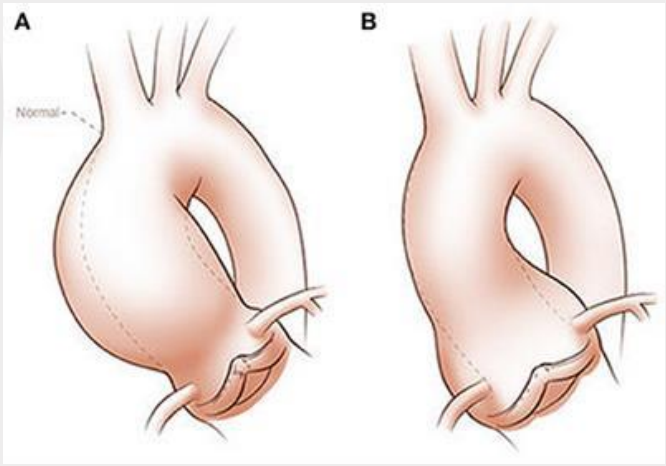
Age-related calcific degeneration

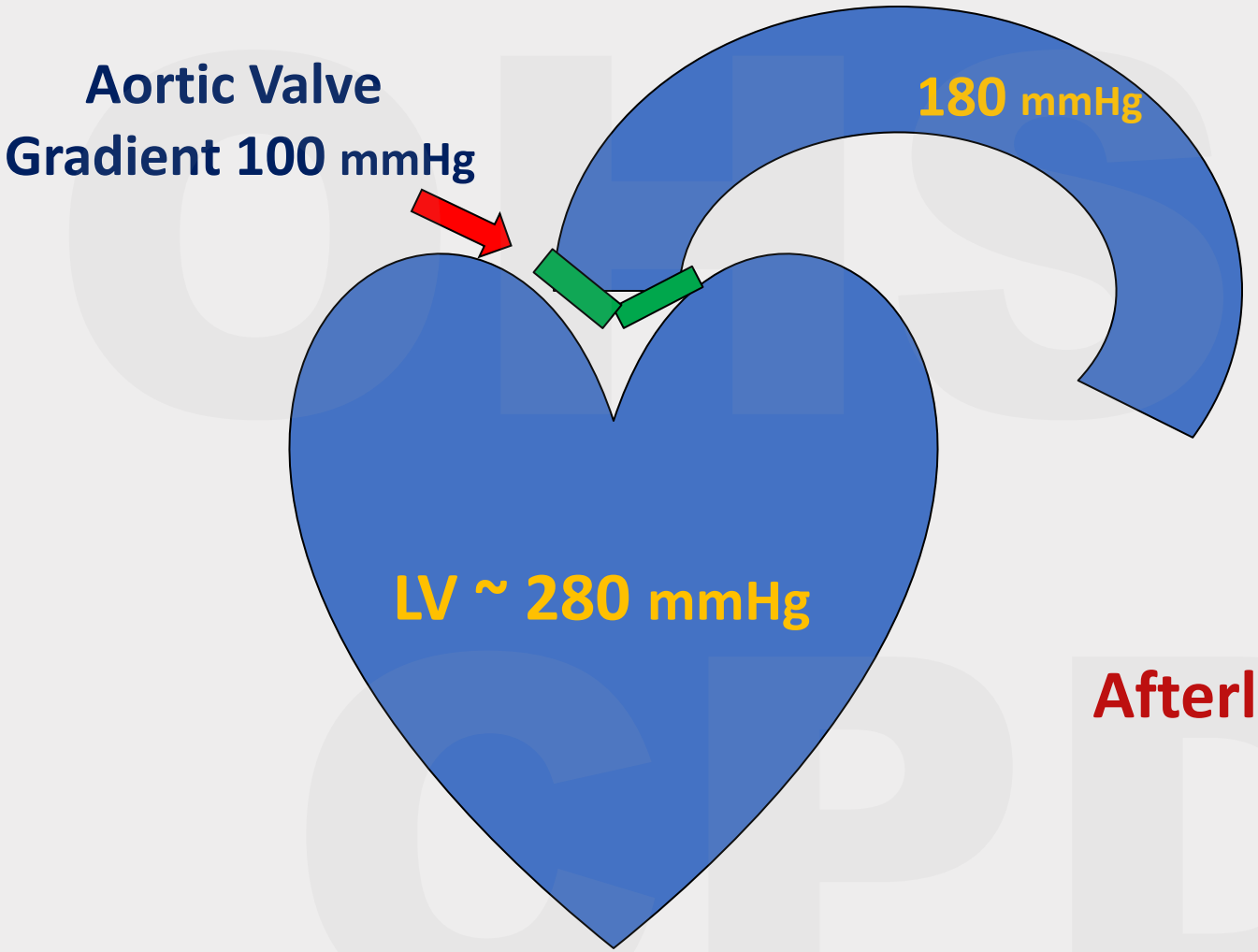
Age >65

Bicuspid AV

- 1-2% of US population
- Accounts for 60% surgical AVR < 70 years
- **Nearly all patients require intervention during lifetime**
- Family screening is recommended
- Aortopathy is common





