AZIENDA OSPEDALIERO-UNIVERSITARIA "S. MARIA DELLA MISERICORDIA"
DI RILIEVO NAZIONALE E DI ALTA SPECIALIZZAZIONE
UDINE

DIPARTIMENTO DI SCIENZE CARDIOPOLMONARI
S.O.C. Cardiologia – *Direttore: Paolo M. Fioretti*

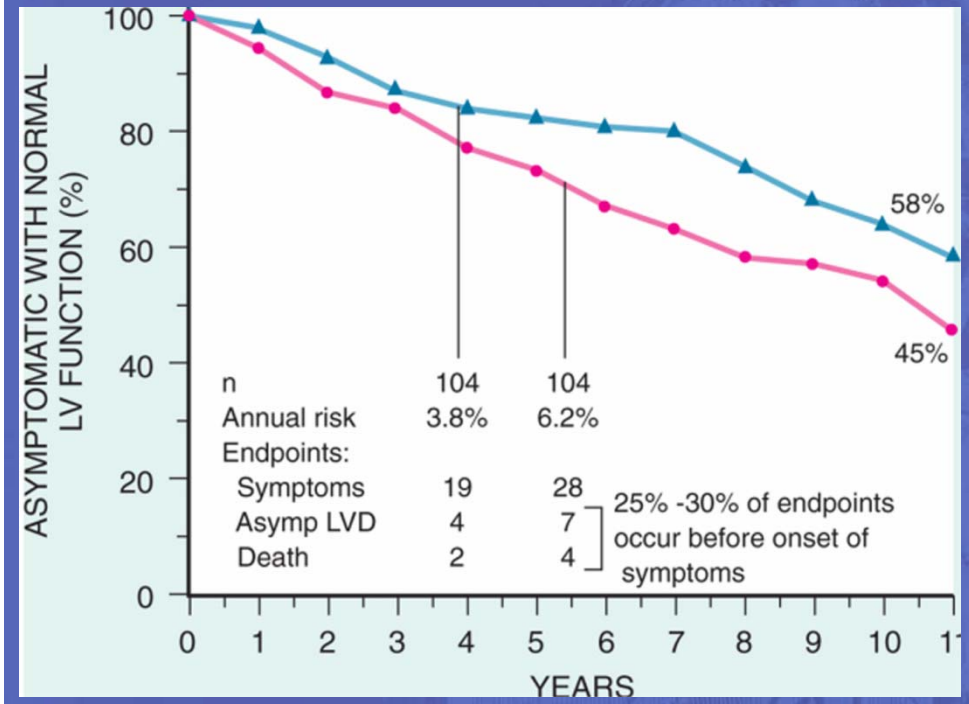
AORTIC REGURGITATION: WHEN TO OPERATE IN 2009 AND SHOULD A VALVE BE REPLACED OR REPAIRED?

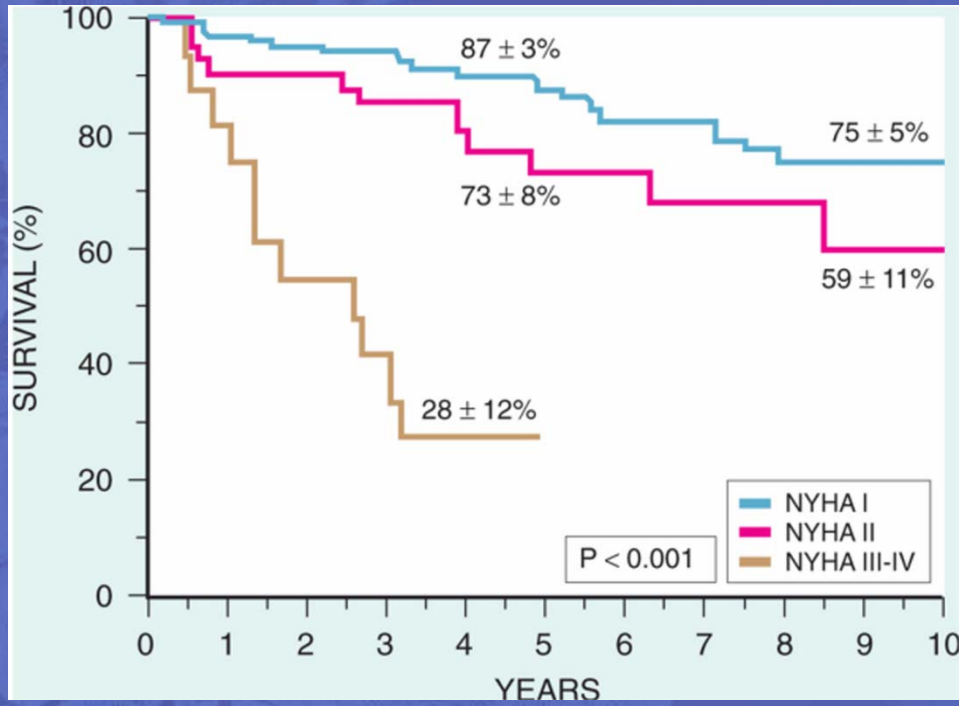
Luigi P. Badano*, MD, FESC

***Dr. Badano received honoraries and research grants from GE Healthcare, Sorin Cardio S.p.A, Edwards Life Sciences, Actelion**
*** No off/label use of devices**

AORTIC REGURGITATION ASSESSMENT

Natural History





Risk of developing symptoms, LV dysfunction, or death ~4 – 6%/yr

Bonow RO et al. Circulation 1991
Borer JS et al . Circulation 1998

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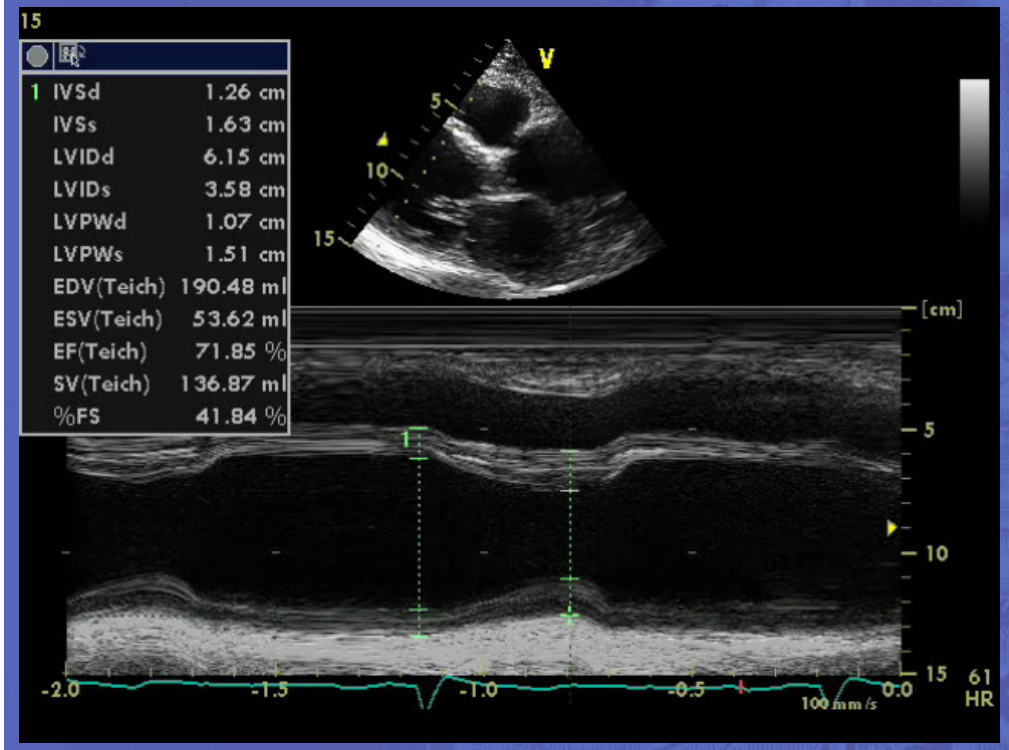
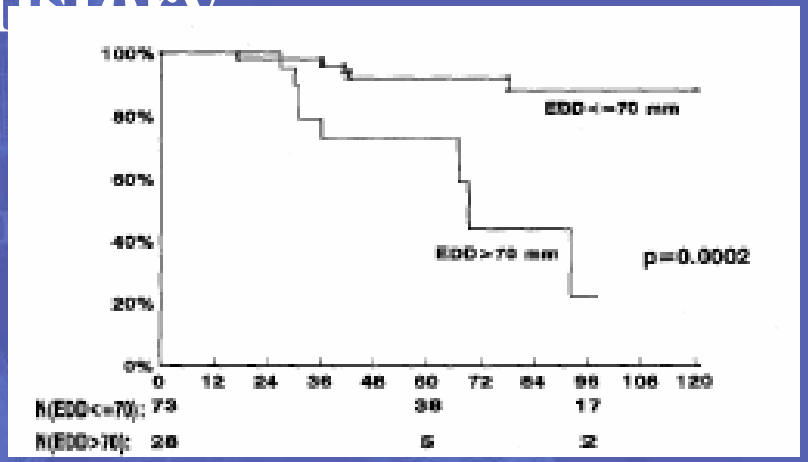
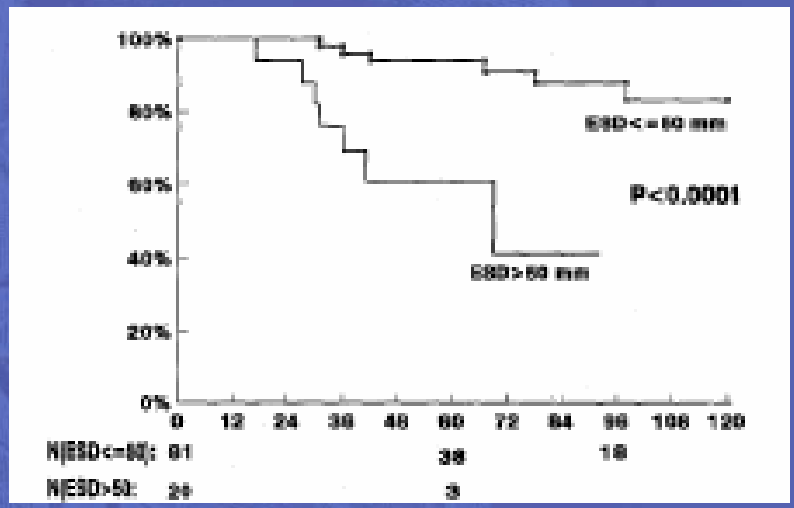
AORTIC REGURGITATION ASSESSMENT

