Cases: Why is the Valve Leaking and What Should I do: Surgery, Clip, or Watchful Waiting?

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DISCLOSURE

Relevant Financial Relationship(s)

None

Off Label Usage

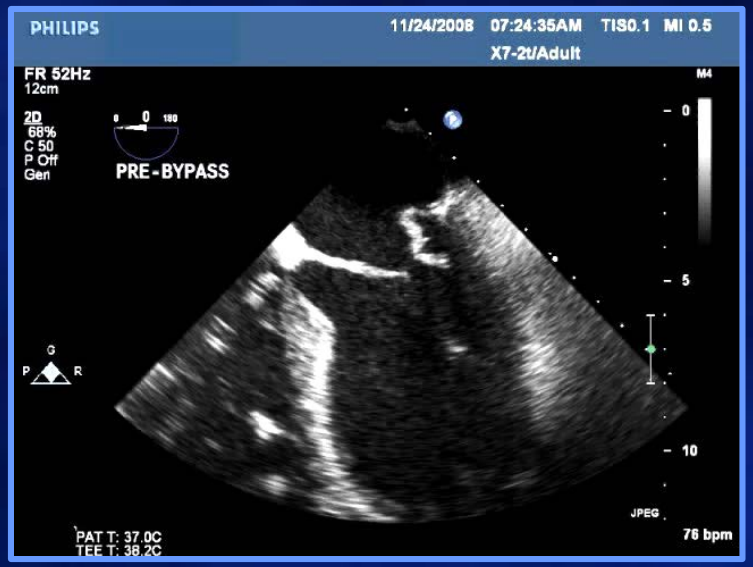
None

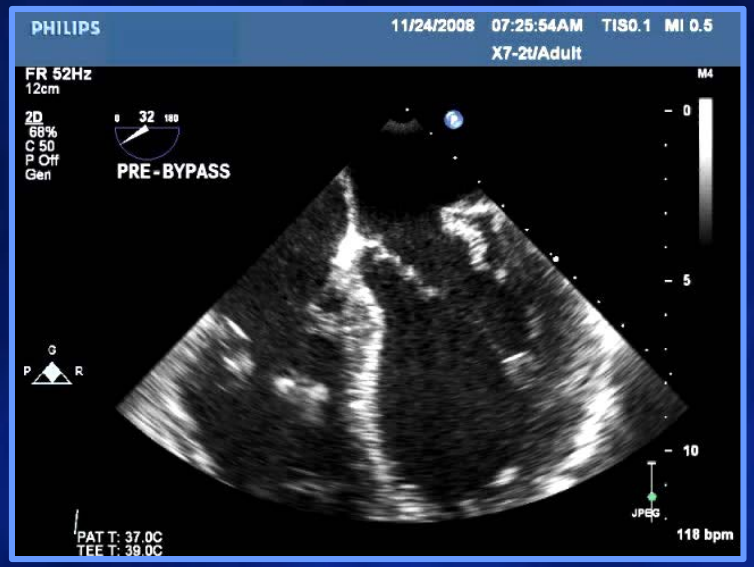
Case

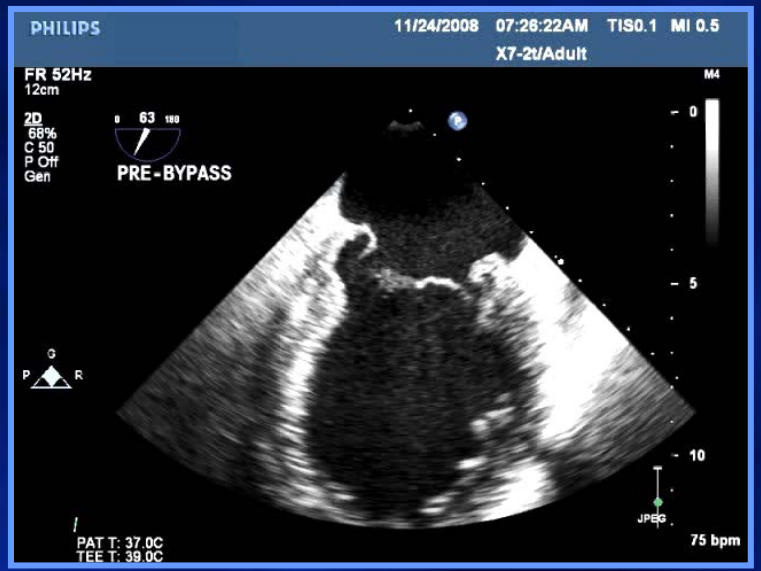
- 55 year old male with symptomatic mitral regurgitation secondary to a flail MV leaflet
- No Co-morbidities
- Referred for MV Repair

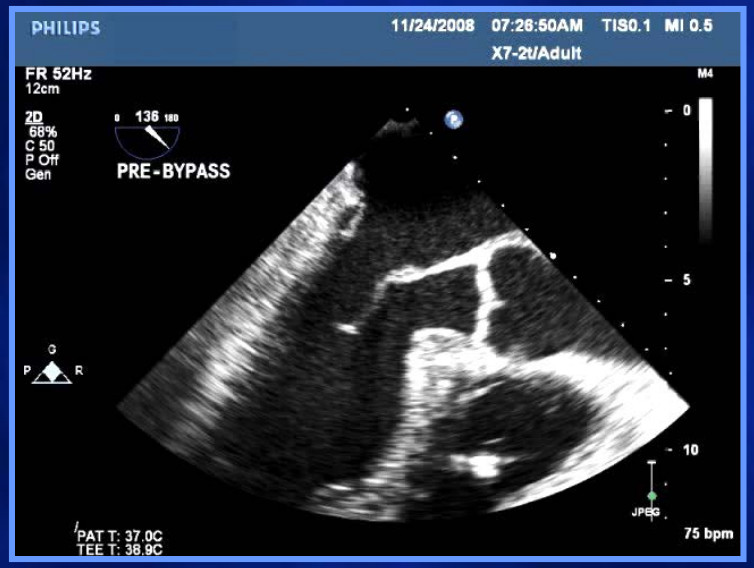
TEE

What's wrong with the mitral valve?









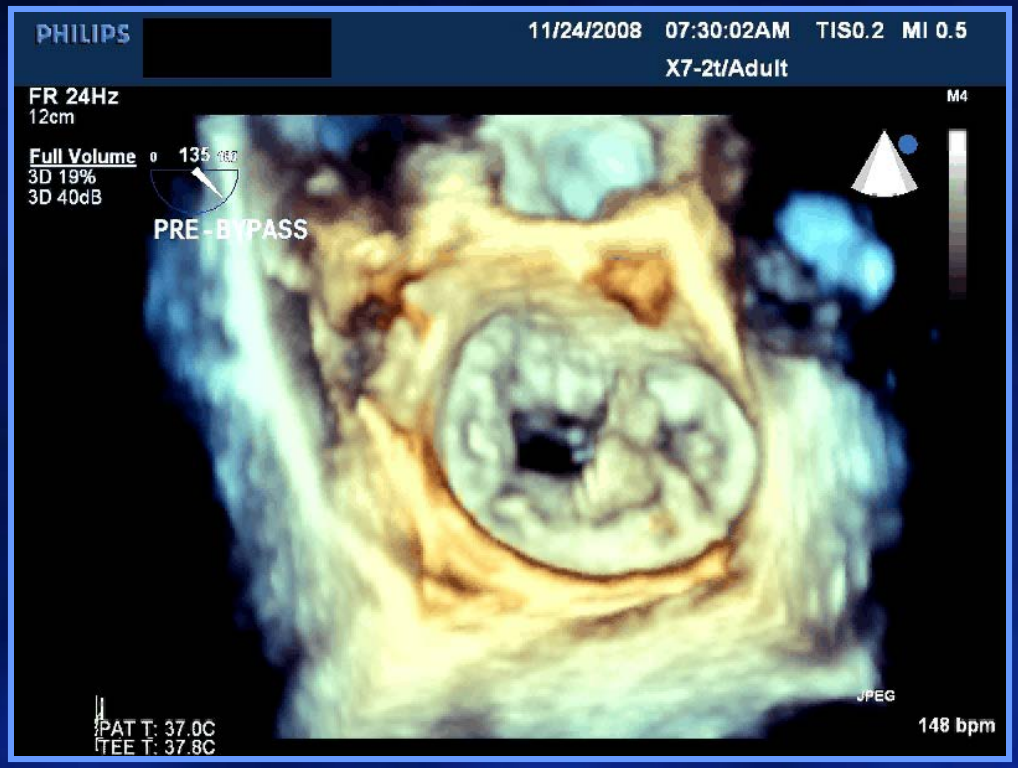
What's wrong with the mitral valve?

1. Flail posterior lateral scallop (P1)
2. Flail posterior middle scallop (P2)
3. Flail posterior medial scallop (P3)
4. Flail anterior middle scallop (A2)
5. Mitral valve cleft

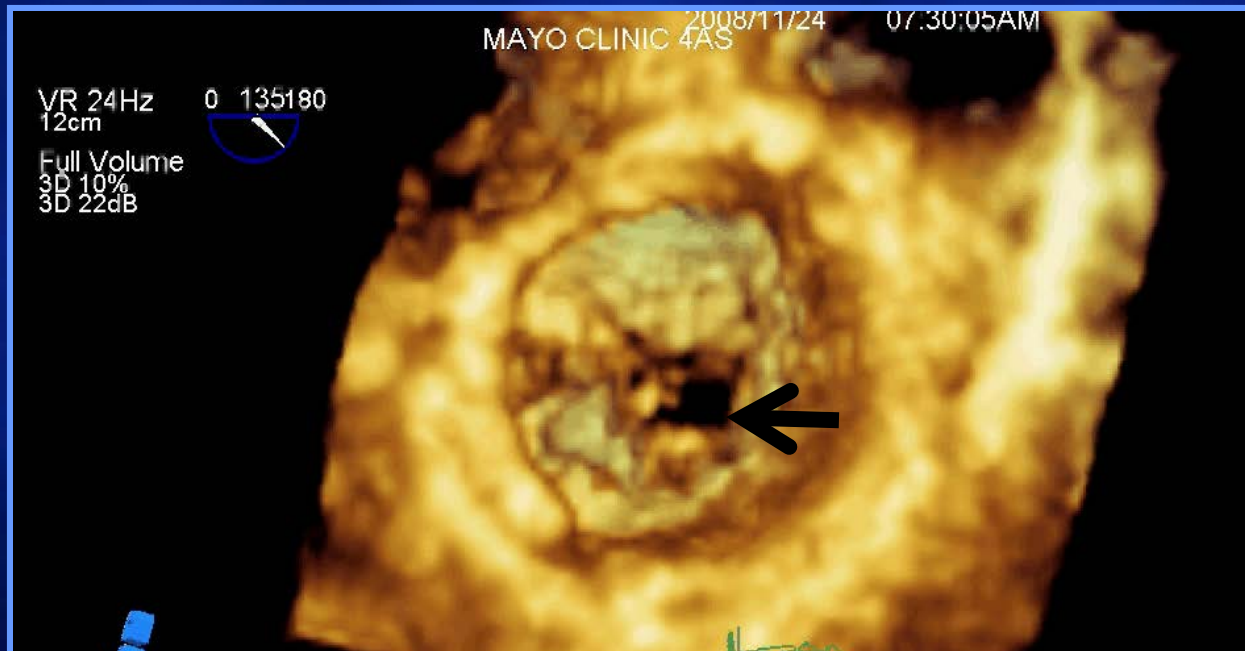
What would you recommend?

1. Surgical MV repair
2. Surgical MV replacement
3. MitraClip (if patient prefers this)

View from LA Perspective →



View from LV Perspective →



Surgical Note

Diagnosis: 1. Severe mitral valve regurgitation.

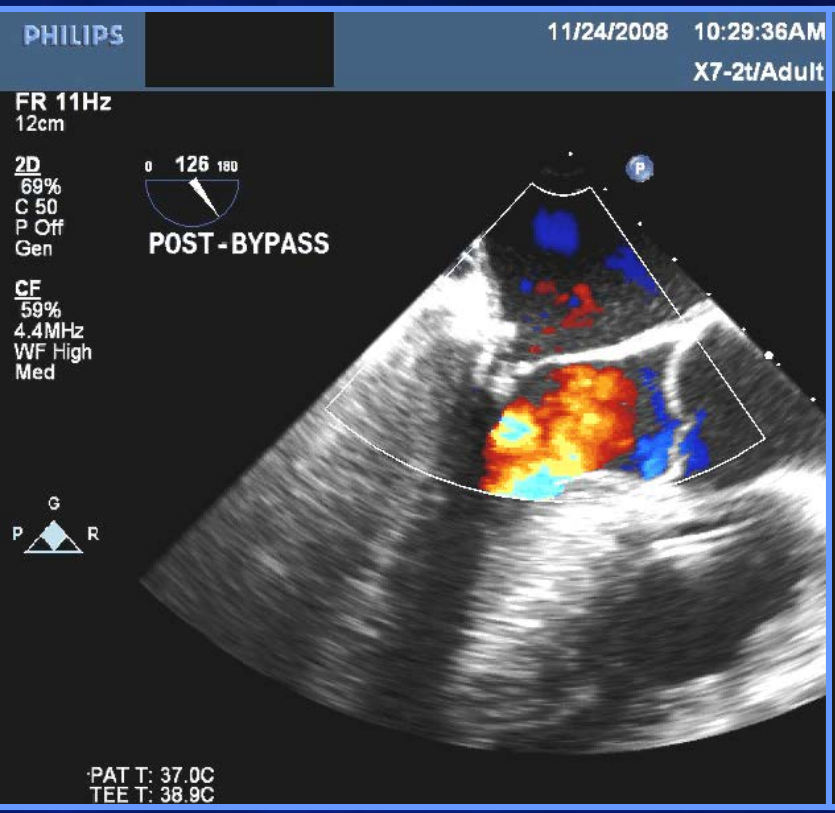
2. Flail middle scallop posterior leaflet.
3. Cleft between lateral and middle scallops of the posterior leaflet.