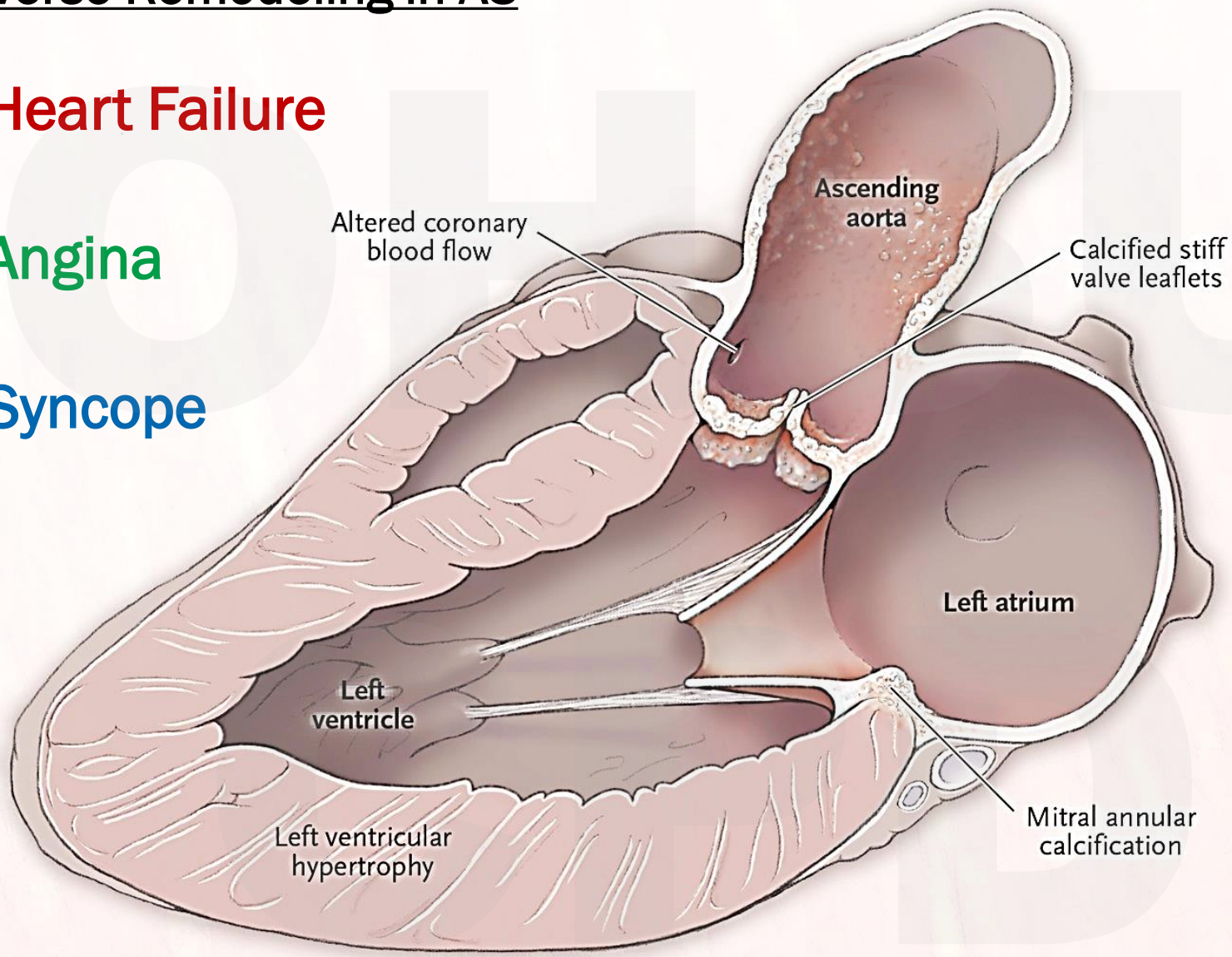


Afterload= SBP + AV gradient

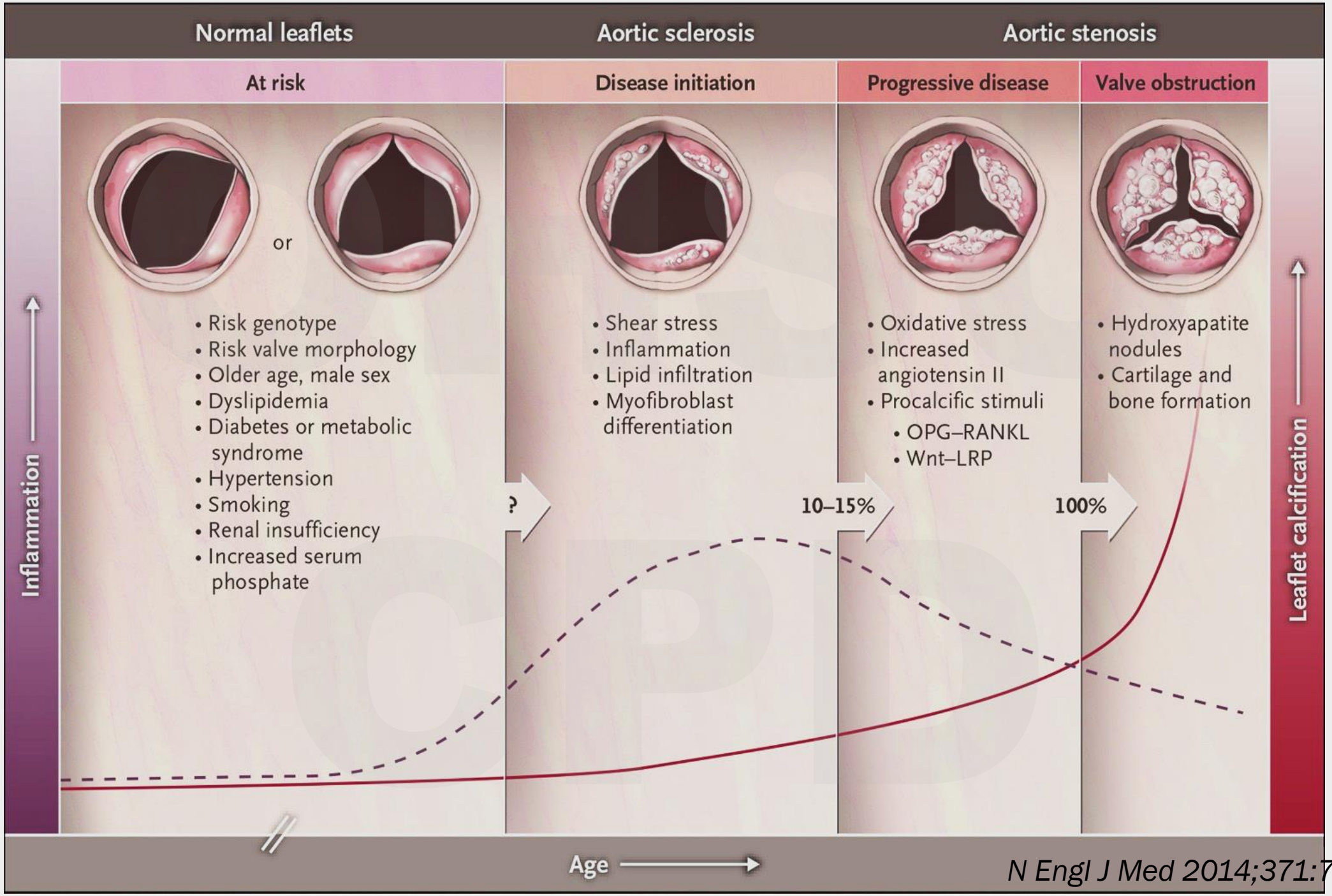
= 180 + 100 mm Hg

Adverse Remodeling in AS

- Heart Failure
- Angina
- Syncope

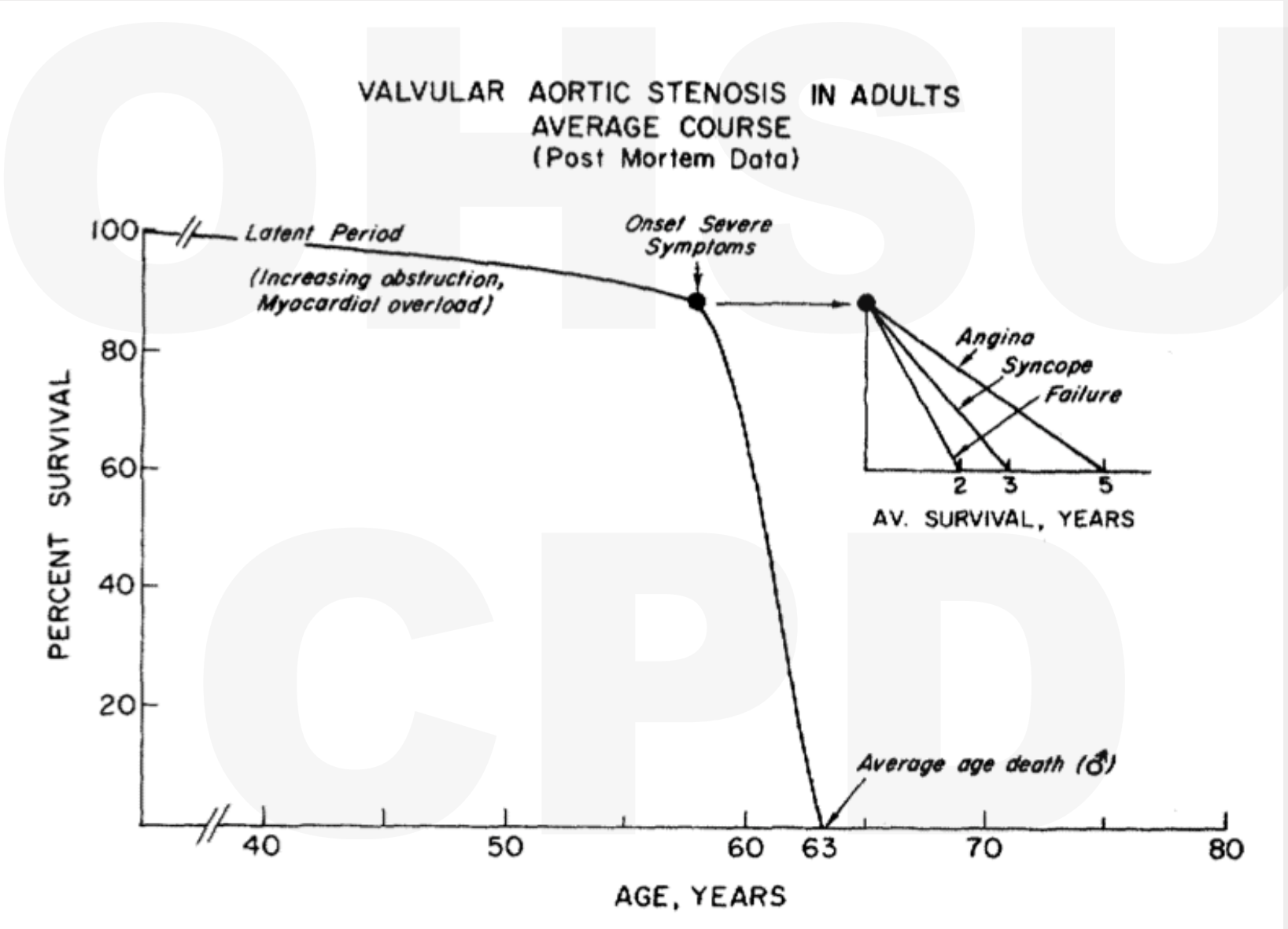


N Engl J Med 2014;371:744-756

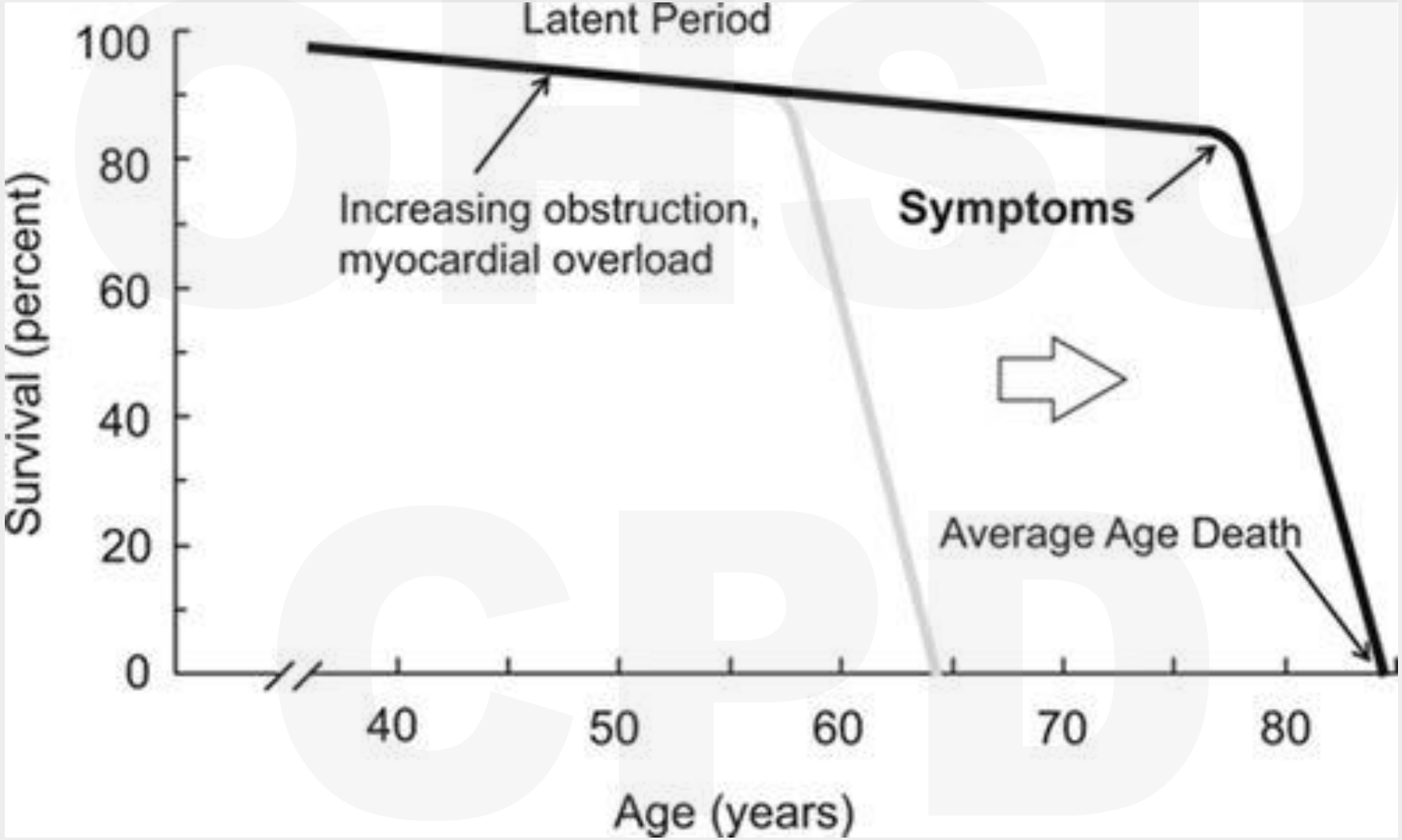


N Engl J Med 2014;371:744-756

Historical perspective



Circulation. 2012;126:118–125



Circulation. 2015 Mar 17;131(11):969-71

Aortic Stenosis

Natural History

- **Long asymptomatic, latent period**

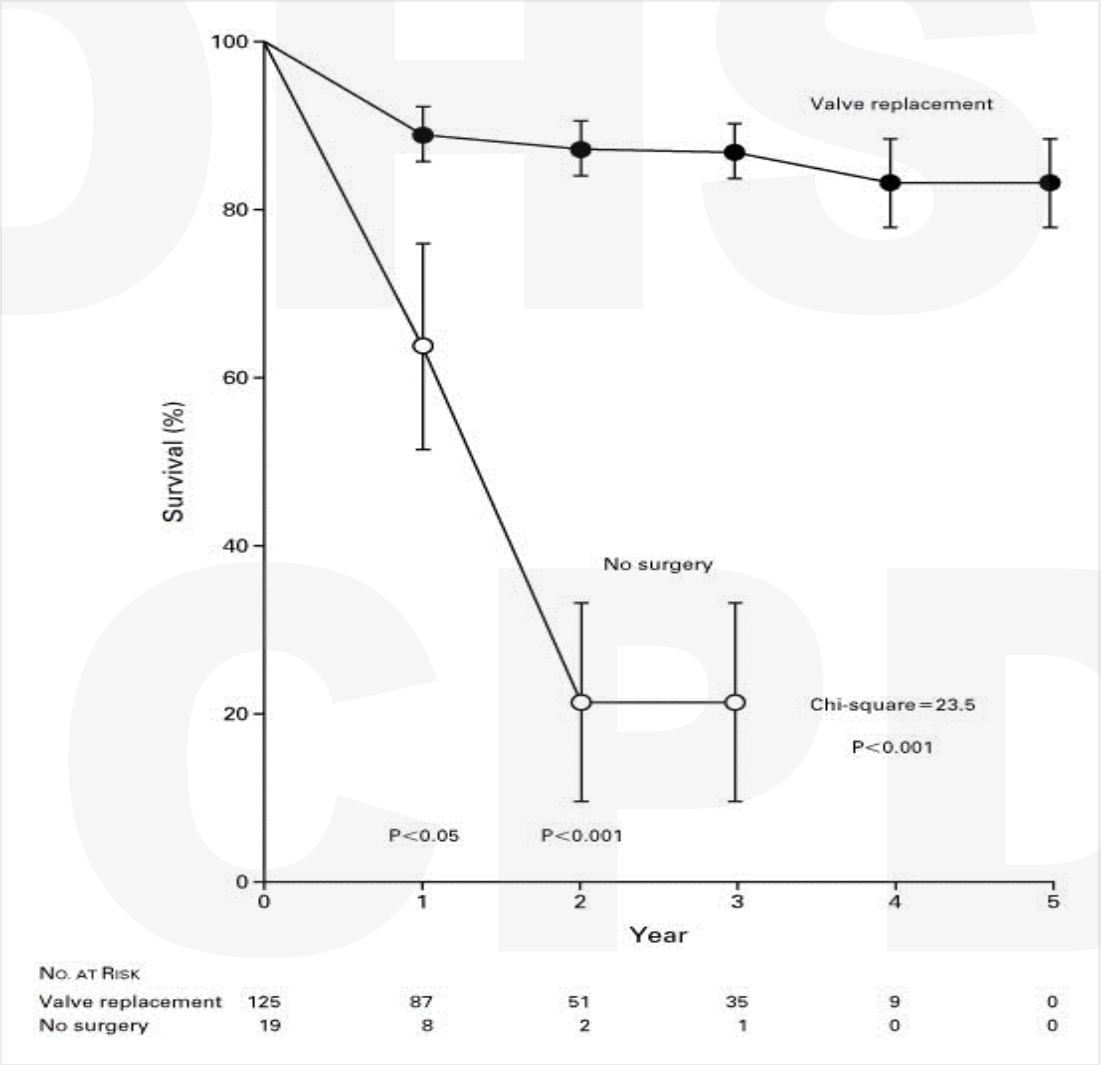
- **Prognosis poor once symptoms occur**
  - ***Angina – median survival 5 yrs***
  - ***Syncope – median survival 3 yrs***
  - ***Dyspnea – median survival 2 yrs***

Aortic Stenosis
Follow Up

- **Annual history and physical**
- **Surveillance Echo:**
  - **Severe AS**
    Every 6-12 months
  - **Moderate AS**
    Every 1-2 years
  - **Mild AS**
    Every 3 to 5 years

– **Any change in signs or symptoms**

Survival among Patients with SSAS who underwent SAVR and similar Patients who declined Surgery



Carabello BA. N Engl J MeD 2002;346:677-682.