Natural History







Pilar Tornos M, et al. Am Heart J. 1995

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AORTIC REGURGITATION ASSESSMENT

Natural History

	%/year
Asymptomatic	
• Normal LV function (good prognosis)	
– Progression to symptoms or LV dysfunction	< 6
– Progression to asymptomatic LV dysfunction	< 3.5
– 5-year survival	75
– Sudden death	< 0.2
• Abnormal LV function	
– Progression to cardiac symptoms	25
Symptomatic (poor prognosis)	
– Mortality	> 10

TX: Medical → Surgery BEFORE LV dysfunction

Bonow RO, et al. J Am Coll Cardiol. 1998

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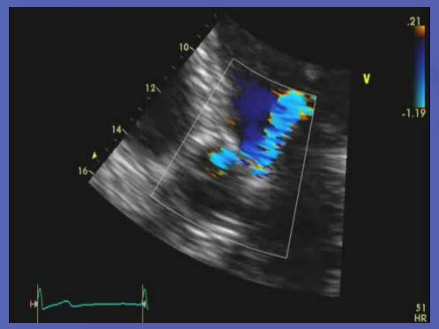
AORTIC REGURGITATION

European Guidelines for Management

Table 14 (modified). Indications for surgery in aortic regurgitation (AR)

SEVERE AORTIC REGURGITATION	Class
Symptomatic patients (dyspnoea NYHA class II, III, IV, or angina)	IB
Asymptomatic patients with resting LVEF ≤ 50%	IB
Patients undergoing CABG or surgery of ascending aorta, or on another valve	IC
Asymptomatic patients with resting LVEF> 50% with severe LV dilatation	
End-diastolic diameter > 70 mm	IIaC
or End-systolic diameter > 50 mm (or 25 mm/m^2 BSA)	IIaC
WHATEVER THE SEVERITY OF AORTIC REGURGITATION	
Pts who have aortic root disease with maximal aortic diameter:	
≥ 45 mm for pts. With Marfan's syndrome	IC
≥ 50 mm for patients with bicuspid aortic valves	IIaC
≥ 55 mm for other patients	IIaC

ASSESSMENT OF AORTIC REGURGITATION SEVERITY



	Mild	Moderate		Severe
Specific Signs for AR severity	• Central Jet, width <25% of LVOT • Vena contracta < 0.3 cm[1] • No or brief early diastolic flow reversal in descending aorta	Signs of AR>mild present but no criteria for severe AR		• Central Jet, width ≥65% of LVOT • Vena contracta > 0.6 cm
Supportive Signs	• Pressure half-time > 500 ms • Normal LV size[2]	Intermediate values		• Pressure half-time <200 ms • Holodiastolic aortic flow reversal in descending aorta • Moderate or greater LV enlargement [3]
Quantitative Parameters				
RVol, ml/beat	< 30	30-44	45-59	≥ 60
RF, %	< 30	30-39	40-49	≥ 50
EROA, cm^2	< 0.10	0.10-0.19	0.20-0.29	≥ 0.30

Zoghbi et al J Am Soc Echocardiogr 2003

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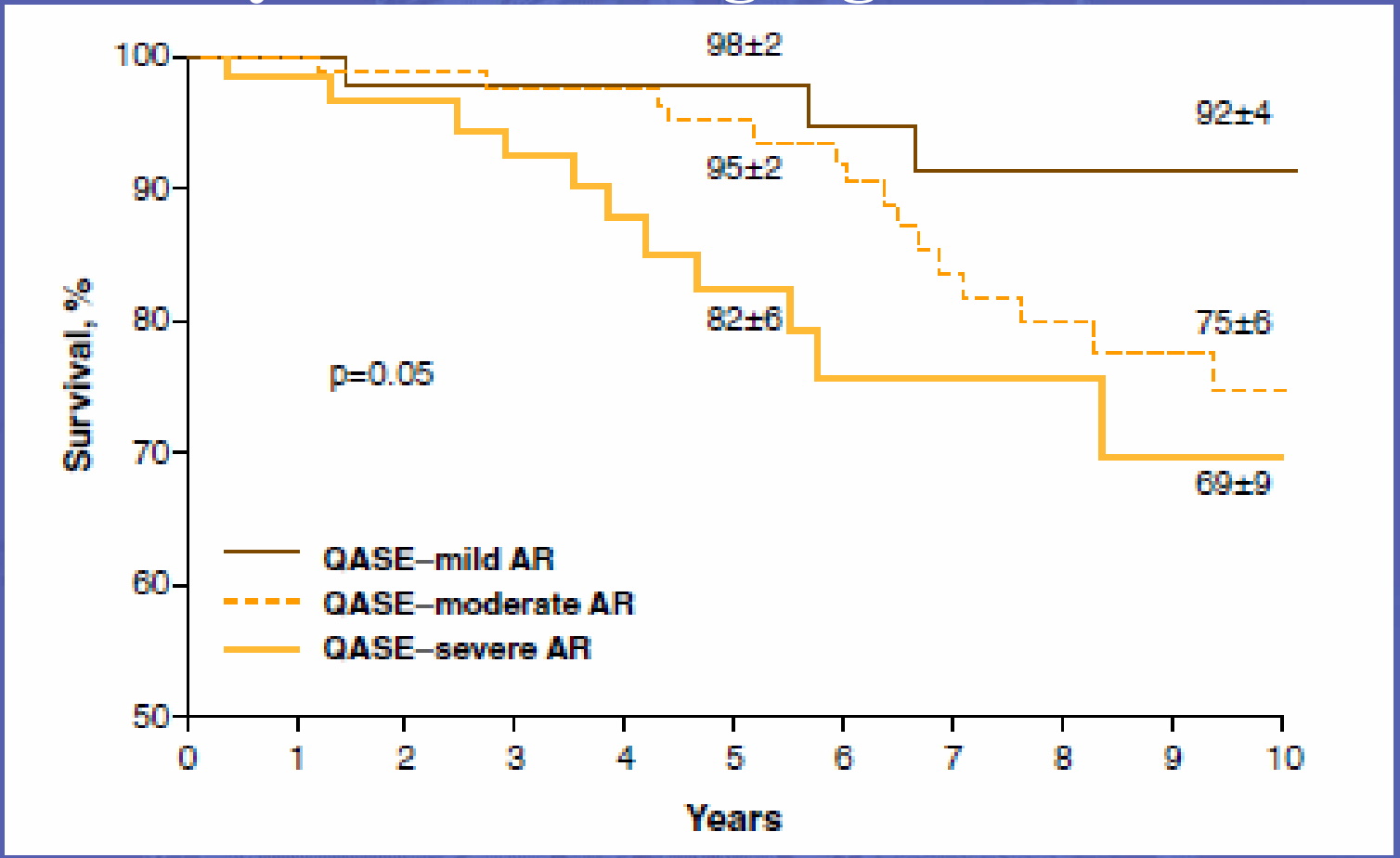
AORTIC REGURGITATION ASSESSMENT

Is Severity of Aortic Regurgitation an Issue?



