

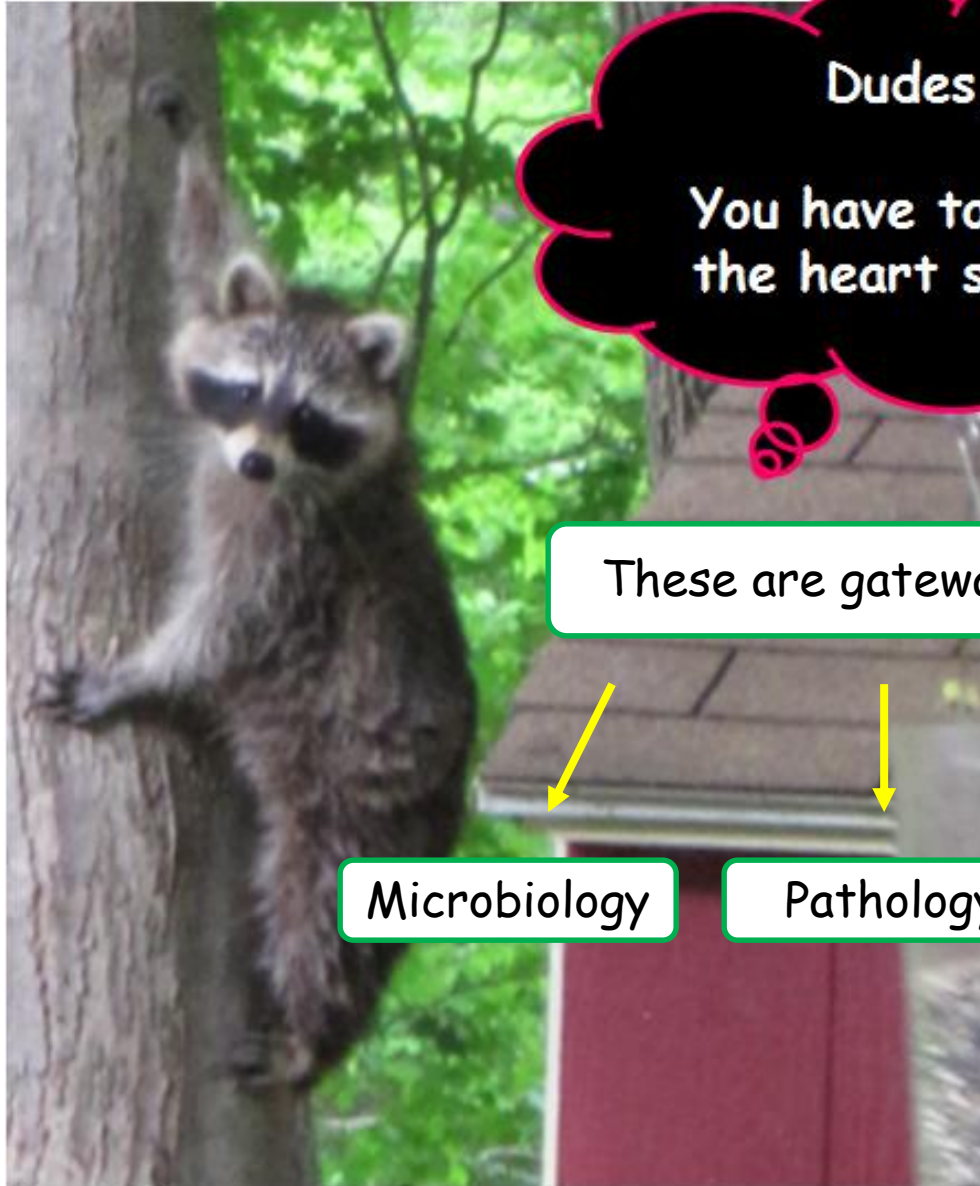


the Sounds

Cardiology

Mitral Stenosis and Derivatives:
Part I: Hemodynamics

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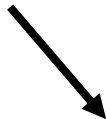
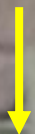
Dudes,
You have to know
the heart sounds

These are gateway conditions

Microbiology

Pathology

Pathophysiology



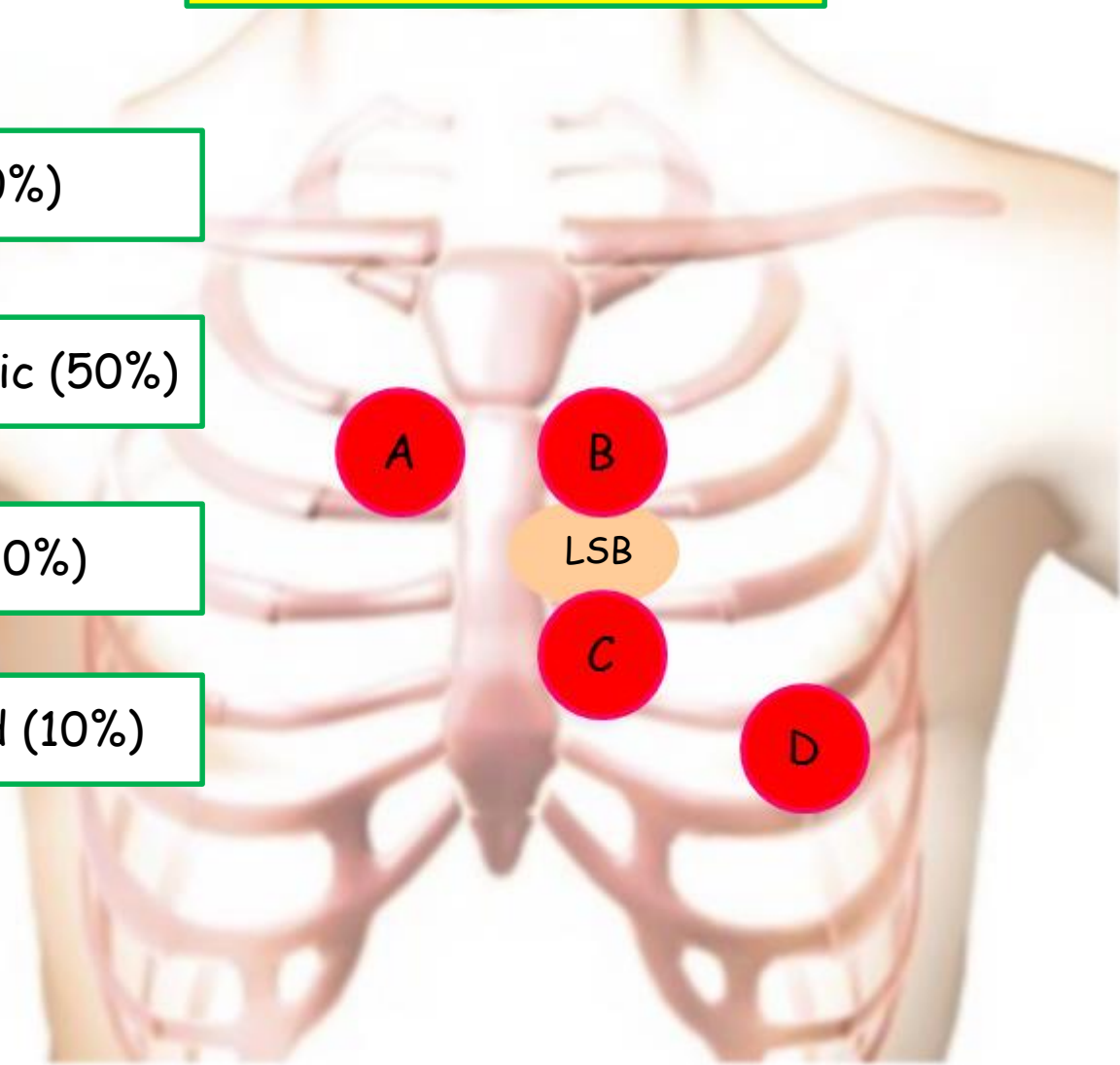
Valve Questions

Location (70%)

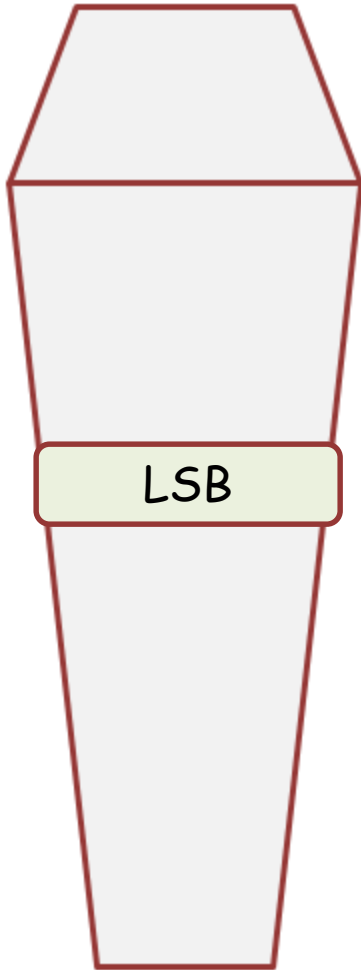
Systolic v Diastolic (50%)

