

68/M with Aortic Stenosis

- Referred from Heart Failure Clinic
- KIV AVR? DSE?
- DM, Hypt, “Ischemic heart”
- Denies symptoms but limited to home
- BP 124/68, HR 87
- Systolic murmur 2/6
- Clinically, no HF

Indications: Heart failure, Diabetes mellitus.

Doppler

Mitral E vel 69.7	PV S vel 14.3
Mitral A vel 32.5	PV D vel 42.4
Mitral EA 2.14	PV ISO 34
Decel time	PV AR vel 13.5
IVRT 50	RAP 25
LVOT diameter 21.7	PASP 60
LVOT TVI 8.5	PAEDP 16
Doppler SV 31	Cardiac index 1.82
Ao Vmax 224	

Wall Motion

0 - Not visualized
1 - Normal
2 - Hypokinetic
3 - Akinesic
4 - Dyskinetic
5 - Aneurysmal
6 - Akinesic with
7 - Dyskinetic with

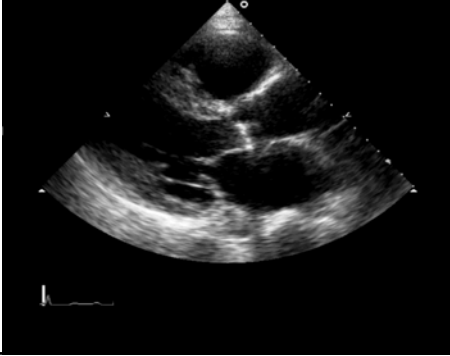
M-Mode

EPSS 17
LVIdd 54
LVIdS 49
FS 9
EDV 141
ESV 113
SV 28
M-Mode EF 20
Visual EF 20
IVSd 13
IVSs 15
LVPWd 11
LVPWs 12
IVS to LVPW 1.18
RVId 35
Ao root diam 36
LA dimension 43
LA to Ao 1.19
LV Mass Index 163
LV Mass Index (g/H) 163

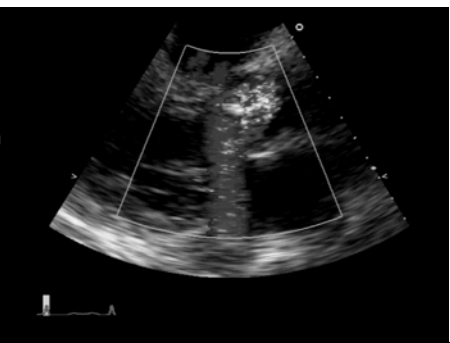
Final Diagnosis
 Dilated left and right heart chambers. Left ventricular hypertrophy, eccentric. Left ventricular systolic dysfunction, severe. Right ventricular systolic dysfunction, moderately severe. Aortic valve calcification. Aortic valve stenosis, severe?. Aortic valve regurgitation, trivial. Mitral valve regurgitation, mild. Tricuspid valve regurgitation, mild to moderate. Pulmonary valve regurgitation, mild. Pulmonary hypertension, moderate. Dilated aortic root and ascending aorta.

Test Comments
 The peak and mean pressure gradients across the aortic valve are 20 and 11 mmHg respectively. However the aortic valve area indexed to body surface area is 0.49 cm²/m². There is low flow, low gradient aortic stenosis in the presence of severe LV dysfunction. Consider dobutamine stress if clinically indicated.