Enriquez-Sarano M, et al. JACC Imaging. 2008

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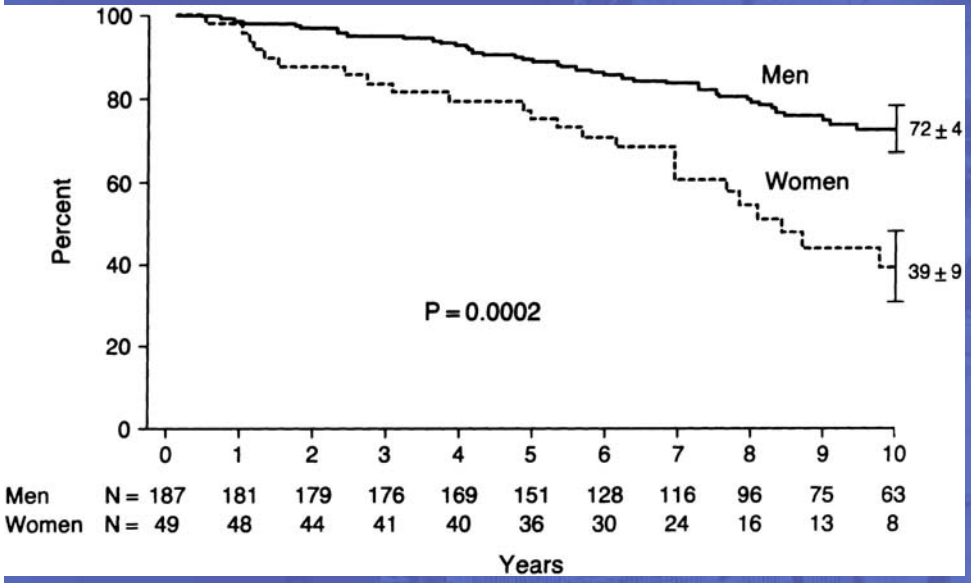
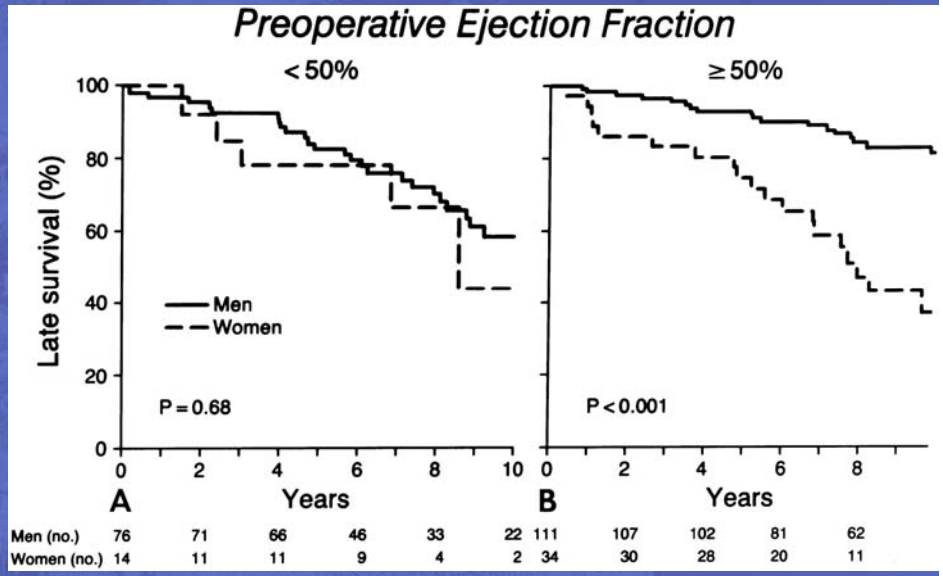
AORTIC REGURGITATION ASSESSMENT

The Gender Issue





Klodas, E. et al. Circulation 1996

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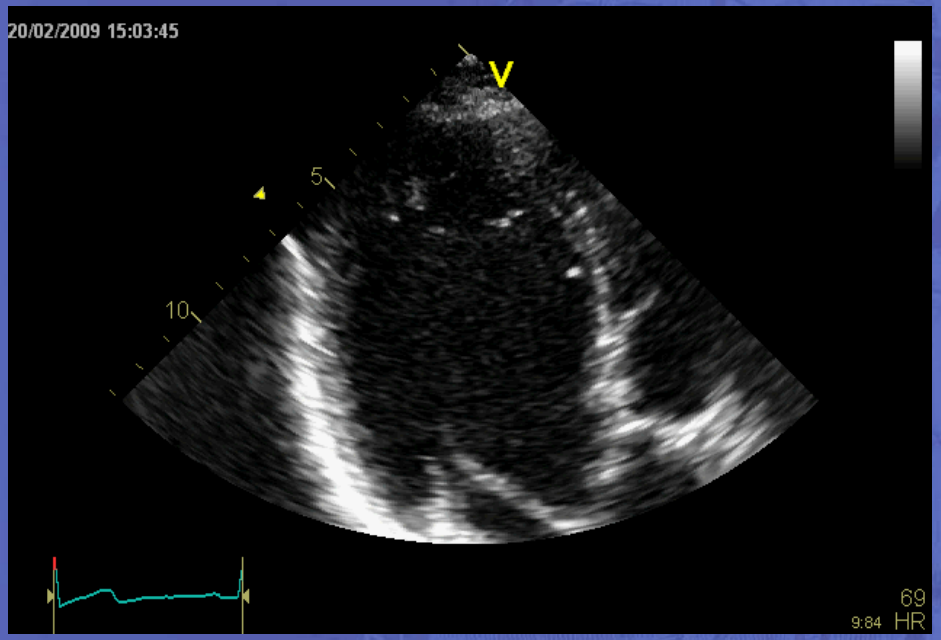
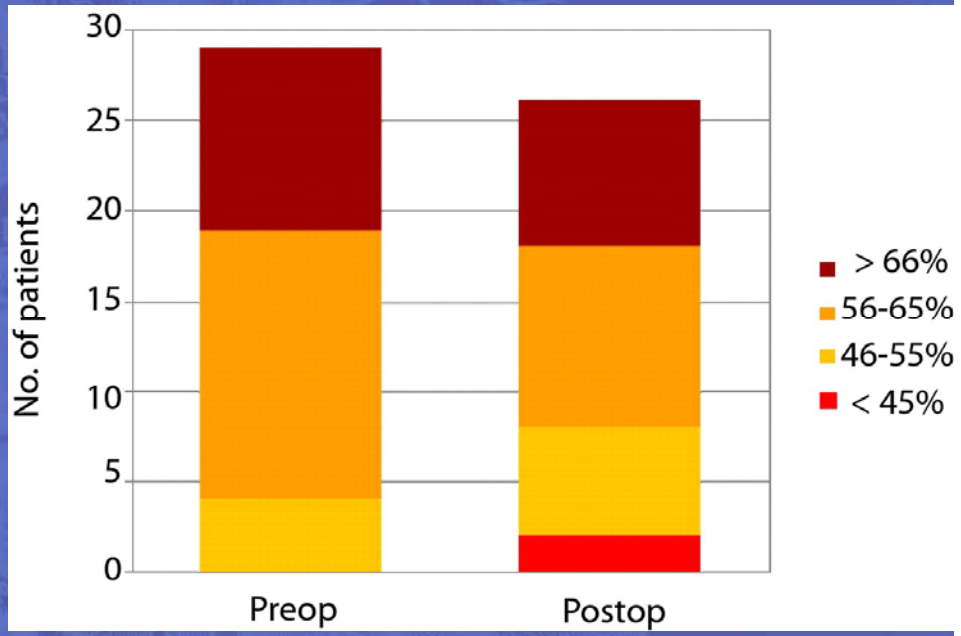
Subclinical Pre-op Myocardial Dysfunction





Tamas, E. et al. J Am Coll Cardiol Img 2009

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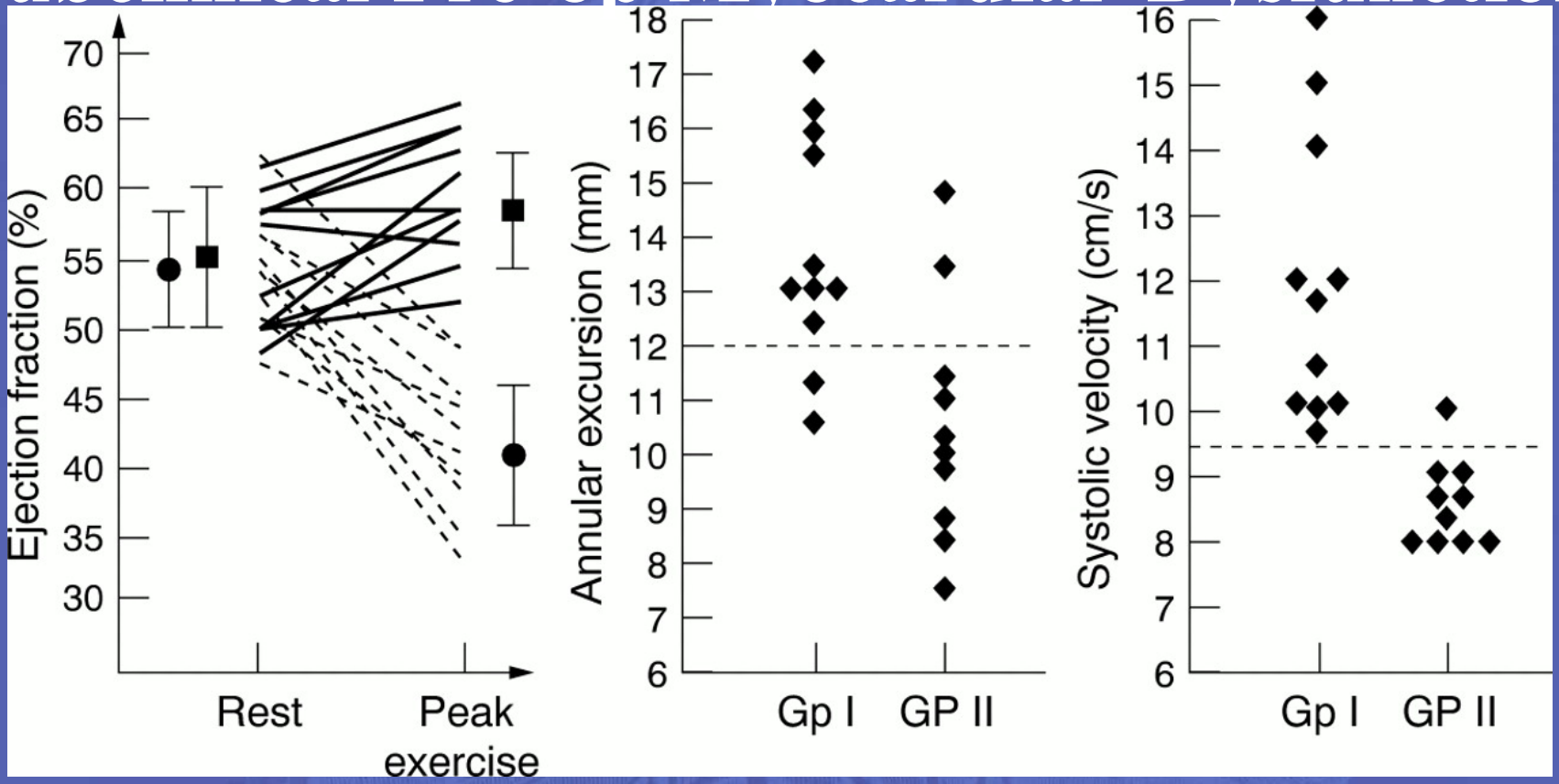

