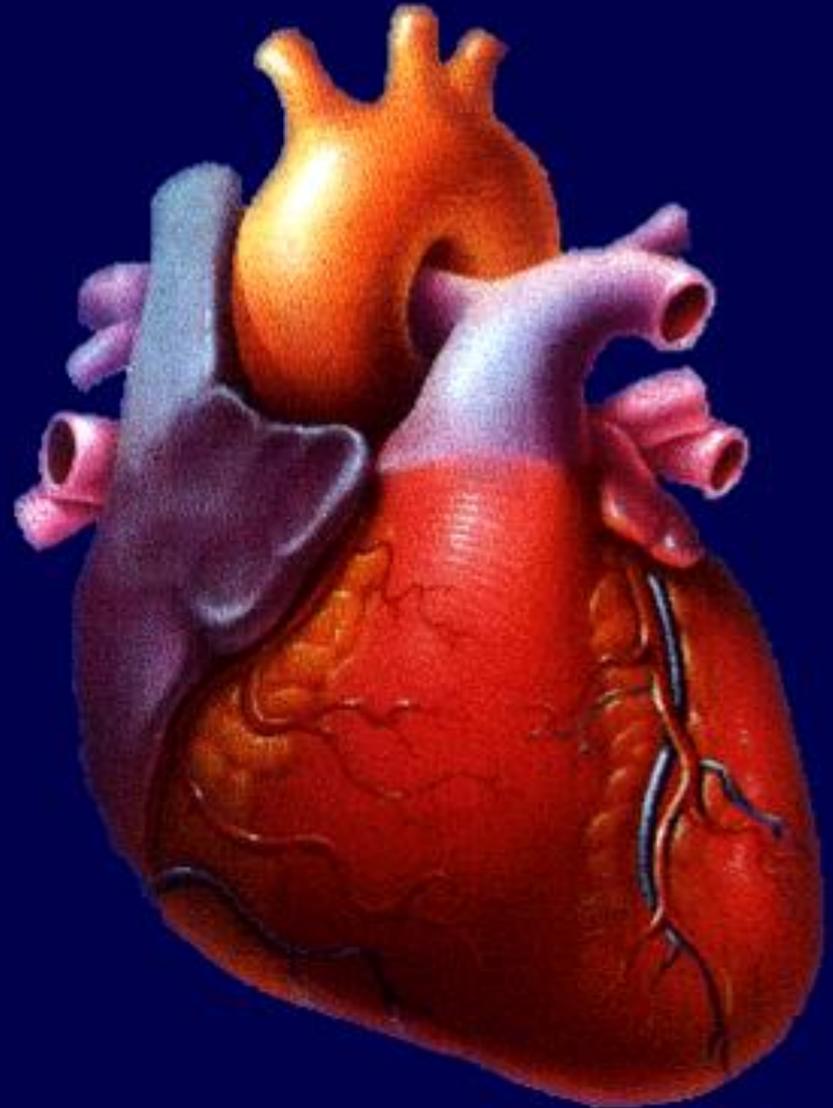


# *Ecocardiografia e Insuficiência Aórtica*

## Ecocardiografia e Insuficiência Aórtica

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## Prevalence

- 4.9 % in the Framingham Heart Study  
10% in the Strong Heart Study
- Prevalence increases with age
- Severe regurgitation clinical more often observed in men than in women

## **Etiology**

Idiopathic dilatation of the aorta

Congenital Abnormalities (most notably bicuspid)

Calcific degeneration

Rheumatic disease

Myxomatous degeneration

Dissection of the ascending aorta

Marfan syndrome

## Etiology

Traumatic injuries

Ankylosing spondylitis

Syphilitic aortitis

Rheumatoid arthritis

Osteogenesis imperfecta

Giant cells aortitis

Ehlers-Danlos syndrome

Reiter's syndrome

Anorectic drugs

## **Mortality in Severe AR**

- Higher mortality than general population
- Also associated with substantial morbidity
- 10 y after diagnosis, heart failure occurs in 50% of the patients

