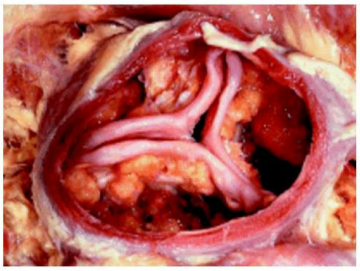
Lecture: Best Measure Response to Aortic Valve Disease: Gradients, areas and others

Fausto Pinto, MD (Yun Zhang, MD PhD in Asia Broadcast)

Aortic Valve Disease



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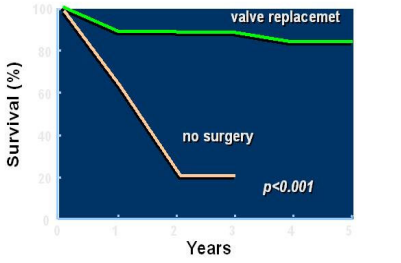
Effect of AoV Surgery



Schwarz et al Circ 1982;66:1105

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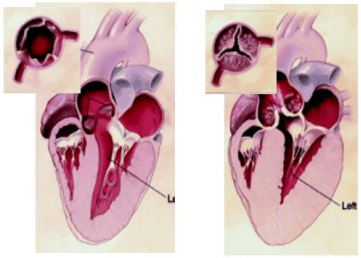
Aortic Valve Stenosis

LV compensatory response



Nishimura RA Circ 2002;106

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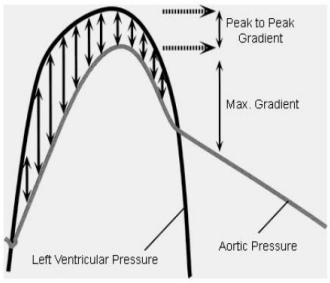
Pressure Gradient in Ao Stenosis



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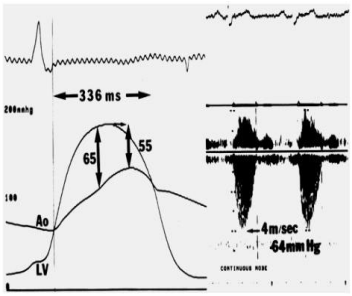
Peak Instantaneous Gradient



Pepine CJ et al 1994

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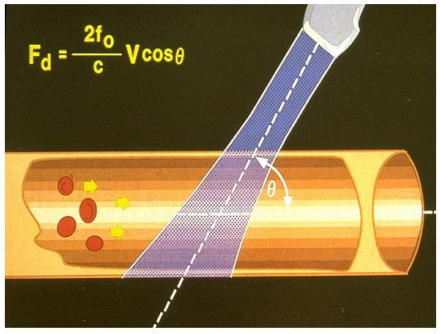

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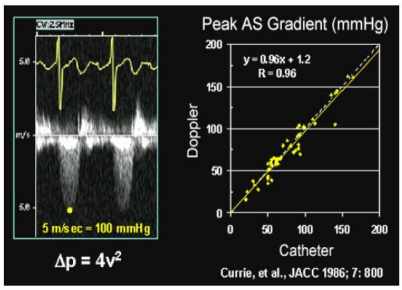
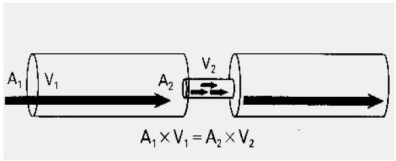
Quantification of Valvular Gradients