Group I (n= 11): LVEF ↑ with Exercise ≥ 5%

Group II (n= 10): LVEF ↑ <5% or ↓ with Exercise

Vinereanu, D et al. Heart 2001

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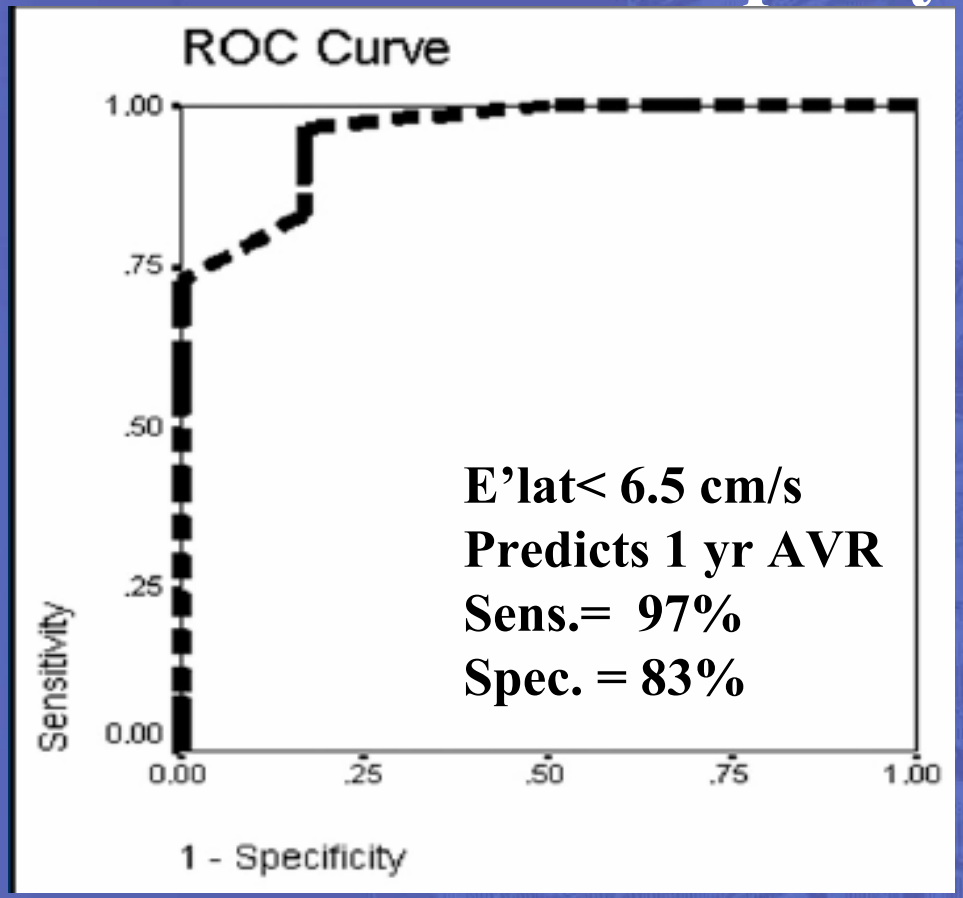

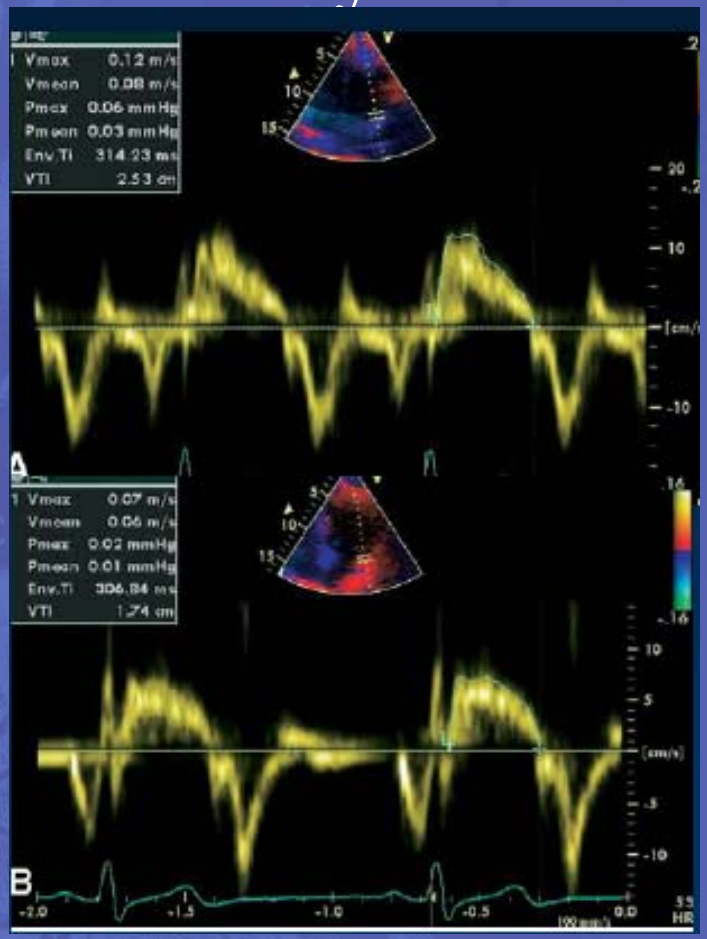

Paraskevaidis D et al. Am J Cardiol 2007

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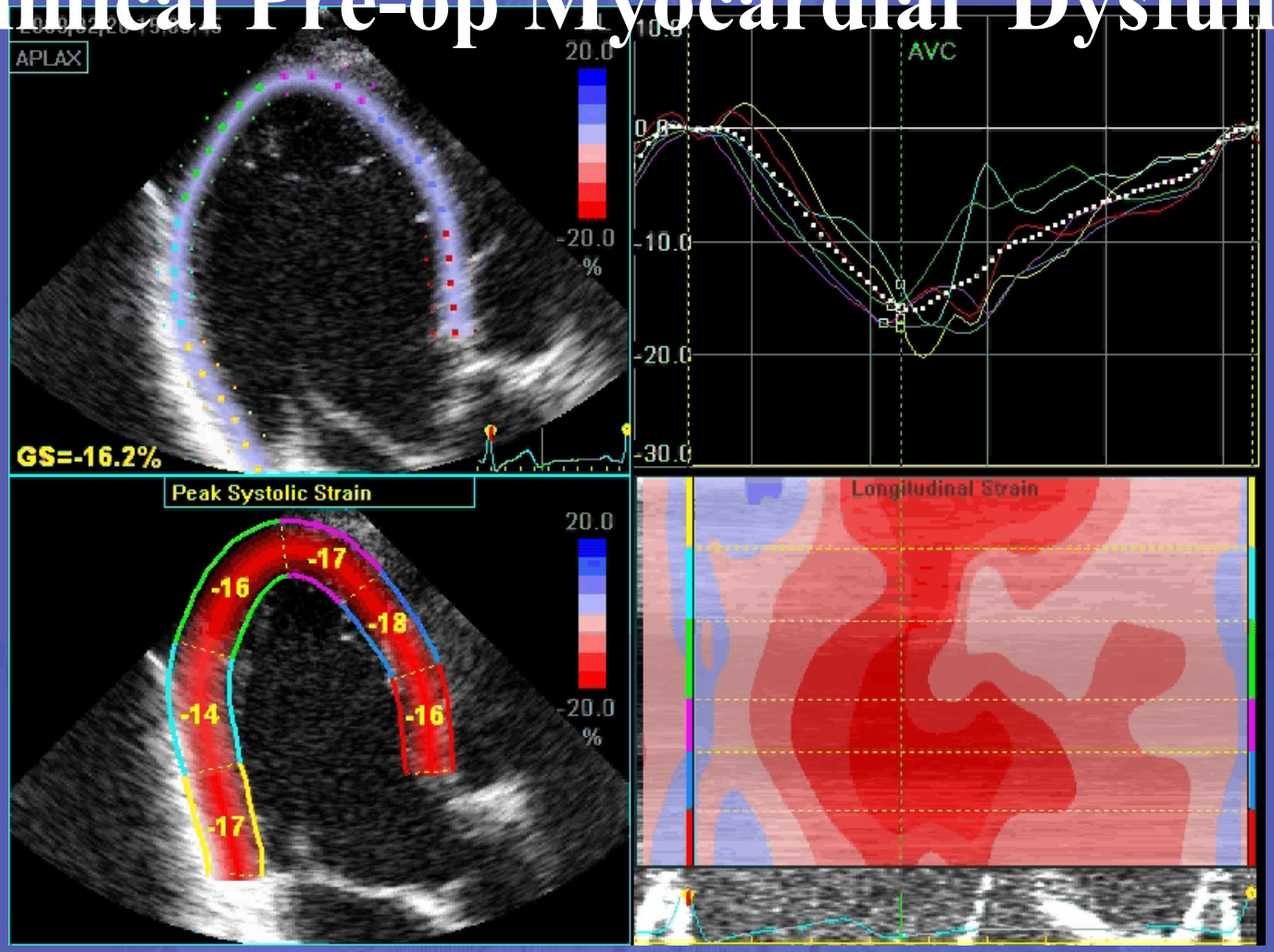
Subclinical Pre-op Myocardial Dysfunction