Maneuvers (20%)

Murmur v Sound (10%)

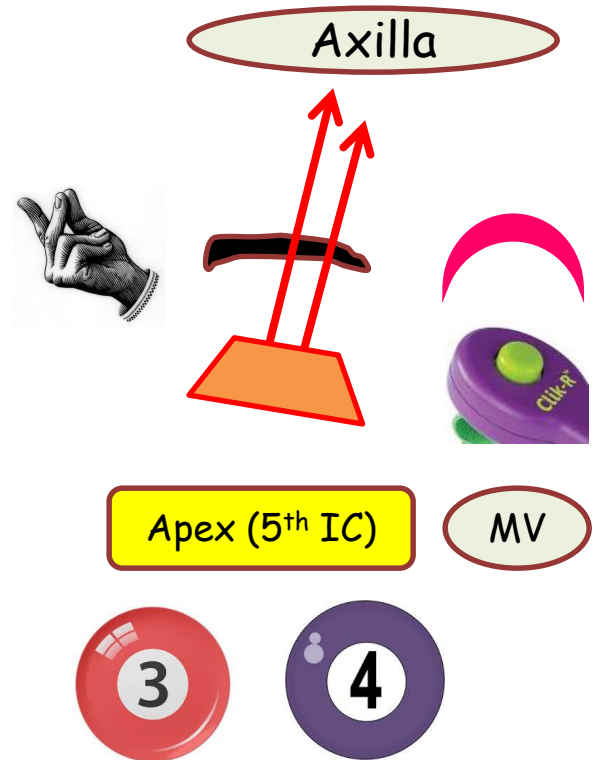


Ao
RUSB

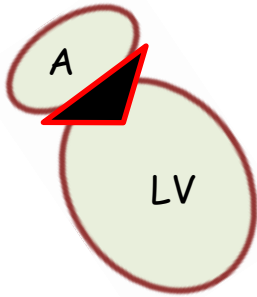


PV
LUSB

LLSB



The Valves



Mitral
(apex, S1)

Stenosis
(diastolic, opening snap)

Regurgitation
(systolic → axilla)

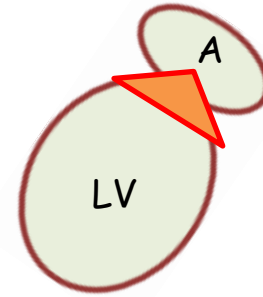
Prolapse
(midsystolic click, maneuvers)

Murmurs

Sound

Diastolic (soft)

Systolic (harsh)



The Valves

Mitral Stenosis

Location: apex (5th IC space, midclavicular line)
Diastolic

Quality: Passive filling/Atrial contraction → Low pitch (pressure) rumble

Key features: **Opening snap** and **A2:OS ratio**

Key pathology:

Calcification of the commissures, Aschoff bodies (Rheumatic fever)

The Valves

Mitral Stenosis

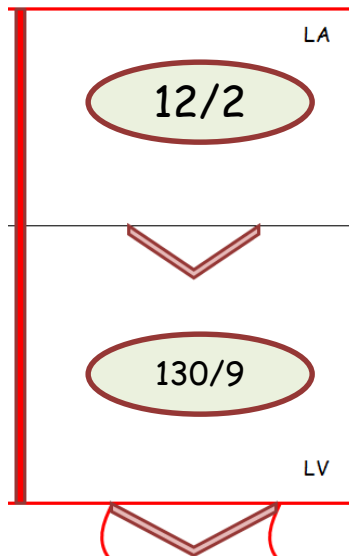
Location: apex (5th IC space, midclavicular line)
Diastolic

Quality: Passive filling/Atrial contraction → Low pitch (pressure) rumble

Key features: **Opening snap** and **A2:OS ratio**

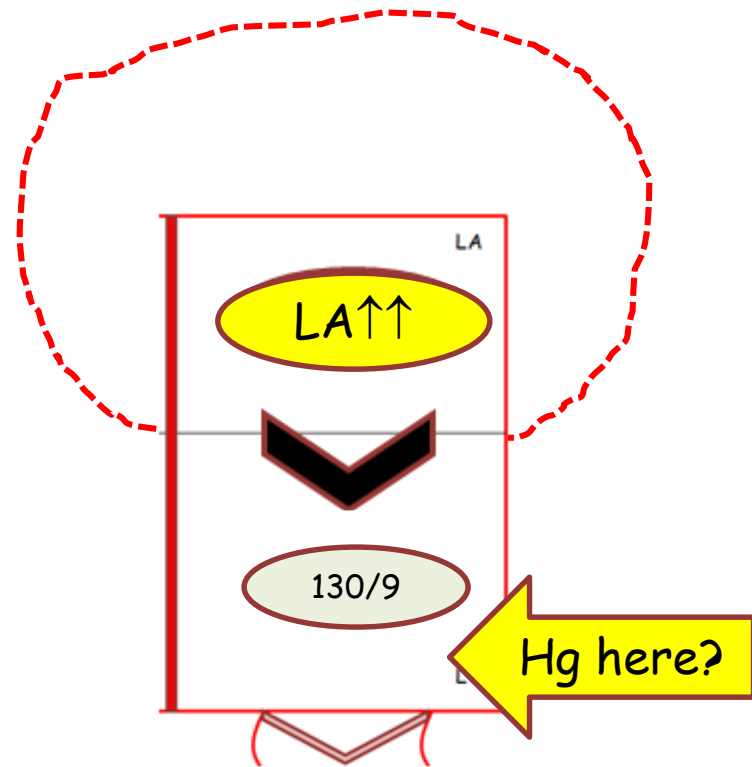
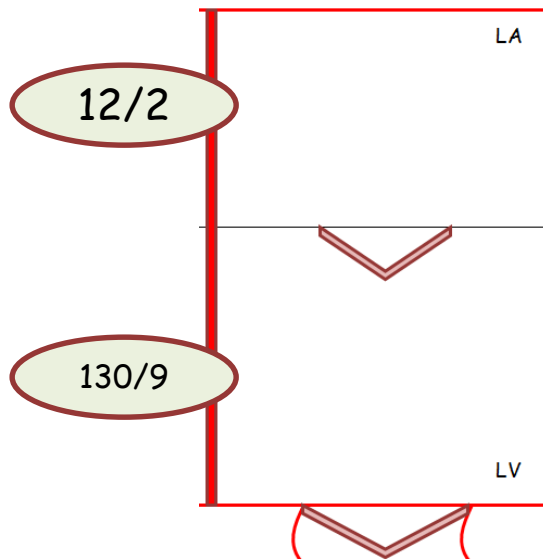
Key pathology:

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The Valves

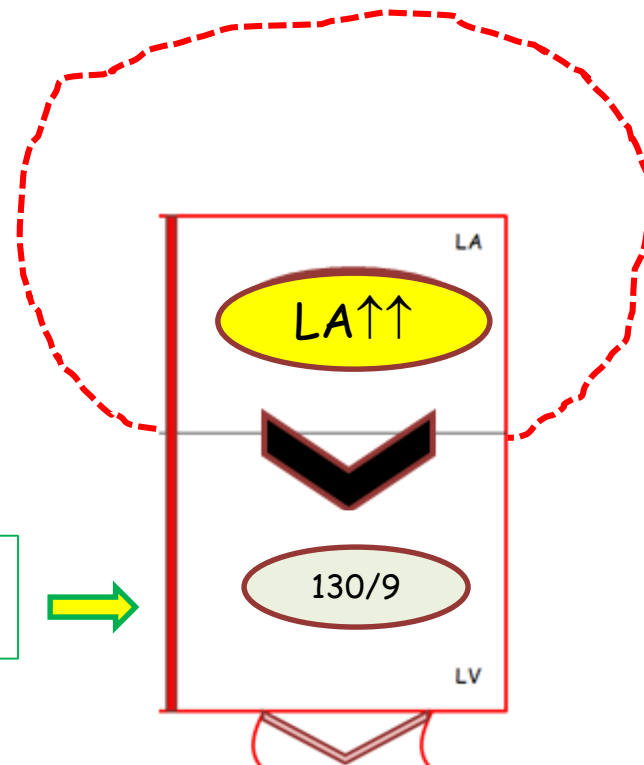
Mitral Stenosis



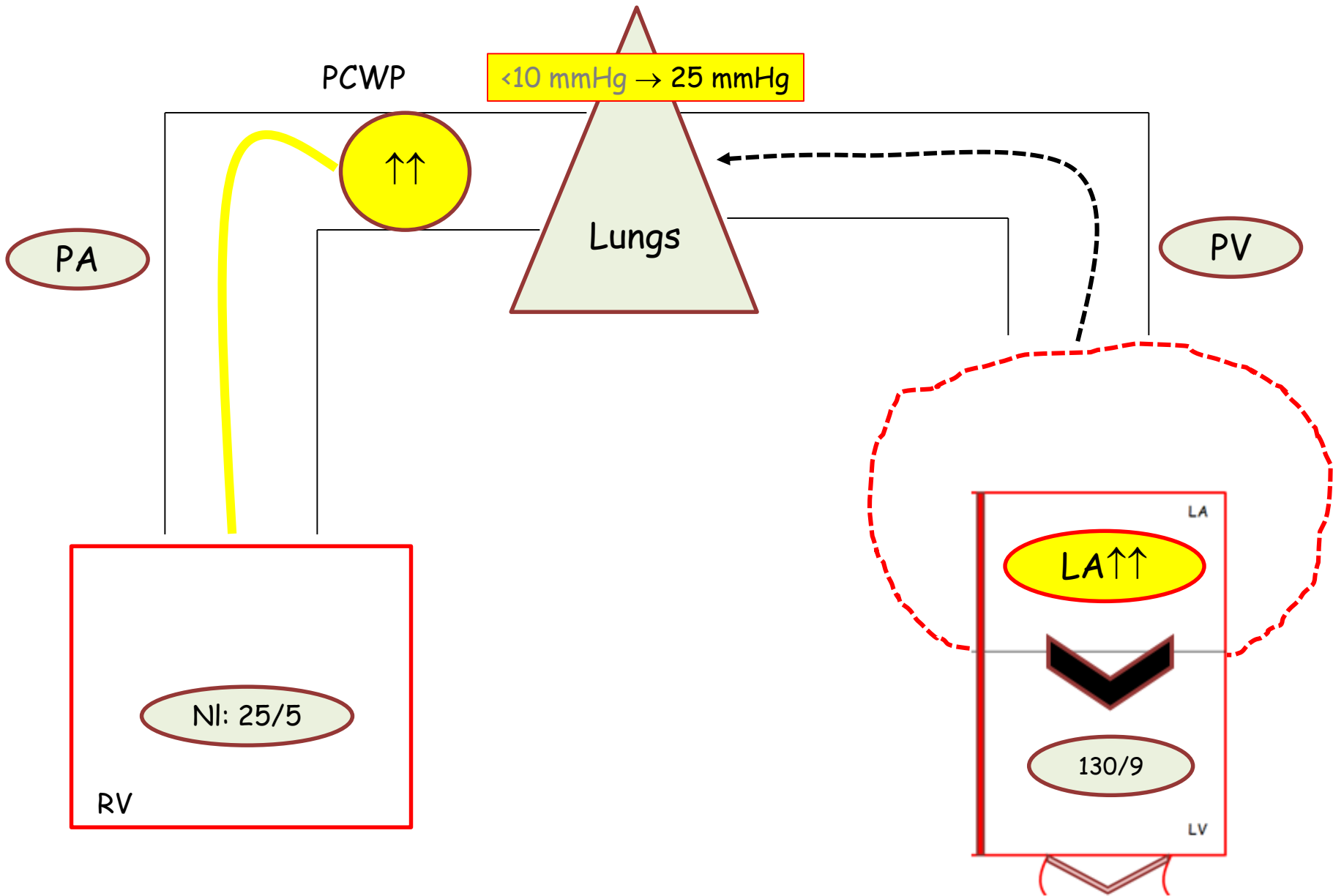
The Valves

Mitral Stenosis

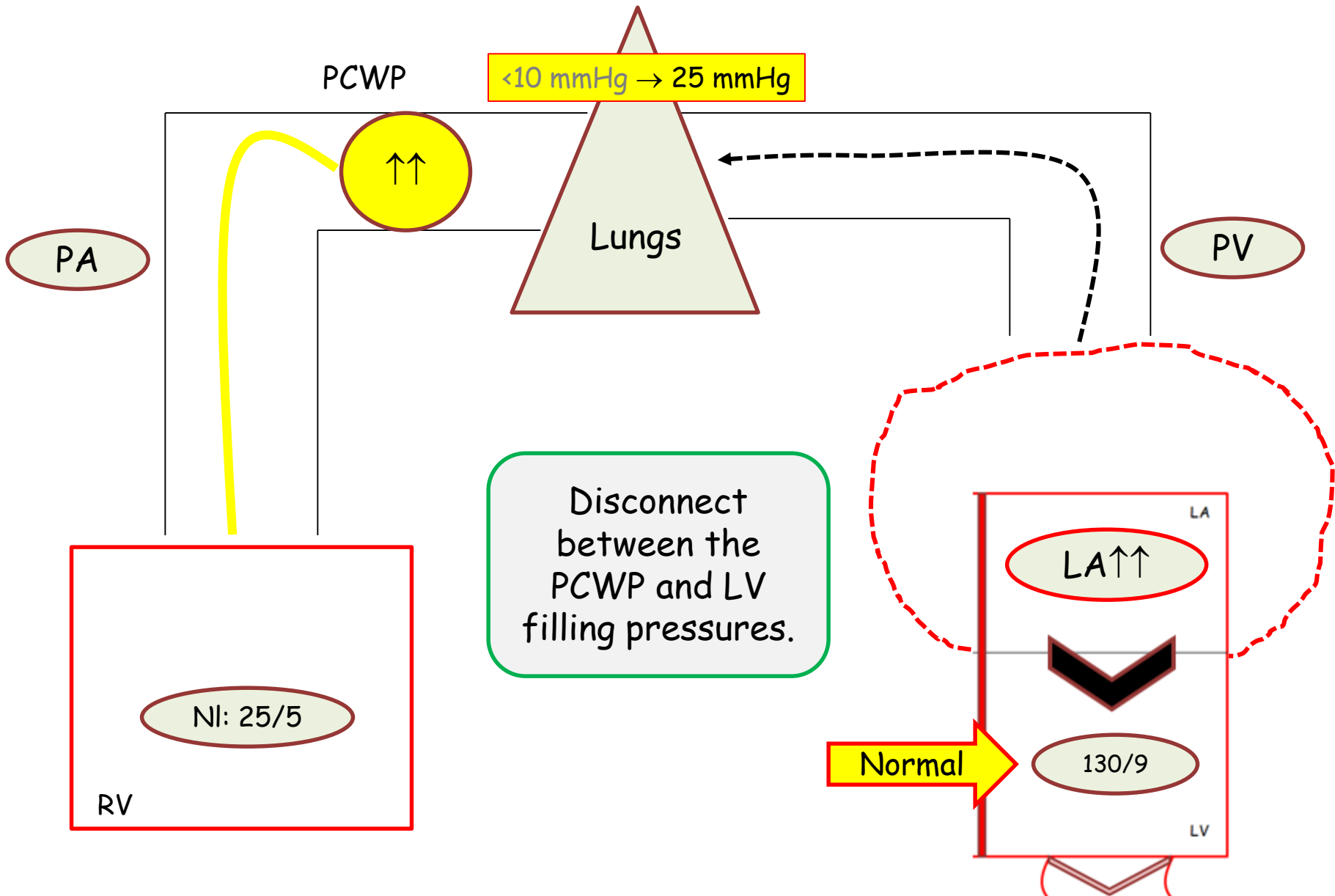
The pressure in the left ventricle remains normal as the stenotic lesion is 'upstream'