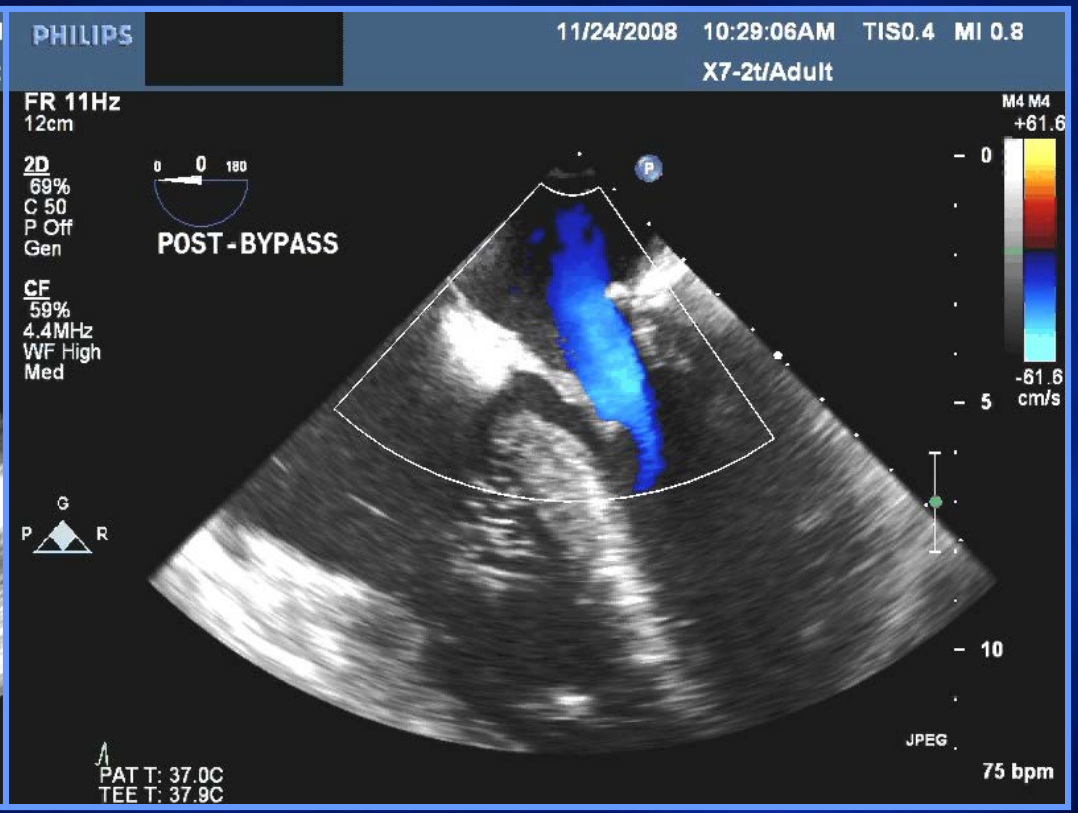
7. Medial scallop posterior leaflet prolapse.

Procedure: > 1. Robotic-assisted minimally invasive mitral valve repair.

1. Robotic-assisted minimally invasive mitral valve repair.
2. Triangular resection of the middle scallop of the posterior leaflet.
3. Closure of cleft between the lateral and middle scallops of the posterior leaflet.

Successful Result

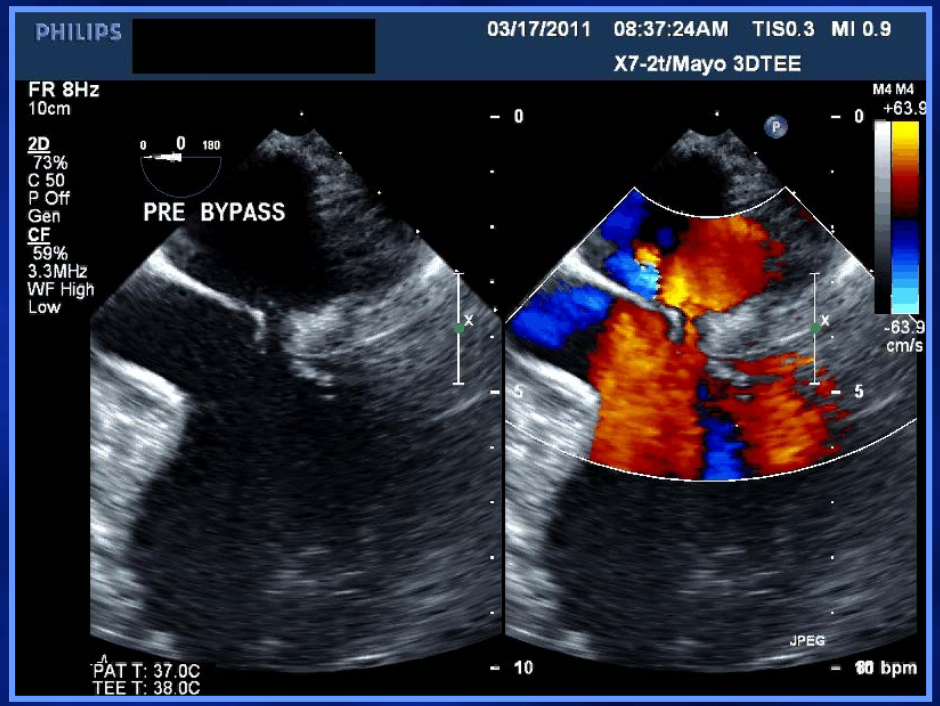




What's wrong with the mitral valve?

1. Flail posterior lateral scallop (P1)
2. Flail posterior middle scallop (P2)
3. Flail posterior medial scallop (P3)
4. Flail anterior middle scallop (A2)
5. Mitral valve cleft


PHILIPS
03/17/2011 08:17:27AM TIS0.1 MI 0.5
X7-2t/Mayo 3DTEE
FR 52Hz
6.0cm
2D
58%
C 50
P Off
Gen
PRE BYPASS
M4
74 bpm
PAT T: 37.0C
TEE T: 38.1C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10cm
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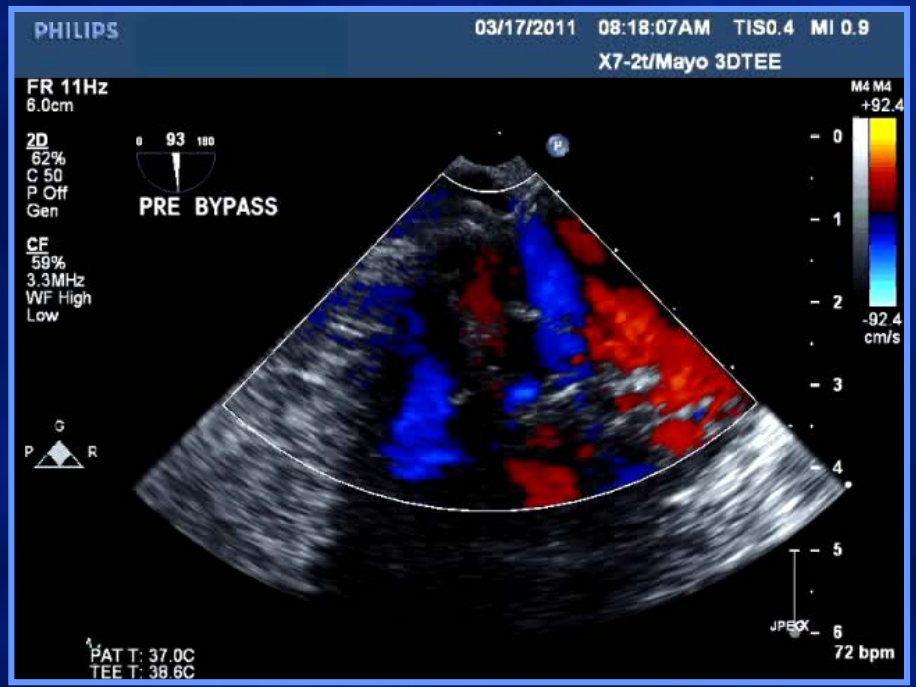
C 50
P Off
Gen
CF
59%
3.3MHz
WF High
Low
PRE BYPASS
M4 M4
+63.9
-63.9
cm/s
JPEG
PAT T: 37.0C
TEE T: 38.0C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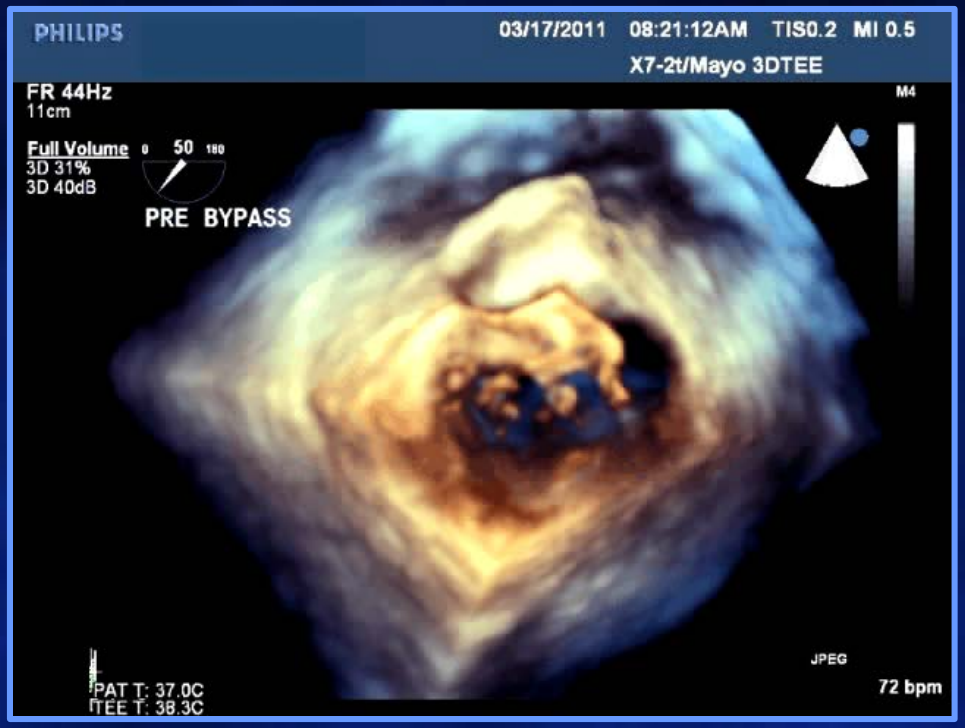
2D
62%
C 50
P Off
Gen
CF
59%
3.3MHz
WF High
Low
PRE BYPASS
M4 M4
+92.4
-92.4
cm/s
72 bpm
PAT T: 37.0C
TEE T: 38.6C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X7-2t/Mayo 3DTEE
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11cm
M4
Full Volume
3D 31%
3D 40dB
PRE BYPASS
JPEG
72 bpm
PAT T: 37.0C
TEE T: 38.3C


PHILIPS
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X7-2t/Mayo 3DTEE
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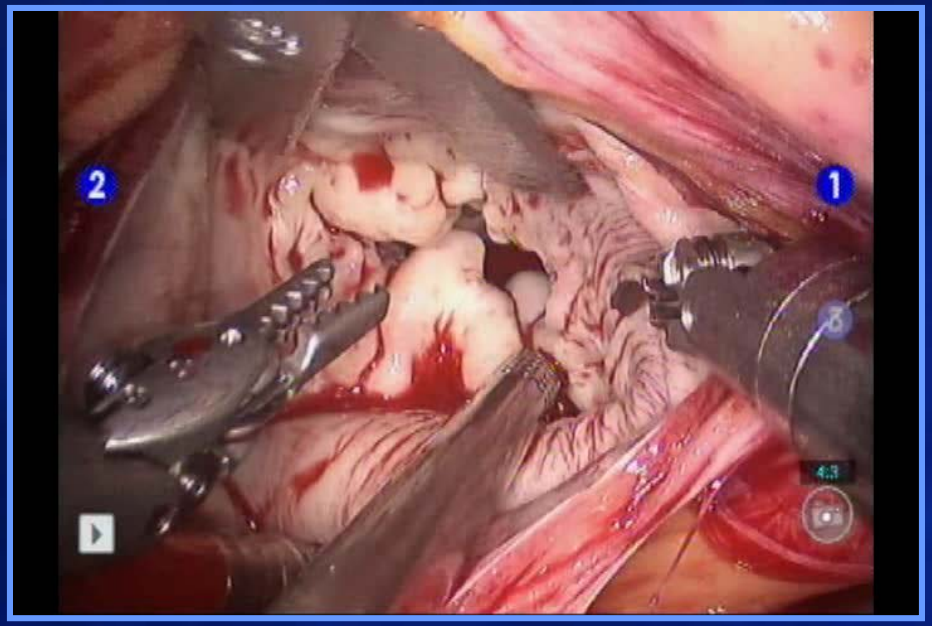
PAT T: 37.0C
TEE T: 38.3C


2
1

Gaping Cleft or Commissure - An Under-Rated Cause of Residual Mitral Insufficiency Following Valve Repair: Case Reports

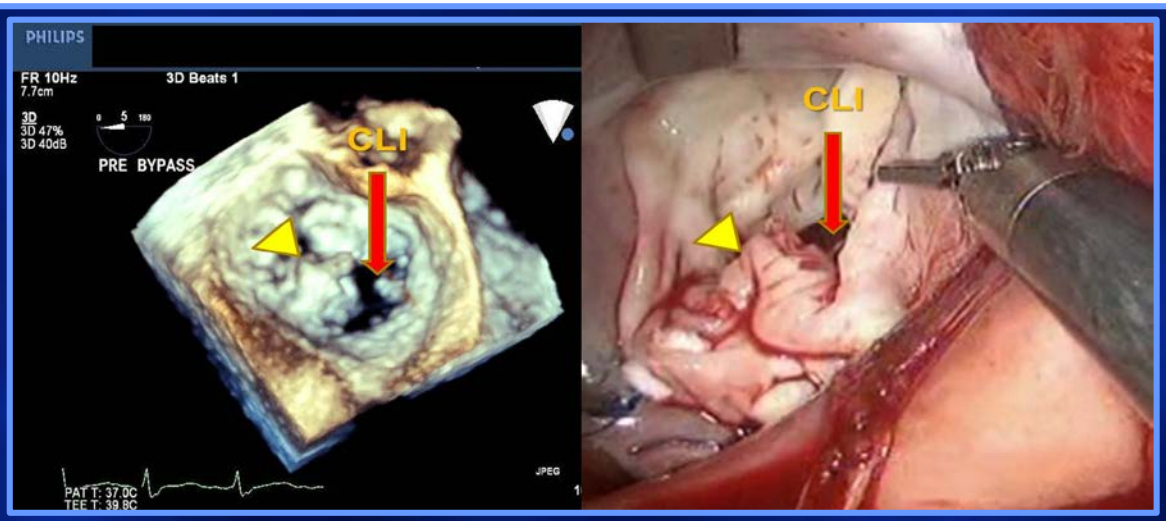
Stéphane Aubert, Christophe Acar

Department of Cardiac Surgery, Heart Institute Hôpital de la Salpétrière, Paris, France