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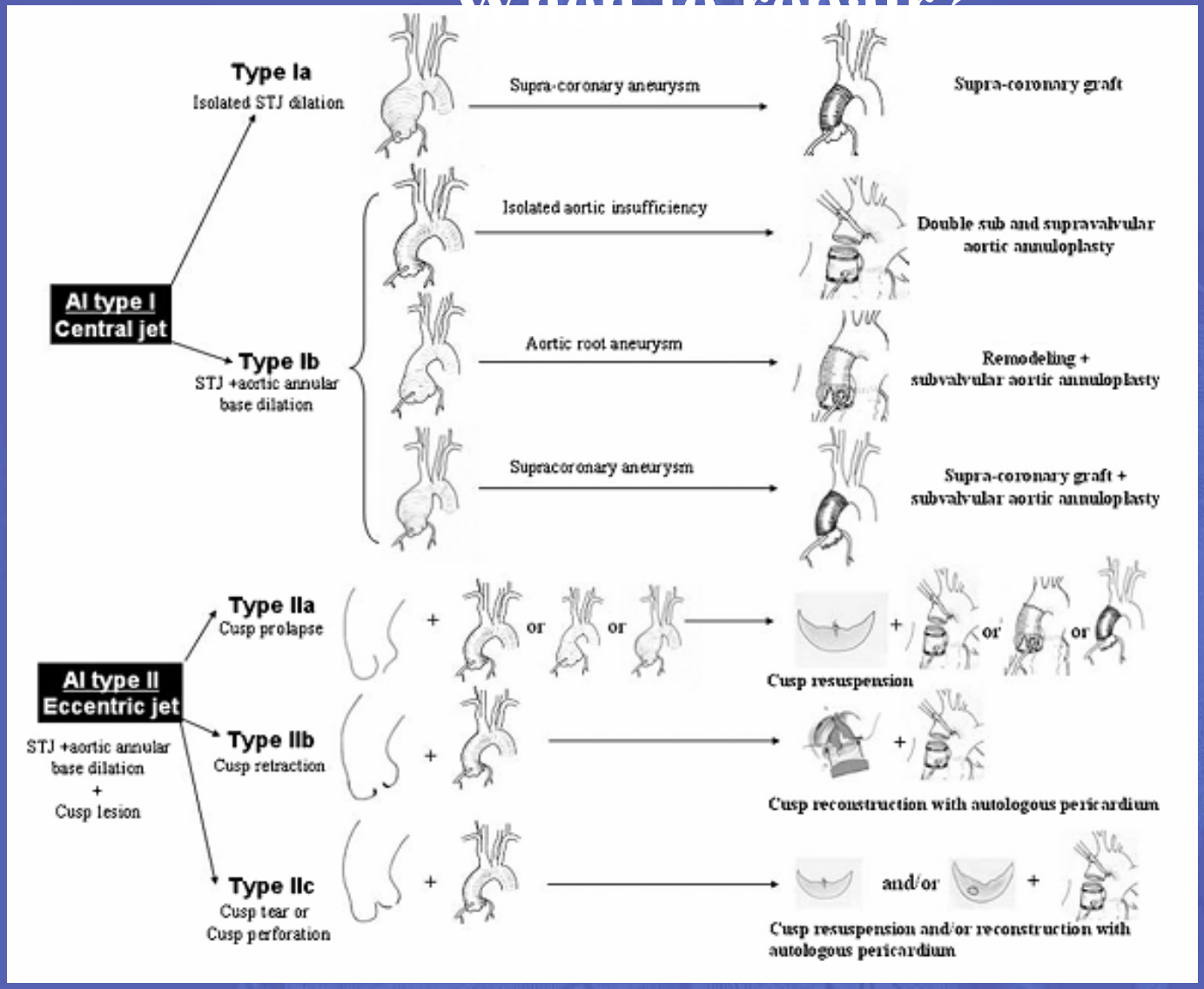
AORTIC REGURGITATION ASSESSMENT

When to repair?



Lansac E, et al. Eur J Cardiothorac Surg. 2008

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AORTIC REGURGITATION ASSESSMENT

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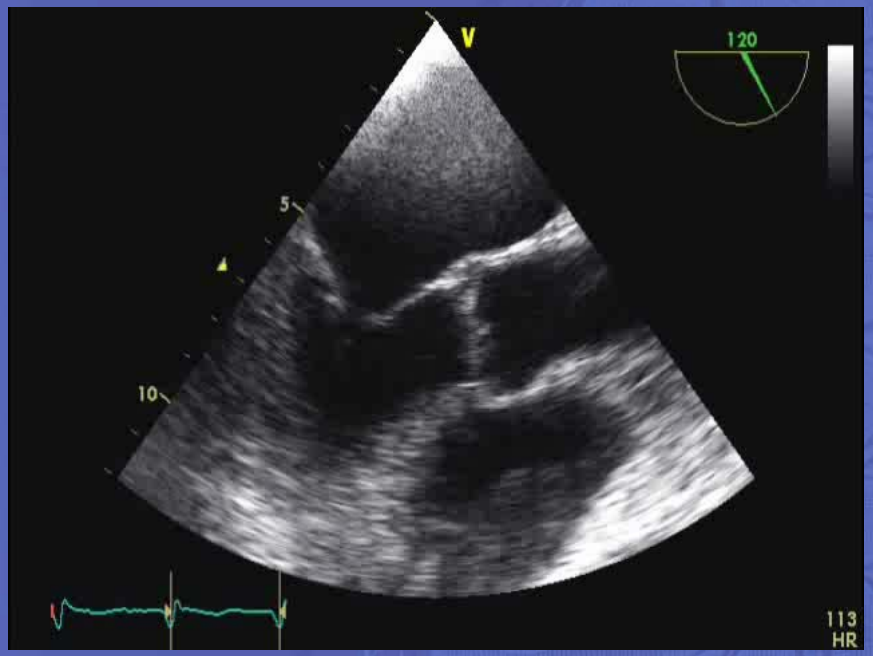