$\Delta p = 4v^2$

Currie, et al., JACC 1986; 7: 800

Continuity Equation to Assess Valve Area



Ross, Braunwald Circulation 1968;38:V61

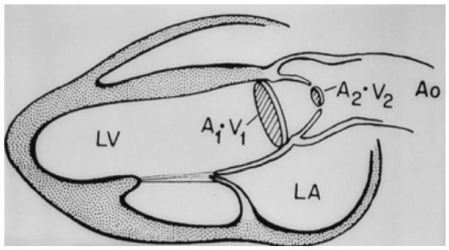
Bernoulli Equation

convective acceleration | flow acceleration | viscous friction

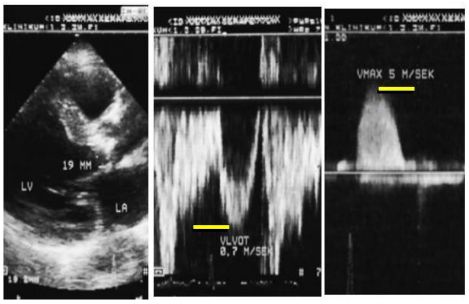
$$p_2 - p_1 = 1/2\rho(V_2^2 - V_1^2) + \rho_1 \int_1^2 \frac{dV}{dt} ds + R(V)$$

$$p_2 - p_1 = 4V^2$$

Continuity Principle



Assessment of Aortic Valve Area

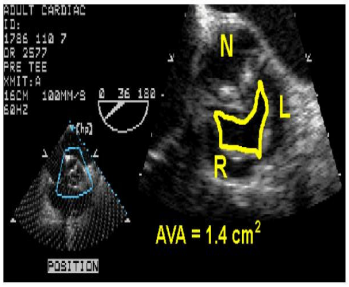


AoV Area Continuity Equation

$$A_{AV} \cdot \bar{V}_{AV} = A_{LVOT} \cdot \bar{V}_{LVOT}$$

$$A_{AV} = 0.785 \times (D)^2 \cdot \frac{\bar{V}_{LVOT}}{\bar{V}_{AV}}$$

Planimetry of Aortic Valve



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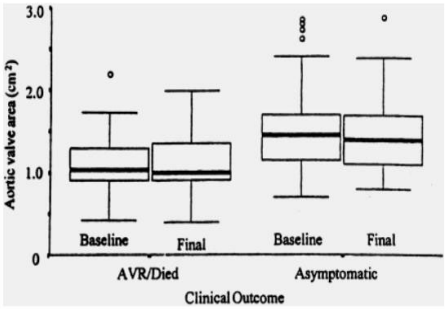
Valve area and Symptoms



Otto CM et al Circulation 1997

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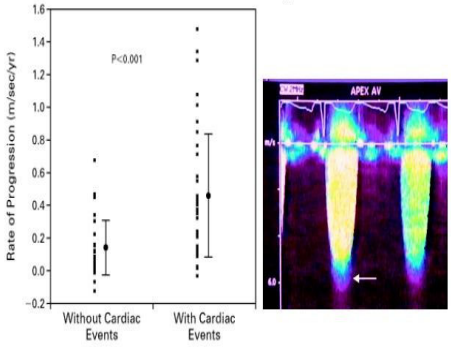
Rate of Progression

Ao Jet Velocity



Rosenhek R et al N Eng J Med 2000;343

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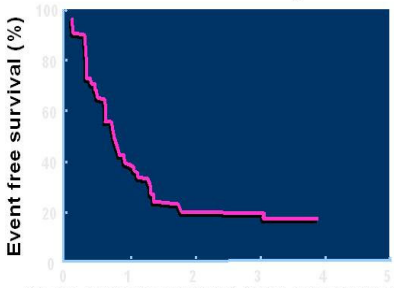
Calcification and Rapid Increase

Ao Jet Velocity



Rosenhek R et al N Eng J Med 2000

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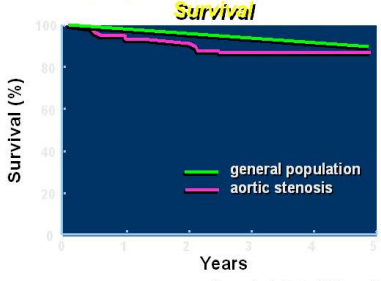
Asymptomatic Severe AS