Mitral Stenosis Hemodynamics I

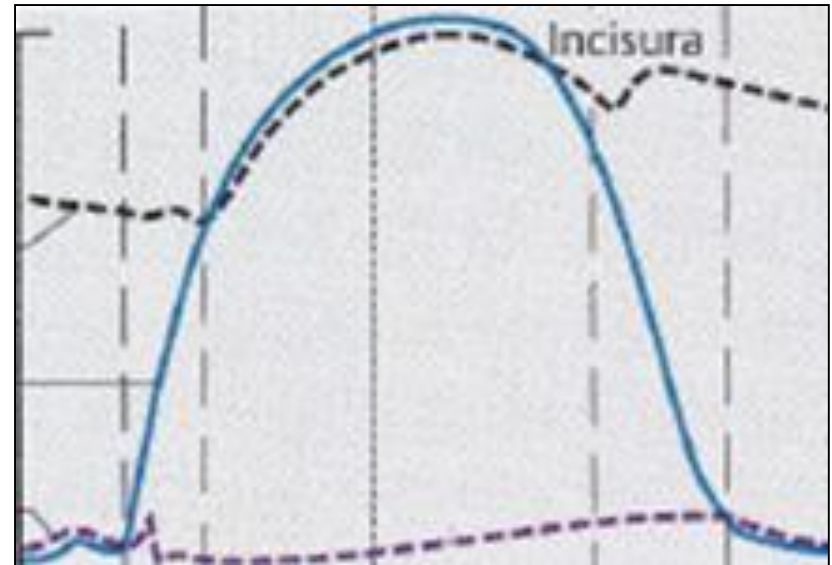
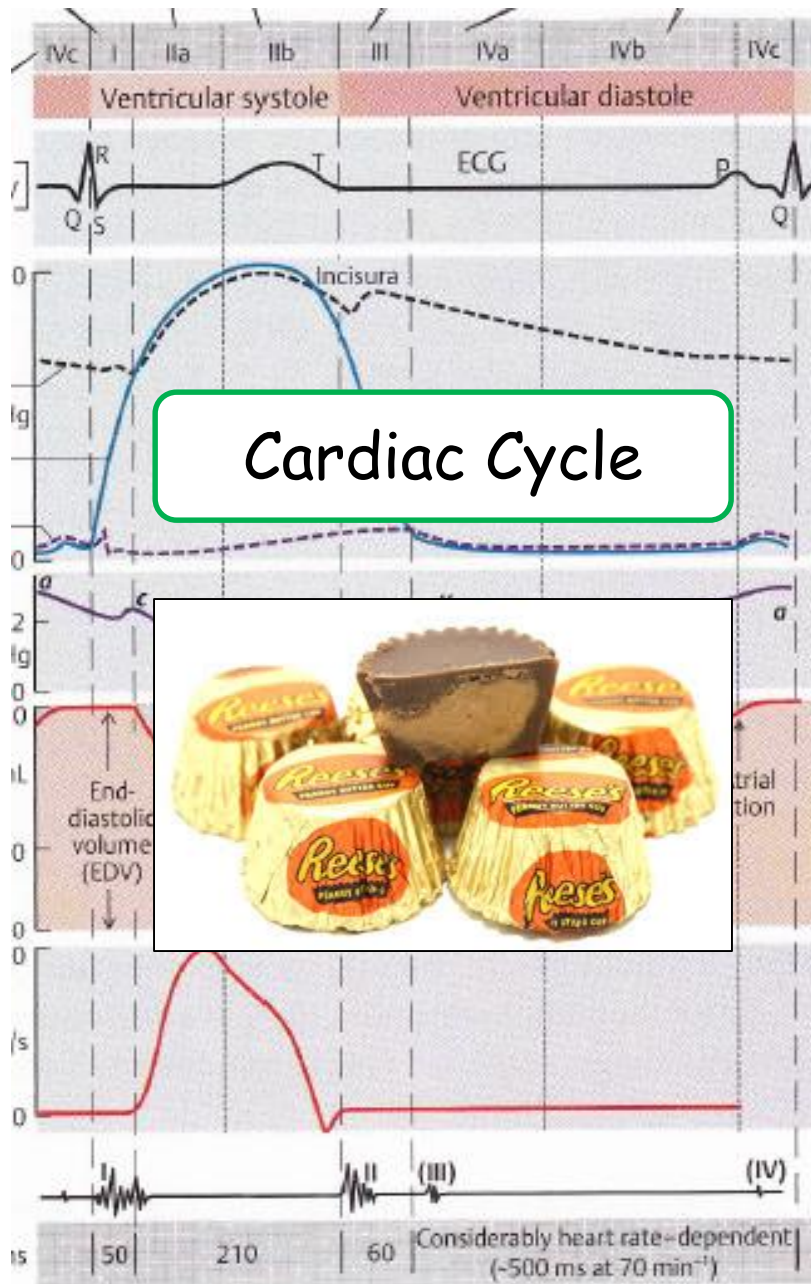