## Subgroups of Severe AR with increased Risk of Death

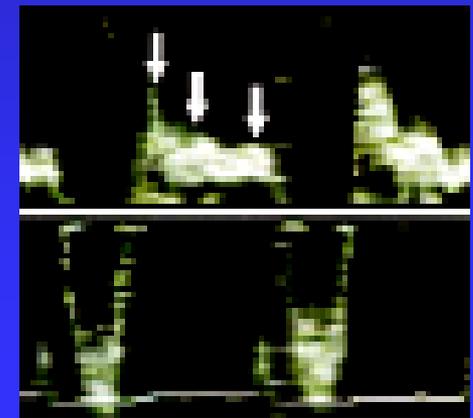
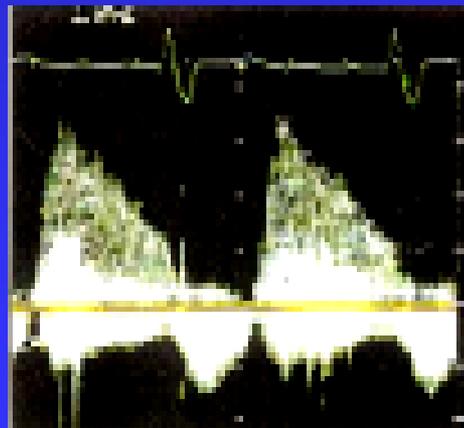
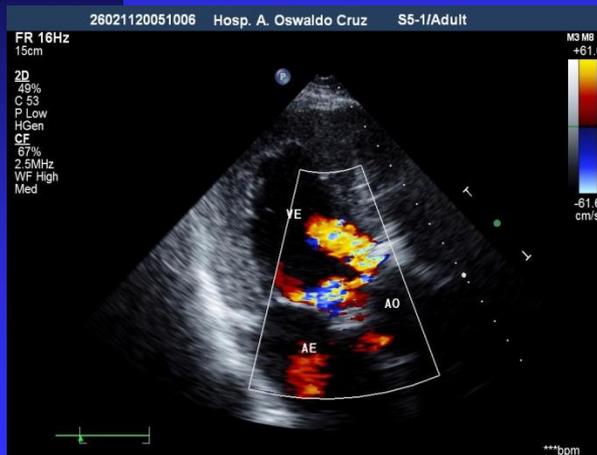
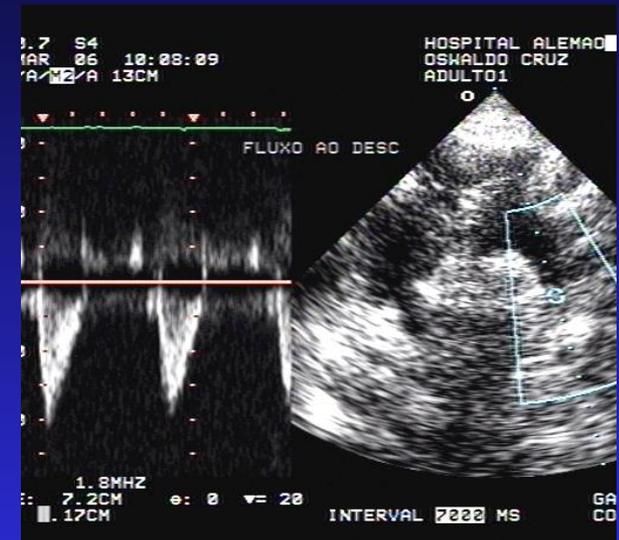
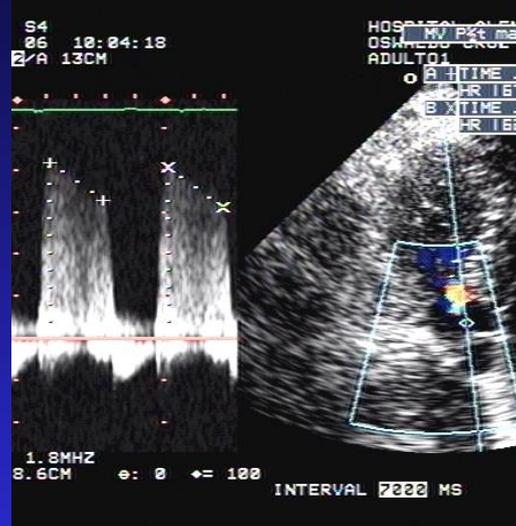
- Pt. with severe symptoms (dyspnea or angina CF III or IV), anual mortality of 25%
- Marked Left Ventricular enlargement
- End Systolic Diameter  $\geq 25$  mm/m<sup>2</sup> \*
- Ejection Fraction  $< 55\%$  \*