Survival



Rosenhek R et al N Eng J Med 2000

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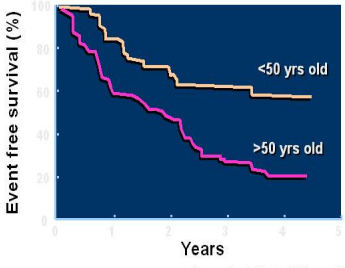
Prognosis of AS and Age



Rosenhek R et al N Eng J Med 2000

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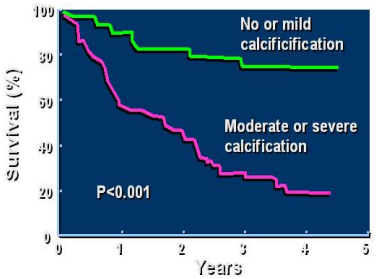
Calcification and Prognosis in AS



Rosenhek R et al N Eng J Med 2000

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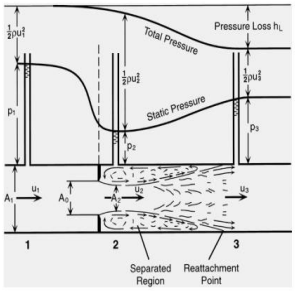
Pressure Recovery



Sugawara M et al. 1989

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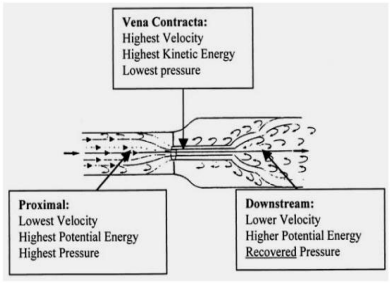
Pressure Recovery



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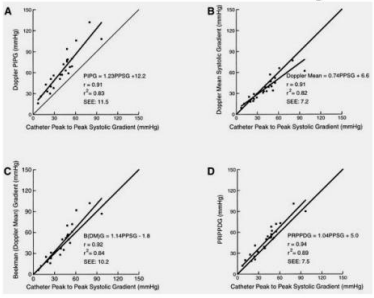
Pressure Recovery



Barker PCA et al JASE 2002;15:1496

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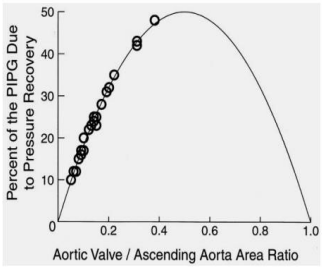
Pressure Recovery



Barker PCA et al JASE 2002;15:1496

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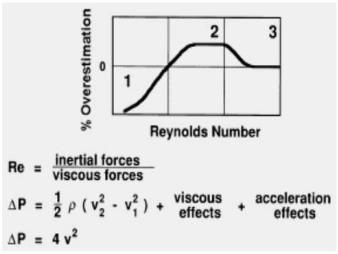
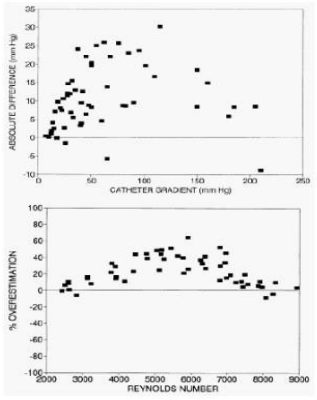
Discrepancy Doppler-Cath



Cape et al. Circulation 1996;94

34.00 Pinto 25 of 33



Cape et al.
Circulation 1996;94

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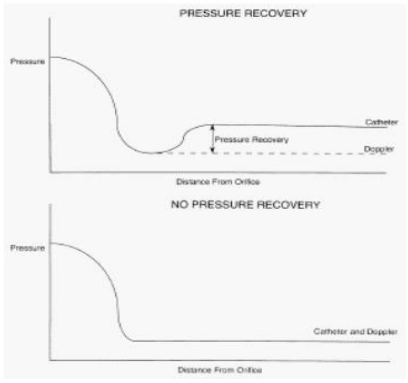
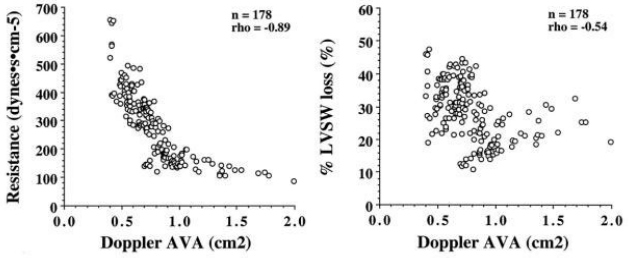