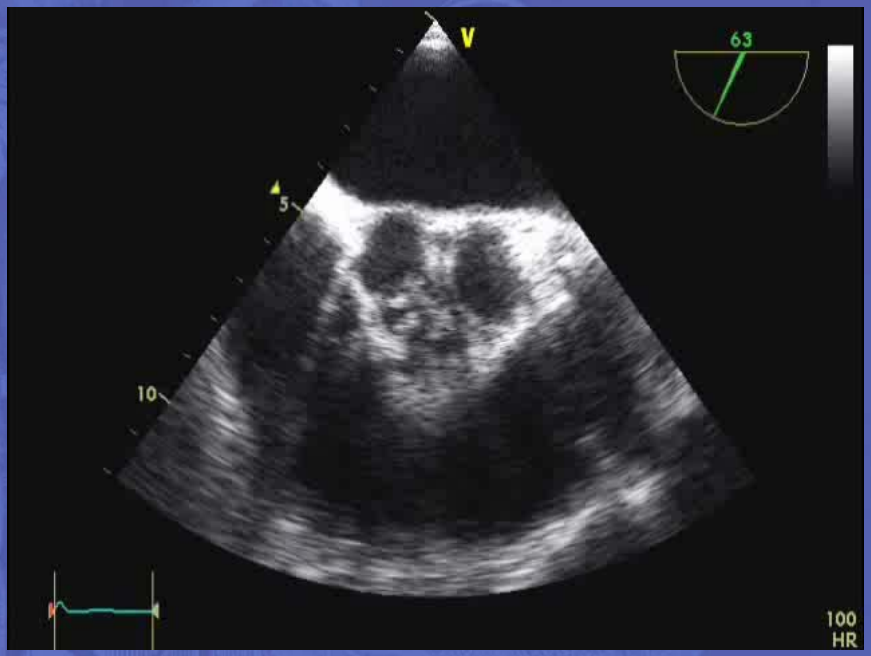

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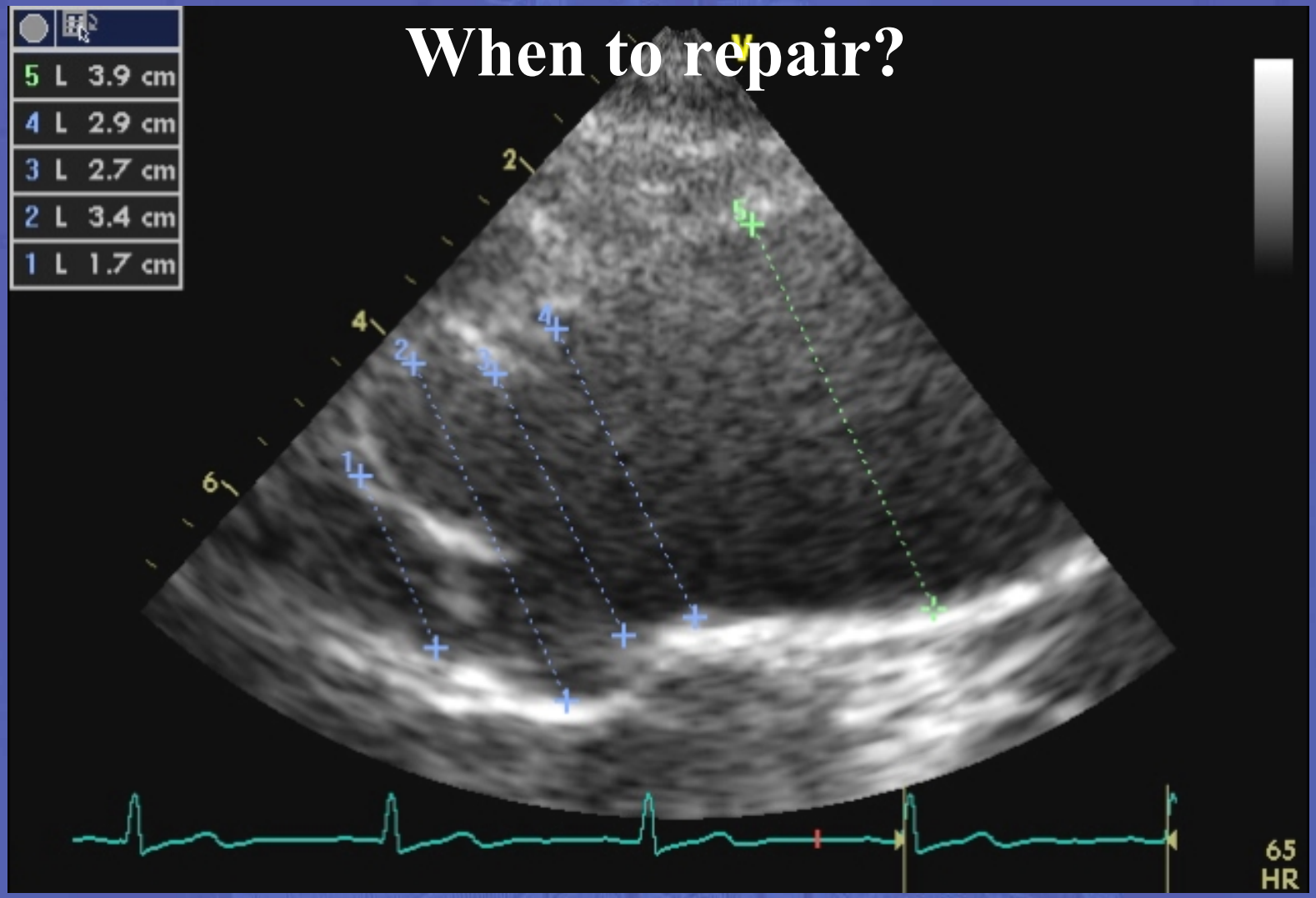

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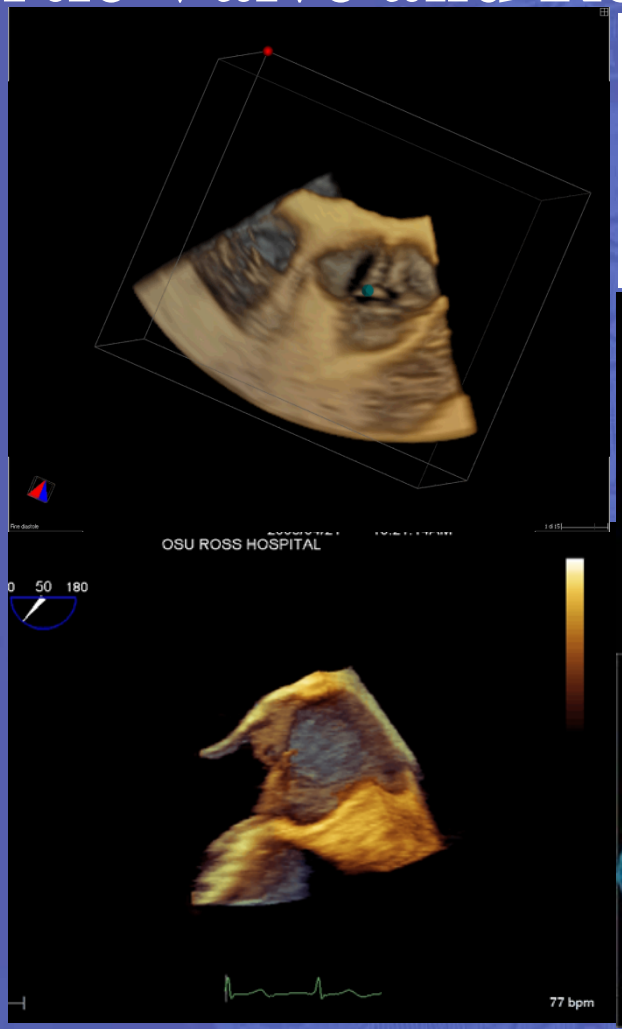
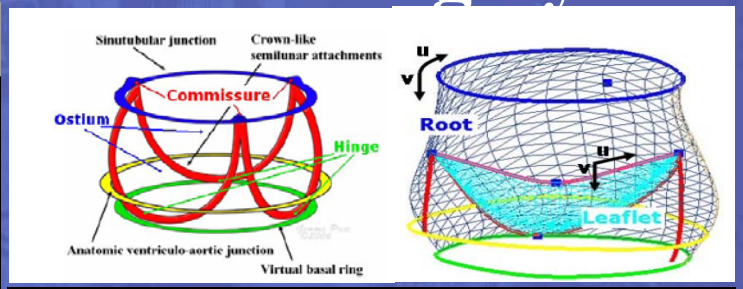
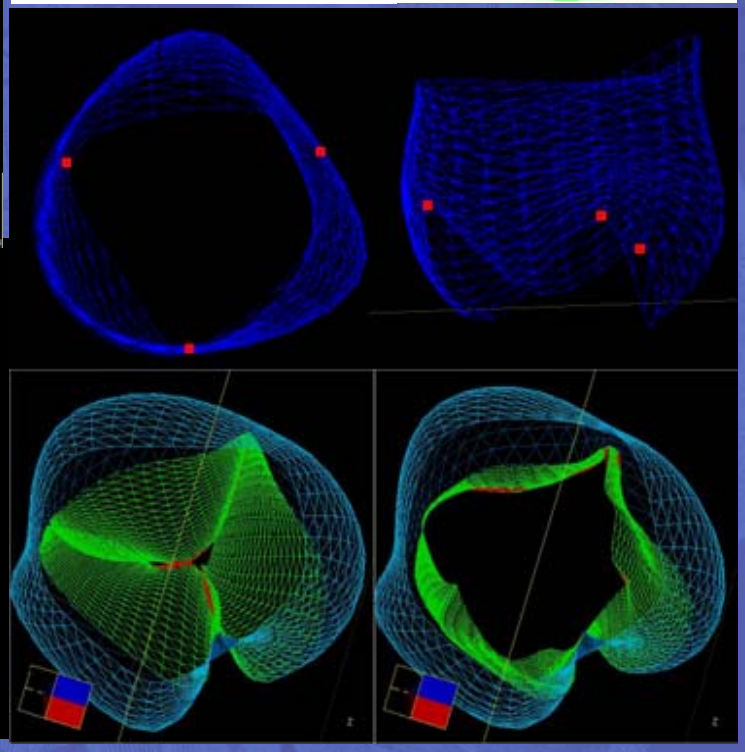
AORTIC REGURGITATION ASSESSMENT

Aortic Valve and Root Modeling by 3D Echo







Courtesy of M Vannan

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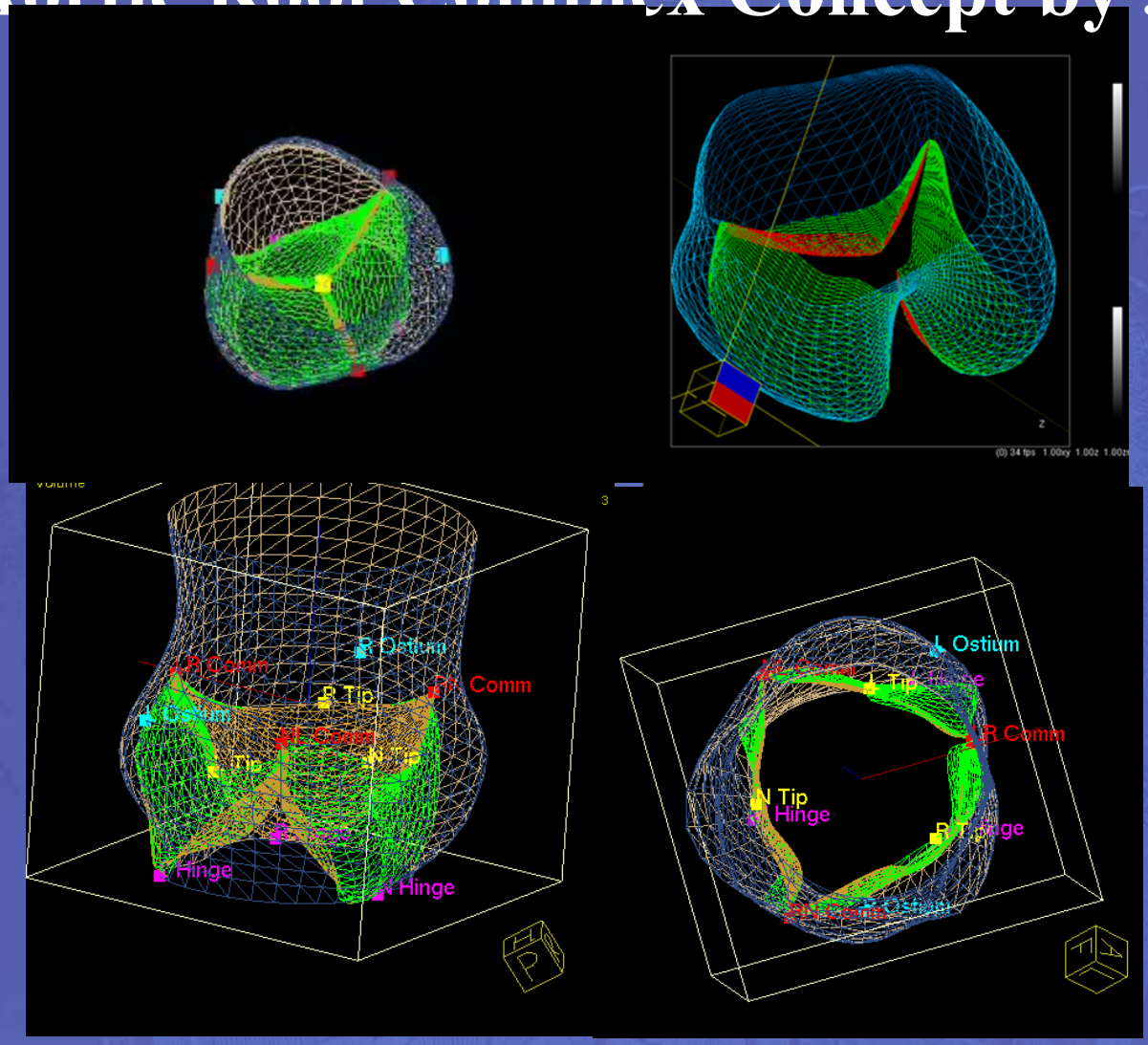
The Aortic Root Complex Concept by 3D Echo