\* even asymptomatic

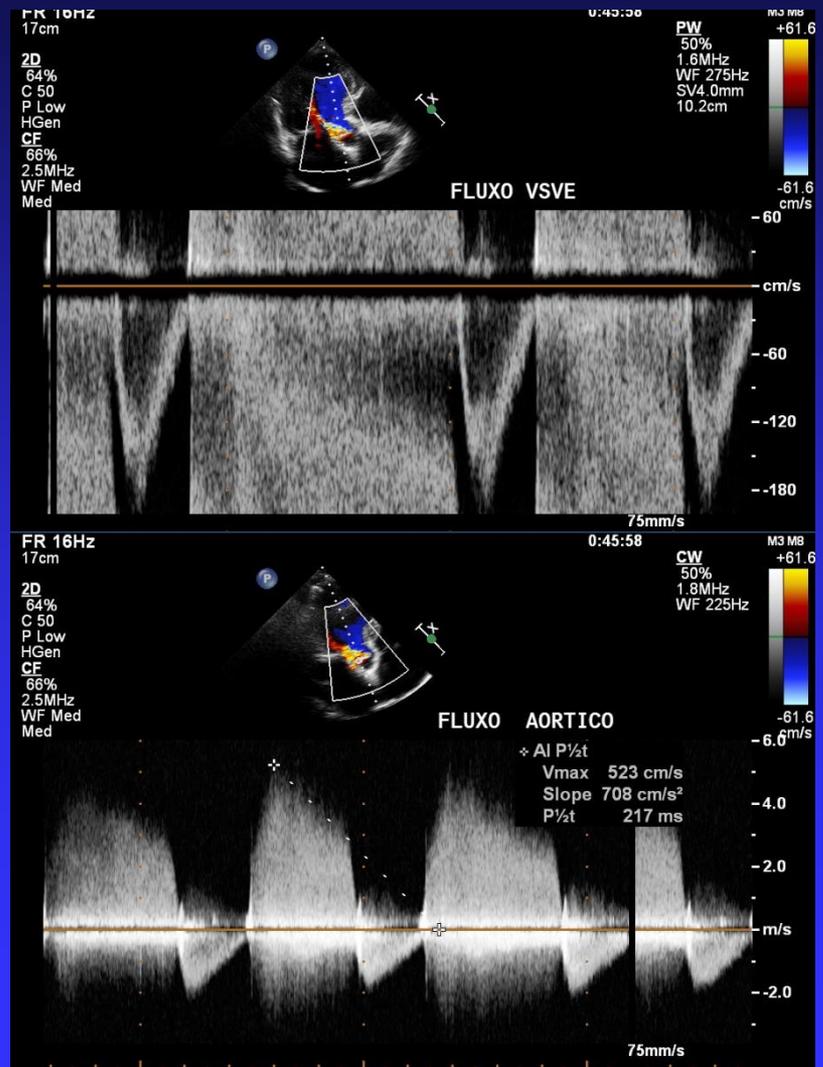
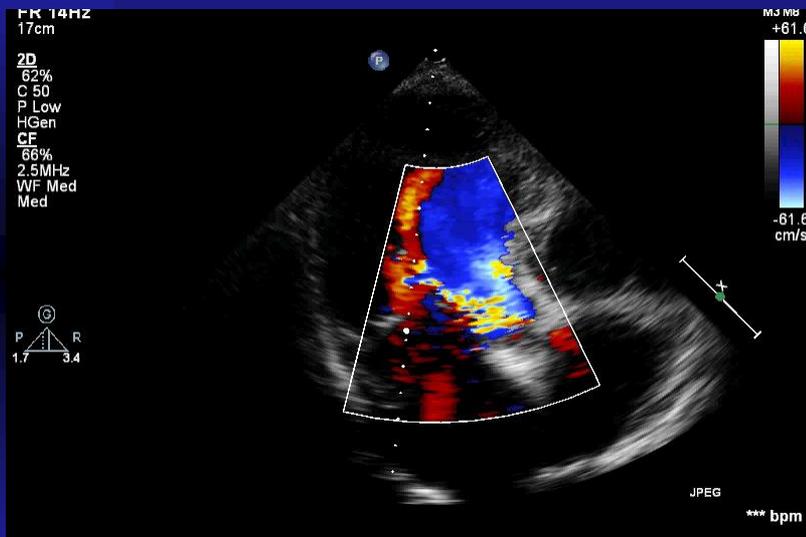
## Doppler Echocardiography Evaluation in Severe AR