ORIGINAL ARTICLE

Cleft-like indentations in myxomatous mitral valves by three-dimensional echocardiographic imaging

Francesca Mantovani,[1,2] Marie-Annick Clavel,[1] Ori Vatury,[1] Rakesh M Suri,[1] Sunil V Mankad,[1] Joseph Malouf,[1] Hector I Michelena,[1] Sonia Jain,[1] Luigi Paolo Badano,[3] Maurice Enriquez-Sarano[1]



89 Year Old Male with Dyspnea

- Worsening over last 1 month
- Improved with diuretics but still NYHA Class III
- PMH
  - CABG 1 year prior
  - Post-op EF 35% (Ischemic CM)
  - Mild MR, Mild PHTN

89 Year Old Male with Dyspnea

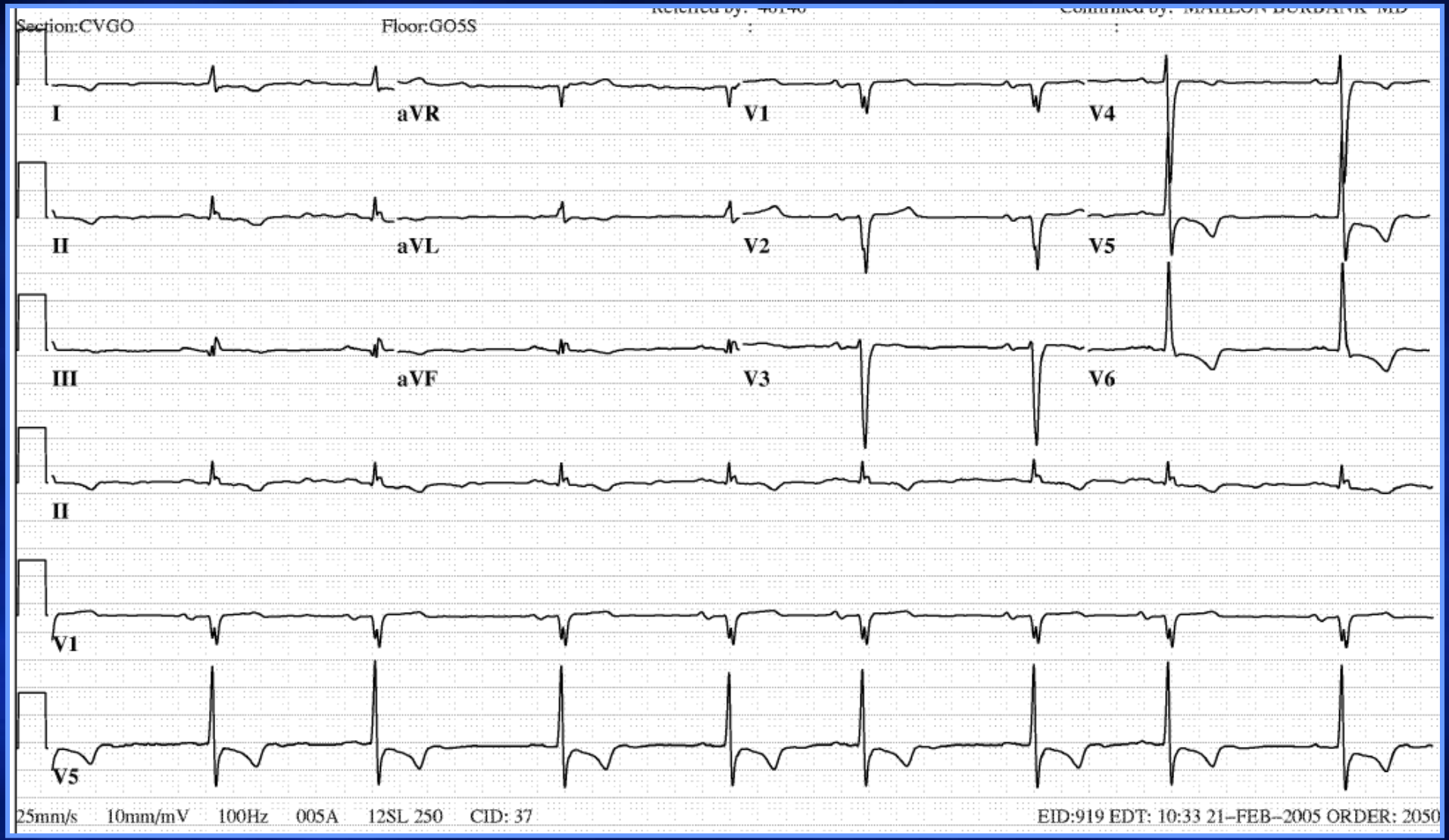
Medications:

- Lisinopril 5 mg qd
- Toprol XL 100 mg qd
- Simvastatin 40 mg qd
- ASA 81 mg qd
- Furosemide 20 mg qd

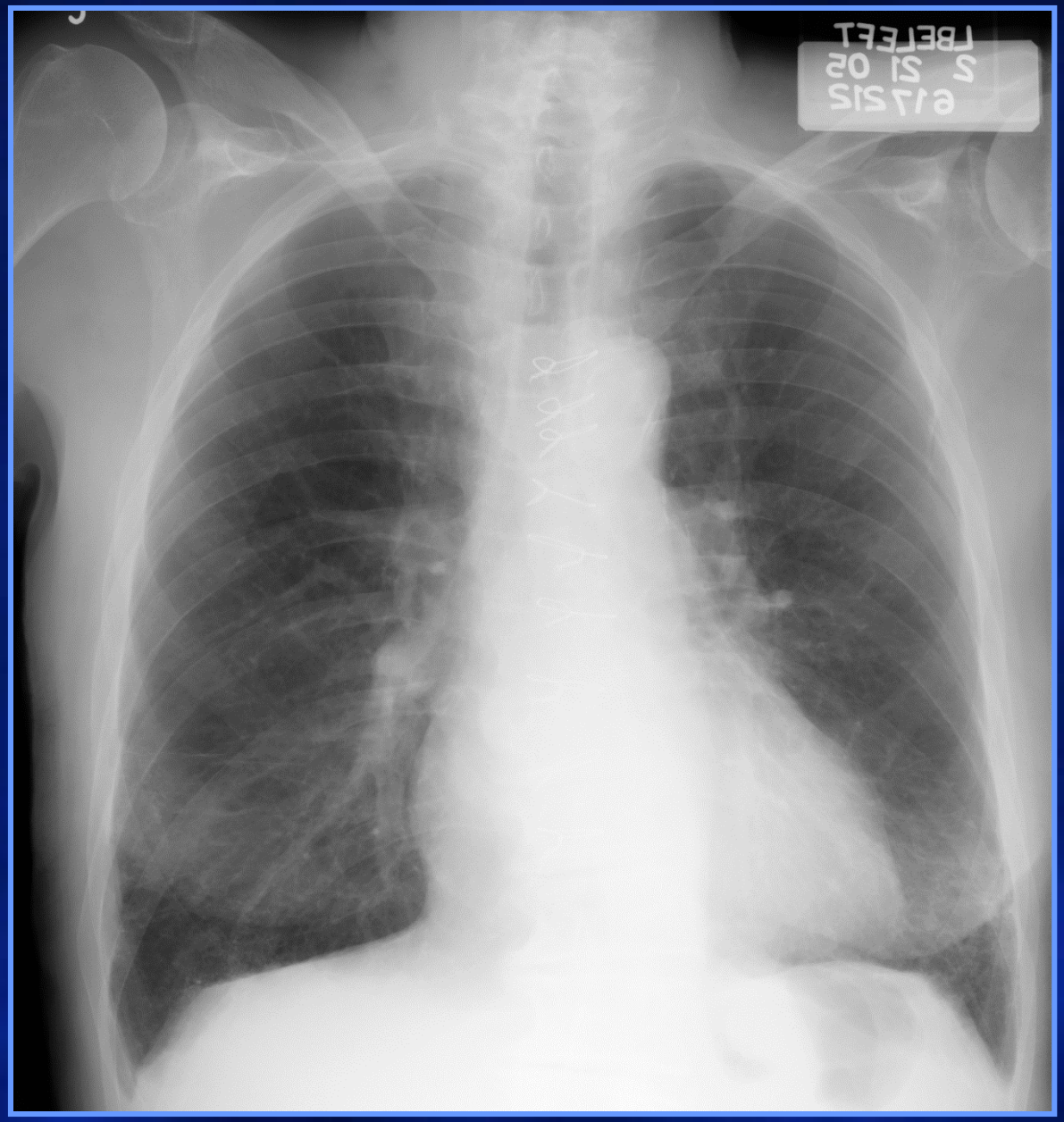
Physical Exam

- BP 130/60 mmHg, pulse 60 BPM, RR 14/min
- JVP mildly elevated
- Heart: diffuse PMI, 2/6 systolic murmur at apex
- Lungs: few bibasilar crackles
- Extremities: minimal pedal edema

EKG


Section:CVGO
Floor:GO5S
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
V1
V5
25mm/s 10mm/mV 100Hz 005A 12SL 250 CID: 37
EID:919 EDT: 10:33 21-FEB-2005 ORDER: 2050

CXR



89 Year Old Male with Dyspnea

89 Year Old Male with Dyspnea

89 Year Old Male with Dyspnea

Moderate RV dysfunction

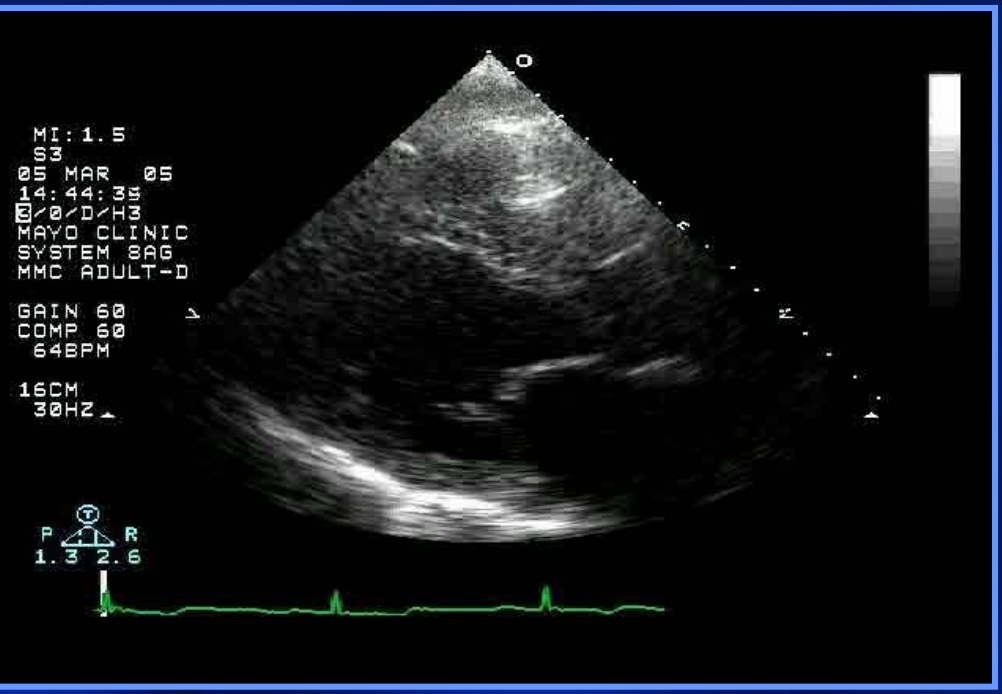
Moderate (2+) TR

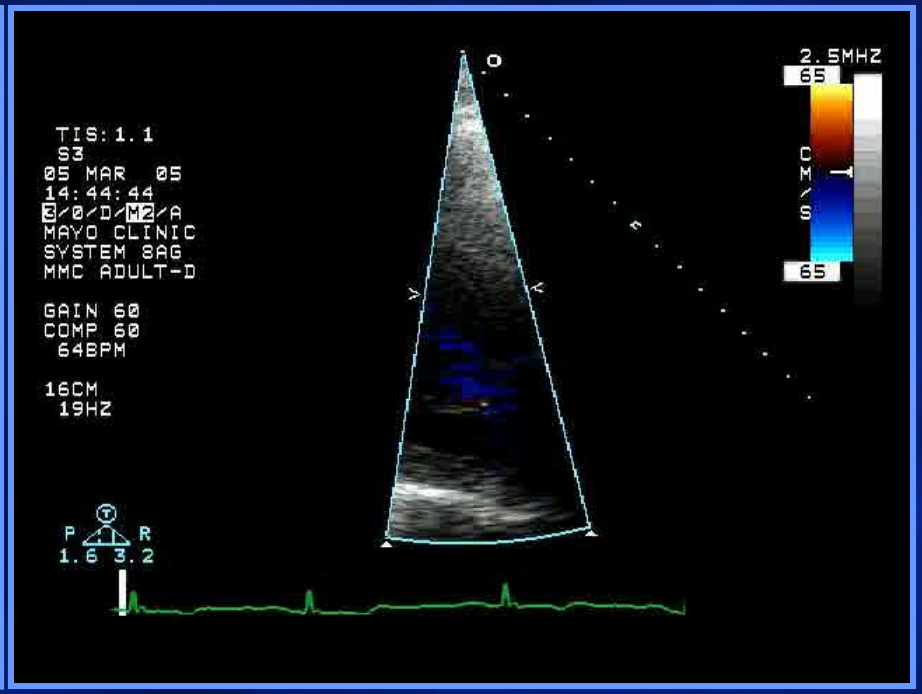
RV Sys Pr = 75 mm Hg

What would you recommend ?