Cape et al. Circulation 1996;94

34.00 Pinto 27 of 33



Burwash IG JASE 2002;15

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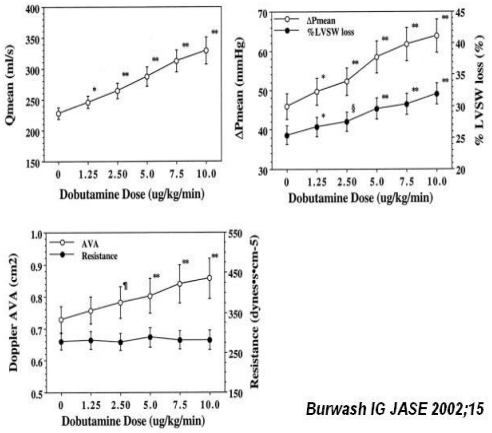
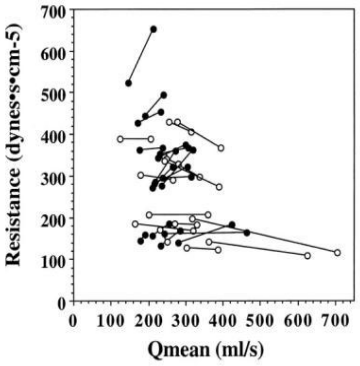


Burwash IG JASE 2002;15

34.00 Pinto 29 of 33



Burwash IG JASE 2002;15

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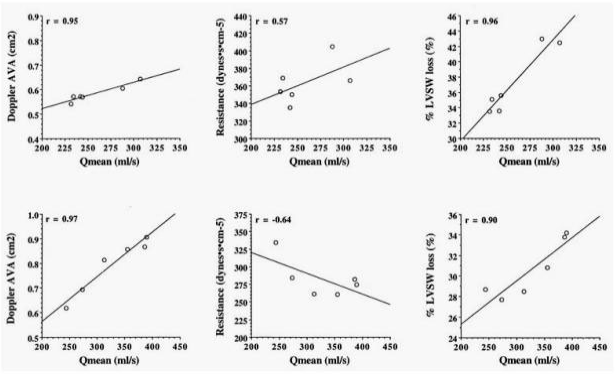

Burwash IG JASE 2002;15

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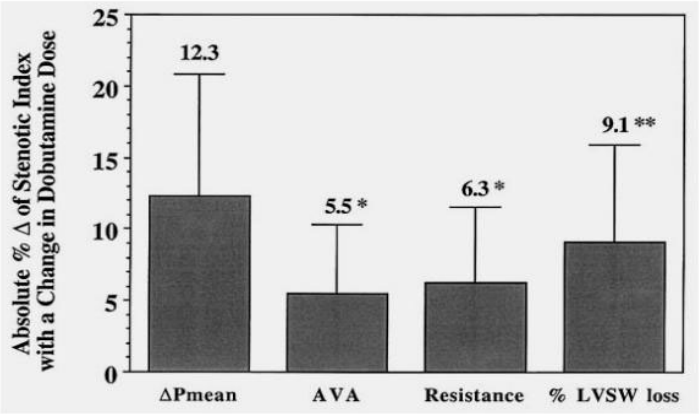

Burwash IG JASE 2002;15

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Doppler Quantification

Stenosis

- Use clinical judgement
- Take your time … and your best pictures
- Use TEE if bad window
- If still in doubt: Use other methods (cath)

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