Courtesy of M Vannan

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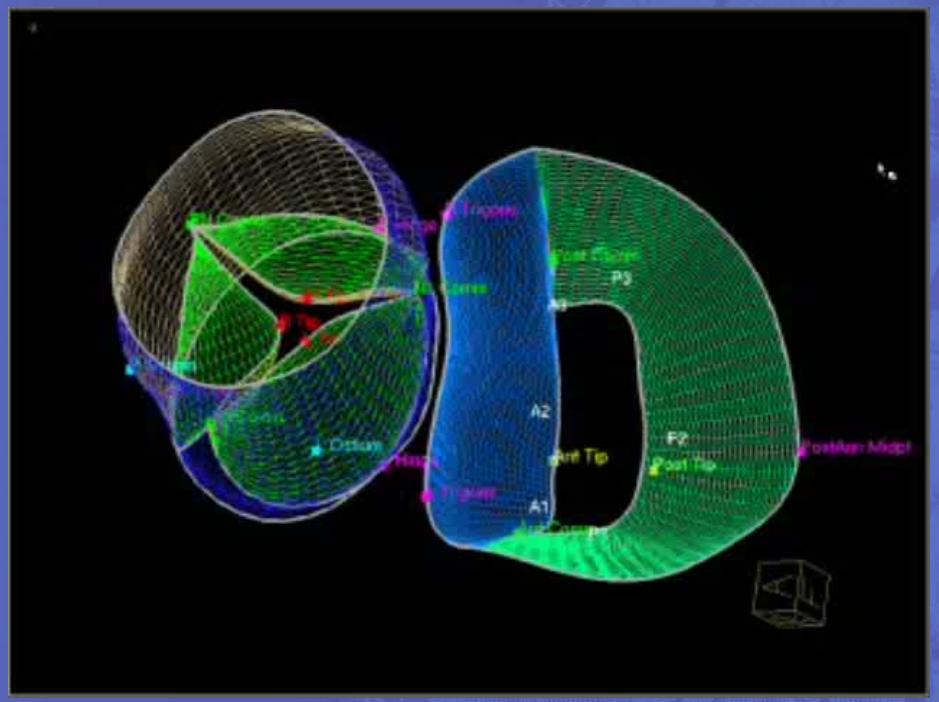

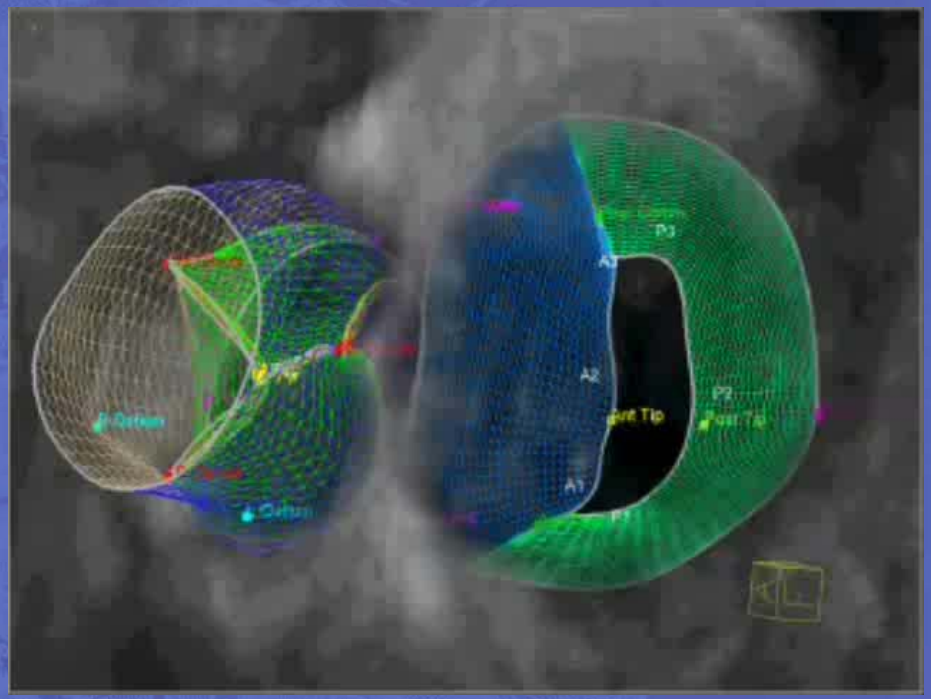

Courtesy of M Vannan

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3D Echo Transoesophageal Aortic Valve Anatomy

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3D Echo To Assess Aortic Valve Anatomy

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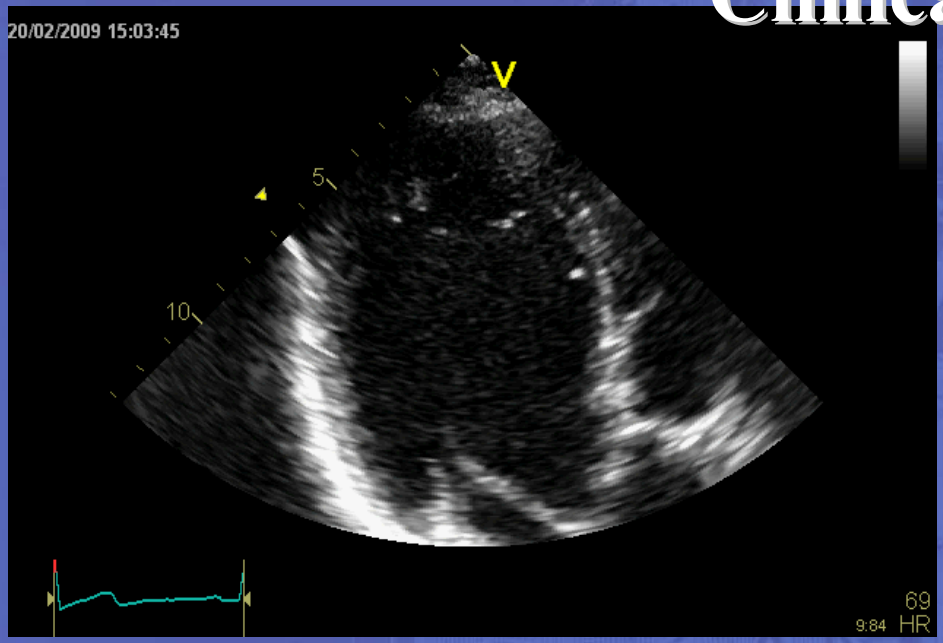
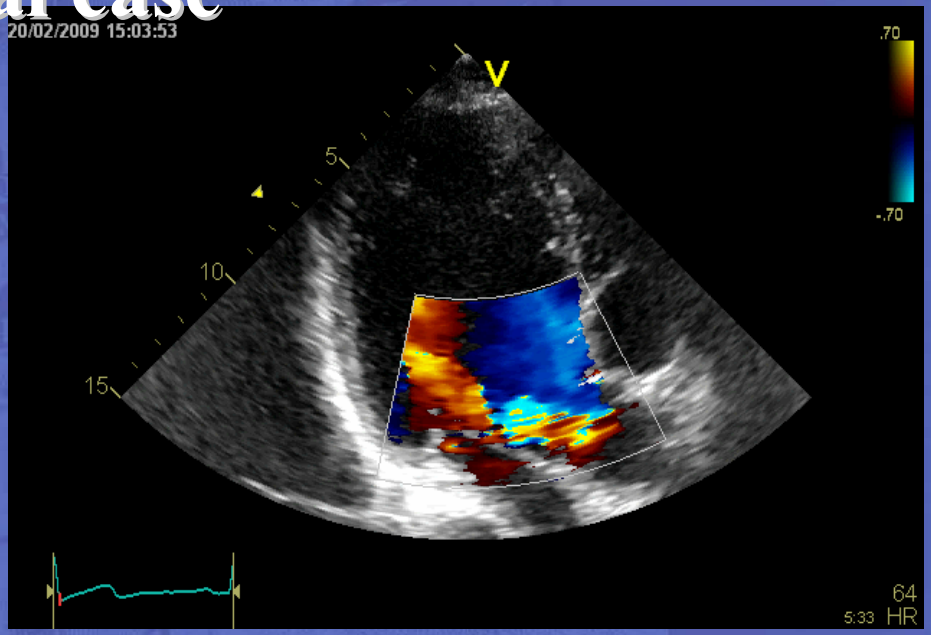
Clinical case