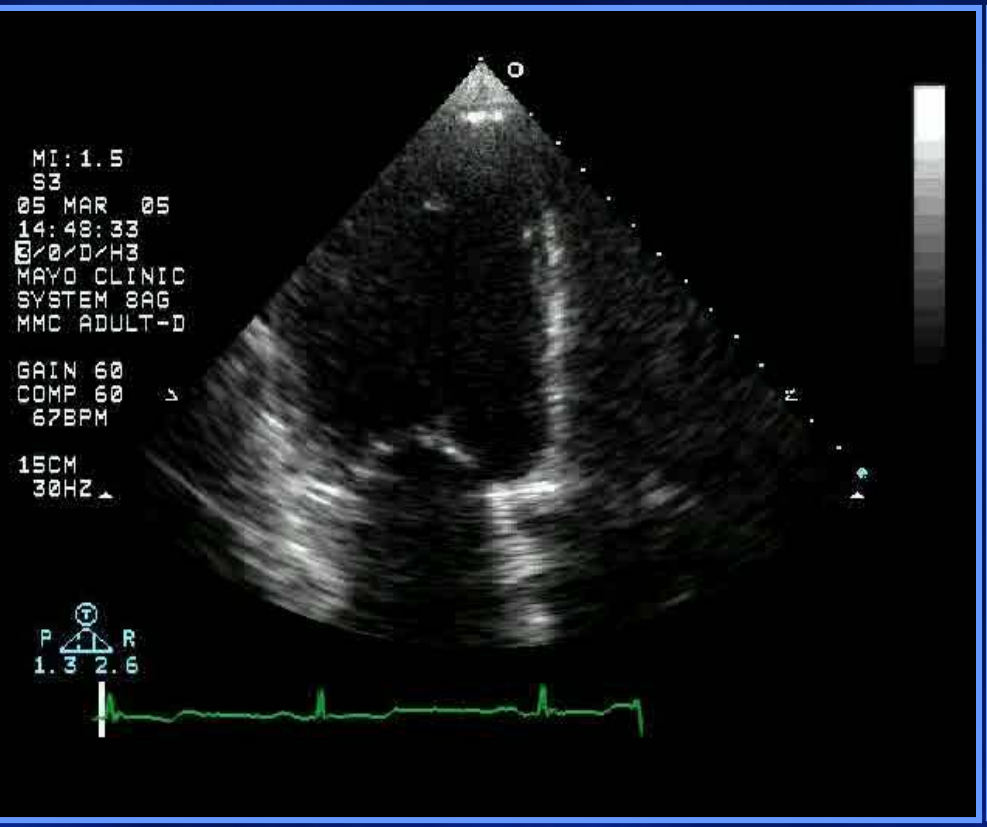
1. 1. PET or DSE for ischemia/viability
2. 2. Coronary and graft angiography
3. 3. Change medical regimen
4. 4. Biventricular pacing
5. 5. Mitral valve surgery

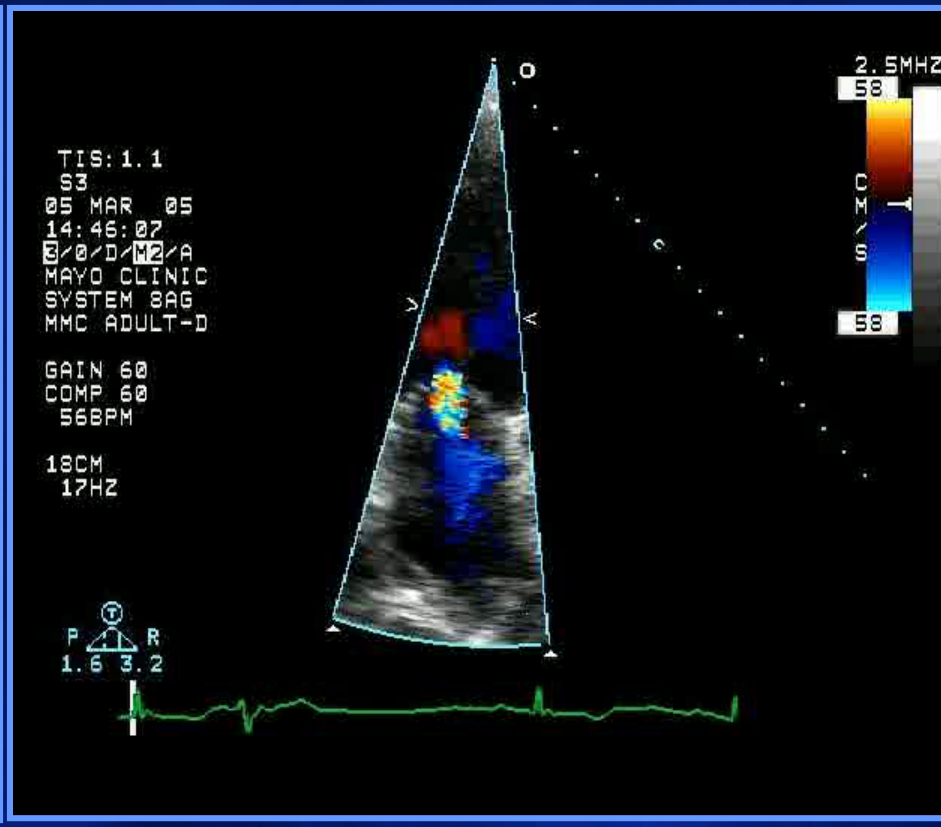
2 Wks After Intervention





2 Wks After Intervention





What was the intervention ?

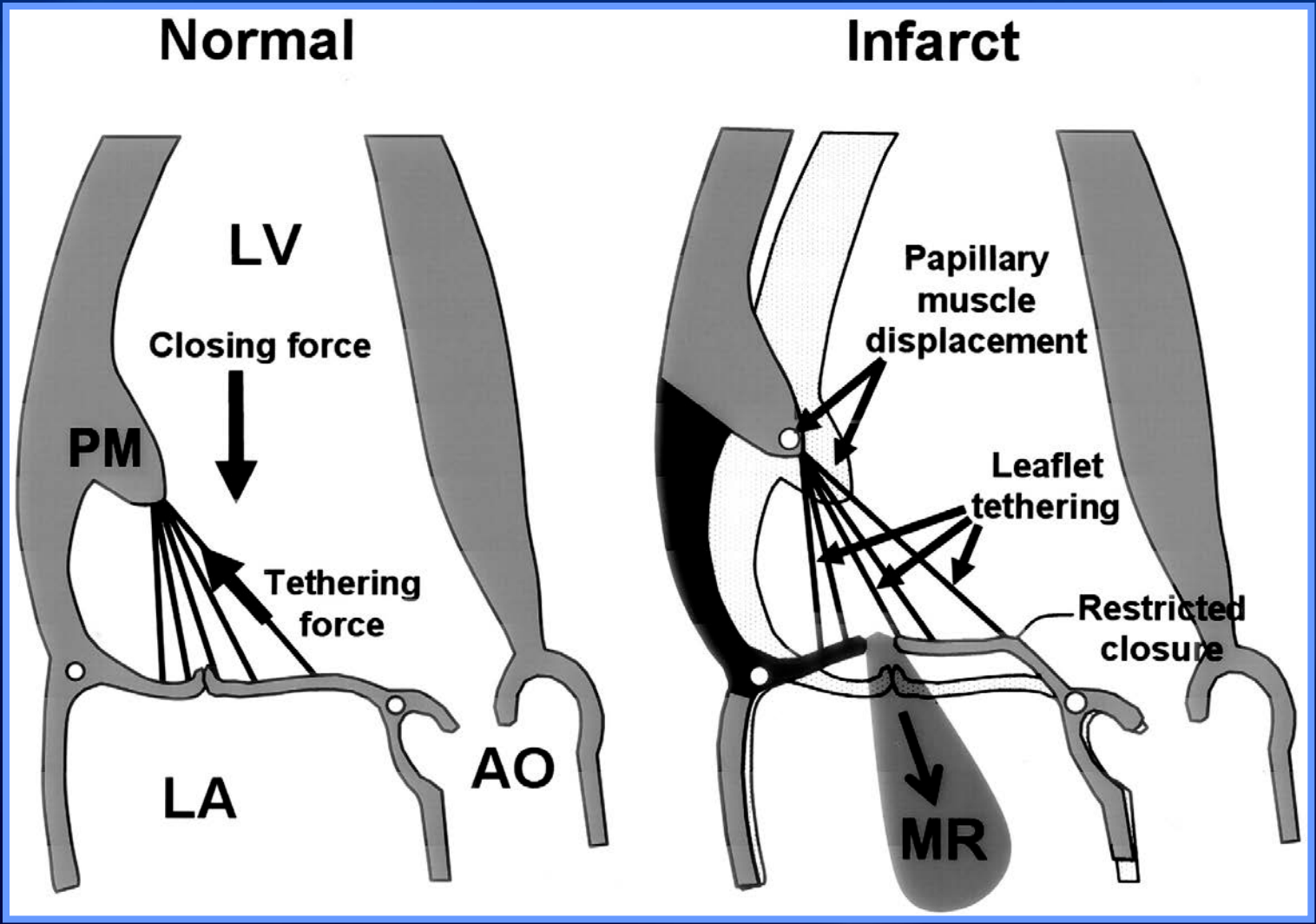
Dr. Robert McCully

1. PCI of SVG to circumflex/OM1
2. Medical regimen changed
3. Biventricular pacing
4. Percutaneous mitral annuloplasty

Intervention

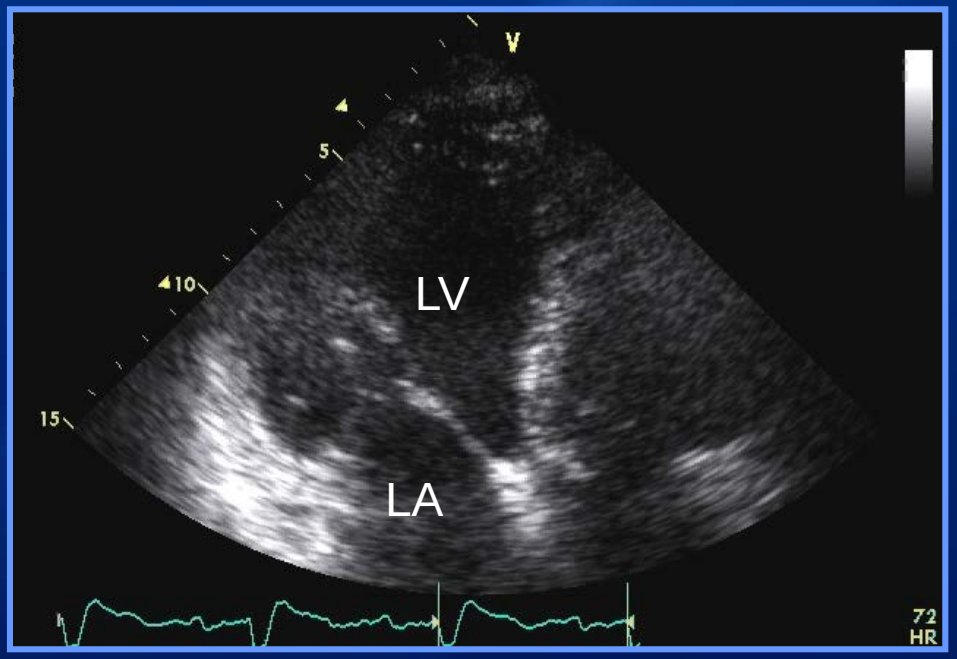
- Imdur 30 mg daily added
- 1 week later, dose ↑ed to 60 mg daily
- 2 weeks later, at the time of the echo, his BP was 115/50 mmHg
- RV systolic pressure was ~ 50 mm Hg