Timing of Intervention

Recommendations	COR	LOE
AVR is recommended for symptomatic patients with severe AS who have **symptoms by history or on exercise testing**	I	B
AVR is recommended for asymptomatic patients with severe AS and **LVEF <50%**	I	B
AVR is indicated for patients with severe AS when **undergoing other cardiac surgery**	I	B

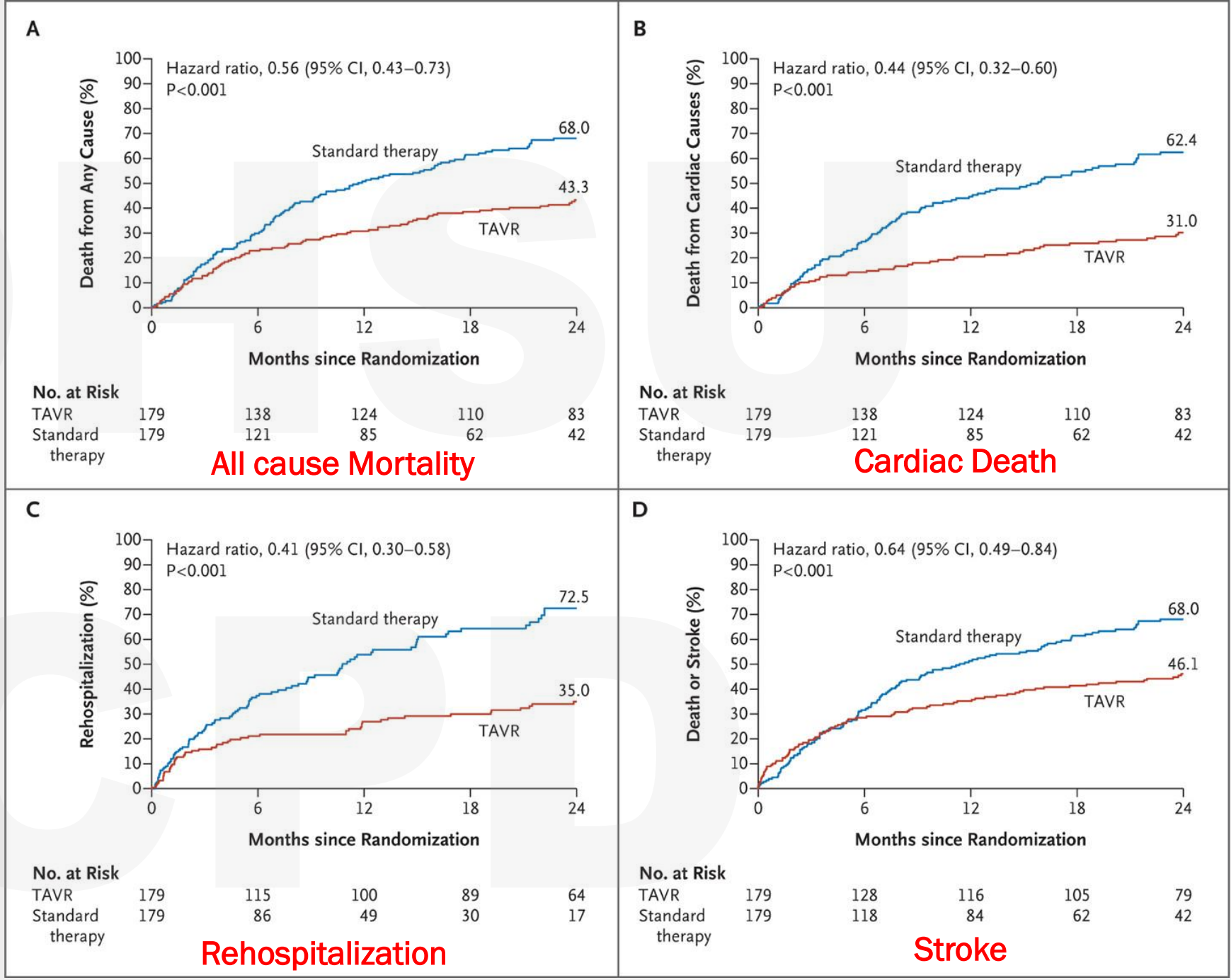
AHA/ACC Guideline for management of patients with Valvular Heart Disease. Circulation. 2020.

TAVR Bio prosthesis

Medtronic (Evolut)

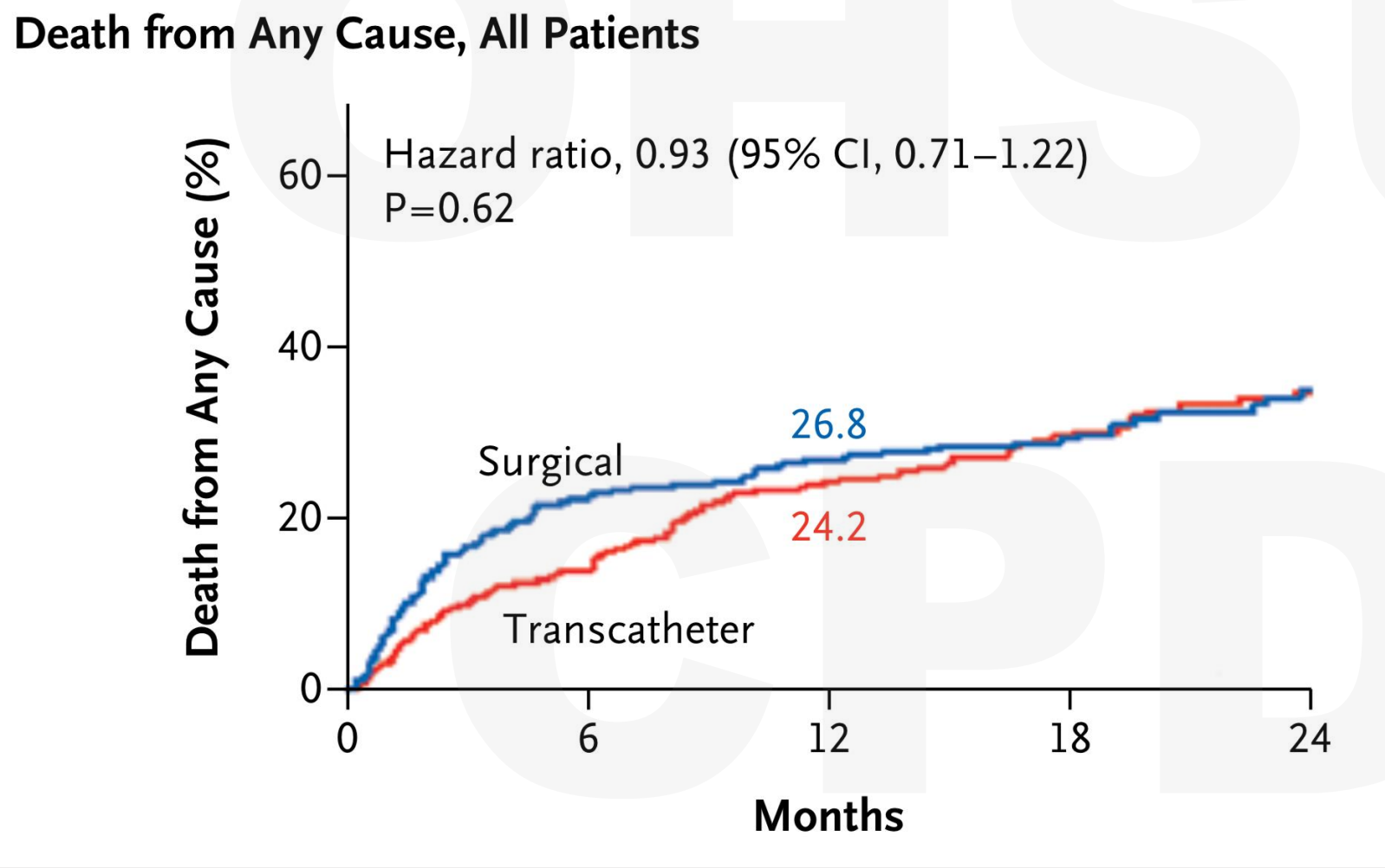
Edwards SAPIEN

TAVR in prohibitive (surgical) Risk patients



N Engl J Med 2010; 363:1597-1607

Transcatheter vs Surgical AVR in High Risk Patients



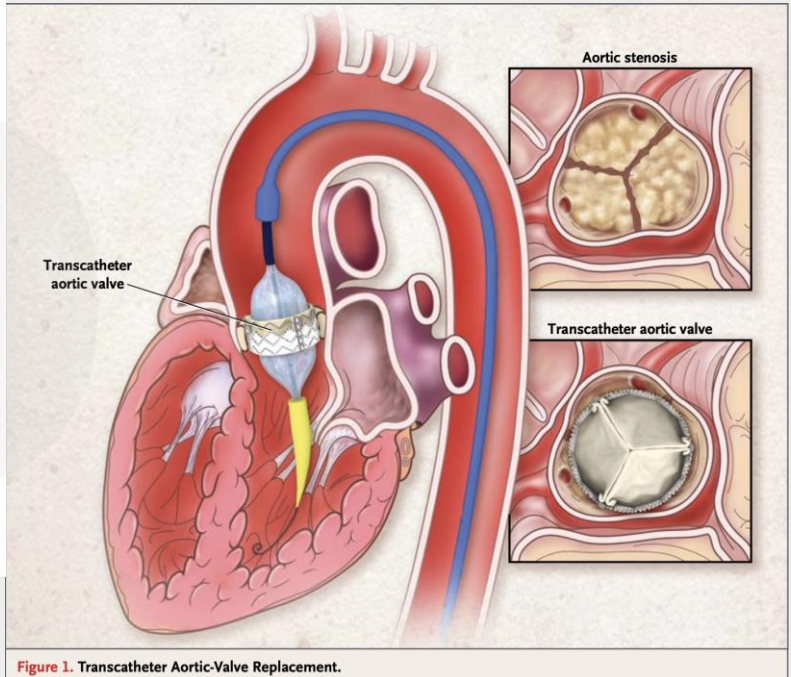
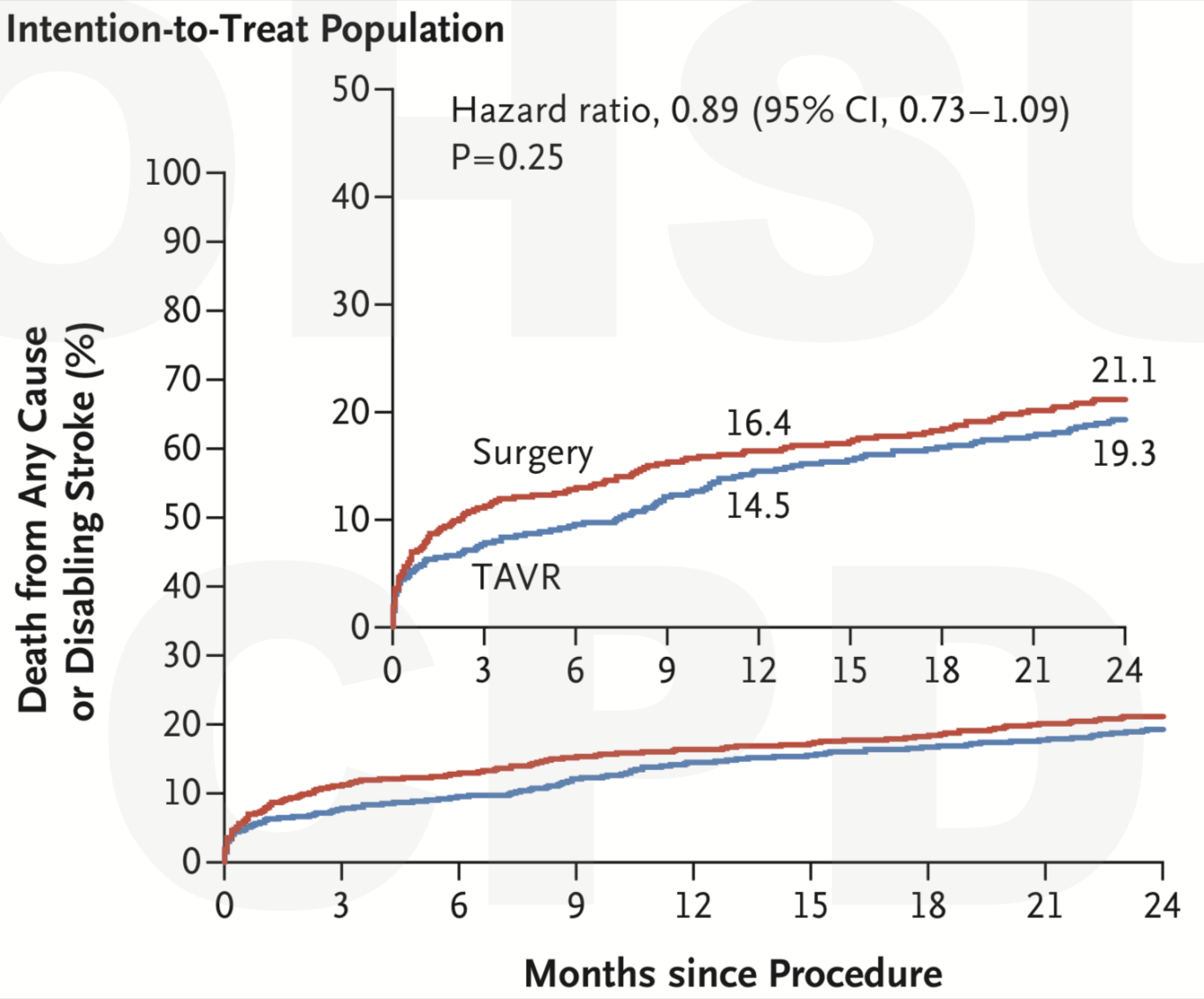


Figure 1. Transcatheter Aortic-Valve Replacement.

