Valvular Heart Disease
Mitral Stenosis

A 75 year old woman with loud first heart sound and mid-diastolic murmur

- Chronic dyspnea Class 2/4
- Fatigue
- Recent orthopnea/pnd
- Nocturnal palpitation
- Pedal edema

Mitral Stenosis

- Etiology
- Symptoms
- Physical Exam
- Severity
- Natural history
- Timing of Surgery

Mitral Stenosis: Etiology

- Primarily a result of rheumatic fever

  (~ 99% of MV's @ surgery show rheumatic damage)
- Scarring & fusion of valve apparatus
- Rarely congenital
- Pure or predominant MS occurs in approximately 40% of all patients with rheumatic heart disease
- Two-thirds of all patients with MS are female.

Mitral Stenosis:
Pathophysiology

- Normal valve area: 4-6 cm^2
- Mild mitral stenosis:
  - MVA 1.5-2.5 cm^2
  - Minimal symptoms
- Mod mitral stenosis
  - MVA 1.0-1.5 cm^2 usually does not produce symptoms at rest
- Severe mitral stenosis
  - MVA < 1.0 cm2

Mitral Stenosis: Pathophysiology

Right Heart Failure: Hepatic Congestion JVD Tricuspid Regurgitation RA Enlargement	↑ Pulmonary HTN Pulmonary Congestion LA Enlargement Atrial Fib LA Thrombi ↑ LA Pressure
RV Pressure Overload RVH RV Failure	 LV Filling

Mitral Stenosis: Symptoms

- Fatigue
- Palpitations
- Cough
- SOB
- Left sided failure
  - Orthopnea
  - PND
- Palpitation
- Afib
- Systemic embolism
- Pulmonary infection
- Hemoptysis
- Right sided failure
  - Hepatic Congestion
  - Edema
- Worsened by conditions that ↑ cardiac output.
  - Exertion,fever, anemia, tachycardia, Afib, intercourse, pregnancy, thyrotoxicosis

Recognizing Mitral Stenosis

Palpation:

- Small volume pulse
- Tapping apex-palpable S1
- +/- palpable opening snap (OS)
- RV lift
- Palpable S2

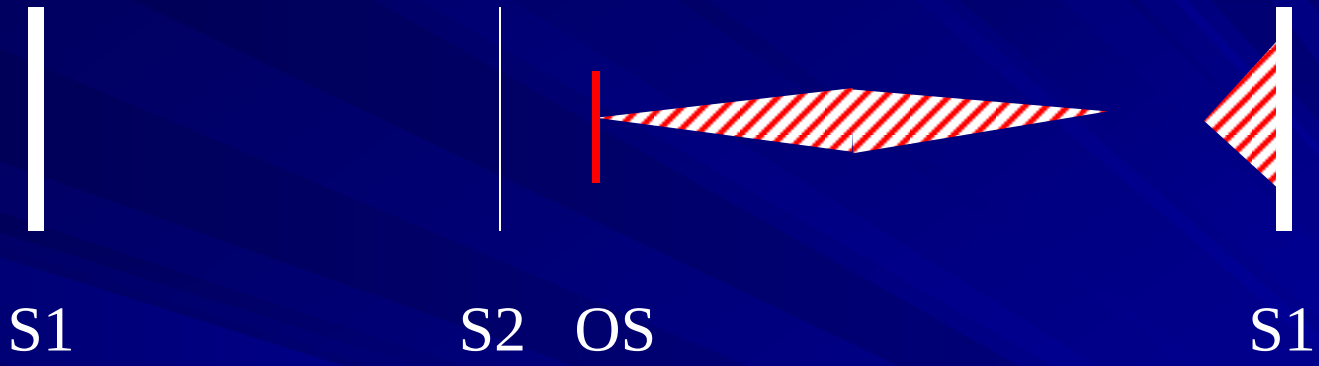
ECG:

- LAE, AFIB, RVH, RAD

Auscultation:

- Loud S1- as loud as S2 in aortic area
- A2 to OS interval inversely proportional to severity
- Diastolic rumble: length proportional to severity
- In severe MS with low flow- S1, OS & rumble may be inaudible

Mitral Stenosis: Physical Exam



- First heart sound (S1) is accentuated and snapping
- Opening snap (OS) after aortic valve closure
- Low pitch diastolic rumble at the apex
- Pre-systolic accentuation (esp. if in sinus rhythm)

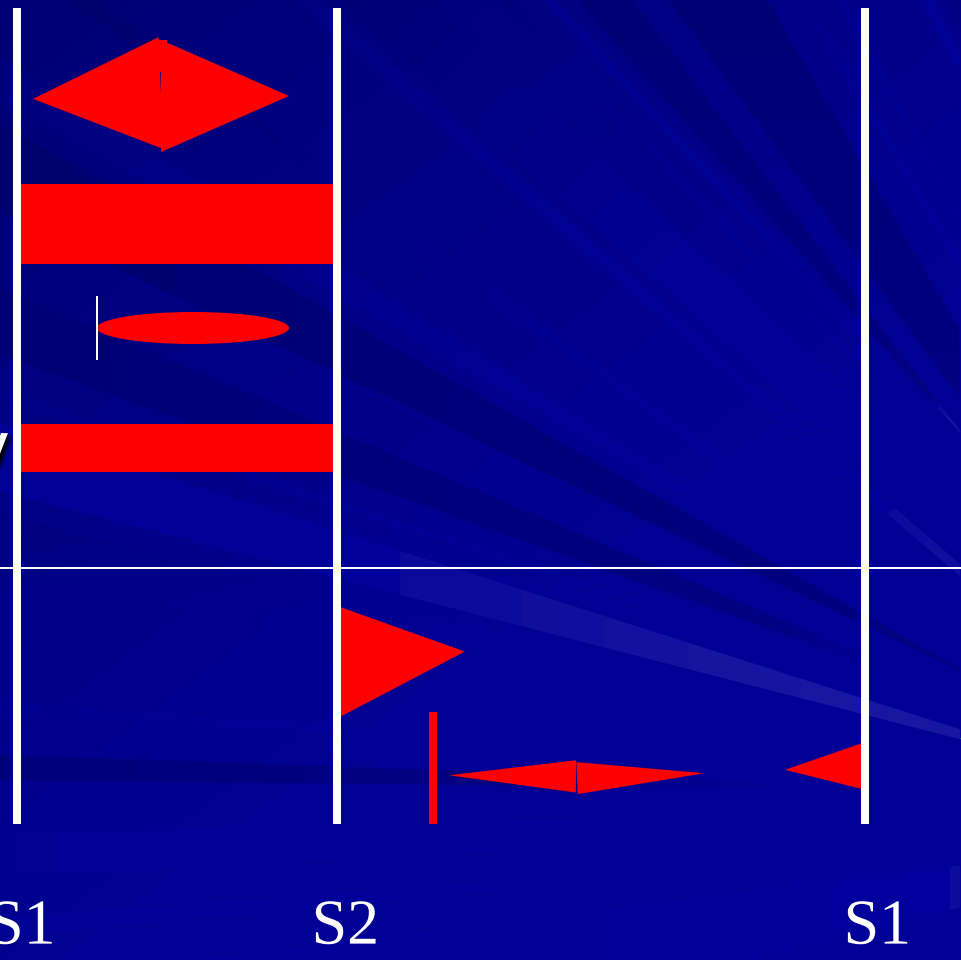
Common Murmurs and Timing (click on murmur to play)

<u>Systolic Murmurs</u>

- Aortic stenosis
- Mitral insufficiency
- Mitral valve prolapse
- Tricuspid insufficiency

<u>Diastolic Murmurs</u>

- Aortic insufficiency
- Mitral stenosis



Auscultation- Timing of A2 to OS Interval

- Width of A2-OS inversely correlates with severity
- The more severe the MS the higher the LAP the earlirthe LV pressure falls below LAP and the MV opens