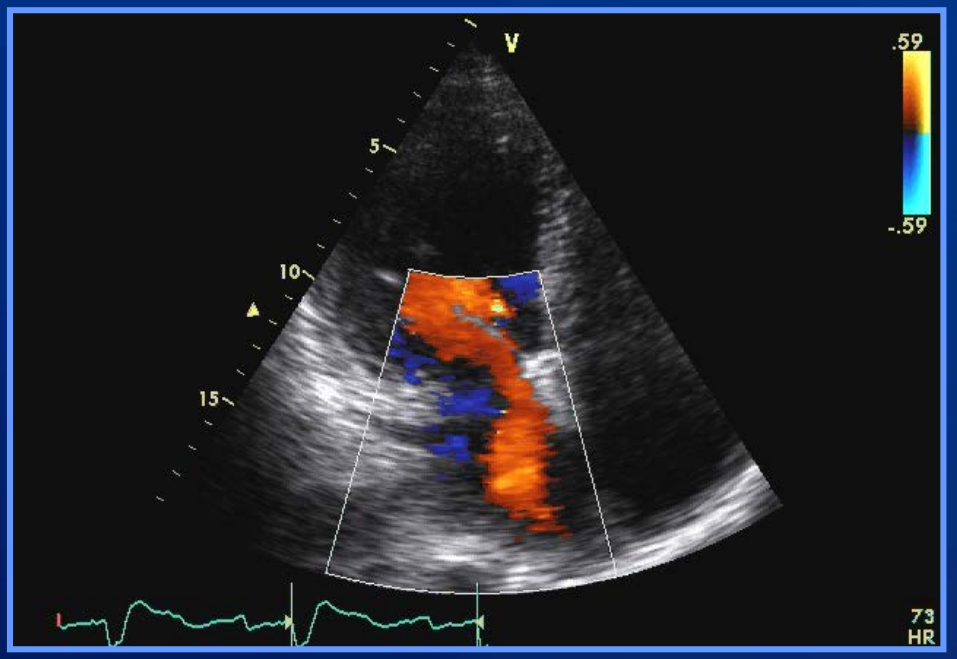
Mechanism of Ischemic MR

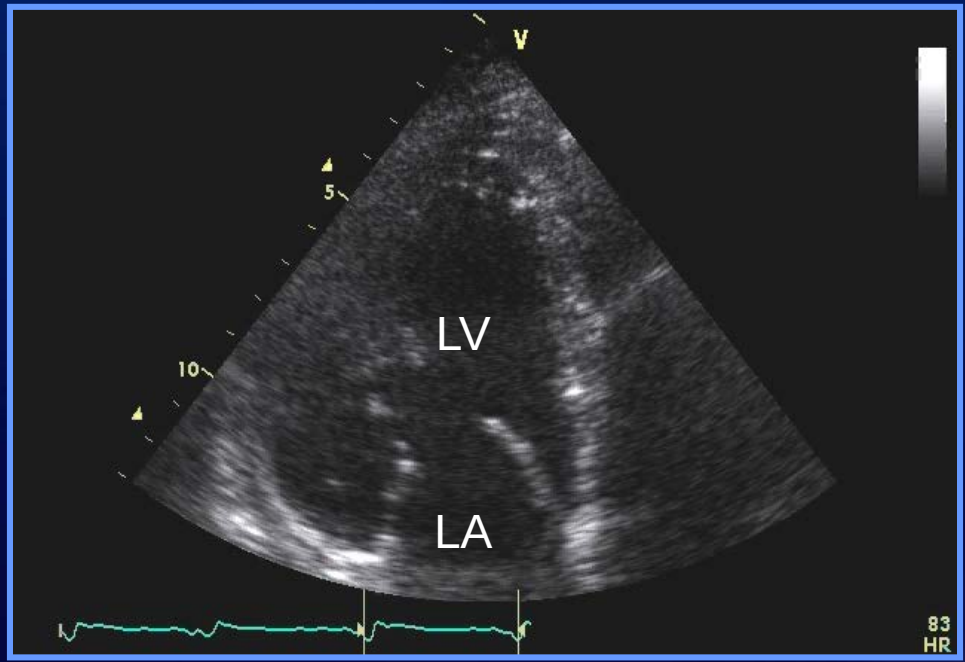


MAYO CLINIC

Levine, R. A. et al. *Circulation* 2005;112:745-758


V
5
10
15
LV
LA
72
HR


V
5
10
15
.59
-.59
73
HR


V
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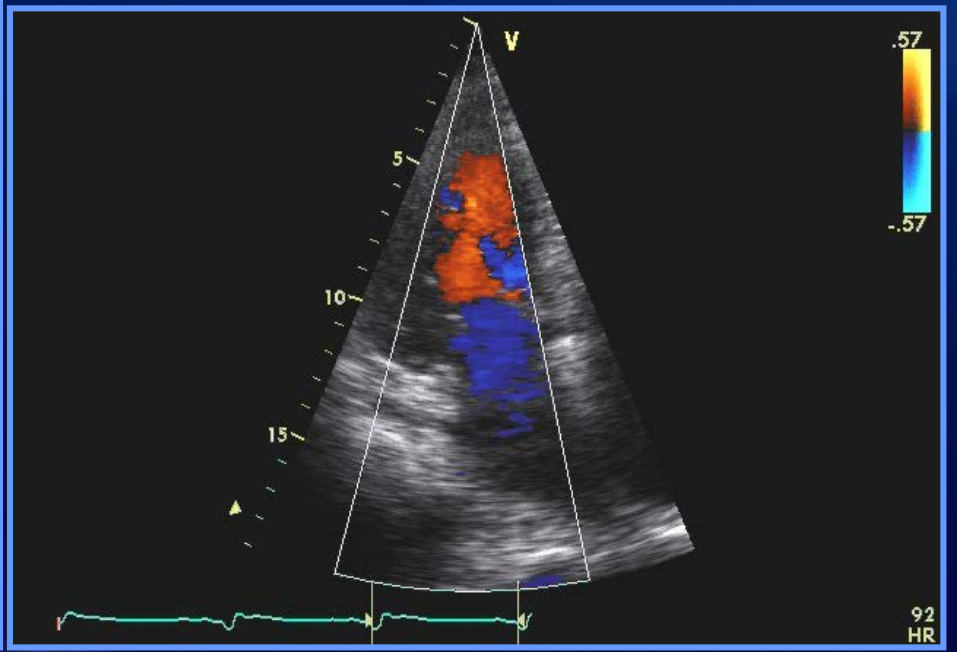
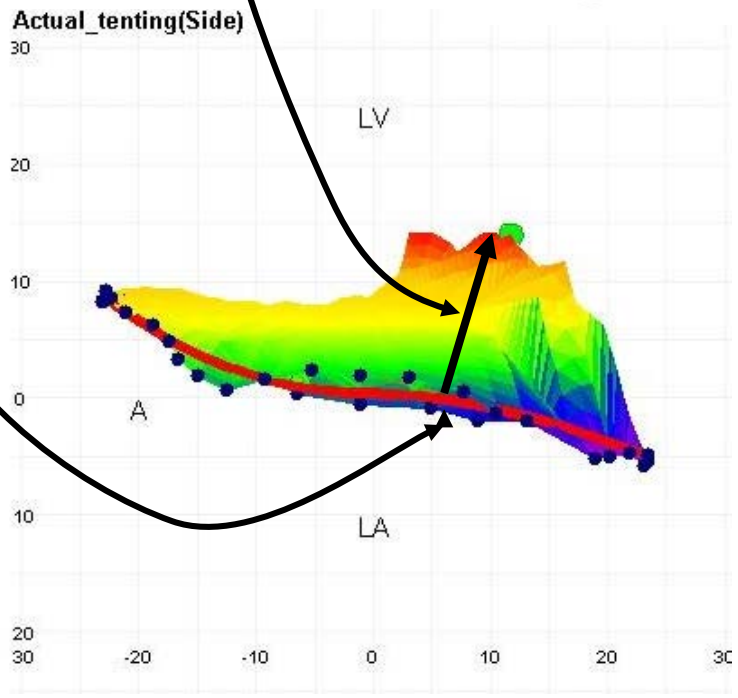
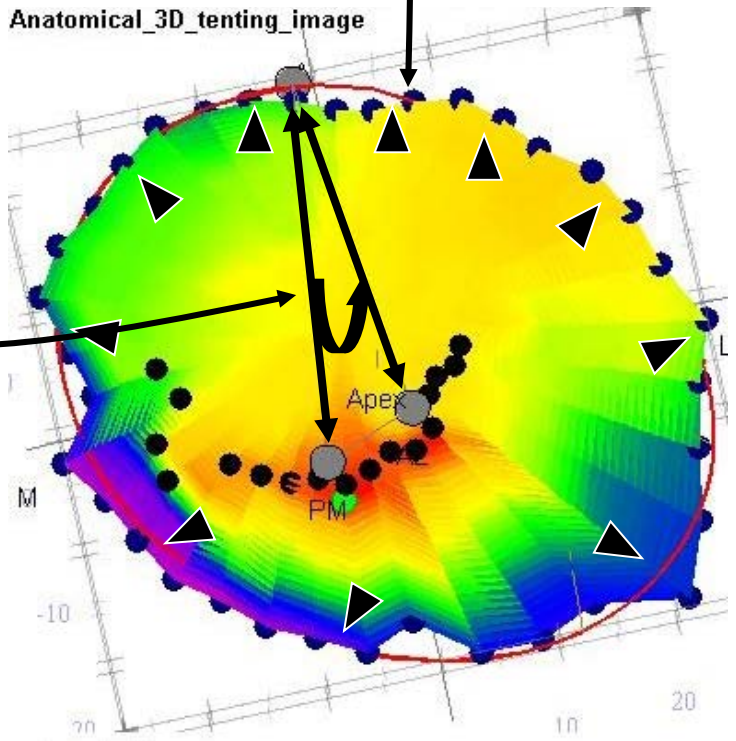
10
LV
LA
83
HR


V
5
10
15
.57
-.57
92
HR

LV Assist Device at “usual” Flow

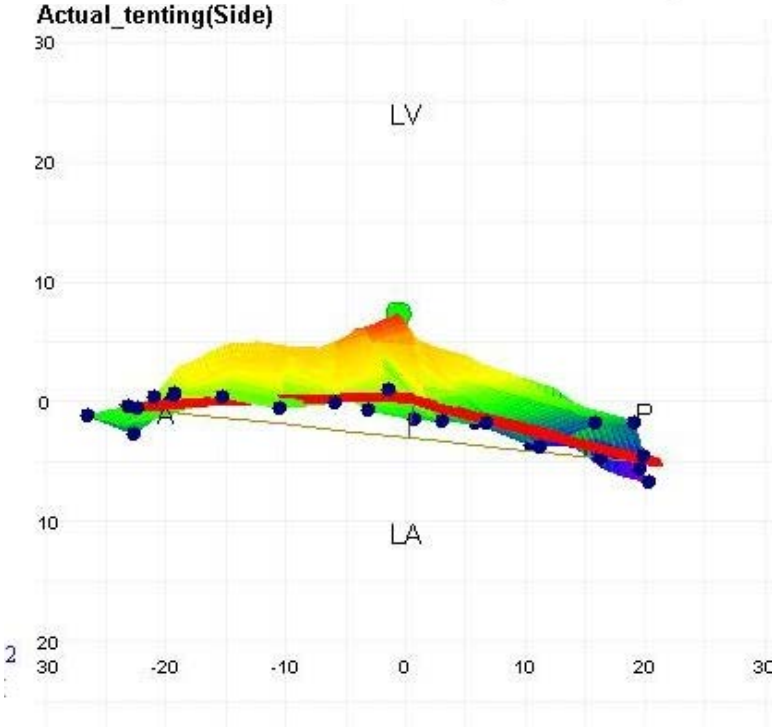
Annular Area:
19.41 cm^2
Annular Circumference:
157.46 mm
Annular Height:
3.78 mm
Maximum tenting length:
14.94 mm
Mean tenting length:
3.79 mm
Tenting volume:
7.42 cm^3
Diameter:
AP=50.39 mm
ML=49.29 mm
Papillary Muscle:
area=5.20 cm^2
length PM,AL=56.72 mm, 46.11 cm
width PM-AL=23.33 mm
Angle 23.44 degree

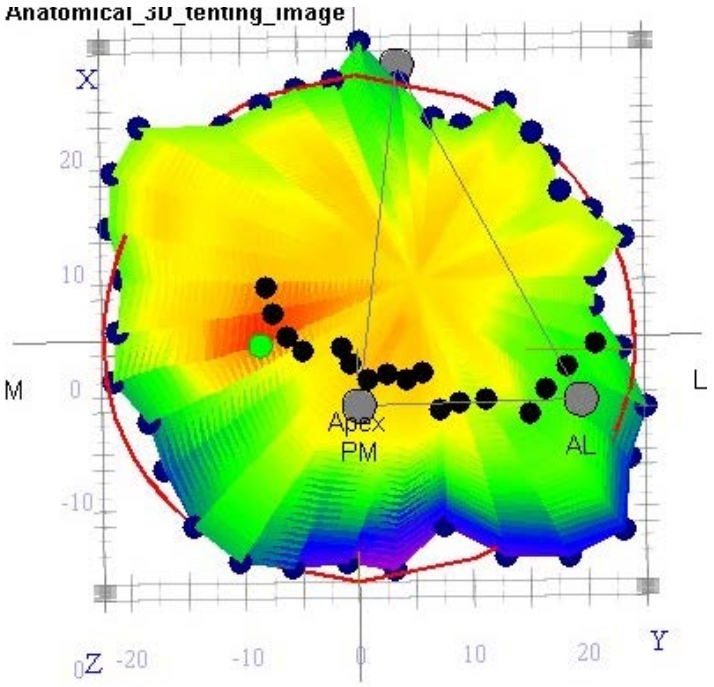




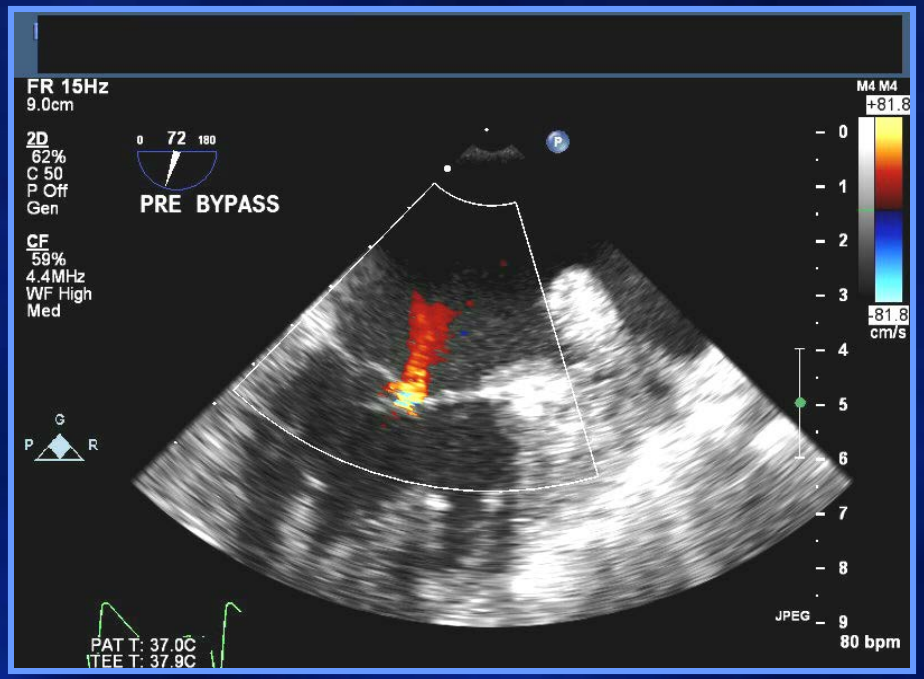
LV Assist Device with Flow Increased

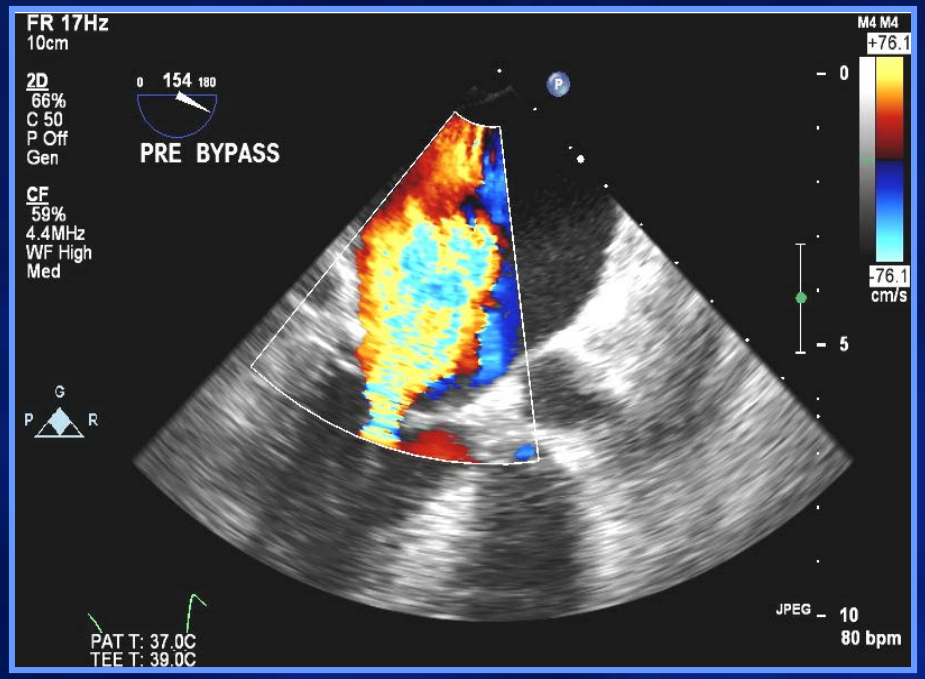
Annular Area:
16.40 cm^2
Annular Circumference:
144.26 mm
Annular Height:
3.54 mm
Maximum tenting length:
7.91 mm
Mean tenting length:
2.44 mm
Tenting volume:
3.61 cm^3
Diameter:
AP=44.68 mm
ML=46.43 mm
Papillary Muscle:
area=3.63 cm^2
length PM,AL=37.98 mm, 39.19 cm
width PM-AL=19.50 mm
Angle 29.22 degree