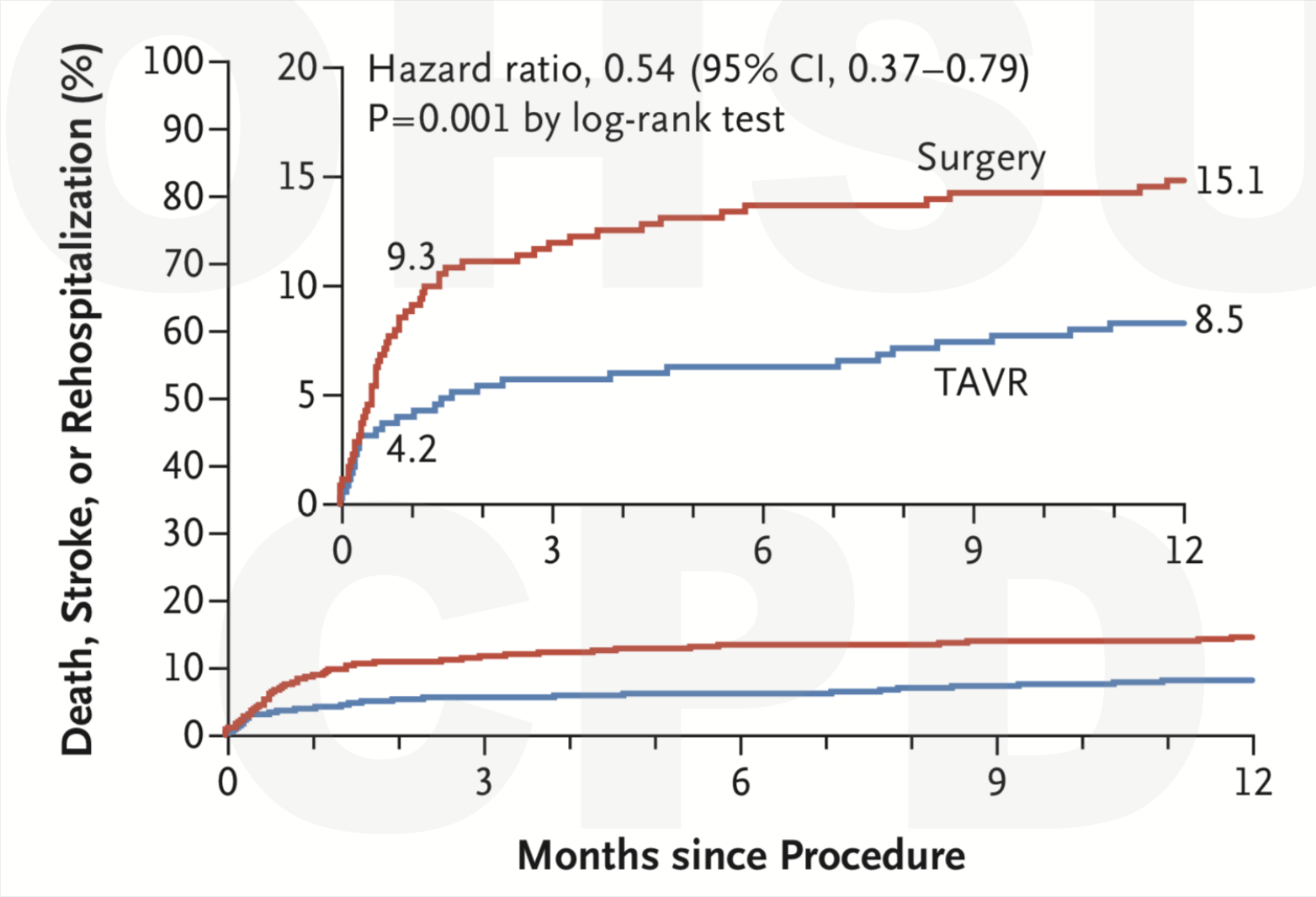
N Engl J Med 2011;364:2187-98.

Transcatheter or Surgical AVR in Intermediate Risk patients



N Engl J Med 2016;374:1609-20.

Transcatheter AVR with a balloon expandable valve in a Low-Risk patients



N Engl J Med 2019;380:1695-705

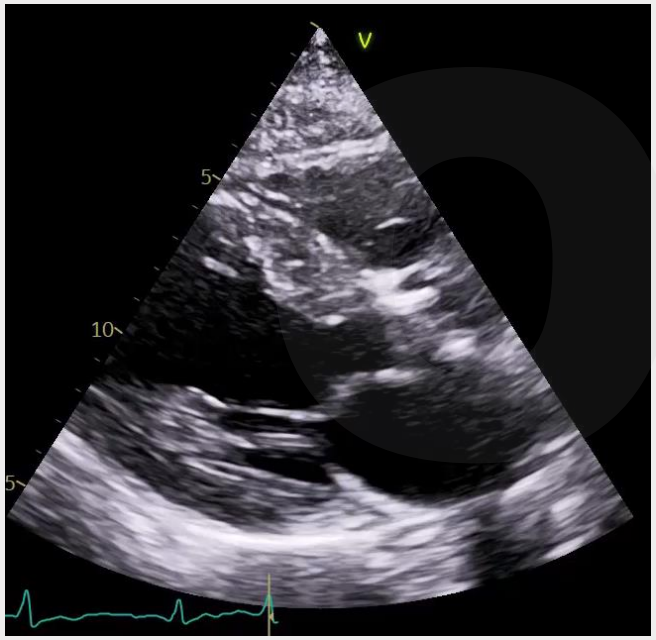
Severe Symptomatic AS Management

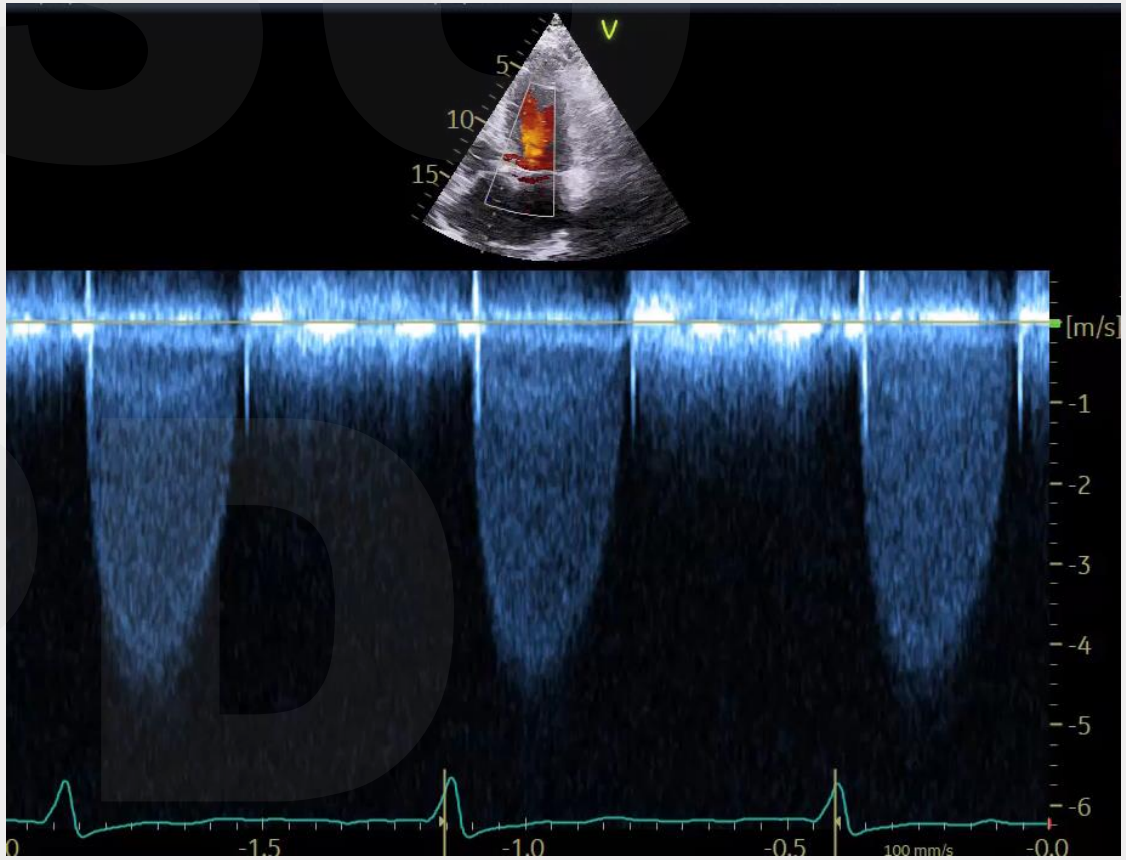
COR	LOE	Recommendations
1	A	< 65 years = SAVR
1	A	65 – 80 years = TAVI or SAVR (shared decision)
1	A	> 80 years = TAVI

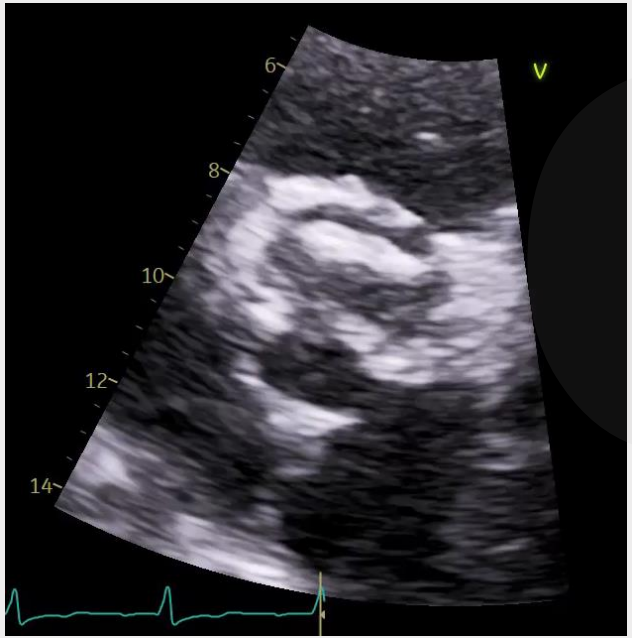
ACC/AHA guidelines 2020

Case 4

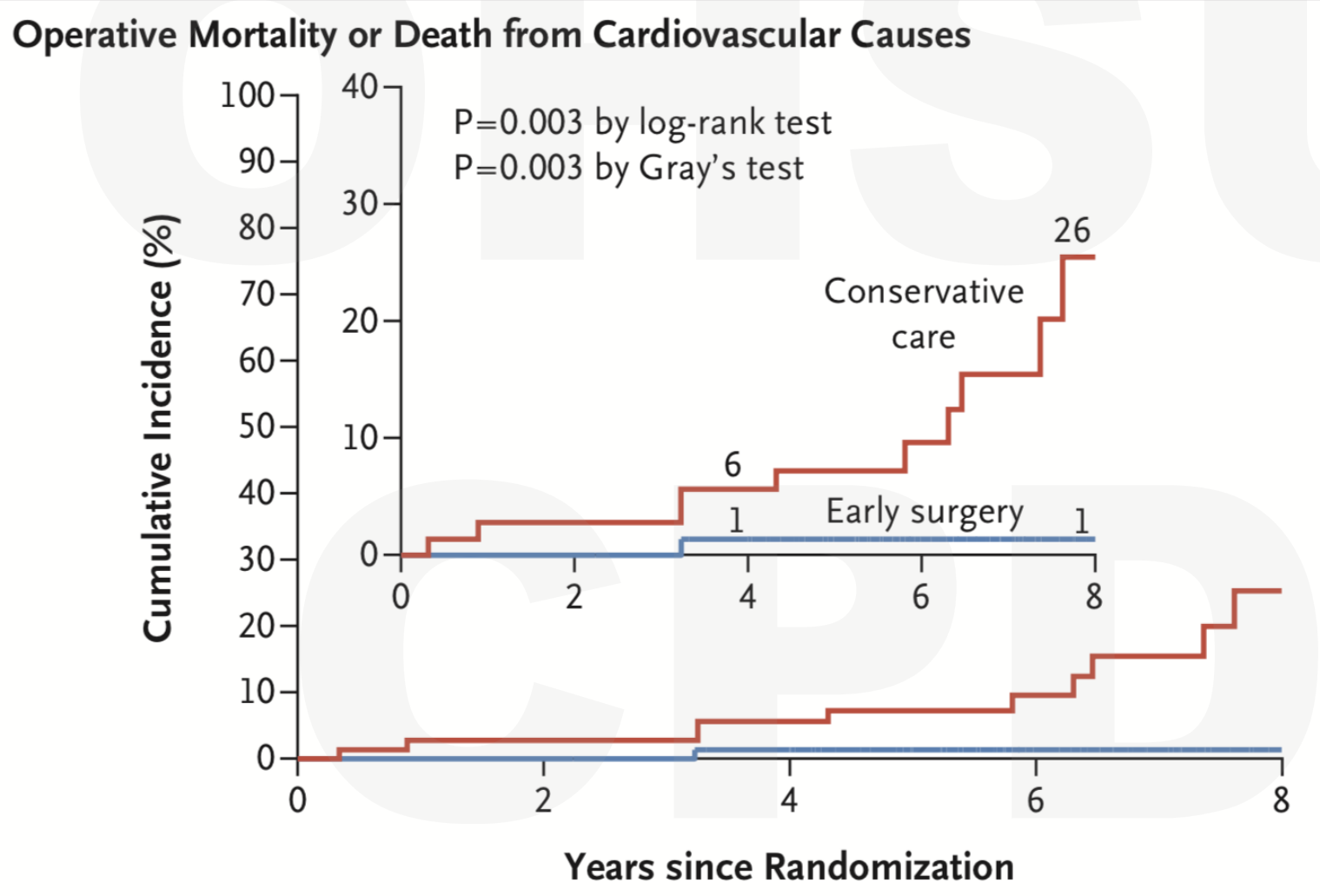
You see a 65 y/o retired internist in clinic. He has congenital bicuspid aortic valve and has been followed with serial echocardiograms. His most recent TTE shows severe AS with valve area of 0.7 cm2 and peak velocity of 5.5 m/s. He is an avid biker (20 miles per day) and likes to ski every season. He denies any symptoms.