Mitral Stenosis Hemodynamics I

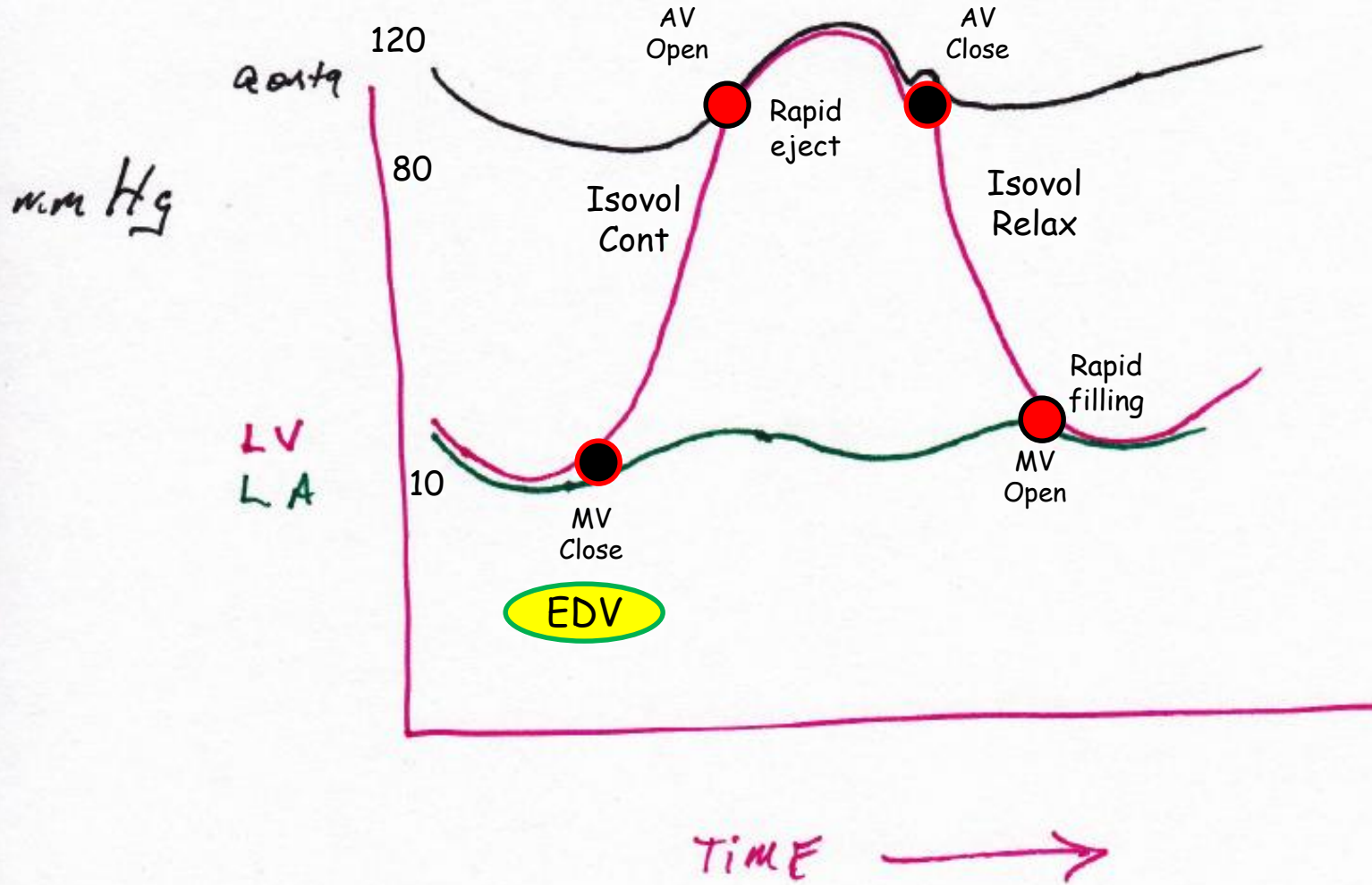


Mitral Stenosis Hemodynamics II

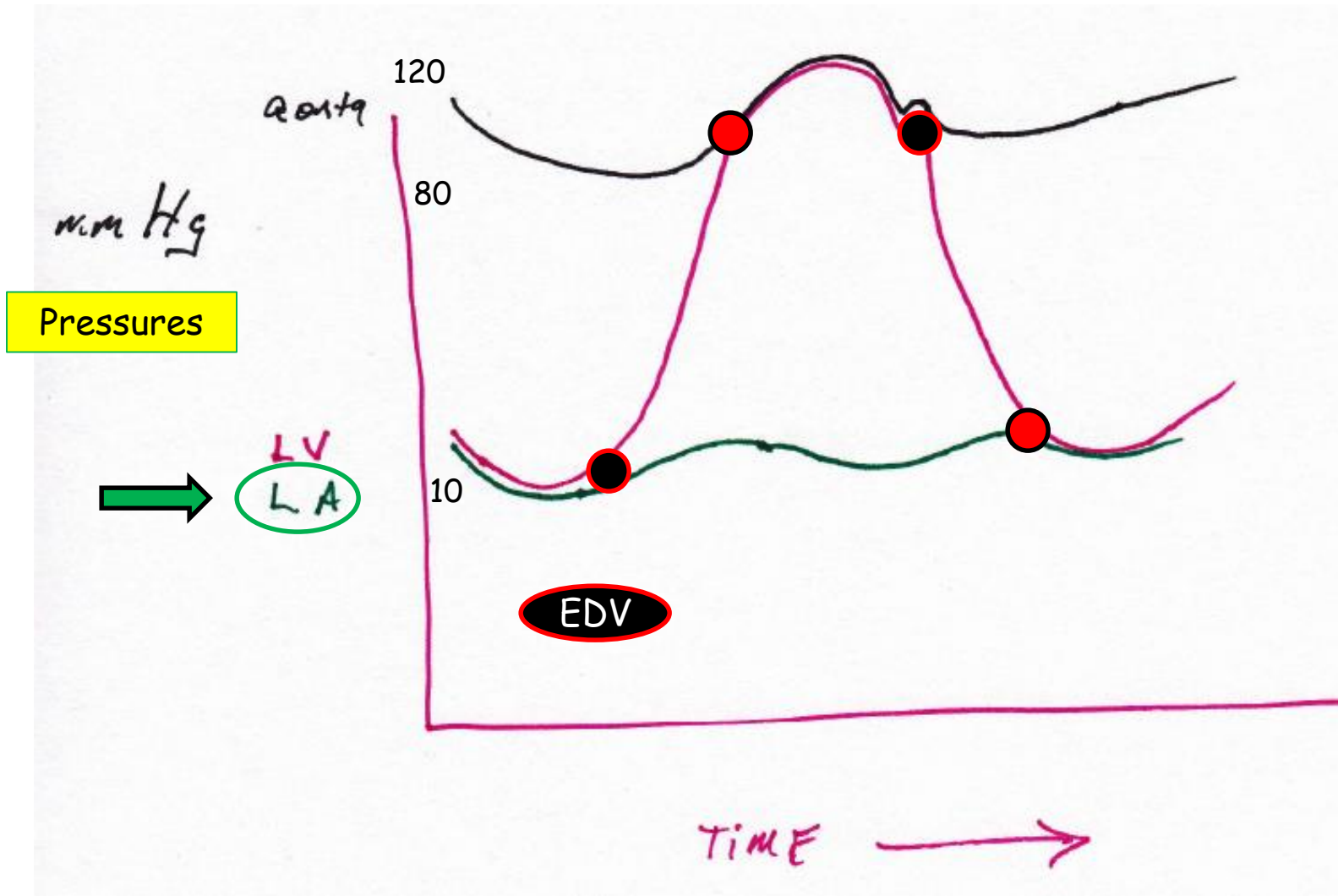
Cardiac Cycle



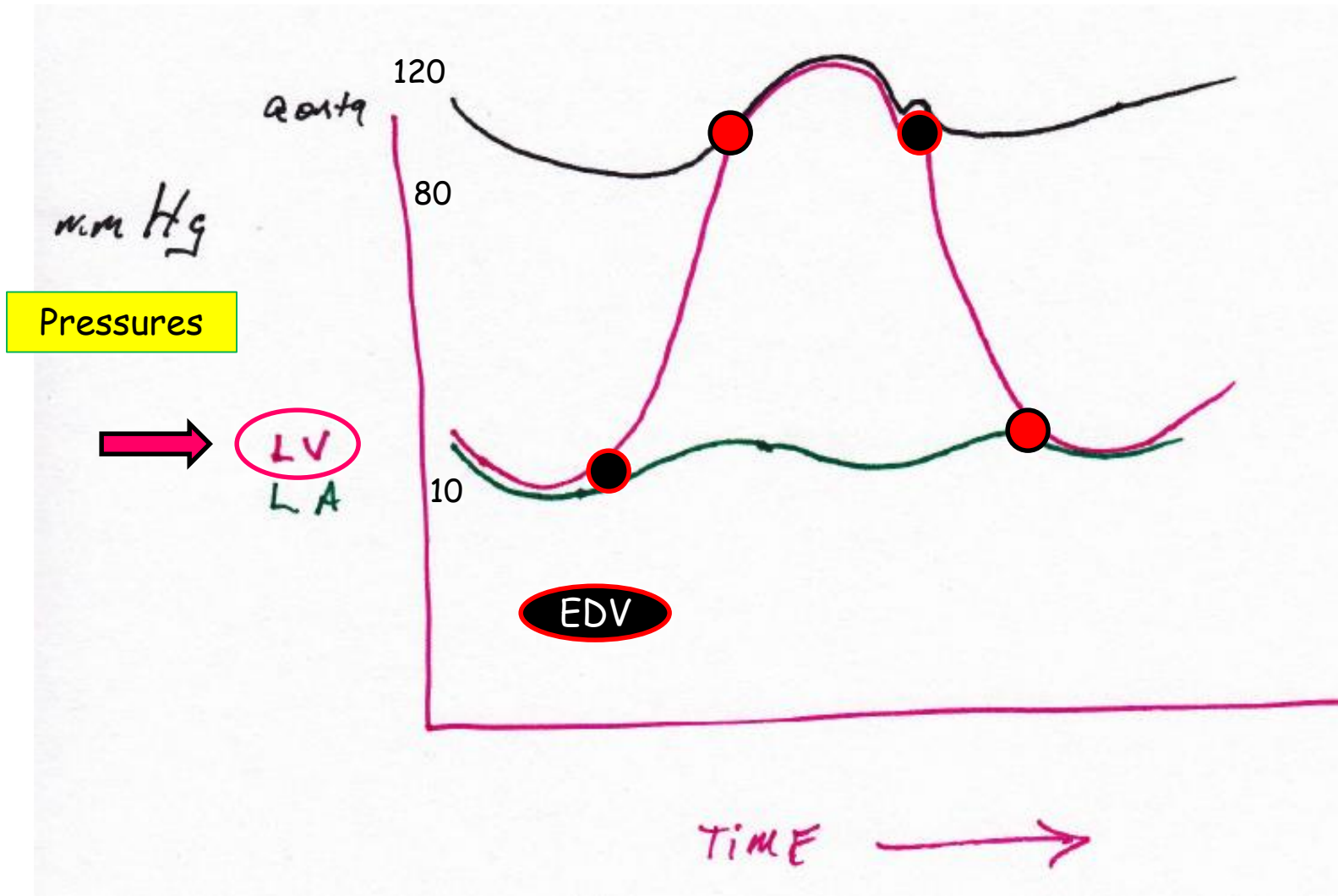