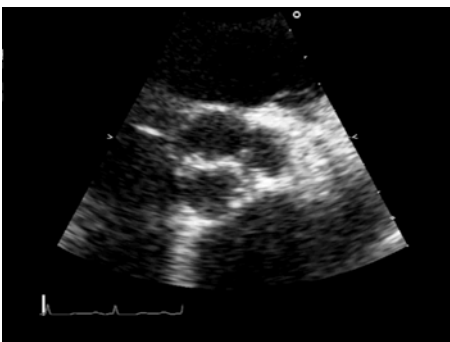
68/M with Aortic Stenosis



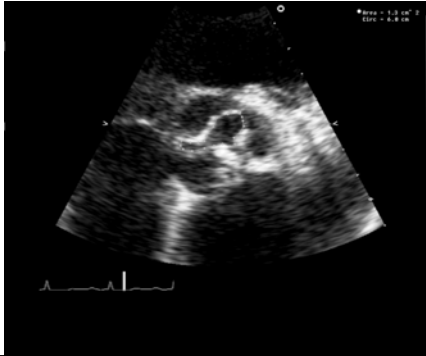
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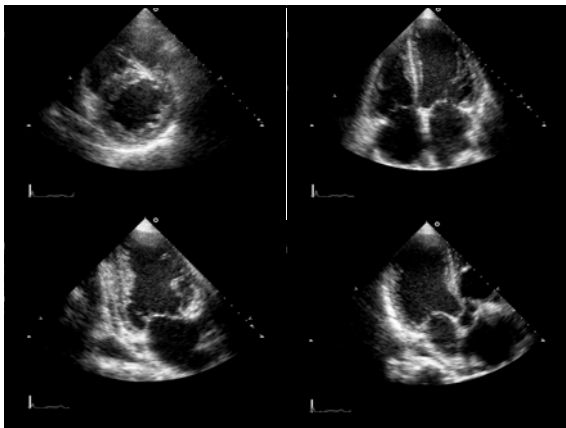


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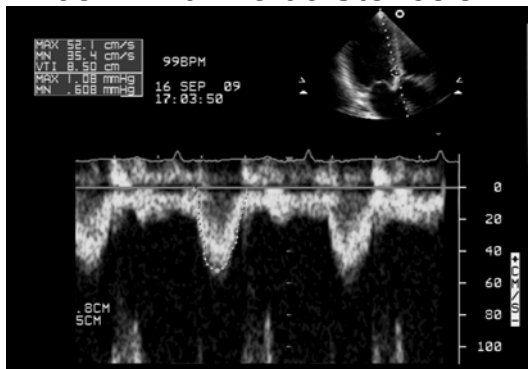


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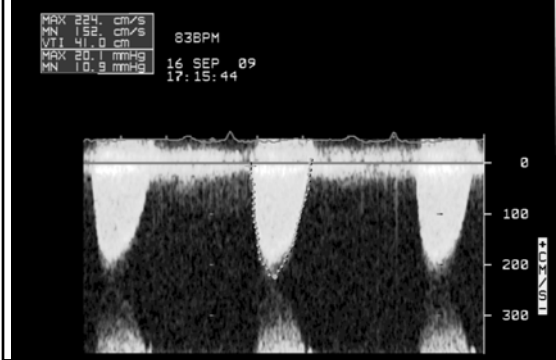


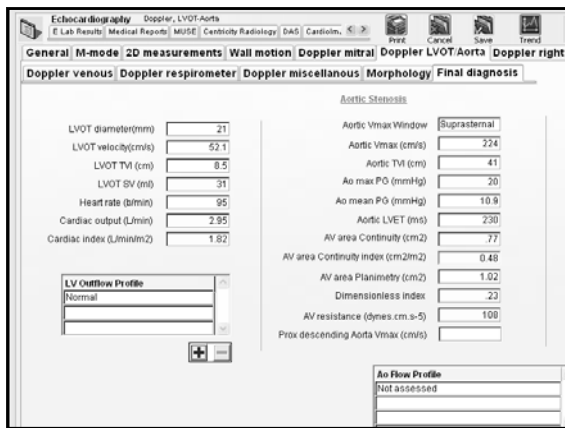


68/M with Aortic Stenosis



68/M with Aortic Stenosis





How Severe is the AS?

- A. Mild
- B. Moderate
- C. Moderately severe
- D. Severe
- E. I'm confused!!!



What to Do Next?