[m/s]
-1
-2
-3
-4
-5
-6
-1.5
-1.0
-0.5
-0.0
100 mm/s

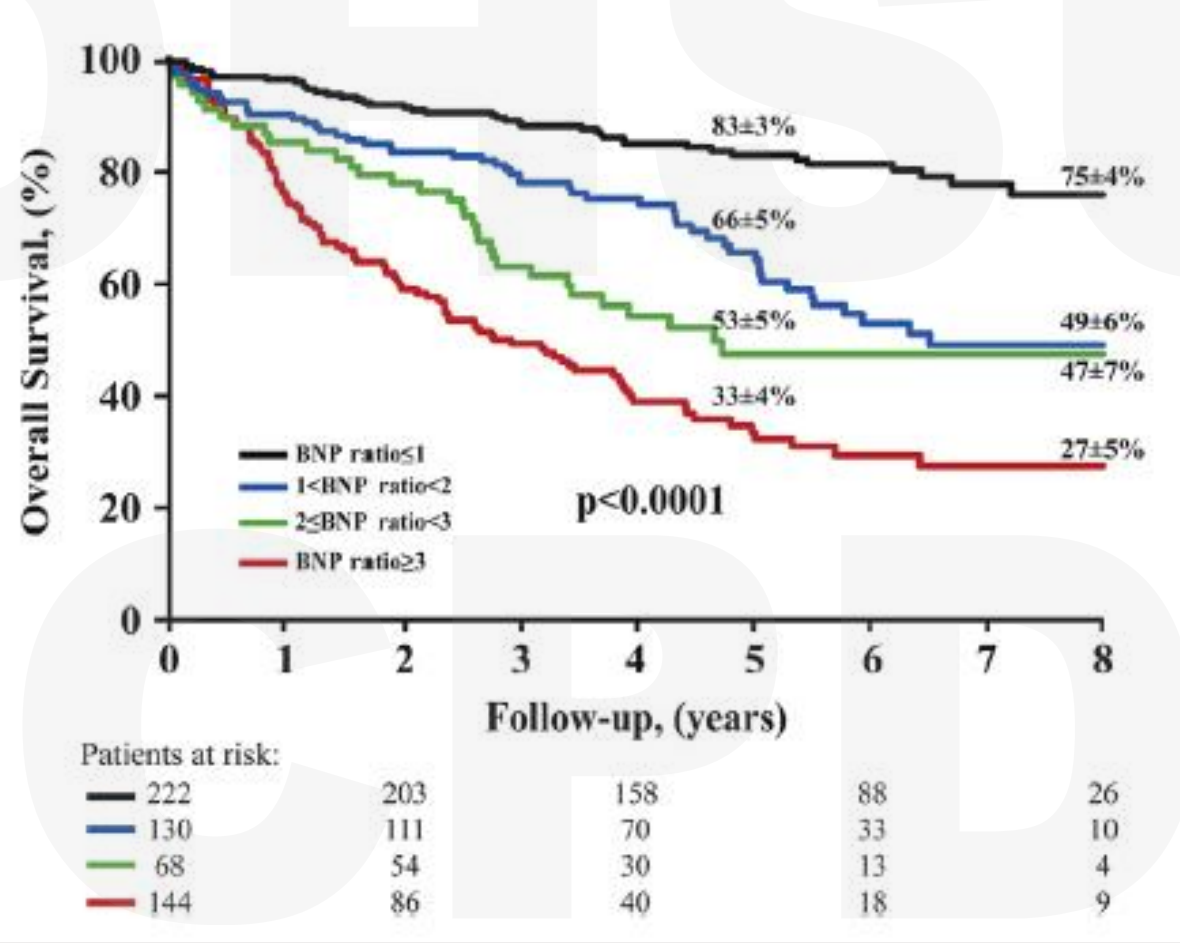


Early Surgery or Conservative Care for Asymptomatic AS



N Engl J Med. 2020 Jan 9;382(2):111-119.

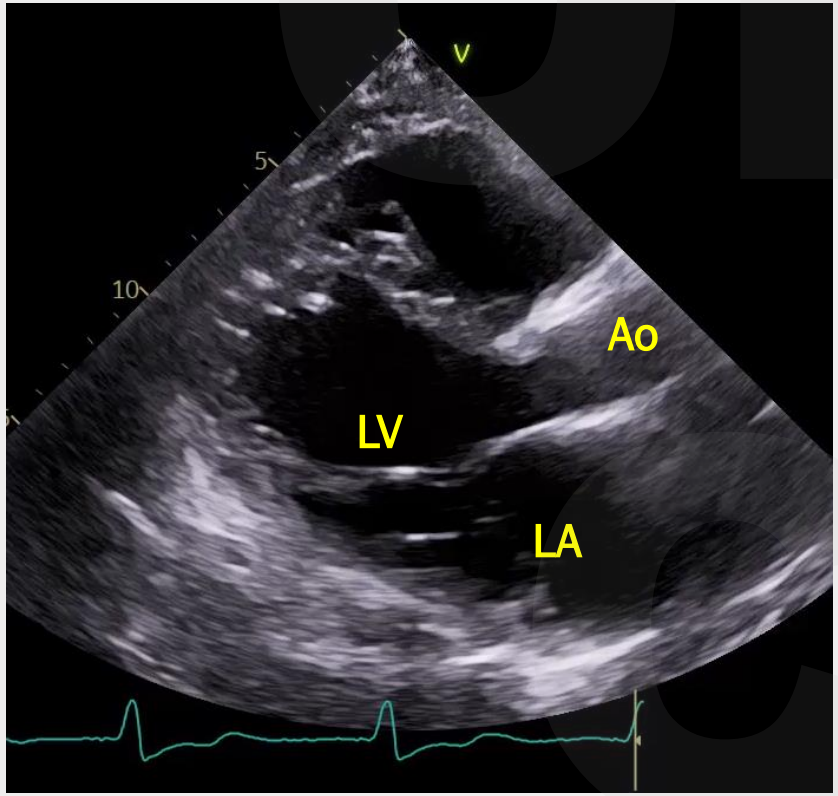
Survival and BNP Ratio
Asymptomatic AS

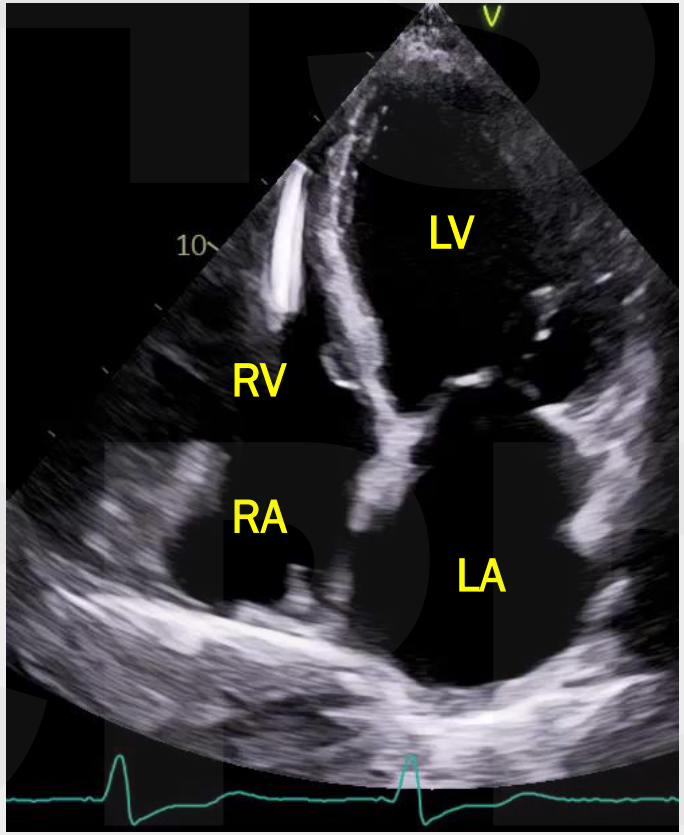


JACC 2014;63:2016

Case 5.

67 y/o M with long standing DCM is admitted with CHF exacerbation. BP 166/89 mm Hg





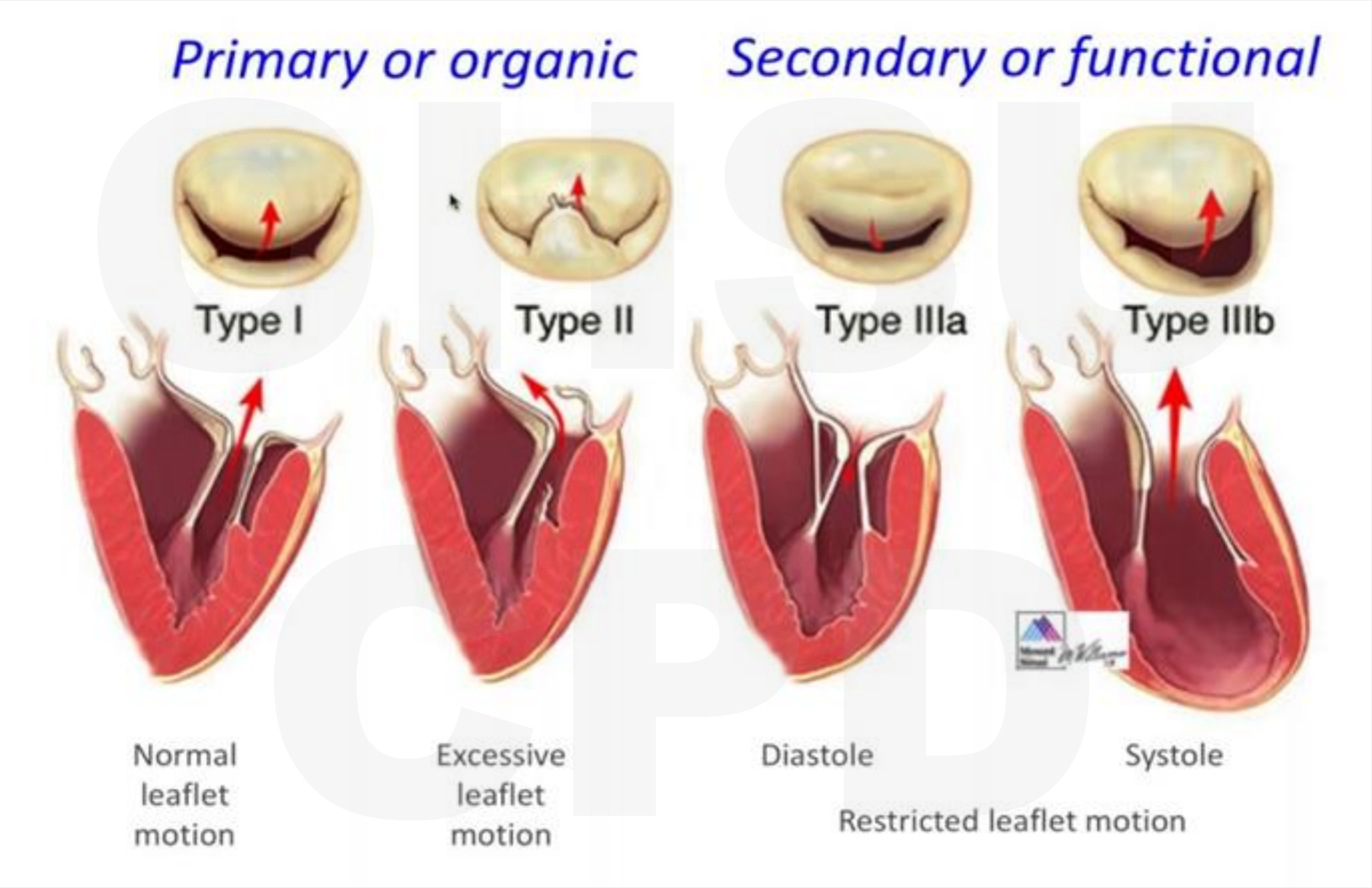
TTE shows dilated LV with reduced systolic function, severe functional MR

How would you manage this patient?