Mitral Stenosis Hemodynamics II



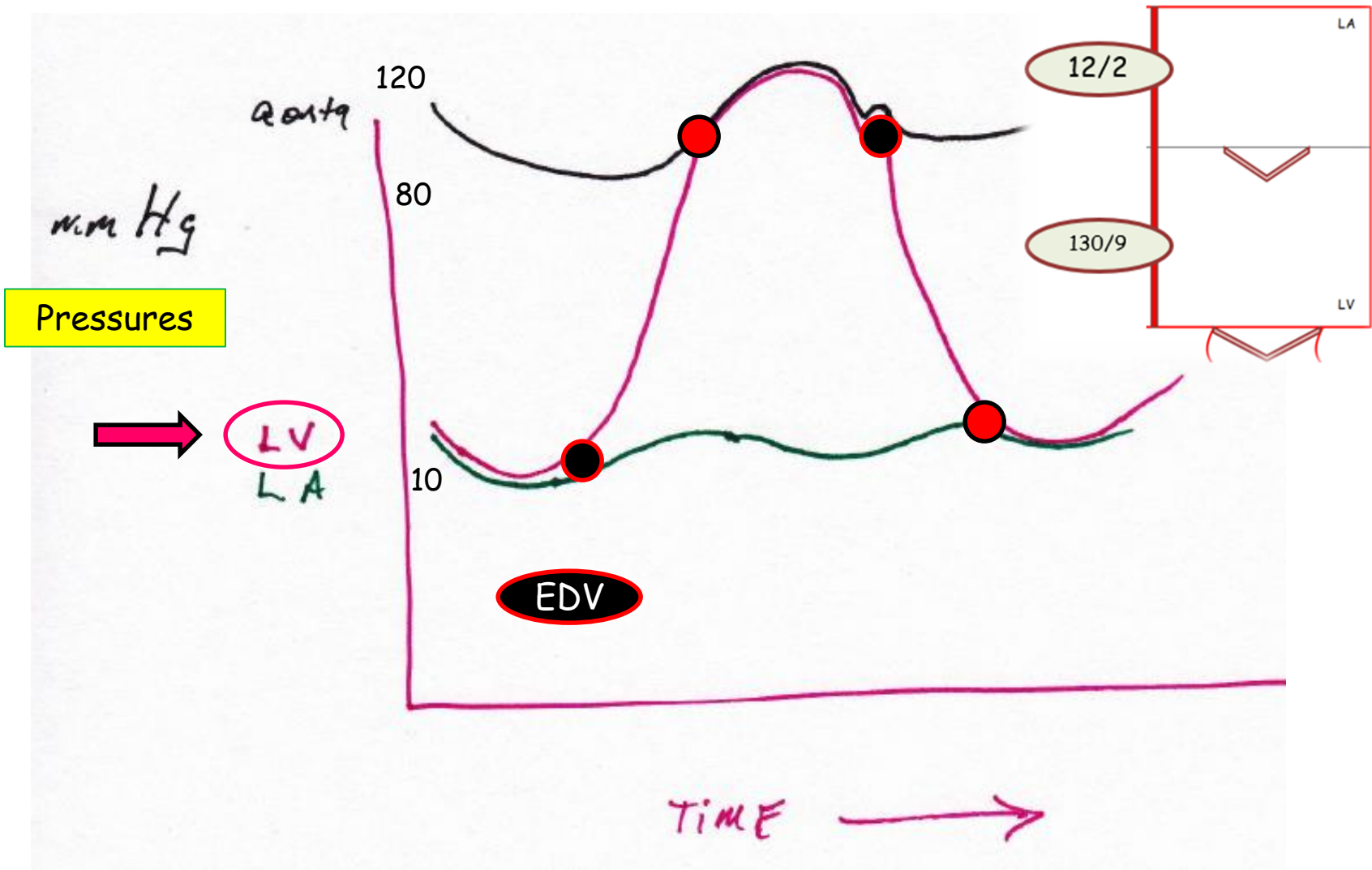
Mitral Stenosis Hemodynamics II



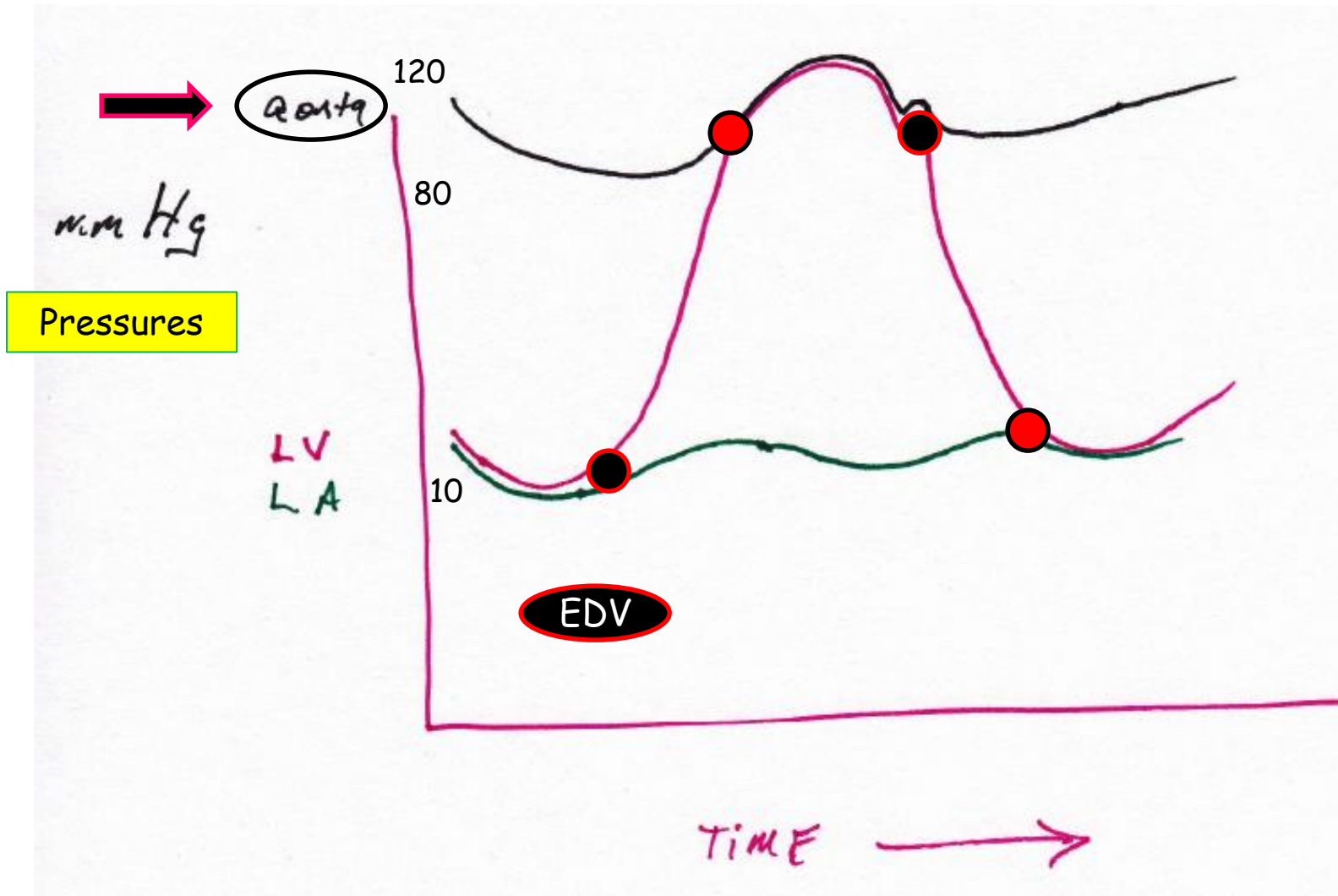
Mitral Stenosis Hemodynamics II



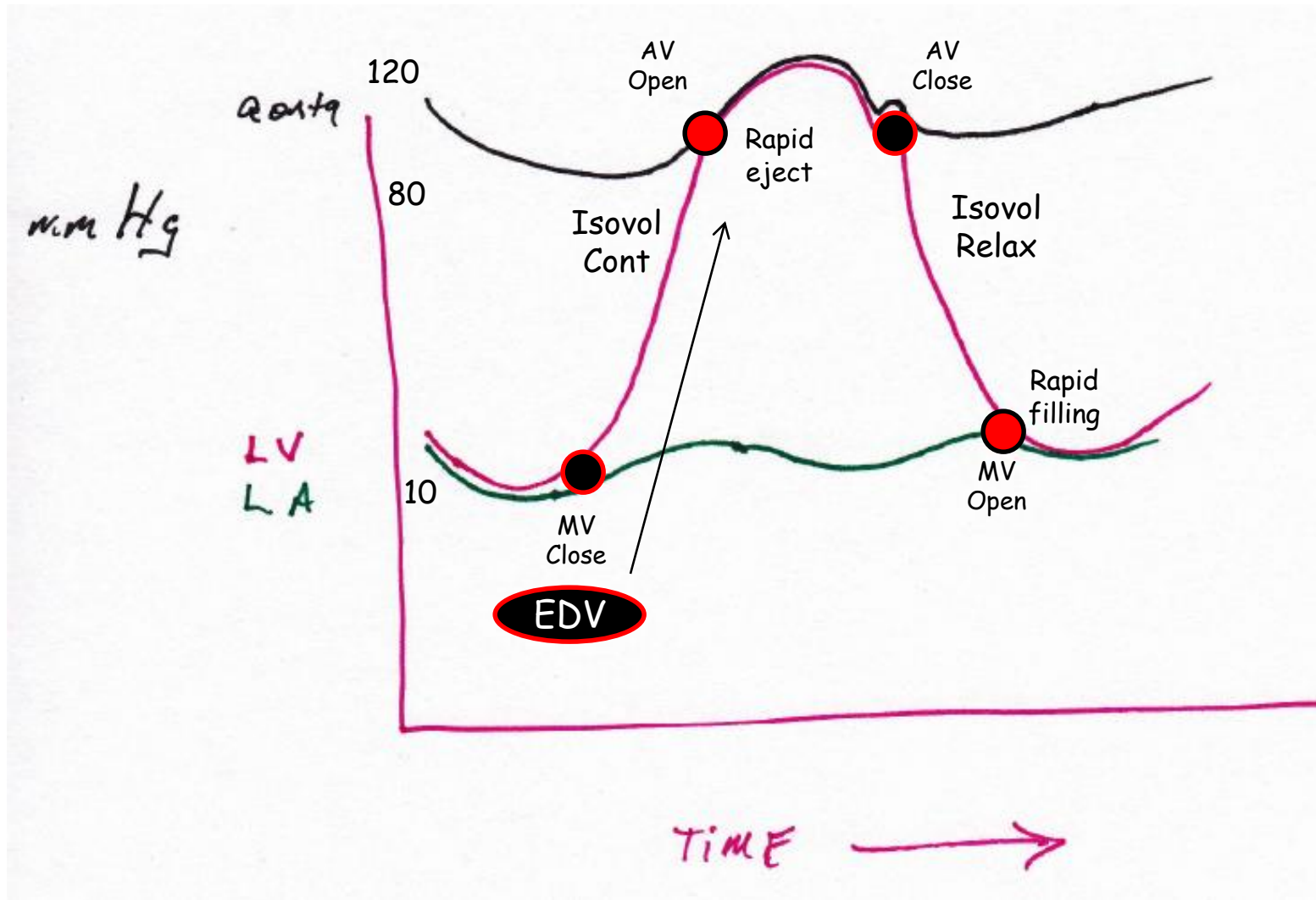