43-yr-old caucasian male

Asymptomatic

AR ERO= 0.32 cm^2

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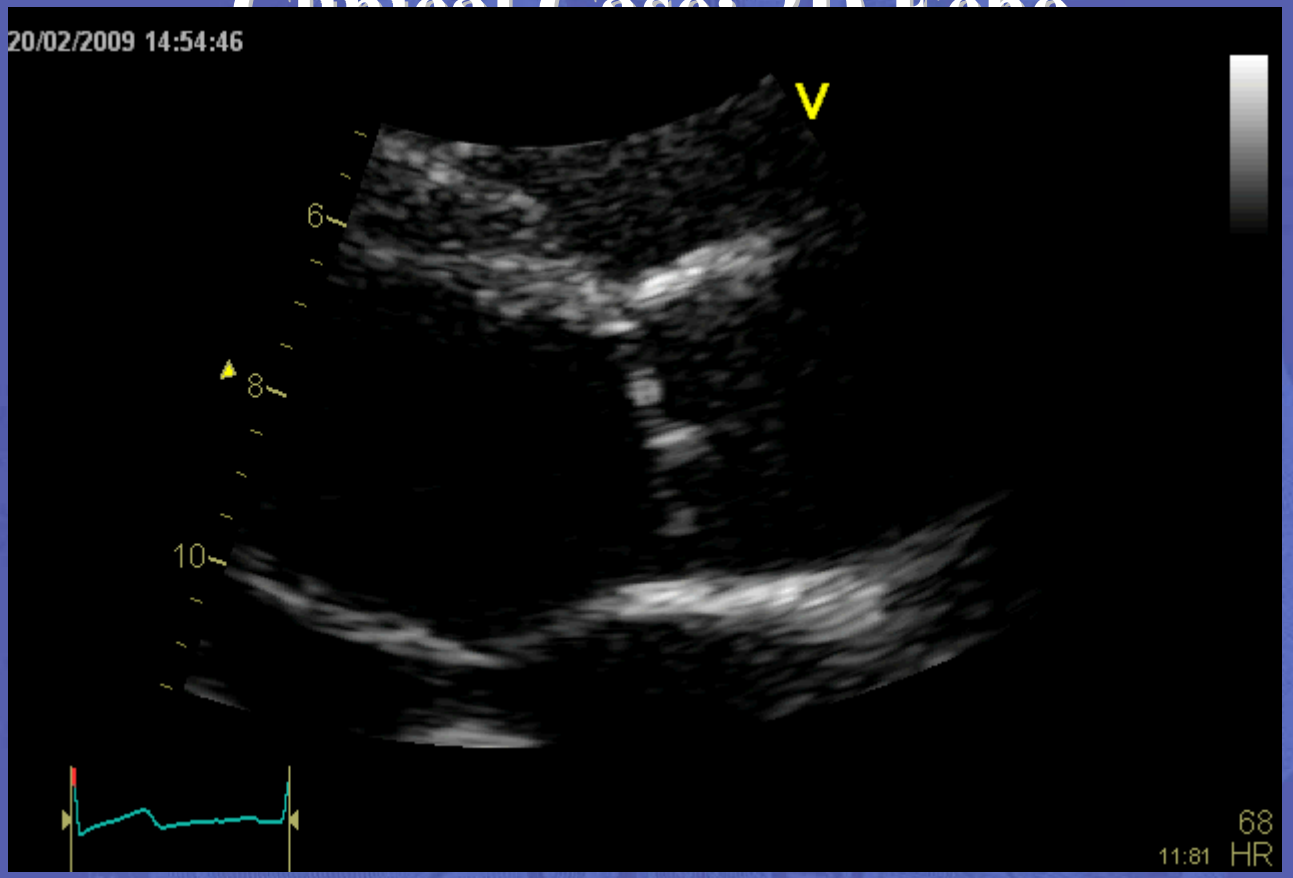
Clinical Case: 2D Echo



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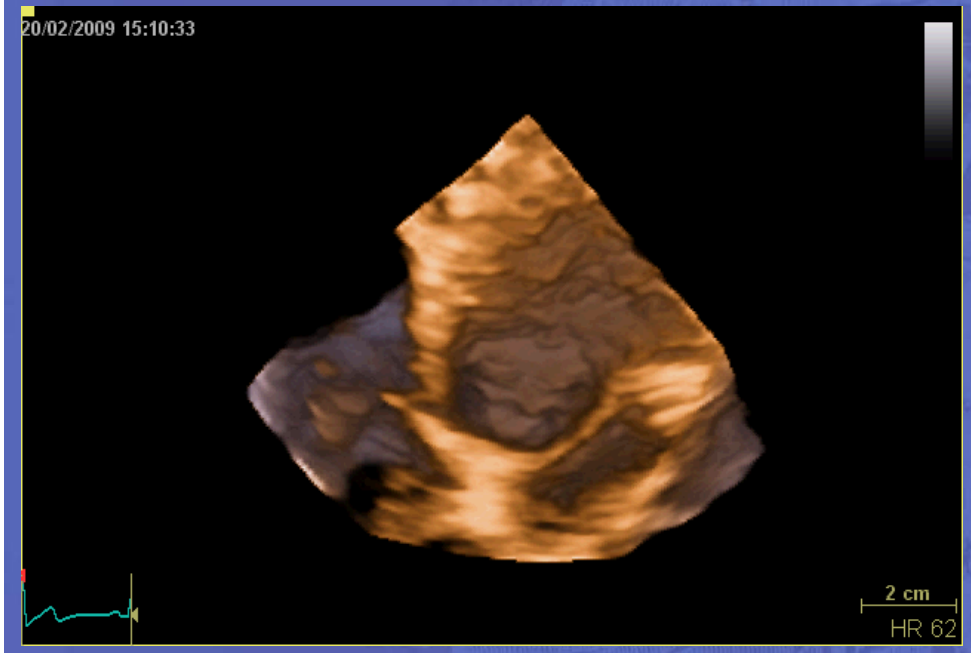
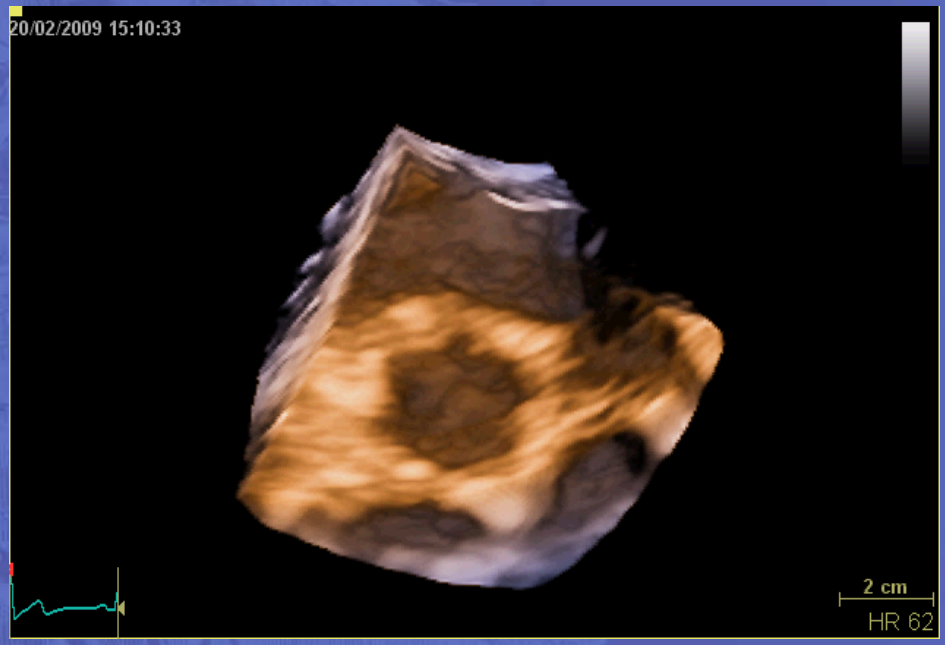
Clinical Case: Pivotal Role of 3D Echo





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AORTIC REGURGITATION ASSESSMENT

Conclusions

- Guidelines defining indications to surgery are suported only by a consensus and inferences from observational studies (no randomized trials!);
- ~ 10% of patients sent to surgery according with current guidelines results in a post-op. LV dysfunction;
- Bicuspid aortic valve, degenerative media diseases (i.e. Mrfan snd), degenerative cusp prolapse, acute aortic dissection, and atherosclerotic aortic aneurysm of ascending aorta are the most common indications for surgical repair in AR;
- Better understanding and quantitation of the aortic root complesx may lead to better understanding the physiopathology of AR and to select the most adequate surgical maeuver to repair the lesion.


Positive proof of global warming.
18th Century
1900
1950
1970
1980
1990
2006