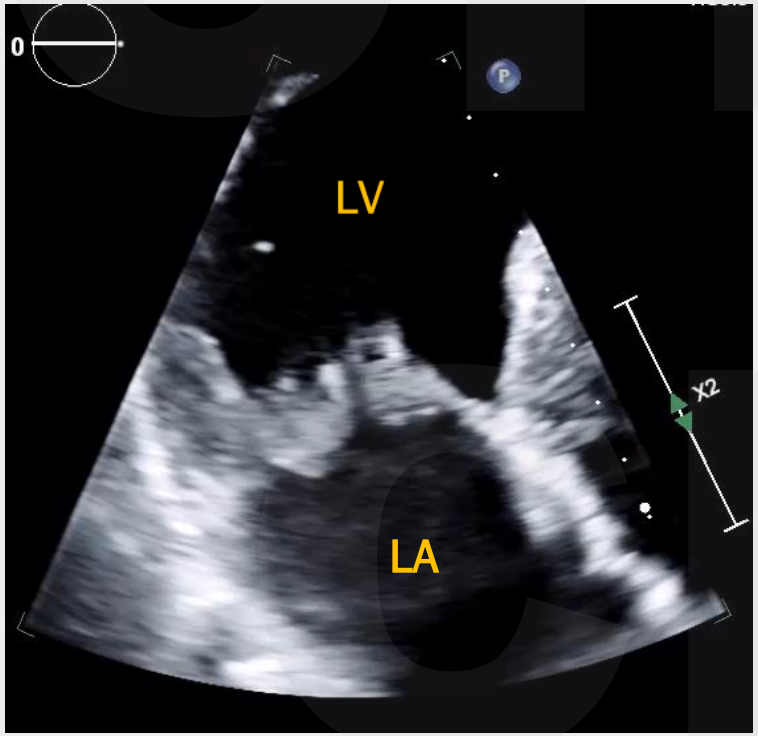
1. Medical therapy for systolic HF
2. Mitra-Clip
3. MV replacement or repair
4. None of the above
5. Combination of 1 and 2

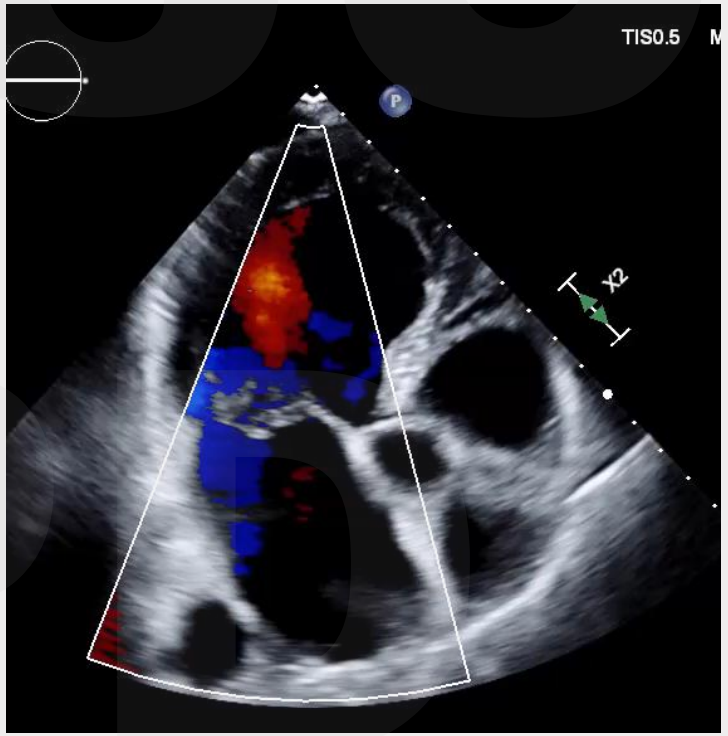
Mitral Regurgitation
Etiology

- **Primary**
  - ***Myxomatous (mitral valve prolapse)***
  - ***Rheumatic***
  - ***Endocarditis***
- **Secondary**
  - ***Cardiomyopathy***
  - ***LV infarction or ischemia***


Primary or organic
Secondary or functional
Type I
Type II
Type IIIa
Type IIIb
Normal leaflet motion
Excessive leaflet motion
Diastole
Systole
Restricted leaflet motion

PRIMARY MR (MVP)





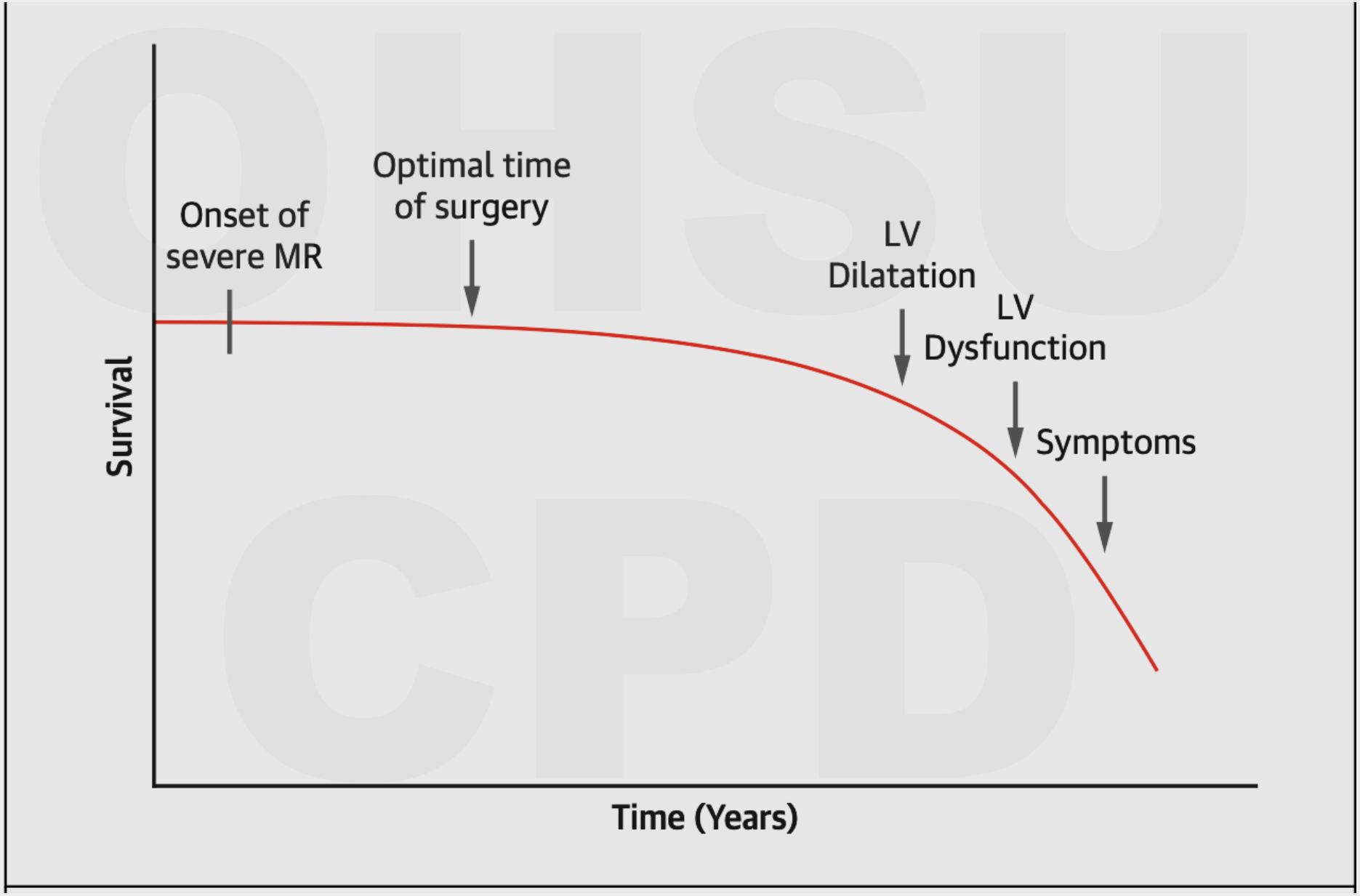
How would you manage this patient?

1. Mitral valve repair
2. Mitral valve replacement
3. Mitra Clip device
4. Medical therapy for HF
5. Diuretic and follow up in clinic

Mitral Regurgitation
Pathophysiology

- **Portion of LV stroke volume goes into low pressure left atrium**
  - *LA pressure rises; LA dilates*
  - *Forward cardiac output decreases*
- **LV "volume overload"**
  - *Increase LV volume to maintain forward SV*
  - *Increase mass ("eccentric" hypertrophy)*
- **Pulmonary venous pressures increases**
- **LV contractility eventually falls**

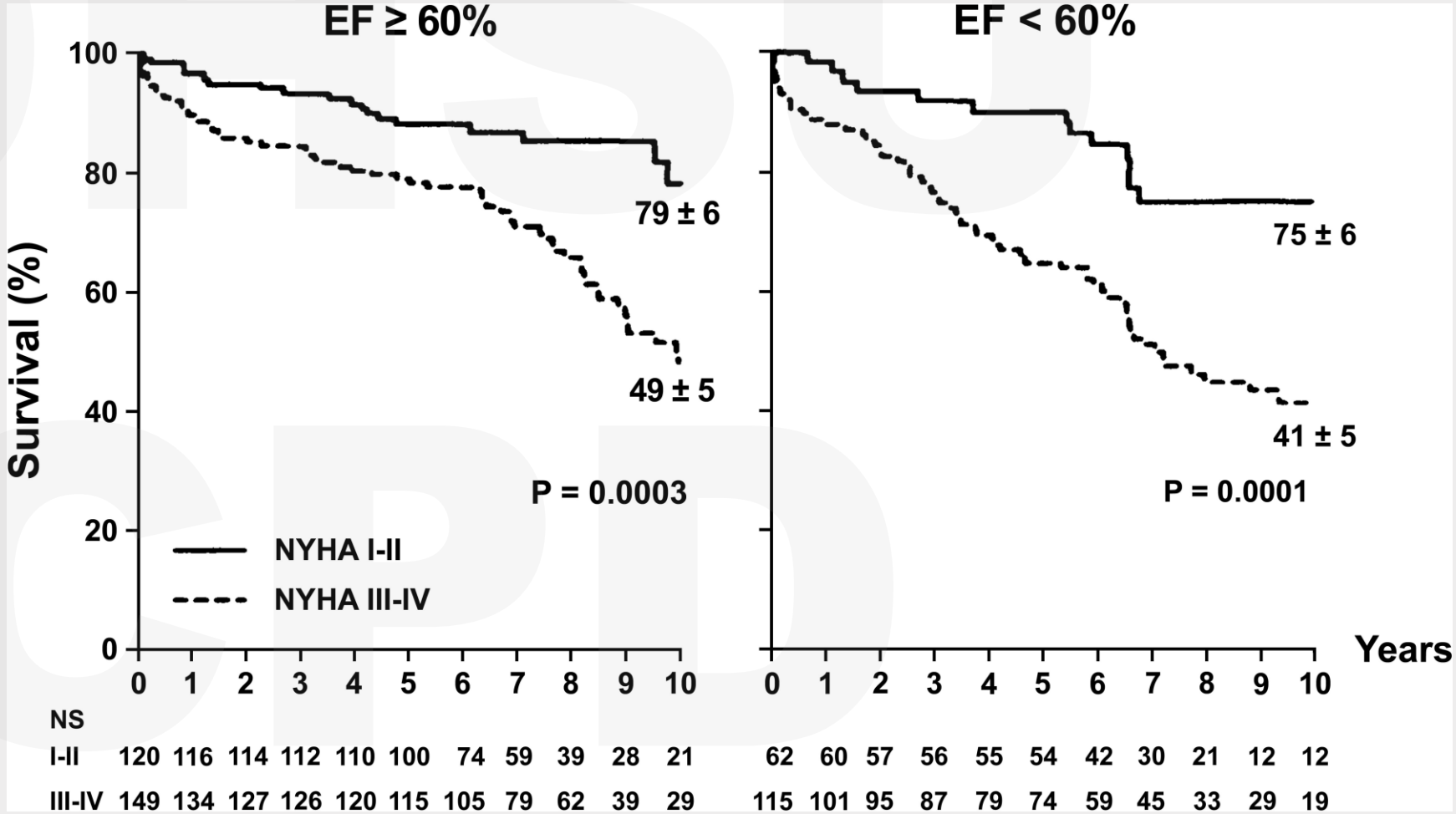
Natural History of MR



Impact of preoperative symptoms on survival after surgical correction in Primary MR