Mitral Stenosis Hemodynamics II



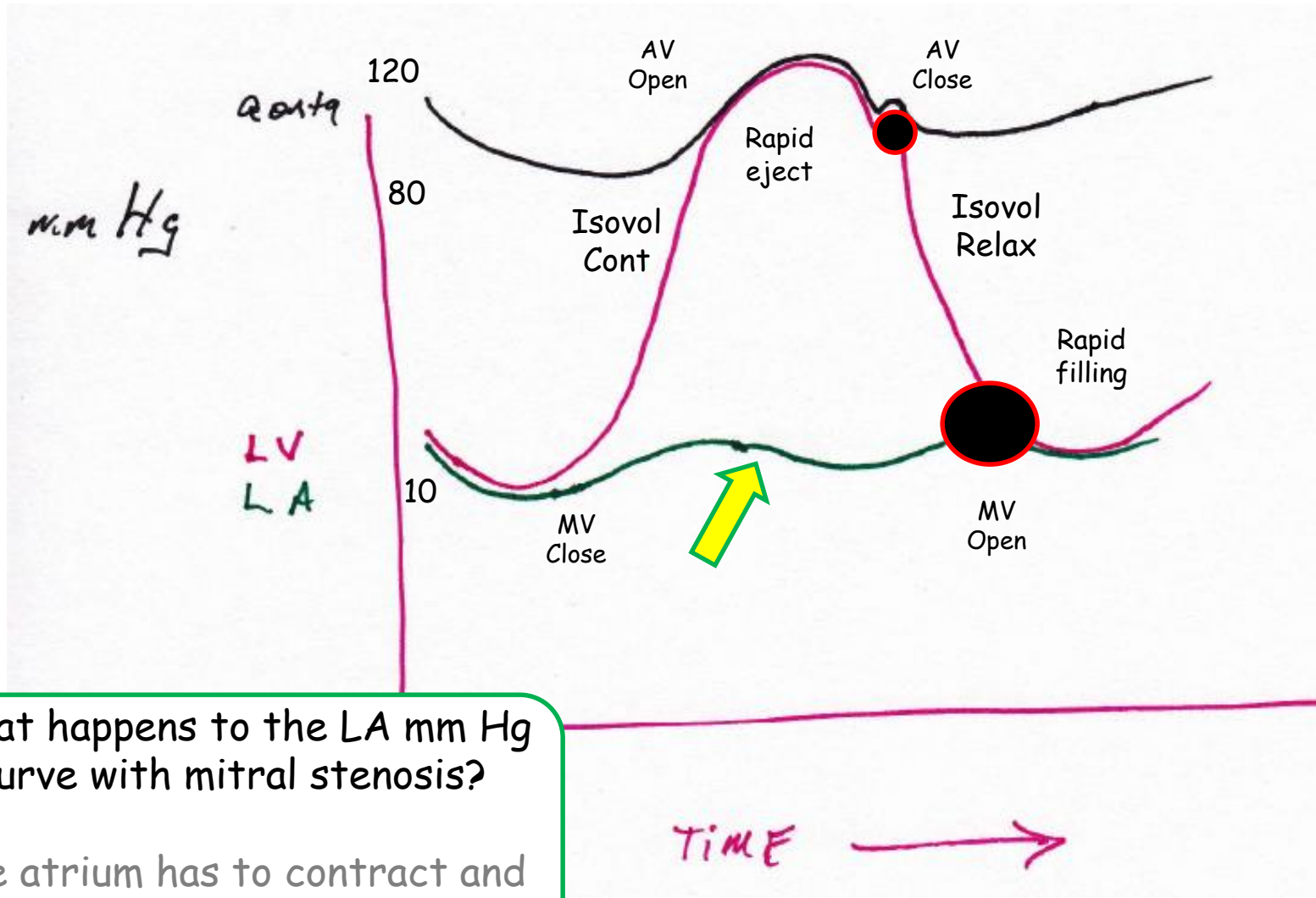
Mitral Stenosis Hemodynamics II



Mitral Stenosis Hemodynamics II



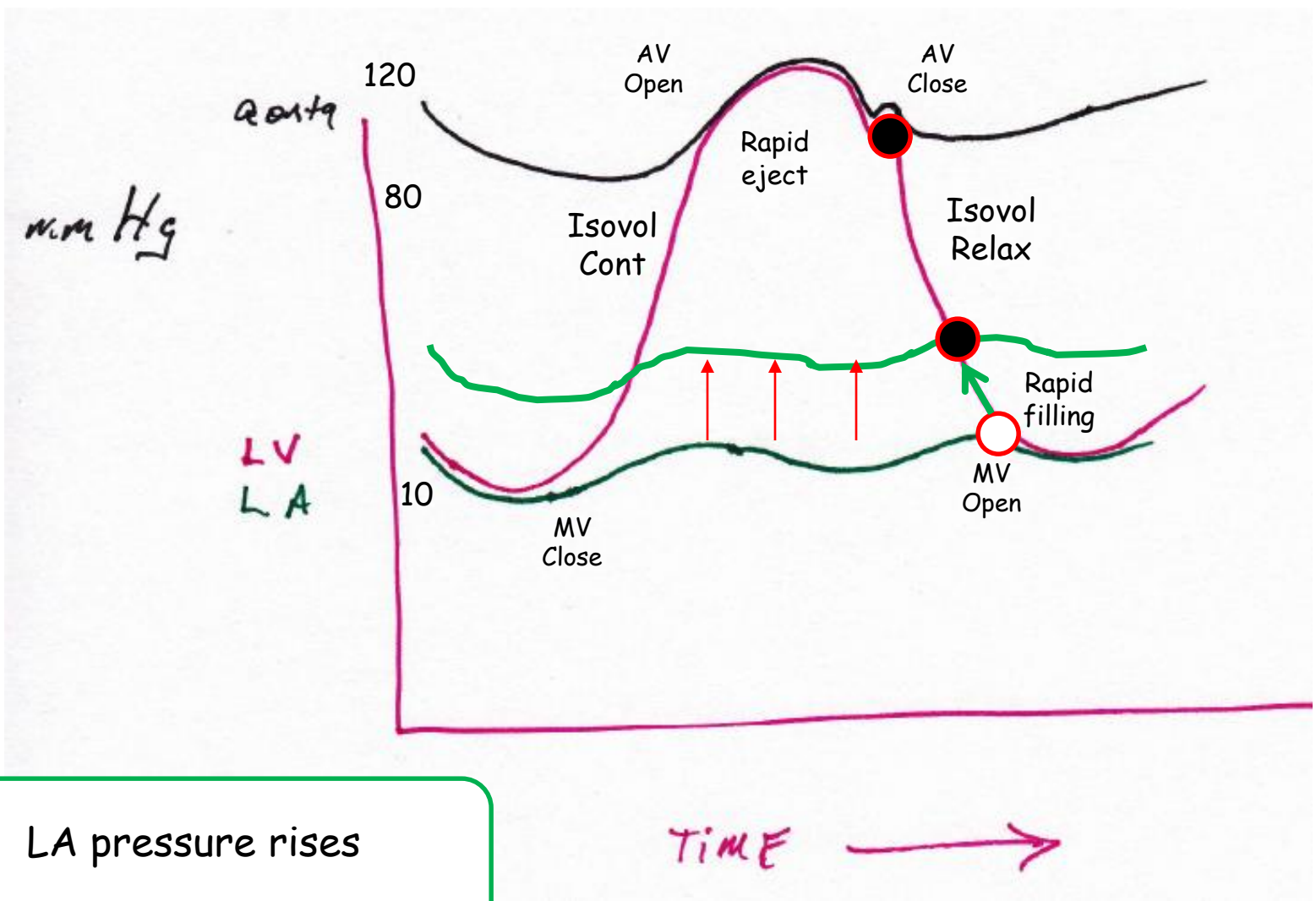
Mitral Stenosis Hemodynamics II