- A. Medical therapy
- B. AVR
- C. Biventricular pacing
- D. Heart transplant
- E. Review the echo



Measurements of LVOT

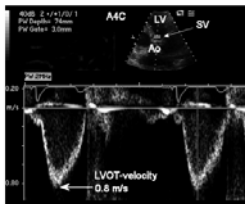


Figure 6 Left ventricular outflow tract (LVOT) velocity is measured from the apical approach either in an apical long-axis view or an anteriorly angulated four-chamber view (as shown here). Using pulsed-Doppler, the sample volume (SV), with a length or gate of 3-5 mm, is positioned on the LV side of the aortic valve, just proximal to the region of flow acceleration into the jet. An optimal signal shows a smooth velocity curve with a narrow velocity range at each time point. Maximum velocity is measured as shown. The VTI is measured by tracing the modal velocity (middle of the dense signal) for use in the continuity equation or calculation of stroke volume.

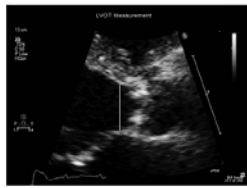
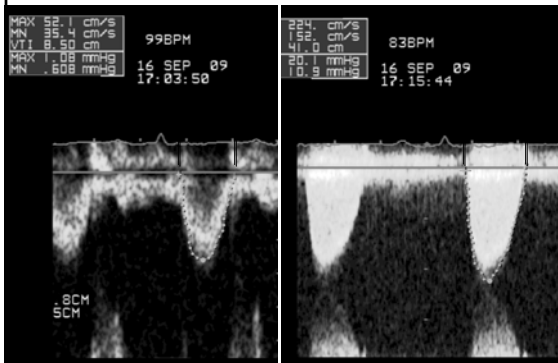
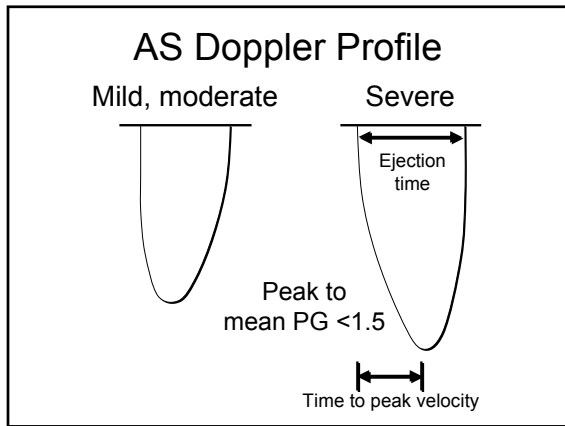


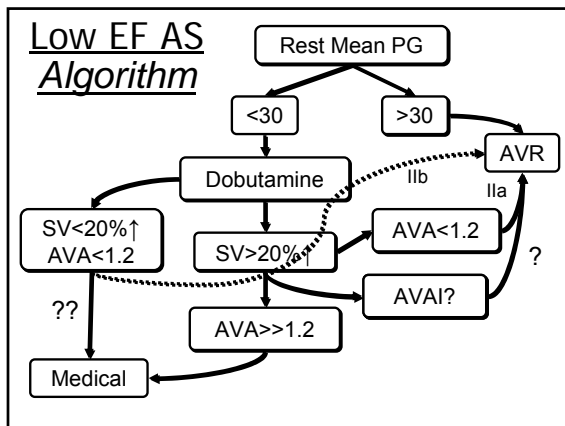
Figure 8 Left ventricular outflow tract diameter is measured in the parasternal long-axis view in mid-systole from the white-black interface of the septal endocardium to the anterior mitral leaflet, parallel to the aortic valve plane and within 0.5-1.0 cm of the valve orifice.