Say	*Timing seconds*	*Severity of MS*	*Other HS's*
Prrr	< 0.06	Severe	
Pada	.07-.08	Mod-severe	
Pata	.08-.09	Mod	
Papa	> 0.10	Mild	PK 0.1-0.110
Tu-huh	≥ .12		A2-S3 0.12-0.18

Mitral Stenosis: Natural History

- Progressive, lifelong disease,
- Usually slow & stable in the early years.
- Progressive acceleration in the later years
- 20-40 year latency from rheumatic fever to symptom onset.
- Additional 10 years before disabling symptoms

Mitral Stenosis: Complications

- Atrial dysrrhythmias
- Systemic embolization (10-25%)
  - Risk of embolization is related to, age, presence of atrial fibrillation, previous embolic events
- Congestive heart failure
- Pulmonary infarcts (result of severe CHF)
- Hemoptysis
  - Massive: 2^0 to ruptured bronchial veins (pulm HTN)
  - Streaking/pink froth: pulmonary edema, or infection
- Endocarditis
- Pulmonary infections

Mitral Stenosis: EKG

- LAE
- RVH
- Premature contractions
- Atrial flutter and/or fibrillation
  - ↑ freq. in pts with mod-severe MS for several years
  - A fib develops in ≈ 30% to 40% of pts w/symptoms