- Broad jet width on color-flow imaging
- Steep jet velocity deceleration (reflecting equalization of aortic and ventricular pressure)
- Prolonged diastolic flow reversal in the aorta

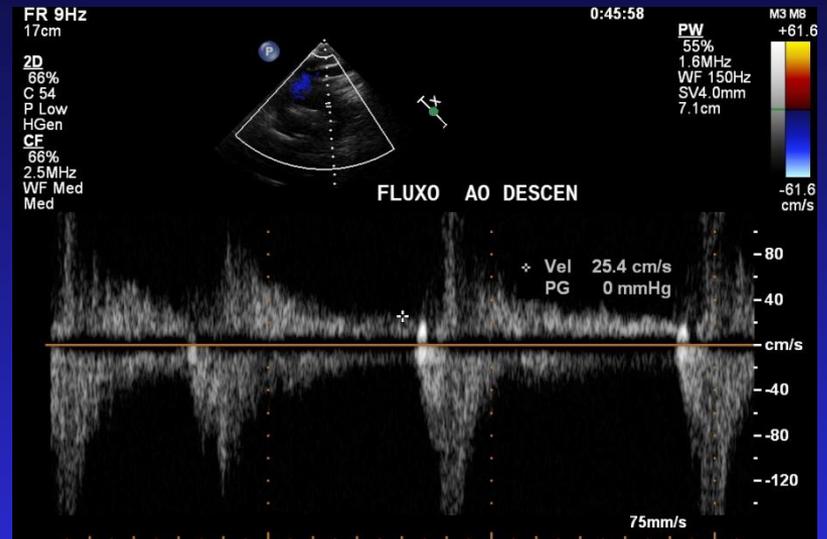
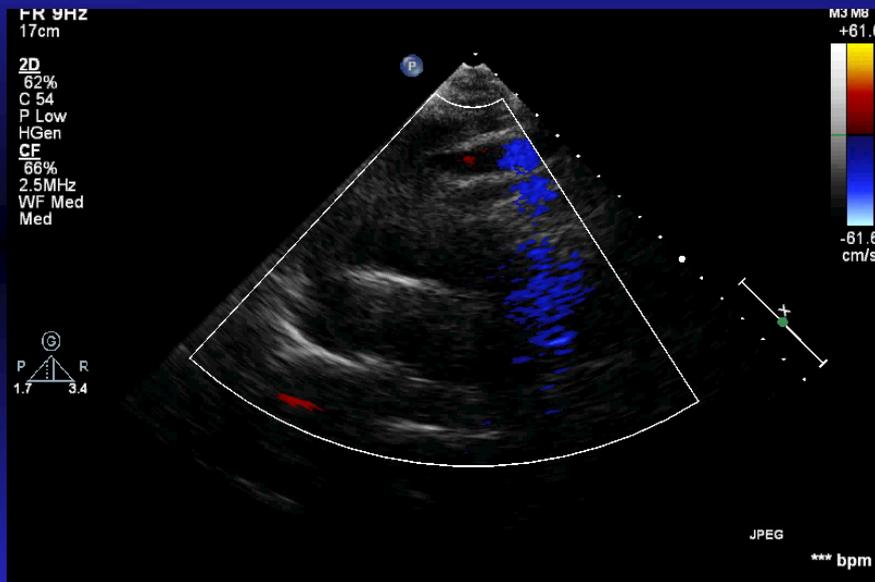
# Doppler Echo Evaluation in Severe AR