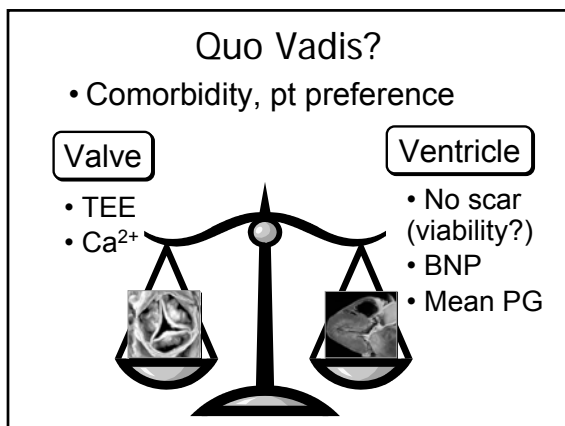
Echocardiographic Assessment of Valve Stenosis: EAE/ASE Recommendations for Clinical Practice 2009

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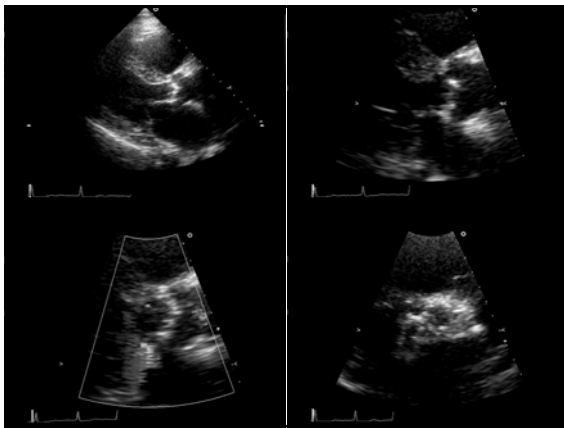


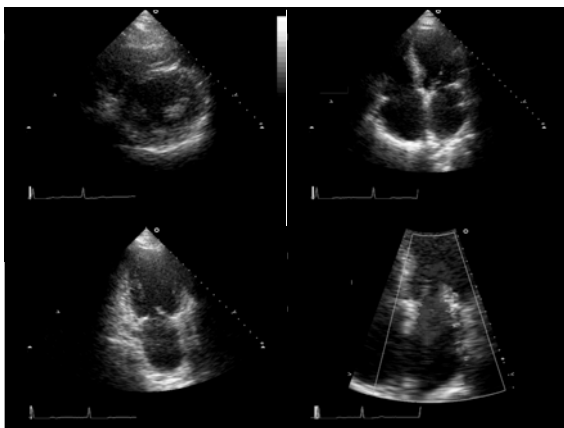




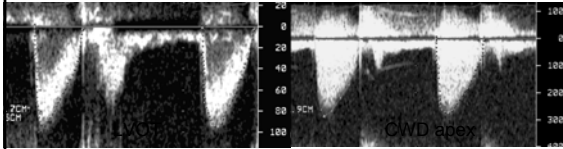
75/M with Aortic Stenosis

- Presents with exertional dyspnea and mild leg edema
- PMH: s/p CABG, AF on warfarin, DM with nephropathy, retinopathy, s/p angioplasty of right leg, s/p stroke
- BP: 161/74, HR 72, BSA 1.85
- Soft systolic murmur
- "Mild" heart failure





75/M with Aortic Stenosis



Vmax = 2.87 m/s
 Mean PG = 18 mmHg
 AVA (cont) = 1.03 cm² (index, 0.56 cm²/m²)
 LVEF = 60%

Procedure type: Trans thoracic, Bedside
 Test result: Severely abnormal
 Rhythm: Atrial fibrillation
 BSA: 1.85
 HR: 99
 BP: 160 / 82

Indications: Aortic stenosis, S/p coronary bypass surgery, Diabetes mellitus, Atrial fibrillation.