Importance of Loading in Ischemic or Functional MR





Baseline

BP 100/60 mmHg

PA 35/20mmHg

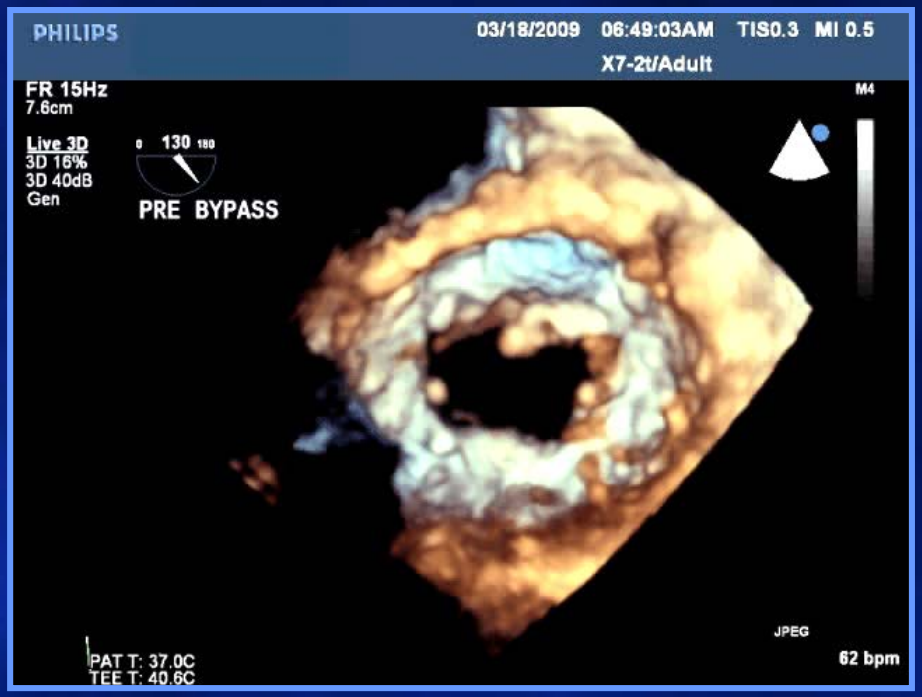
Phenylephrine

BP 156/80 mmHg

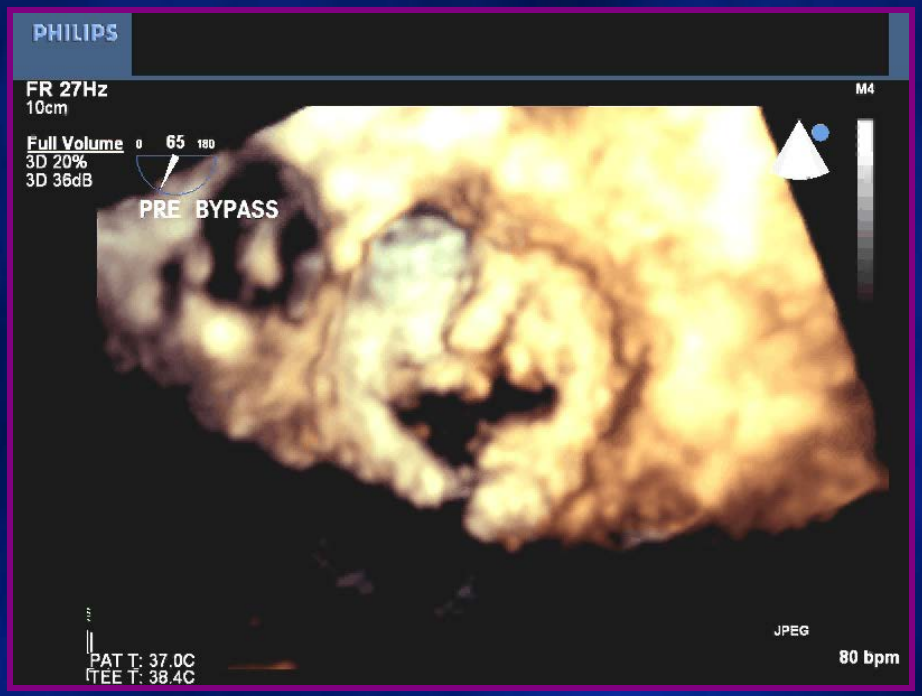
PA 76/41 mmHg

Intraoperative TEE : Pre-op

LV Perspective: "*en-face*" view

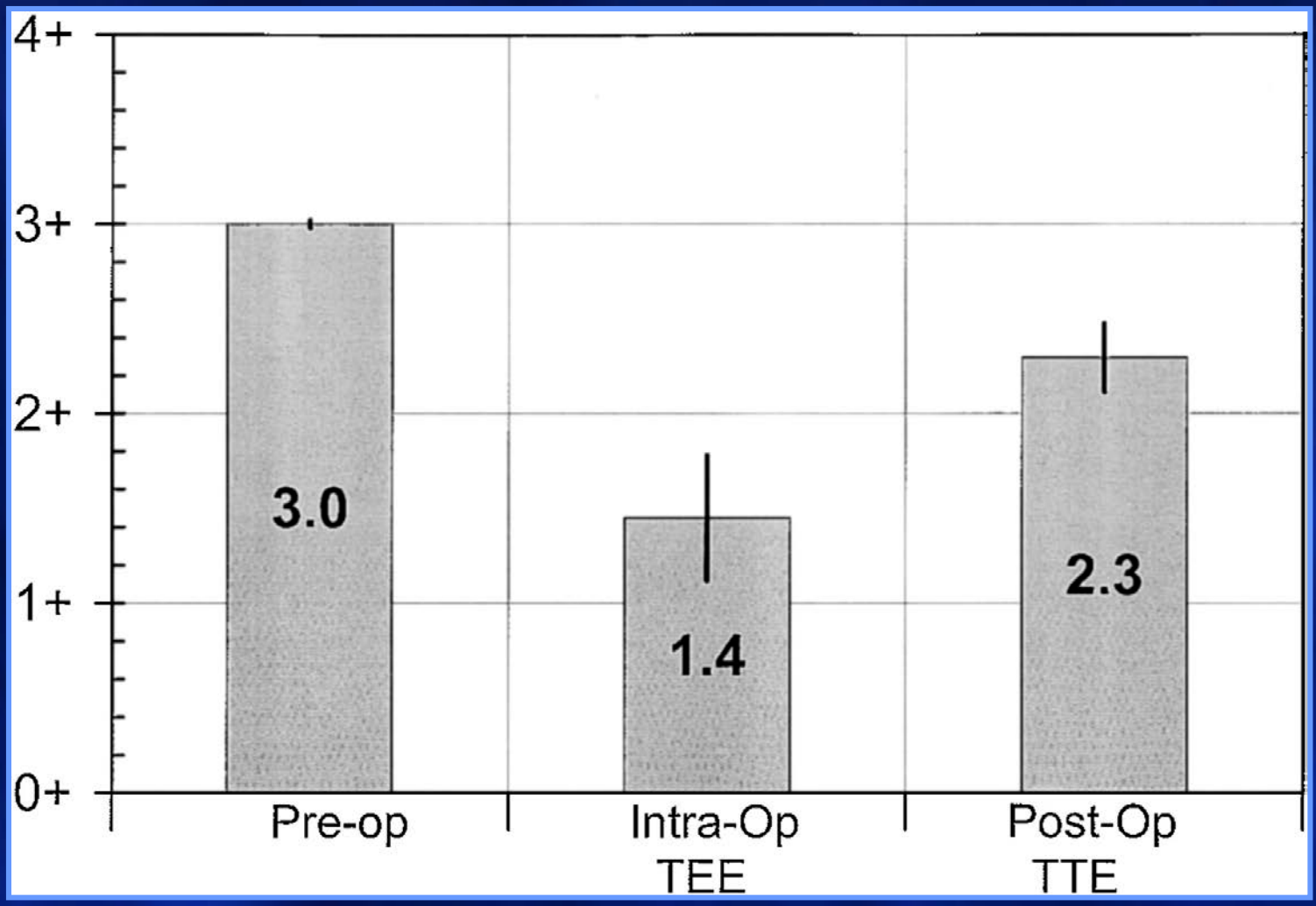


Baseline



Phenylephrine

Mean severity of Functional MR Pre-, Intra and Post-CABG



Aklog, L. et al. *Circulation* 2001;104:I-68-I-75

Intraoperative Assessment of Mitral Regurgitation: Role of Phenylephrine Challenge

Dennis G. Mihalatos, MD, FACC, Aasha S. Gopal, MD, FACC, Robert Kates, MD, Rena S. Toole, RDCS, Neil R. Bercow, MD, Christopher Lamendola, MD, Sinan H. Berkay, MD, Paul Damus, MD, Newell Robinson, MD, Roger Grimson, PhD, Kevin Shen, CRTT, and Nathaniel Reichek, MD, FACC, *Roslyn, New York*

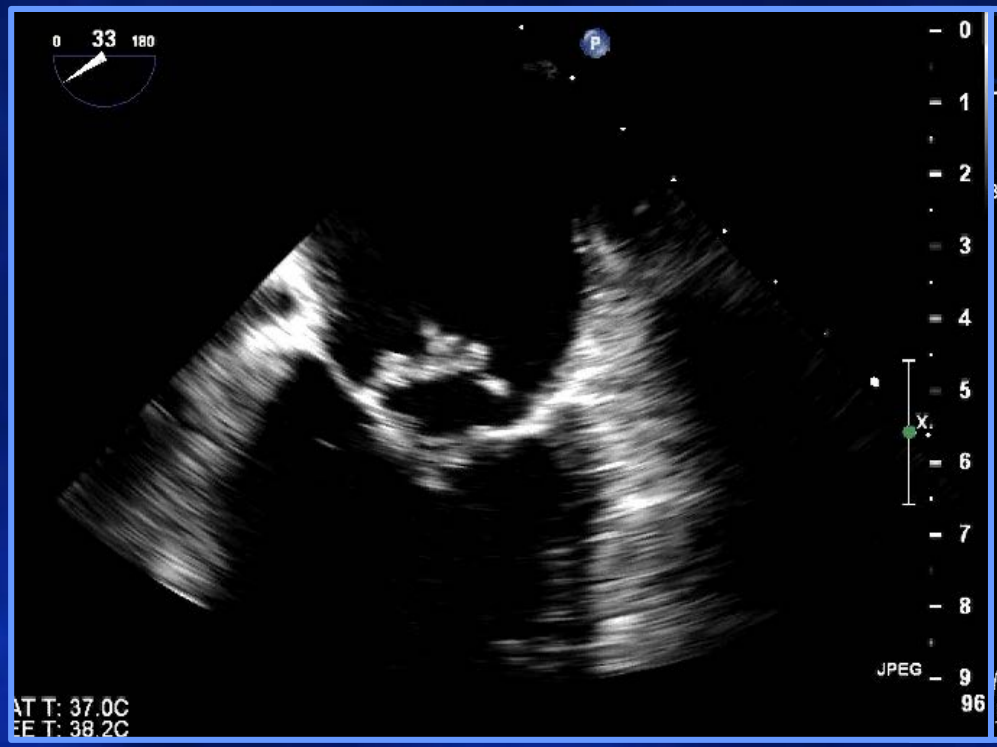
J Am Soc Echoardiogr 2006;19:1158-1164

Conclusions: **Intra-op transesophageal echocardiography underestimates MR severity; phenylephrine reduces, yet does not eliminate, intra-op underestimation of MR severity.**