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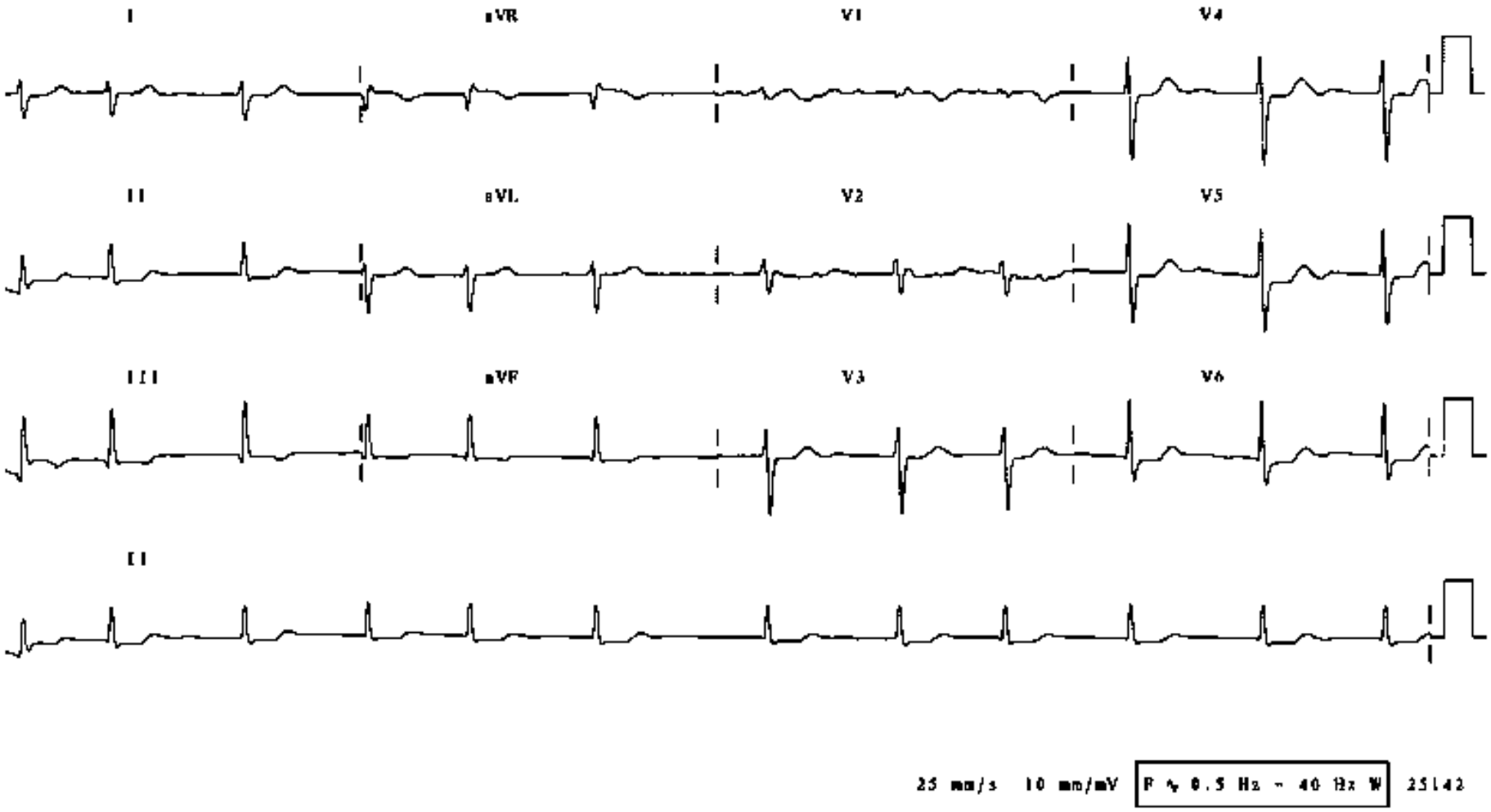
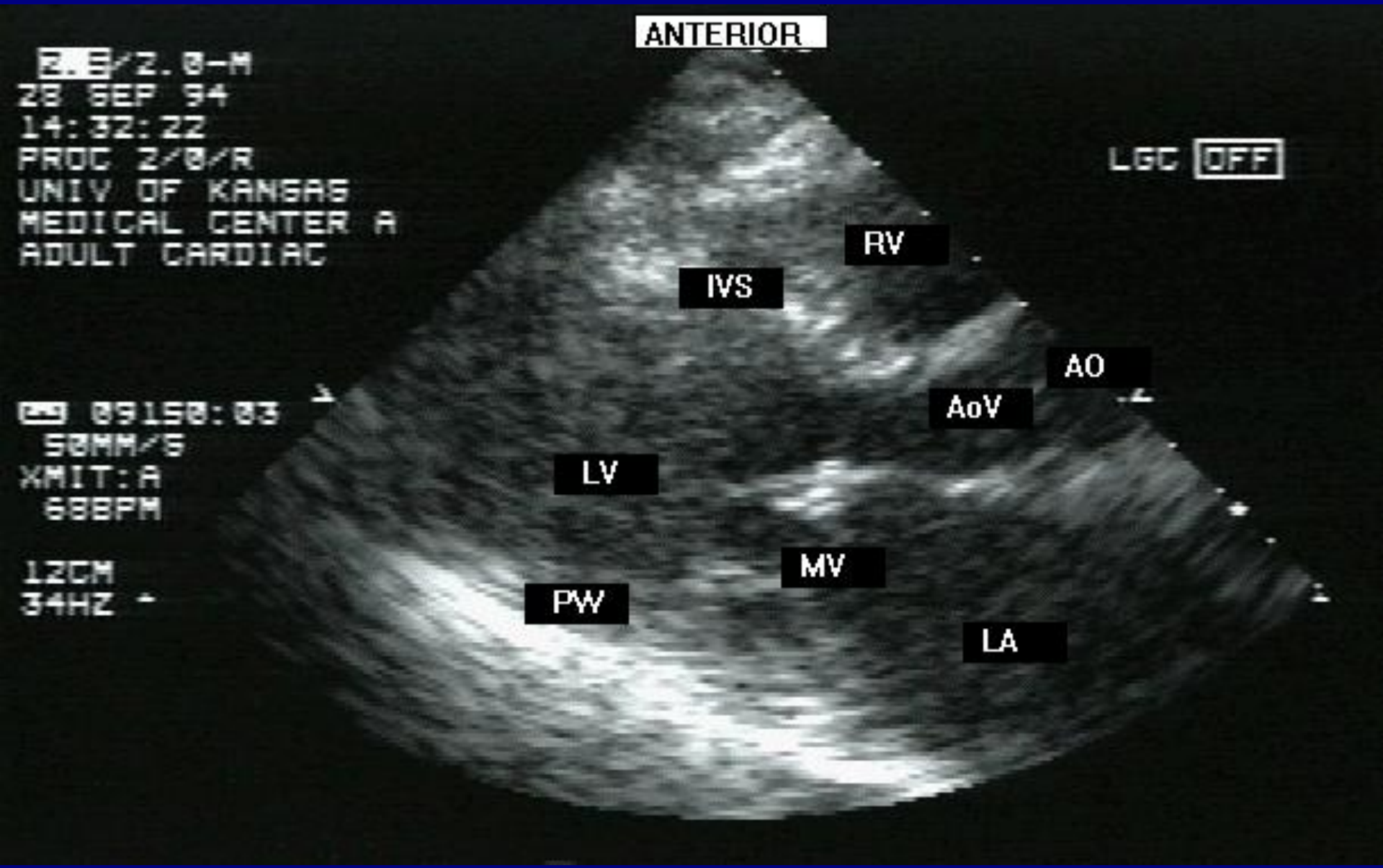