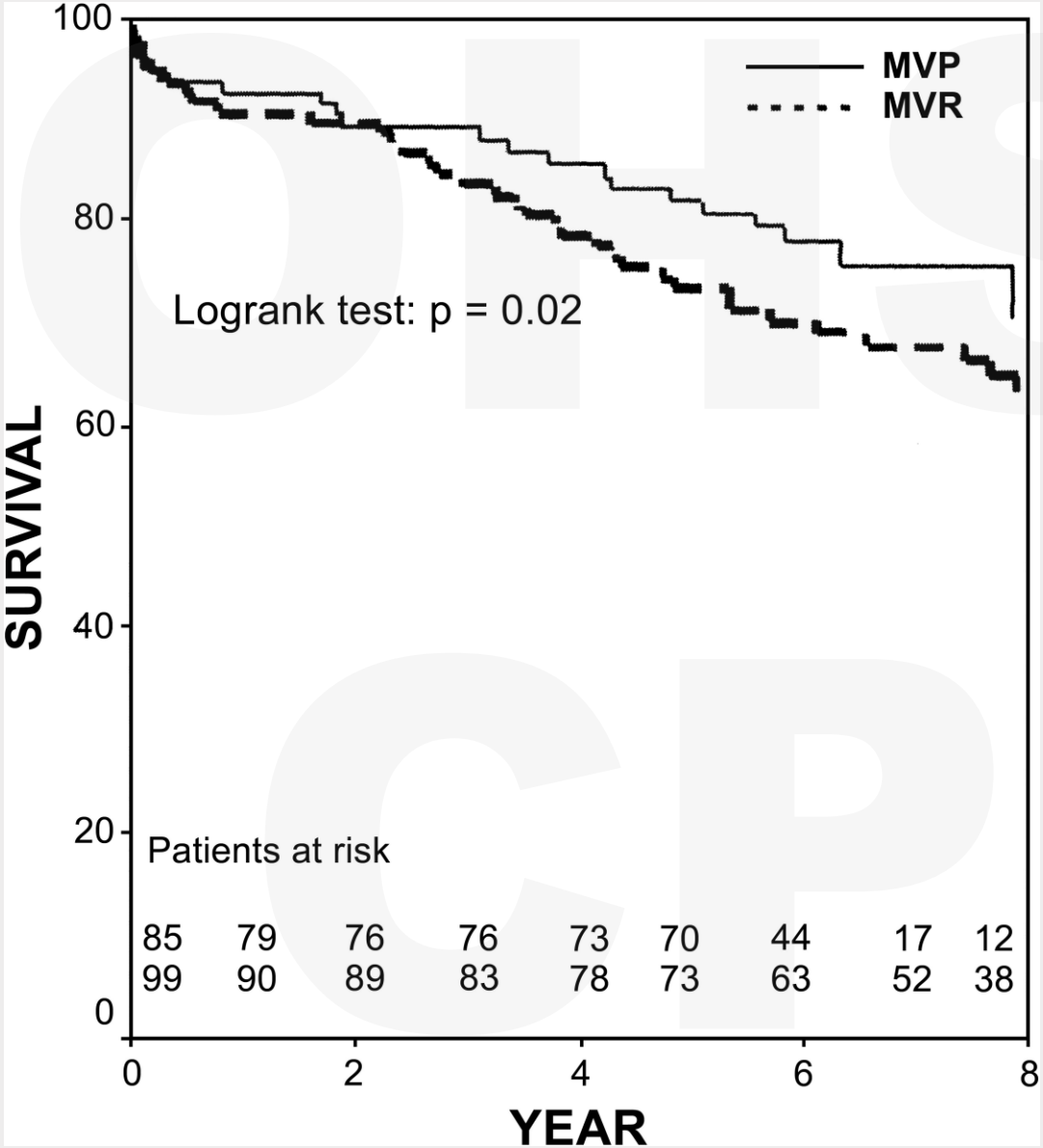
Symptomatic MR

↑ **MORTALITY**



Circulation Volume 99, Issue 3, 26 January 1999

Valve Repair vs Replacement



Repair is superior

The Annals of Thoracic Surgery Volume 84, Issue 2, August 2007

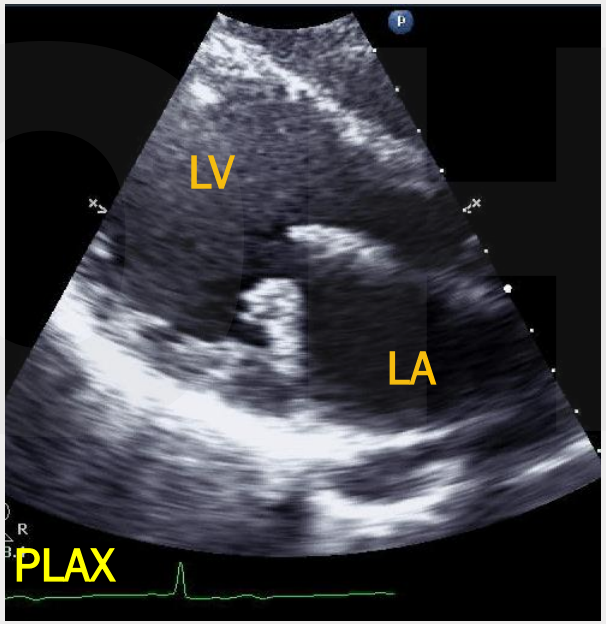
Management of MR

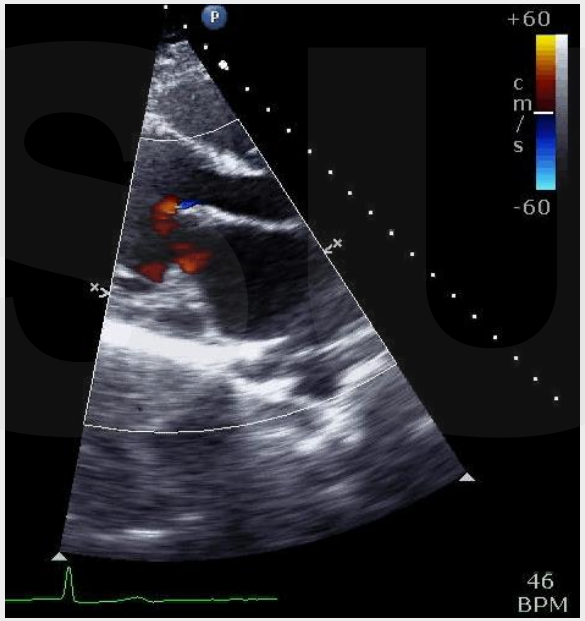
- **Mild to Moderate:**

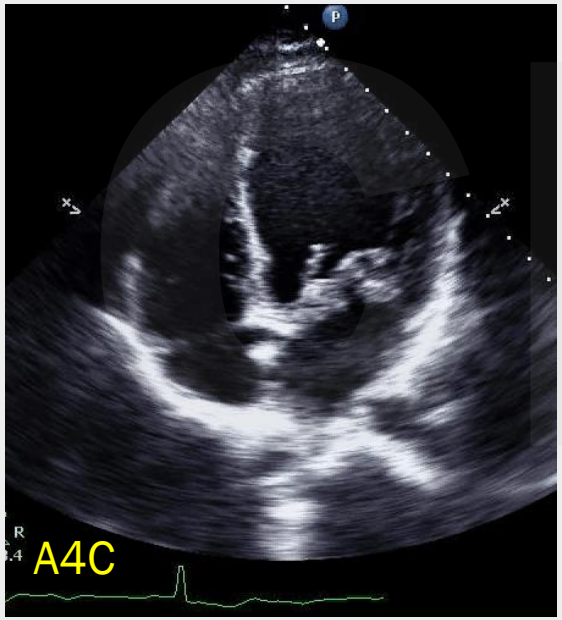
  If LV normal and patient is asymptomatic → no intervention

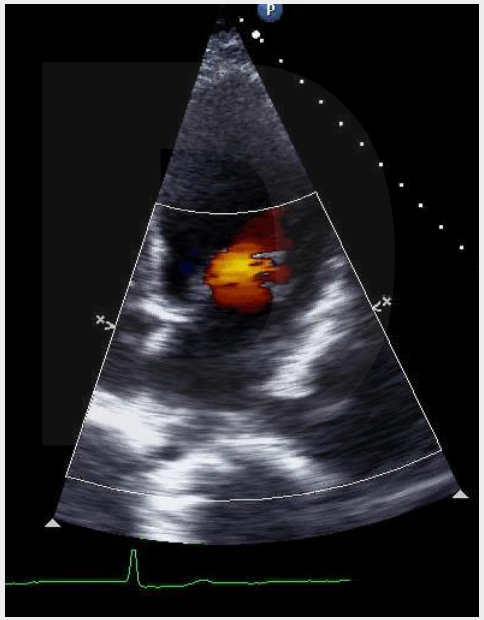
  - **For hypertension: BP control**
  - **Periodic assessment of symptoms**
  - **Echo every 3-5 years for surveillance**

Barlow's Valve









Management

- **Severe MR:**
  - **Symptomatic (need to act)**
    - **Primary: MV repair or replacement**
    - **Secondary: GDMTx and then Mitra-Clip**
  - **Asymptomatic: active surveillance with echo**

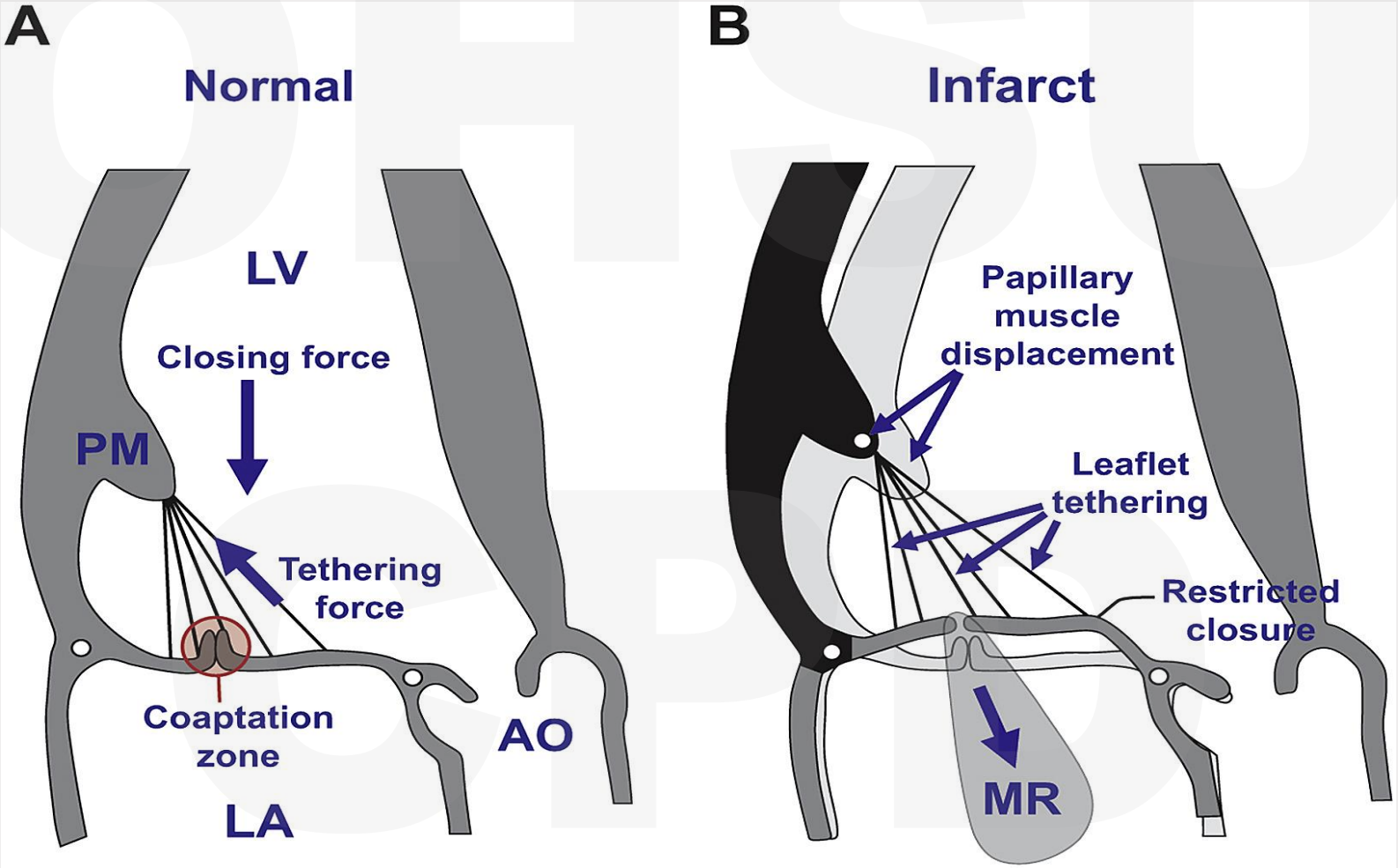
Primary Severe MR

Recommendations	COR	LOE
MV surgery for symptomatic patients and LVEF >30%	I	B
MV repair is recommended in preference to MV replacement when surgical treatment is indicated	I	B

Circulation. 2020;135:e1159–e1195

Figure 1

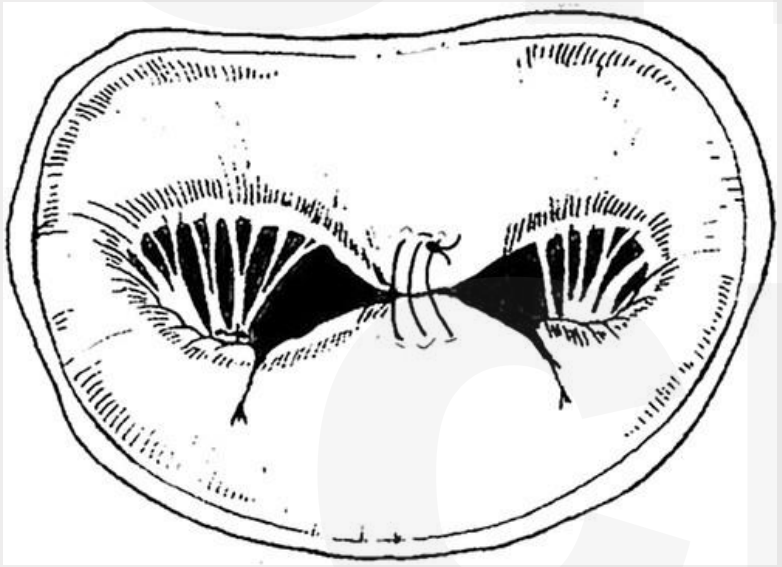
Ischemic MR (secondary MR)