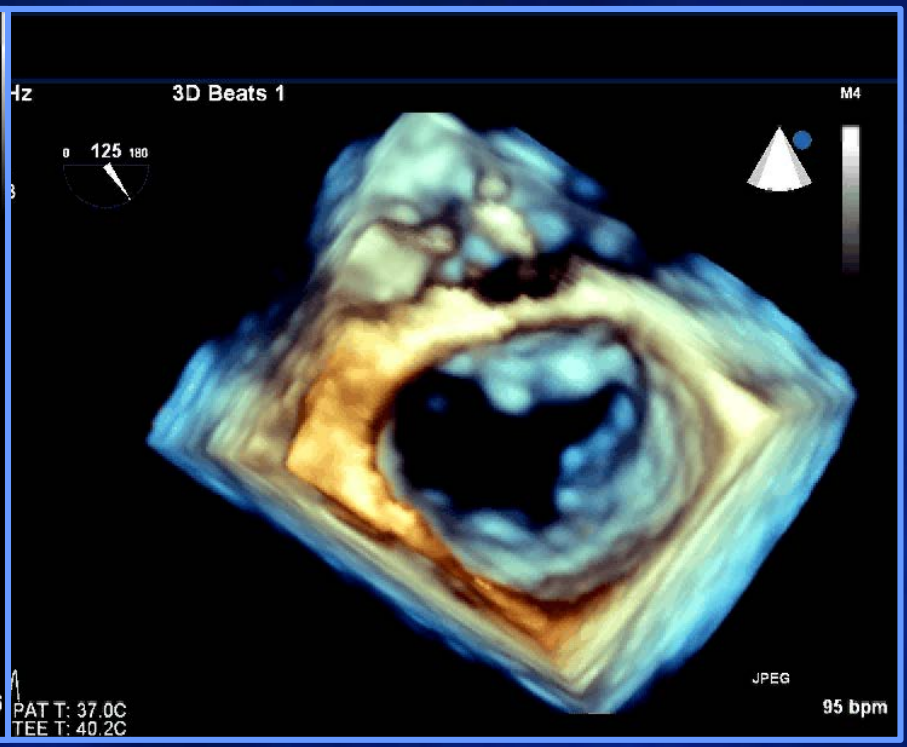
Case

- 55 year old female with fever, chills
- *Staph aureus* bacteremia
- Systolic murmur
- Started on antibiotics, but within 24 hours had transient left arm weakness
  - No CVA on CT
  - No residual neurologic symptoms (left arm weakness resolved)
- TEE performed

Transesophageal Echocardiogram



2D TEE



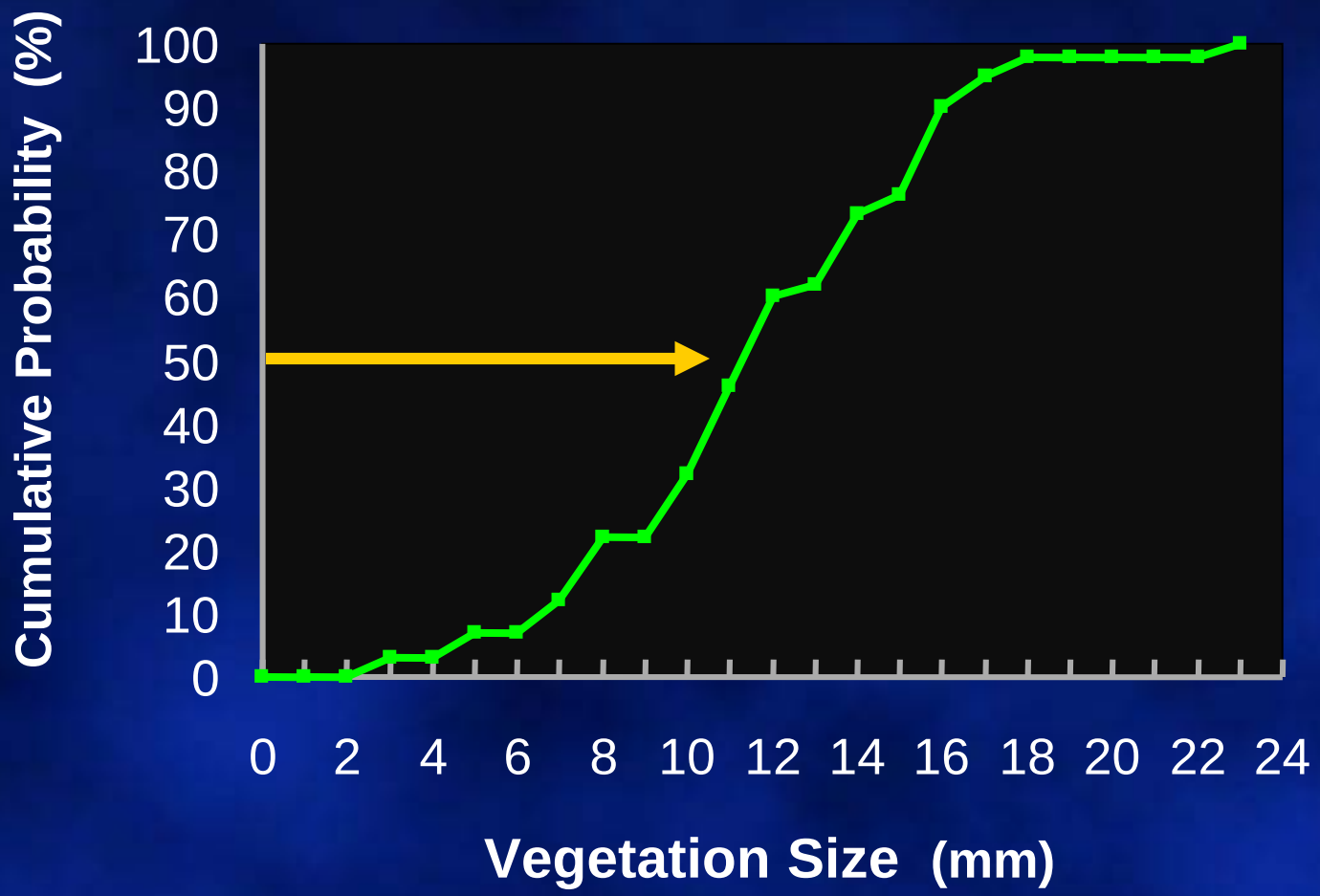
3D TEE
(View from Left Atrium)

What do you recommend?

1. Immediate mitral valve surgery
2. Continue antibiotics and close observation
3. Anticoagulation

Can Echo help decide based on size and mobility?

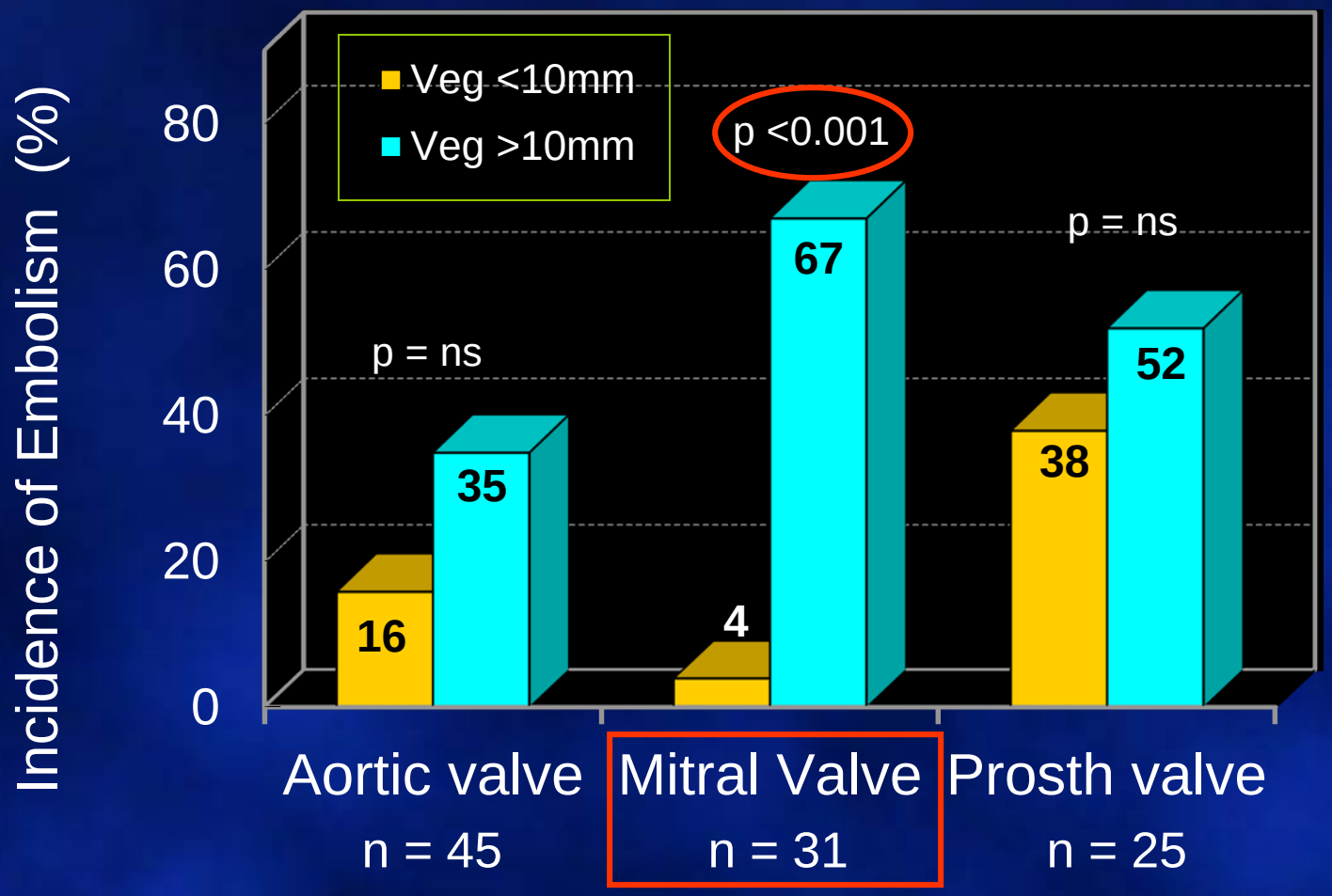
Vegetation Size and Risk of Embolism



Sanfilippo (Mass Gen) JACC 18:1191(1991)

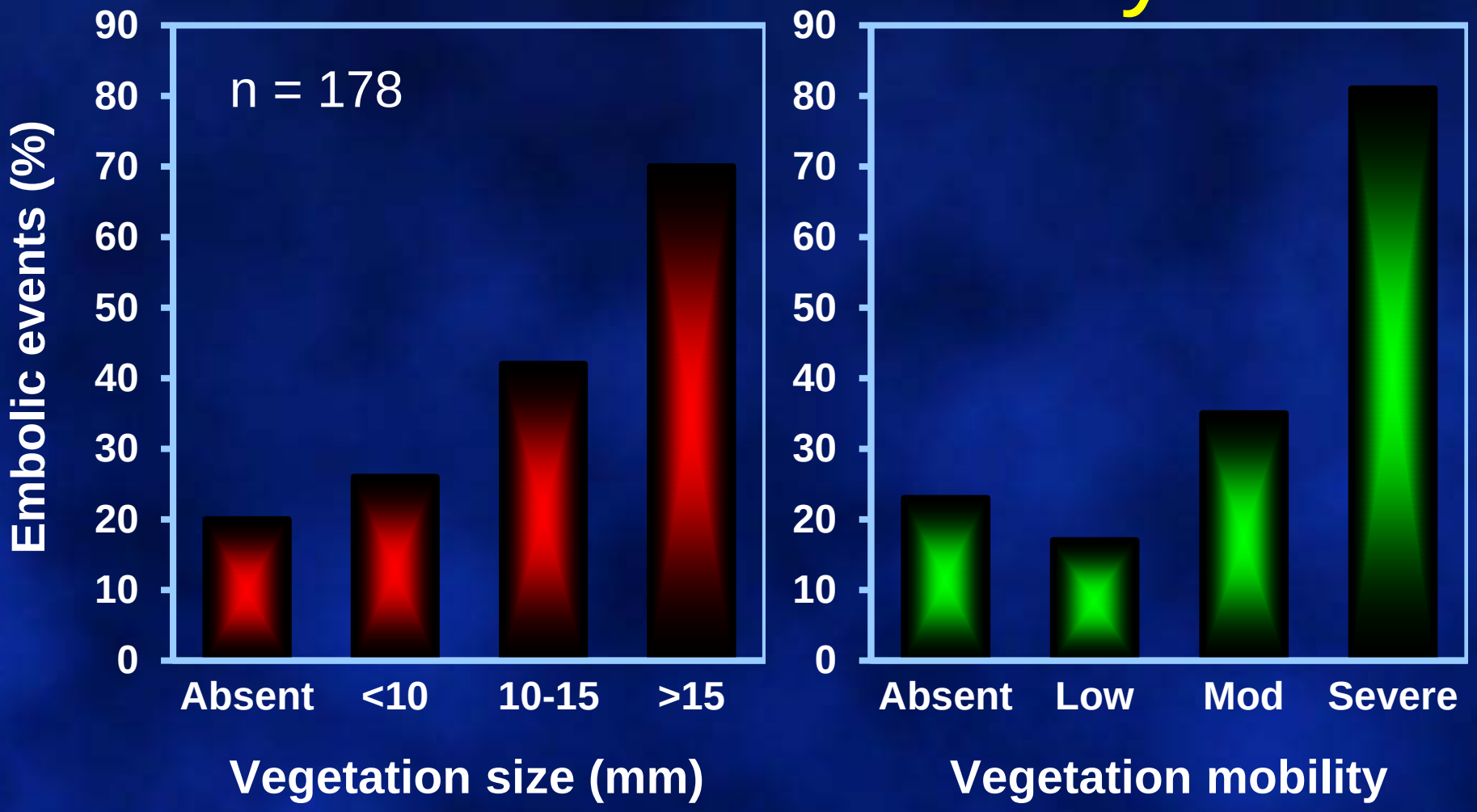
TEE in Infective Endocarditis

Incidence of Embolism



Mugge JACC 14:631(1989)