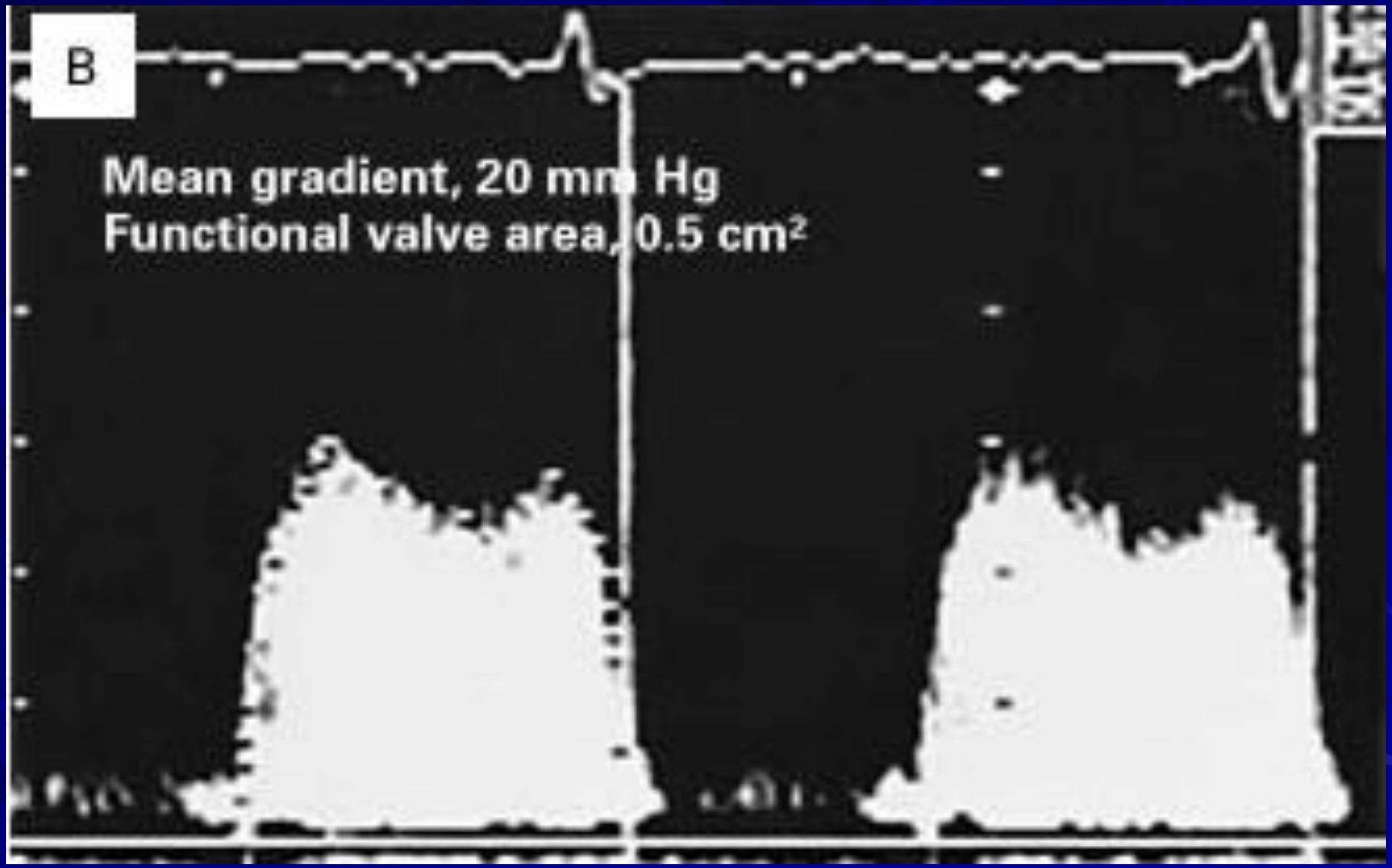
Mitral Stenosis: Role of Echocardiography