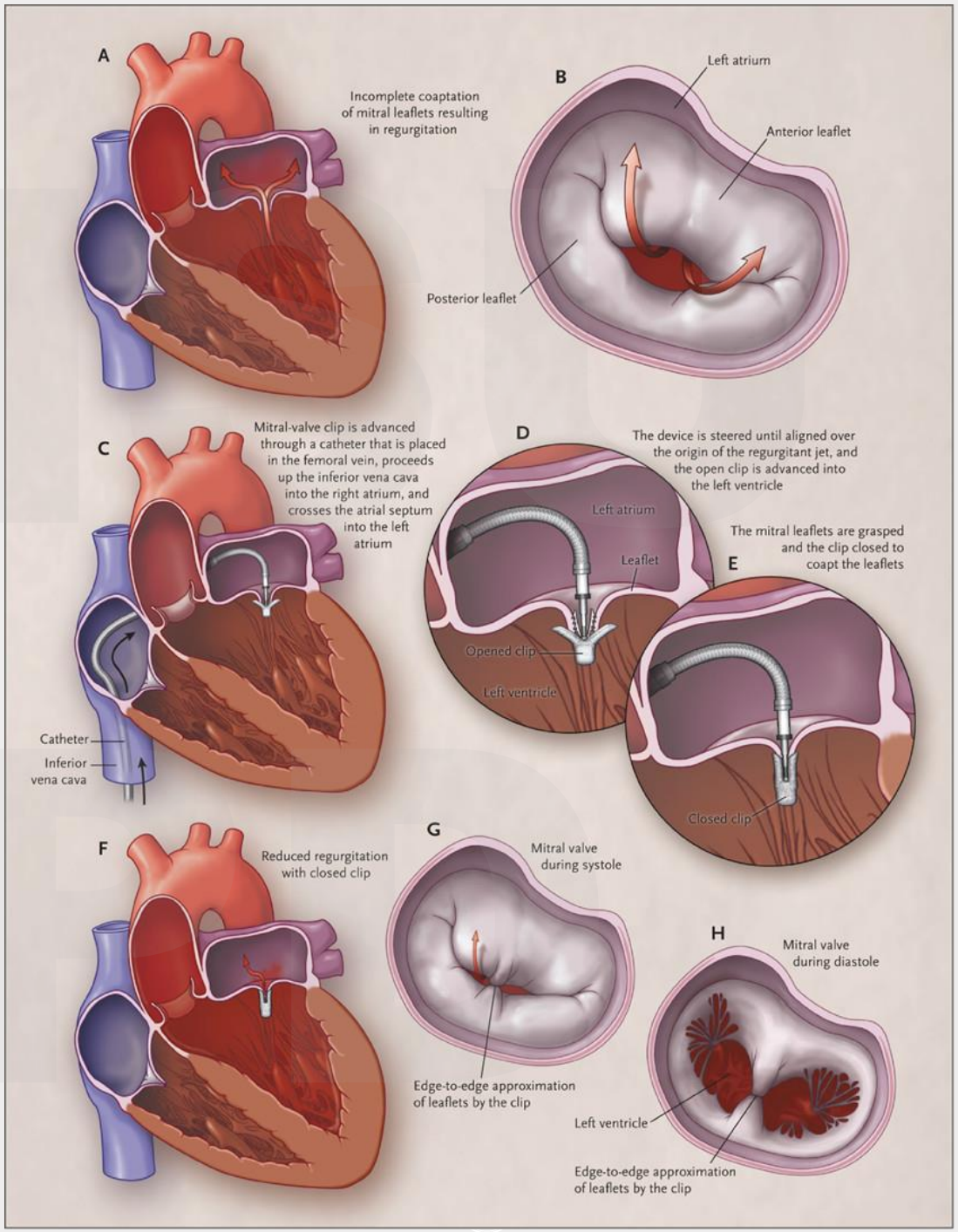
Journal of the American Society of Echocardiography 2013 26, 1107-1117

Mitra clip

Alfieri stitch

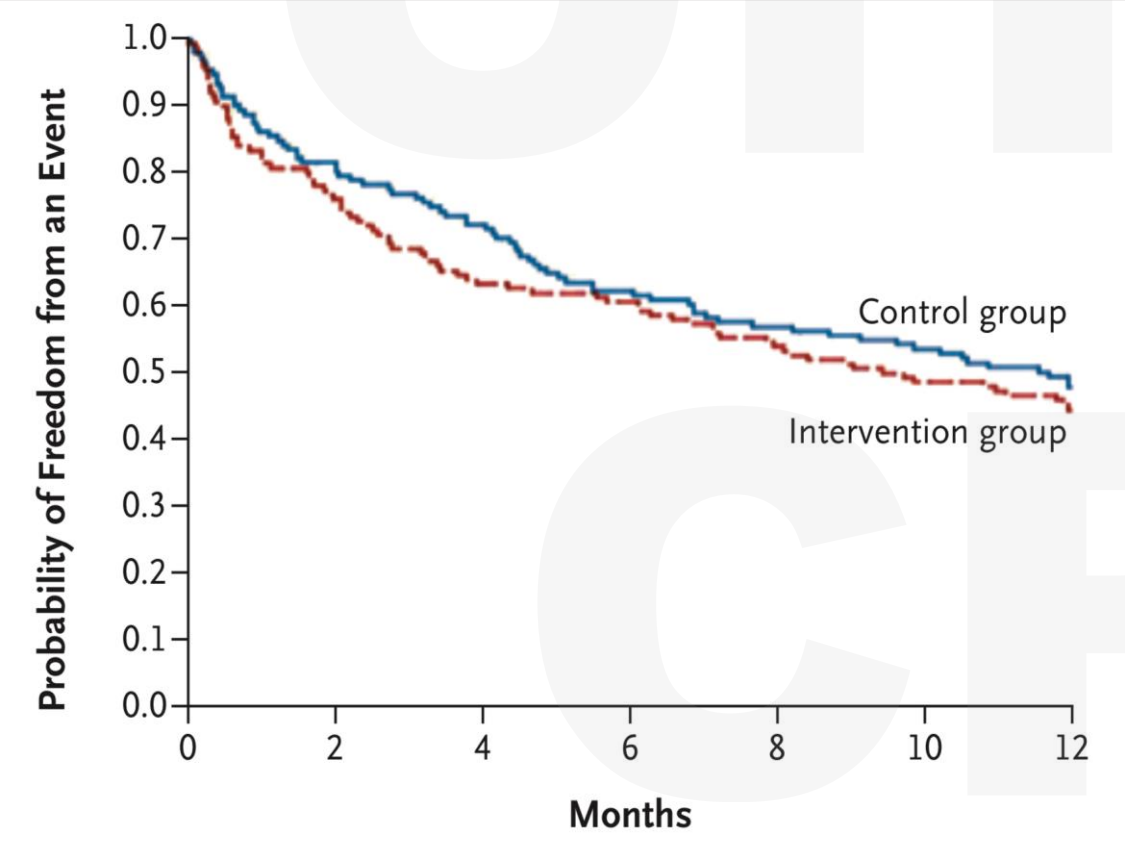


Percutaneous Repair of a Mitral Valve



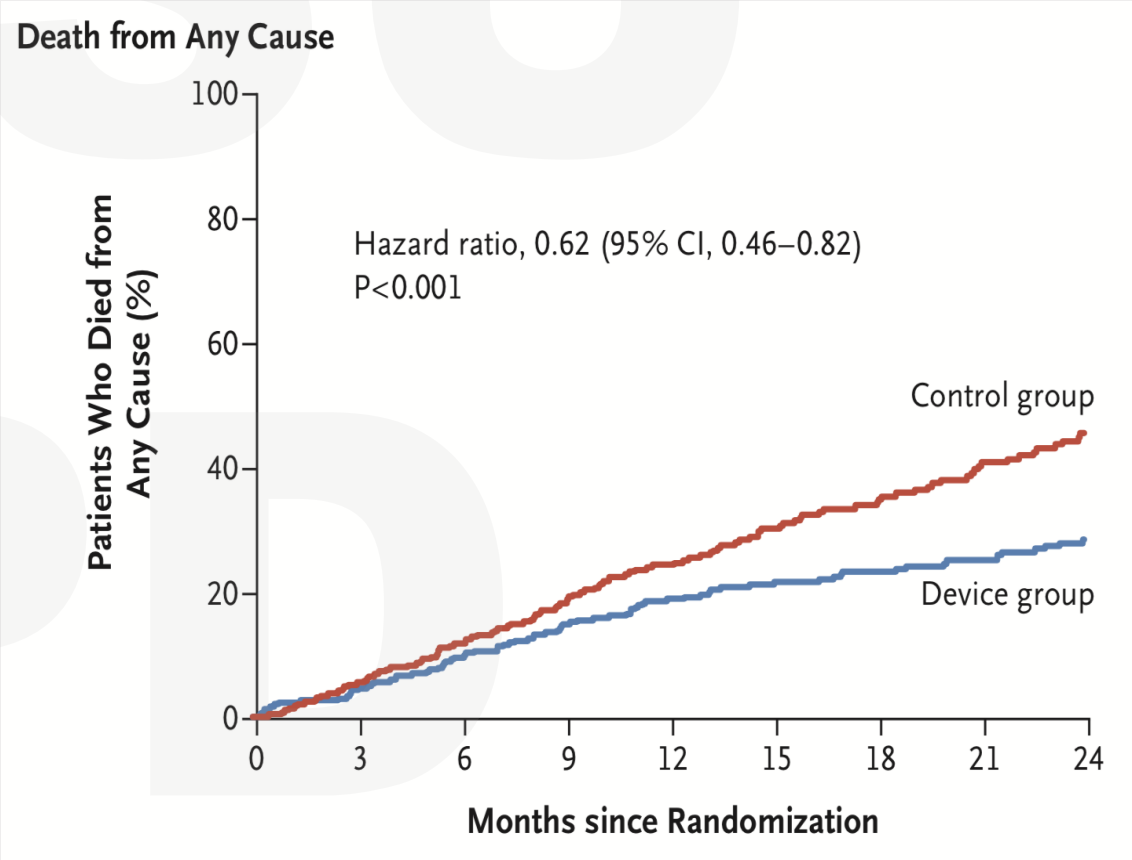
Feldman T et al. N Engl J Med 2011;364:1395-1406.

MITRA- FR Trial



N Engl J Med 2018;379:2297-2306.

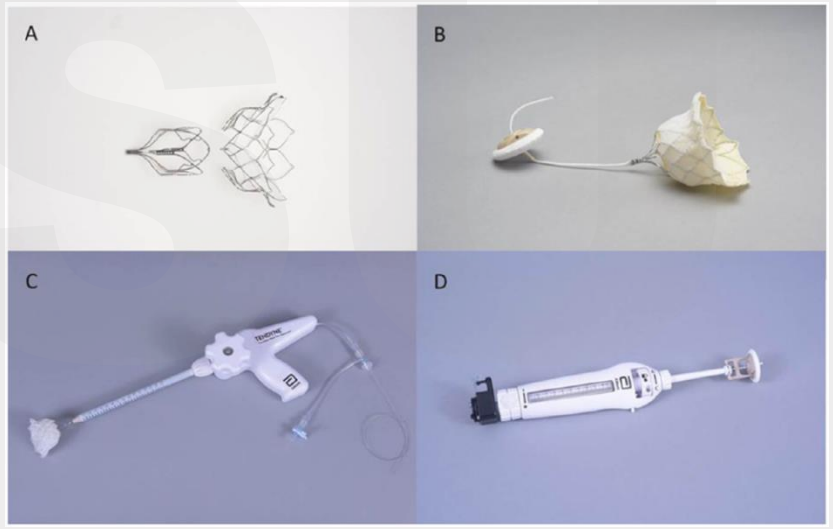
COAPT Trial



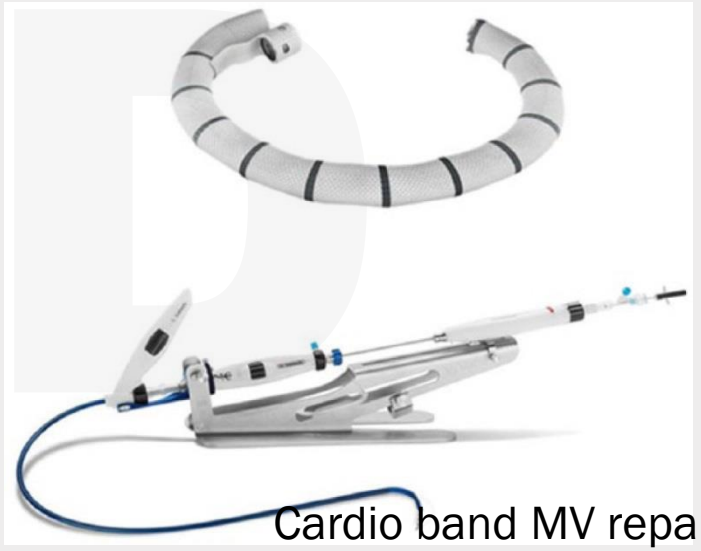
N Engl J Med 2018;379:2307-18.

Future of percutaneous MR therapies

Intrepid MV replacement



Tendyne MV system



Cardio band MV repair

Infectious Endocarditis Prophylaxis

Recommendations	COR	LOE
Antibiotic Prophylaxis against IE is reasonable before dental procedures: 1. All prosthetic cardiac valves 2. All valve repairs	IIa	C-LD

Circulation. 2017;135:e1159–e1195

Mechanical vs Bio prosthetic valve

- **Age :**
  - ***< 50 mechanical,***
  - ***> 70 bio prosthesis***
- Lifestyle
- Patient preference

Anticoagulation and Antiplatelet therapy

- **Bio prosthesis: ASA 81mg indefinite**
  - **Surgical**
  - **TAVR**

- **Mechanical Valve: Warfarin (indefinite)**
  - **Bio Prosthesis (Surgical): 3 months**

INR Goal for mechanical valve

- AV= 2.5
- MV= 3

Take Home Points

- **Aortic Stenosis**
  - Common in elderly
  - Symptoms = Intervention
  - **TAVR – High or intermediate surgical risk (> 80 y/o)**
  - **Low Surgical Risk = Surgery (< 65 y/o)**

- **Mitral Regurgitation**
  - Primary severe MR: **surgical repair is preferred** over replacement
  - **Secondary MR best managed with GDMTx**
  - **Mitra Clip is approved for severe secondary MR**

Thank you

Bhaskar.Arora@va.gov