Doppler

Mitral E vel: 148	PV S vel: 23	M-Mode
Mitral A vel: 66	PV D vel: 66	EPSS: 6
Mitral EA: 35	PV S/D: 35	LVIDd: 49
Decel time: 140	PV AR vel: 15	LVIDs: 30
IVRT: 15	RAP: 15	FS: 39
LVOT diameter: 20	PASP: 78	EDV: 113
LVOT TVI: 20.3	PAEDP: 15	ESV: 35
Doppler SV: 64	Cardiac index: 3.18	SV: 78
Ao Vmax: 310		M-Mode EF: 69
		Visual EF: 65
		IVSd: 12
		IVSs: 15
		LVPWd: 15
		LVPWs: 18
		IVS to LVPW: 8
		RVcd: 17
		Ao root diam: 35
		LA dimension: 47
		LA to Ao: 1.34
		LV Mass Index: 145
		LV Mass Index (g/m ²): 162

Wall Motion

0 - Not visualized
 1 - Normal
 2 - Hypokinetic
 3 - Akinesis
 4 - Dyskinetic
 5 - Aneurysmal
 6 - Akinesis with
 7 - Dyskinetic w/

Final Diagnosis
 Dilated aorta, Left ventricular hypertrophy, concentric, Normal left ventricular ejection fraction, Aortic valve calcification, Aortic valve stenosis, moderate, Aortic valve regurgitation, mild to moderate, Mitral annular calcification, Mitral valve regurgitation, mild, Tricuspid valve regurgitation, severe, Pulmonary hypertension, moderate, Dilated aortic root and ascending aorta, Restrictive left ventricular diastol.

How Severe is the AS?

- A. Mild
- B. Moderate
- C. Moderately severe
- D. Severe
- E. Can't tell, he needs a cath

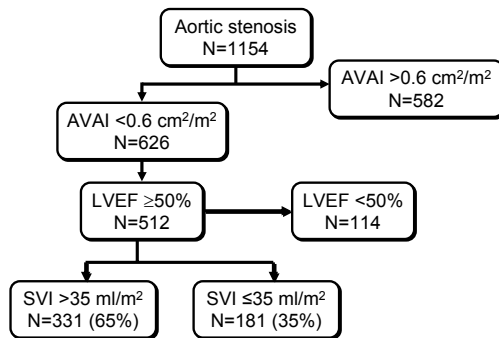


Why is the Gradient Low?

- A. Low flow
- B. ↓ LV contractility
- C. Small, thick LV cavity
- D. Hypertension
- E. All of the above???

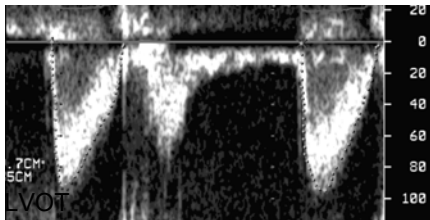


Paradoxical Low Flow Aortic Stenosis



Hachica. *Circulation* 2007;115:2856-2564

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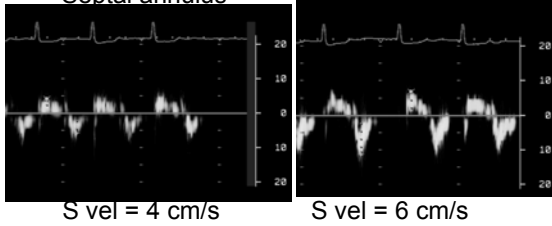
Cardiac index 3.18 L/min
BSA 1.85 m²
SV 64 ml, SVI 34 ml/m²

Mechanism of Paradoxical Low Flow AS

- Higher global LV afterload
- More concentric remodelling
- Intrinsic myocardial dysfunction

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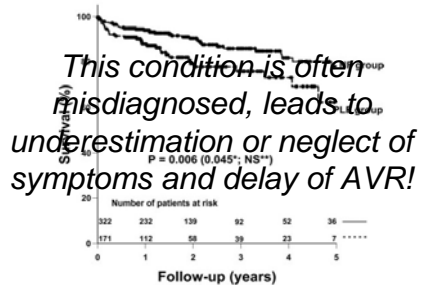
Septal annulus



S vel = 4 cm/s

S vel = 6 cm/s

Paradoxical Low Flow Aortic Stenosis Clinical Outcome



Hachica. *Circulation* 2007;115:2856-2564