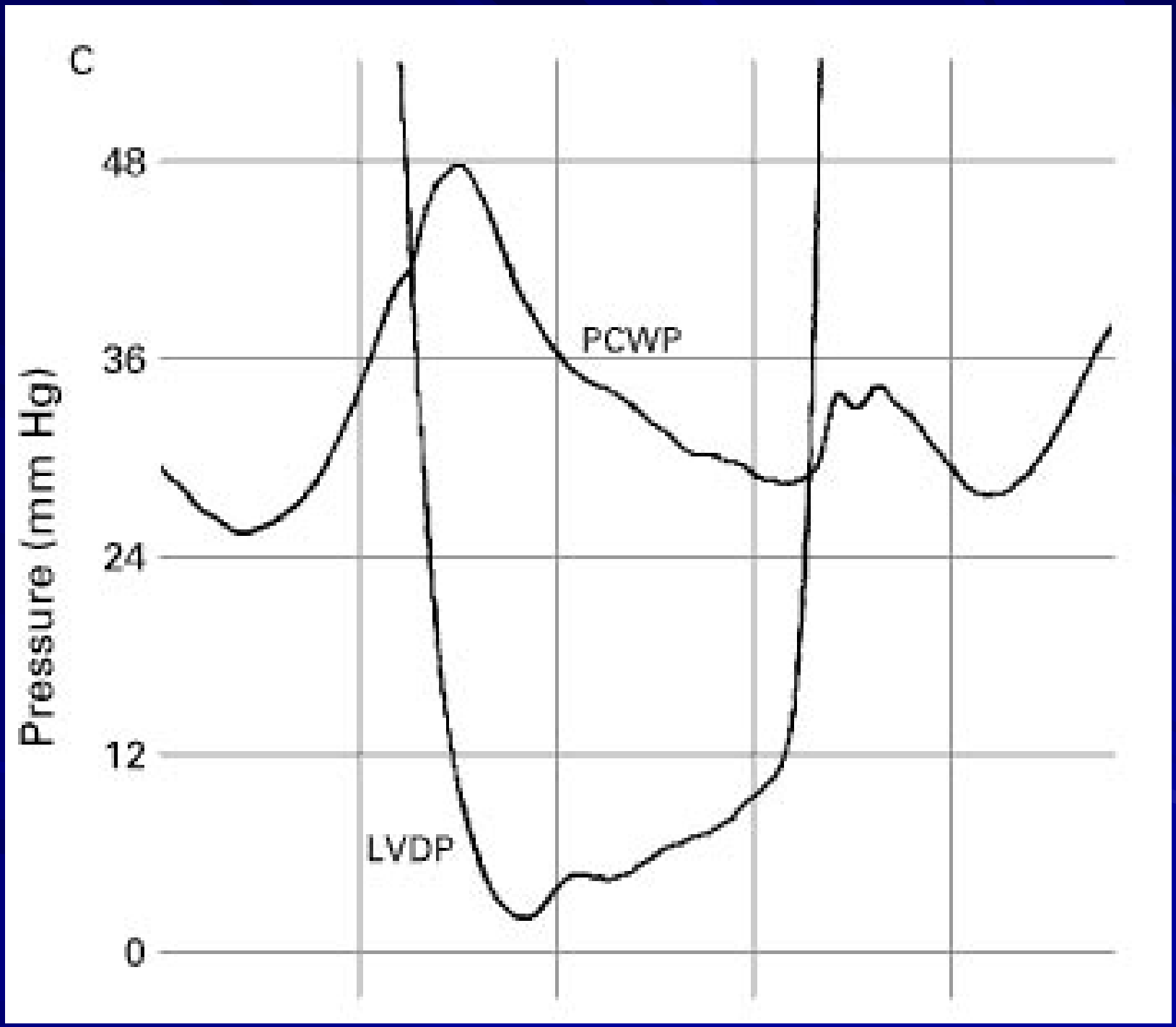
- Diagnosis of Mitral Stenosis
- Assessment of hemodynamic severity
  - mean gradient, mitral valve area, pulmonary artery pressure
- Assessment of right ventricular size and function.
- Assessment of valve morphology to determine