# Doppler Echo Evaluation in Severe AR



# Doppler Echo Evaluation in Severe AR

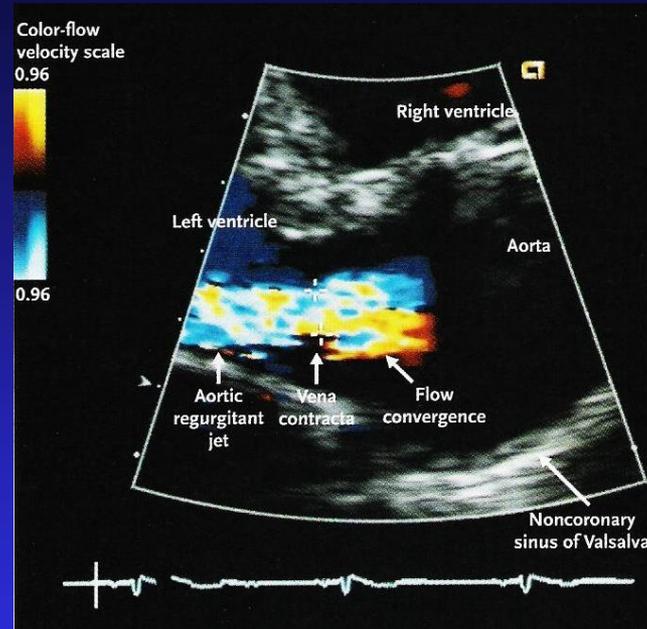


# Classification of the Severity of AR

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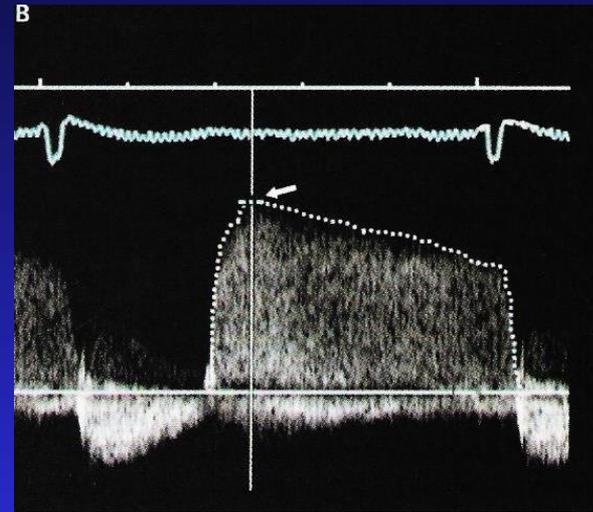
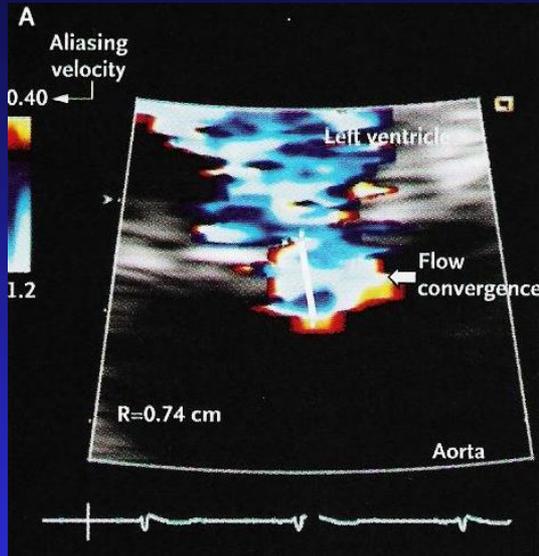
Variable	Mild	Moderate	Severe
Width vena contracta (mm)	< 3.0	3.0-5.9	>=6.0
Ratio width AR jet to LV outflow (%)	< 25	25-44 45-64	>=65
Regurgitant volume (ml/beat)	< 30	30-44 45-59	>=60
Regurgitant fraction (%)	<30	30-39 40-49	>=50
Effective regurg.orifice (mm <sup>2</sup> )	<10	10-19 20-29	>=30

# Width of the Vena Contracta in AR



Variable	Mild	Moderate	Severe
Width vena contracta (mm)	< 3.0	3.0-5.9	$\geq 6.0$
Ratio width AR jet / LV outflow (%)	< 25	25-44 45-64	$\geq 65$

# Effective Regurgitant Orifice in AR



Variable

Effective regurg.orifice (mm<sup>2</sup>)