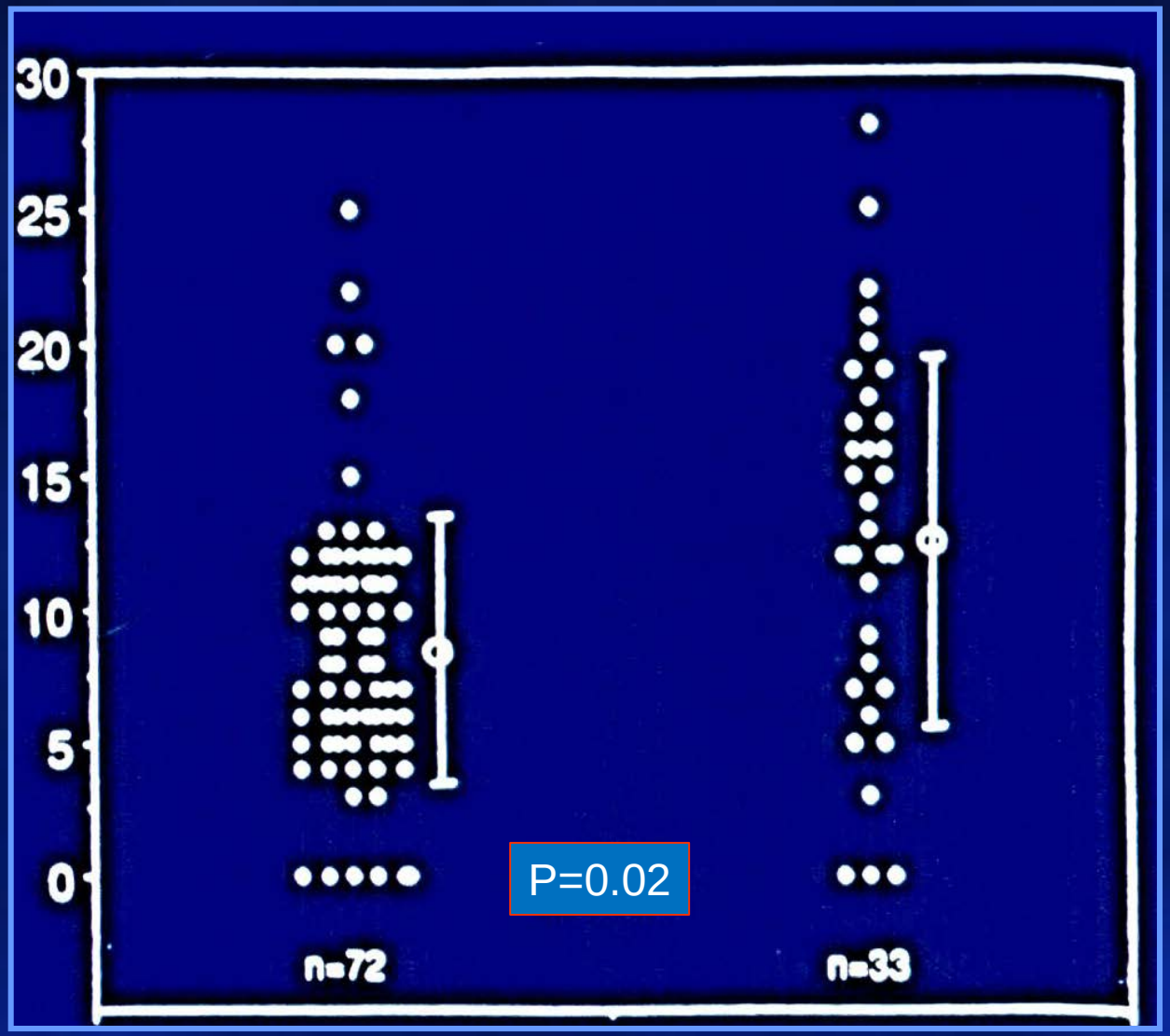
Importance of Vegetation Size and Mobility



MAYO CLINIC

De Salvo G et al. *J Am Coll Cardiol 2001*;37: *1077-1079.*

Considerable Overlap



MAYO CLINIC

Mugge et al. J Am Coll Cardiol 1989;14:631

Vegetation Size

- 145 patients with endocarditis
- Aortic: 62 (43%) Mitral valve 83 (57%)
- Strokes occurred more often in mitral valve endocarditis: 33% vs. 11% with aortic
- Independent Predictor of stroke:
  - Mitral Valve Vegetation Length > 7 mm

Cabell et al. Am Heart J. 2001;142:75-80

Vegetation Size and Embolic Events

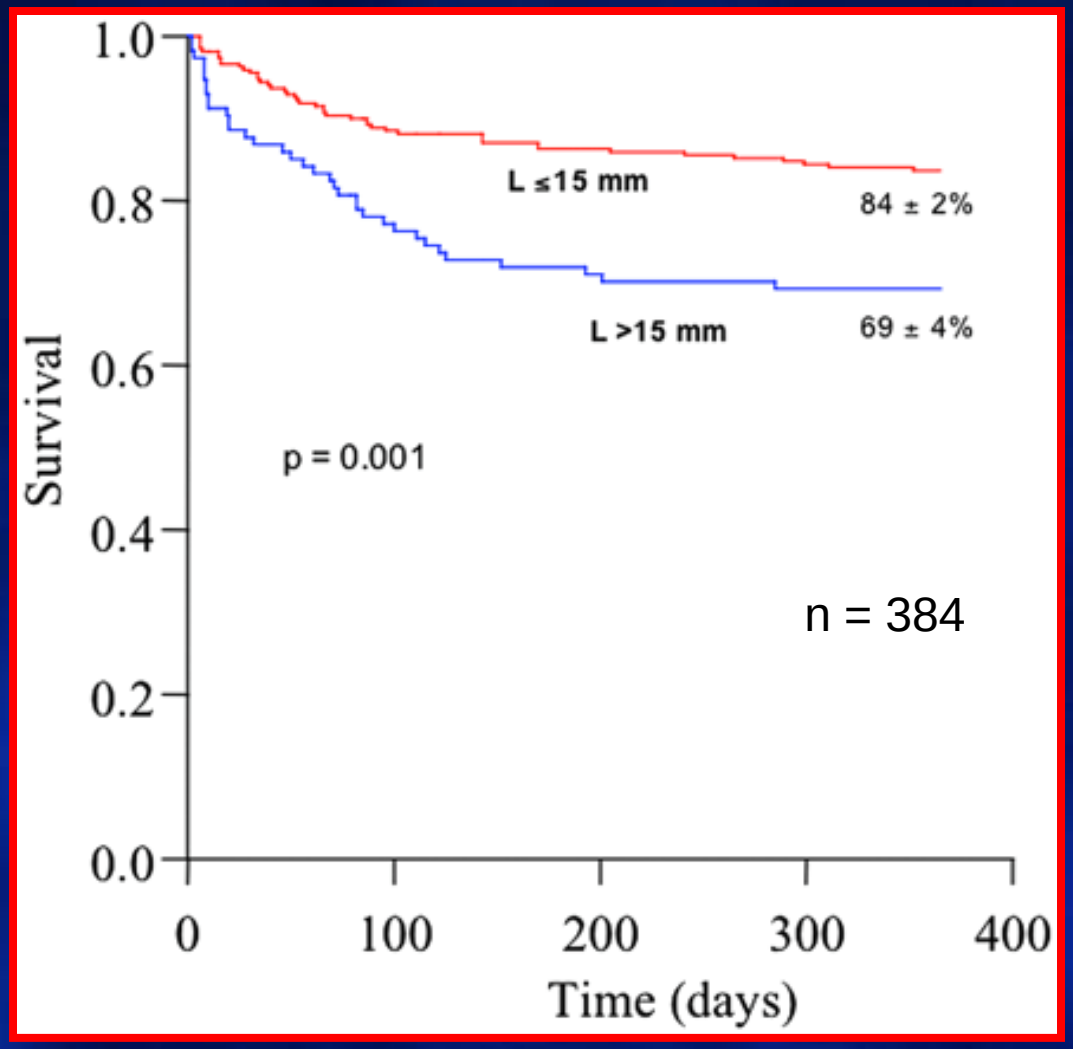
Authors	No.	Events	Relation to size
Lutas	77	22%	-
Mugge	105	31%	+
Jaffe	70	43%	-
Sanfilippo	204	33%	+
Steckelberg	207	13%	-
Rohman	118	26%	+
Heinle	41	49%	-
Werner	106	35%	+
De castro	57	44%	-
Di Salvo	178	37%	+

Embolism in Infective Endocarditis

Vegetation Size by TEE and Impact of Therapy

	Relation of embolism to vegetation size	Embolic events	
		Total	On therapy
Di Salvo et al: JACC, 2001 (178 pt)	Positive (>10 mm)	37%	9%
Cabell et al: AHJ, 2001 (145 pt)	Positive (>7 mm)	23%	11%
Vilacosta et al: JACC, 2002 (211 pt)	Positive (>10 mm)	33%	13%

One Year Survival According to Vegetation Length



Thuny F et al. *Circulation* 2005; 112:69-75

Predictors of 1-Year Mortality (Cox Multivariable Analysis)

	Adjusted RR	95% CI	*P*
Age	**1.02**	**1.01–1.04**	**0.007**
Female sex	**1.6**	**1.01–2.58**	**0.048**
Comorbidity index >2	**1.6**	**0.92–2.64**	**0.1**
Serum creatinine >2 mg/L	**1.9**	**1.16–3.23**	**0.01**
Prosthetic valve	**1.6**	**0.99–2.68**	**0.053**
***S aureus* IE**	**2**	**1.19–3.24**	**0.001**
Moderate or severe CHF	**1.6**	**1.02–1.54**	**0.04**
Vegetation length >15 mm	**1.8**	**1.10–2.82**	**0.02**

Thuny F et al. *Circulation* 2005; 112:69-75

The NEW ENGLAND JOURNAL of MEDICINE

N Engl J Med 2012;366:2466-73

ORIGINAL ARTICLE

Early Surgery versus Conventional Treatment for Infective Endocarditis

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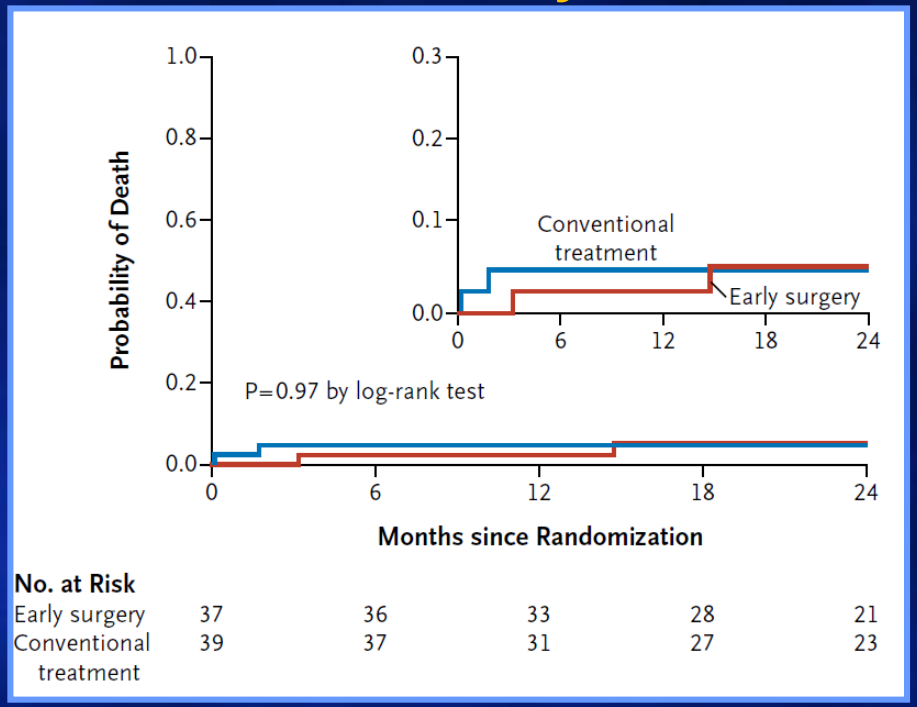
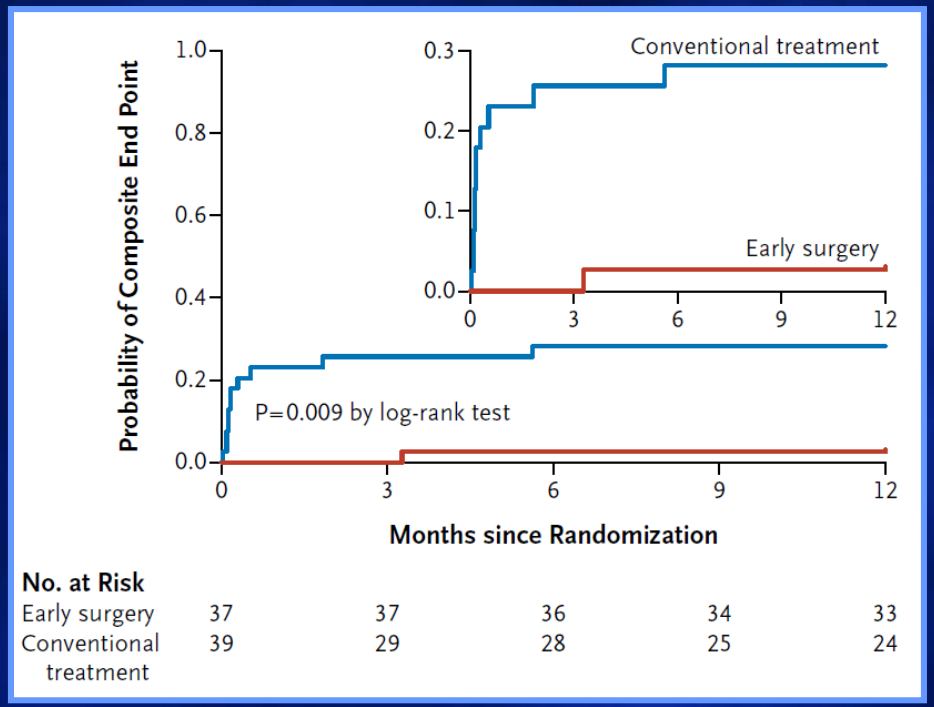
and Dae-Won Sohn, M.D., Ph.D.

Early Surgery for Infective Endocarditis with Large Vegetations (> 10 mm)

Mortality



Composite End-Point



8 vs 0 embolic events

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Risk of Embolism

- *Consider* early surgical treatment for:
  - Larger vegetations
  - Highly mobile vegetations
  - Mitral valve location
  - Controversial
- Risk diminishes significantly over time with antibiotics

Thank You!

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