suitability for percutaneous mitral balloon valvuloplasty

- Diagnosis and assessment of concomitant valvular lesions
- Reevaluation of patients with known MS with changing symptoms or signs.
- F/U of asymptomatic patients with mod-severe MS


ANTERIOR
2.5/2.0-M
28 SEP 94
14:32:22
PROC 2/0/R
UNIV OF KANSAS
MEDICAL CENTER A
ADULT CARDIAC
LGC OFF
RV
IVS
AO
AoV
09150:03
50MM/S
XMIT:A
68BPM
12CM
34HZ
LV
MV
PW
LA


B
Mean gradient, 20 mm Hg
Functional valve area, 0.5 cm²


C
48
36
24
12
0
Pressure (mm Hg)
PCWP
LVDP

Mitral Stenosis:Therapy

- Medical
  - Diuretics for LHF/RHF
  - Digitalis/Beta blockers/CCB: Rate control in A Fib
  - Anticoagulation: In A Fib
  - Endocarditis prophylaxis
- Balloon valvuloplasty
  - Effective long term improvement

Mitral Stenosis:Therapy

- Surgical
  - Mitral commissurotomy
  - Mitral Valve Replacement
    - Mechanical
    - Bioprosthetic

Recommendations for Mitral Valve Repair for Mitral Stenosis

- **ACC/AHA Class I**
  - Patients with NYHA functional Class III-IV symptoms, moderate or severe MS (mitral valve area <1.5 cm 2),*and valve morphology favorable for repair if percutaneous mitral balloon valvotomy is not available
  - Patients with NYHA functional Class III-IV symptoms, moderate or severe MS (mitral valve area <1.5 cm 2),*and valve morphology favorable for repair if a left atrial thrombus is present despite anticoagulation
  - Patients with NYHA functional Class III-IV symptoms, moderate or severe MS (mitral valve area <1.5 cm 2),* and a non-pliable or calcified valve with the decision to proceed with either repair or replacement made at the time of the operation.

Recommendations for Mitral Valve Repair for Mitral Stenosis

- **ACC/AHA Class IIB**
  - **Patients in NYHA functional Class I, moderate or severe MS (mitral valve area <1.5 cm 2),* and valve morphology favorable for repair who have had recurrent episodes of embolic events on adequate anticoagulation.**

ACC/AHA Class III

- **Patients with NYHA functional Class I-IV symptoms and mild MS.**

*The committee recognizes that there may be a variability in the measurement of mitral valve area and that the mean trans-mitral gradient, pulmonary artery wedge pressure, and pulmonary artery pressure at rest or during exercise should also be considered.