Mild

<10

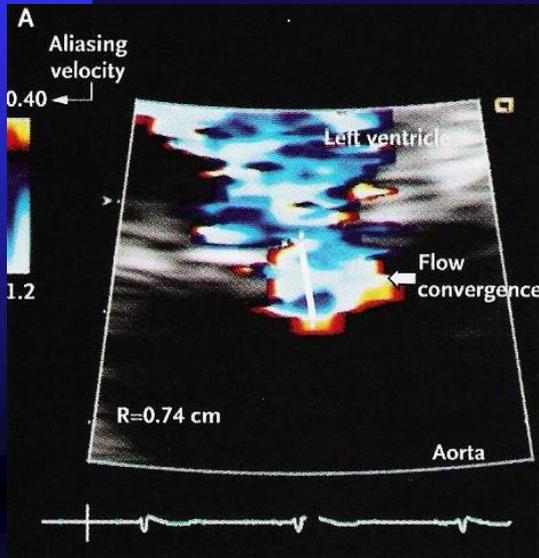
Moderate

10-19 20-29

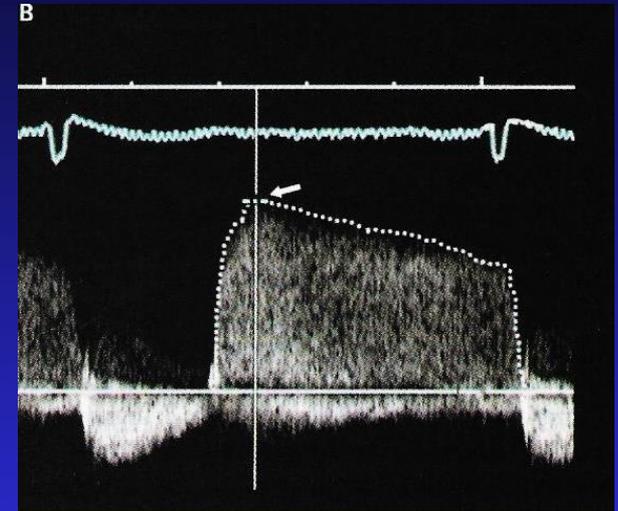
Severe

>=30

# Effective Regurgitant Orifice in AR



$$\text{Orifice} = \frac{\text{Flow}}{\text{Velocity}}$$



$$\begin{aligned} \text{Flow} &= \text{Velocity}_{\text{shell}} \times \text{PISA} \\ &= 0.40 \text{ m/seg} \times 2 \pi R^2 \\ &= 40 \text{ cm/seg} \times 2 \times 3,1416 \times 0.74^2 \\ &= 138 \text{ ml/seg} \end{aligned}$$

$$\begin{aligned} \text{Velocity} &= 4.55 \text{ m/seg} \\ &= 455 \text{ cm/seg} \end{aligned}$$

$$\begin{aligned} \text{Orifice} &= \frac{138 \text{ cm}^3/\text{seg}}{455 \text{ cm/seg}} \\ &= 0.30 \text{ cm}^2 = 30 \text{ mm}^2 \end{aligned}$$

# Surgical Management in Severe AR

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- Surgery relieves AR but is not appropriate for all pt. because of the small but definite risks of the procedure and aortic prostheses complications.
- No randomized trials data comparing surgical vs clinical management of severe AR
- There is general consensus that surgery is appropriate in **high-risk patients** who have no surgical contraindications.

# Severe AR in Symptomatic Patients

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- The strategy of severe symptoms as a sole criterion for surgery is associated with **excess mortality** even after successful correction of AR.
- Pt. with mild symptoms and those with symptoms that improved or resolved with medical therapy **remain at notable risk** without surgery
- In those pt. , surgery relieves the symptoms , has a low risk and postoperative **survival is similar** to the expected survival in the general population.

# Severe AR in Asymptomatic Patients

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- Delay of surgery until symptoms develop is associated with substantial postoperative risks of frank LV enlargement and death.
- Extreme LV dilatation ( $\geq 80$  mm) is a recognized risk factor for sudden death.
- Degree of LV dysfunction is associated with increased postoperative mortality.

# Severe AR and Left Ventricular Dysfunction

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## Posoperative Outcome

Preoperative  
Ejection Fraction

10-year postoperative  
survival rate

< 35 %	41 %
35-49 %	56 %
> 50 %	70 %

# Severe AR in Asymptomatic Patients

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## Surgical Management

- End-systolic Diameter LV  $\geq 55$  mm  
( 25 mm/m<sup>2</sup> applies equally to men and women)
- Ejection Fraction LV  $< 55$  %  
( ideally between 50 – 55 %)

# Ecocardiografia e Insuficiência Aórtica

## Aortic Valve Planimetry in TEE (90pt)

Angiography	TEE	Sens.	Spec.	(+) PV	(-) PV	Acc.
mild	$\leq 0.2\text{cm}^2$	85%	97%	97%	87%	91%
moderate	$0.2-0.4\text{cm}^2$	84%	92%	81%	93%	90%
severe	$>0.4\text{cm}^2$	98%	93%	93%	98%	97%