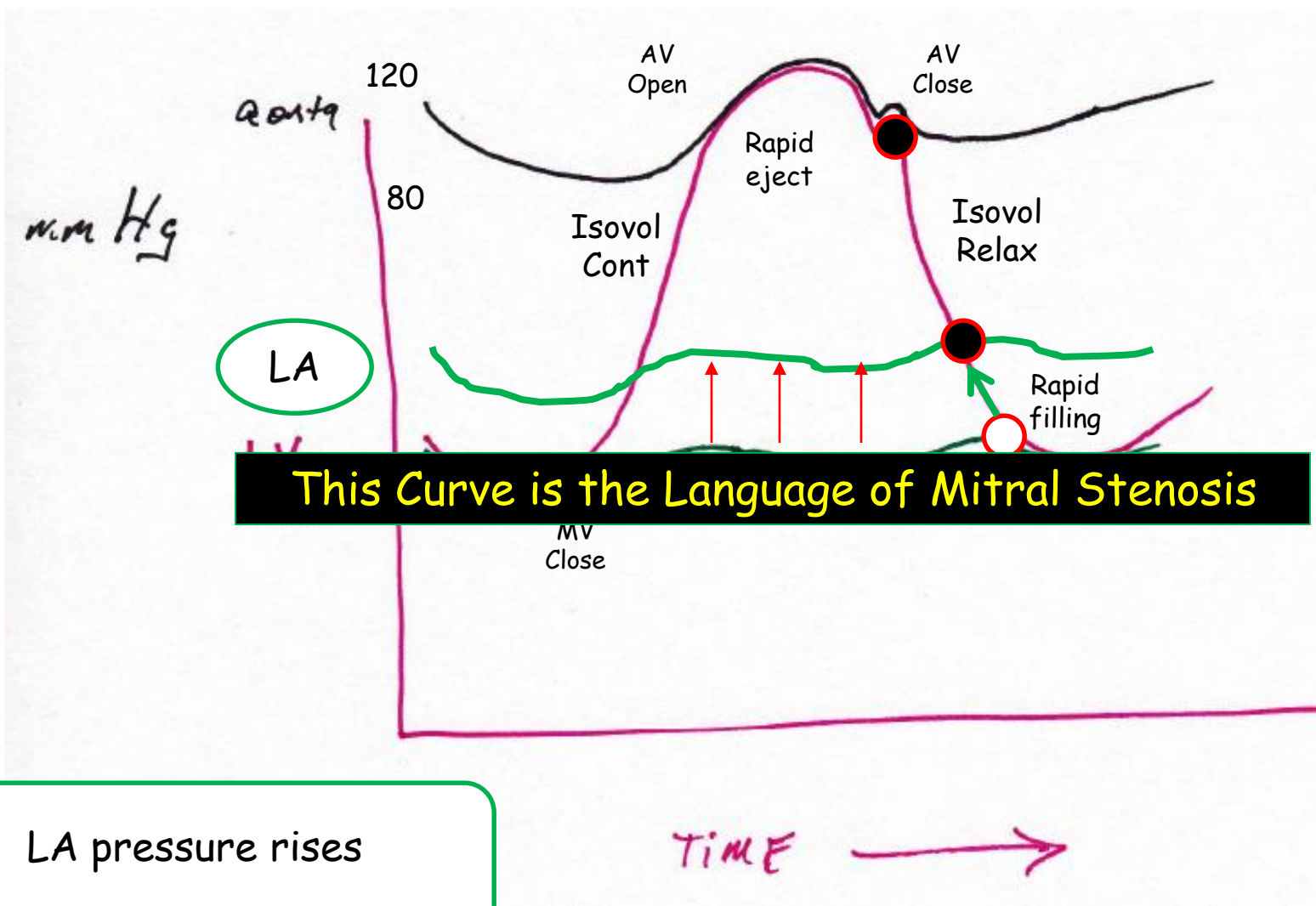
What happens to the LA mm Hg curve with mitral stenosis?

The atrium has to contract and eject blood into the LV.

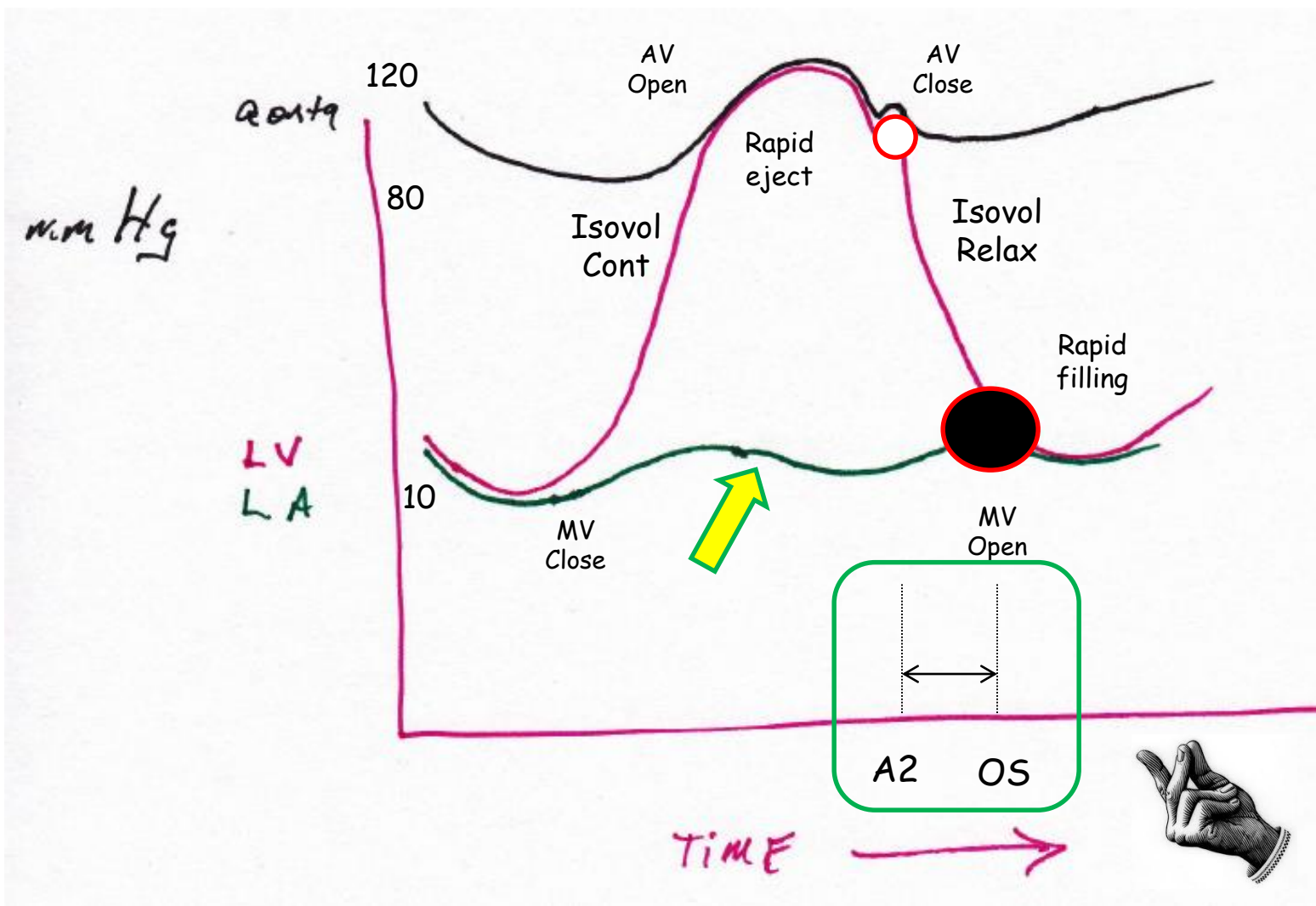
Mitral Stenosis Hemodynamics II



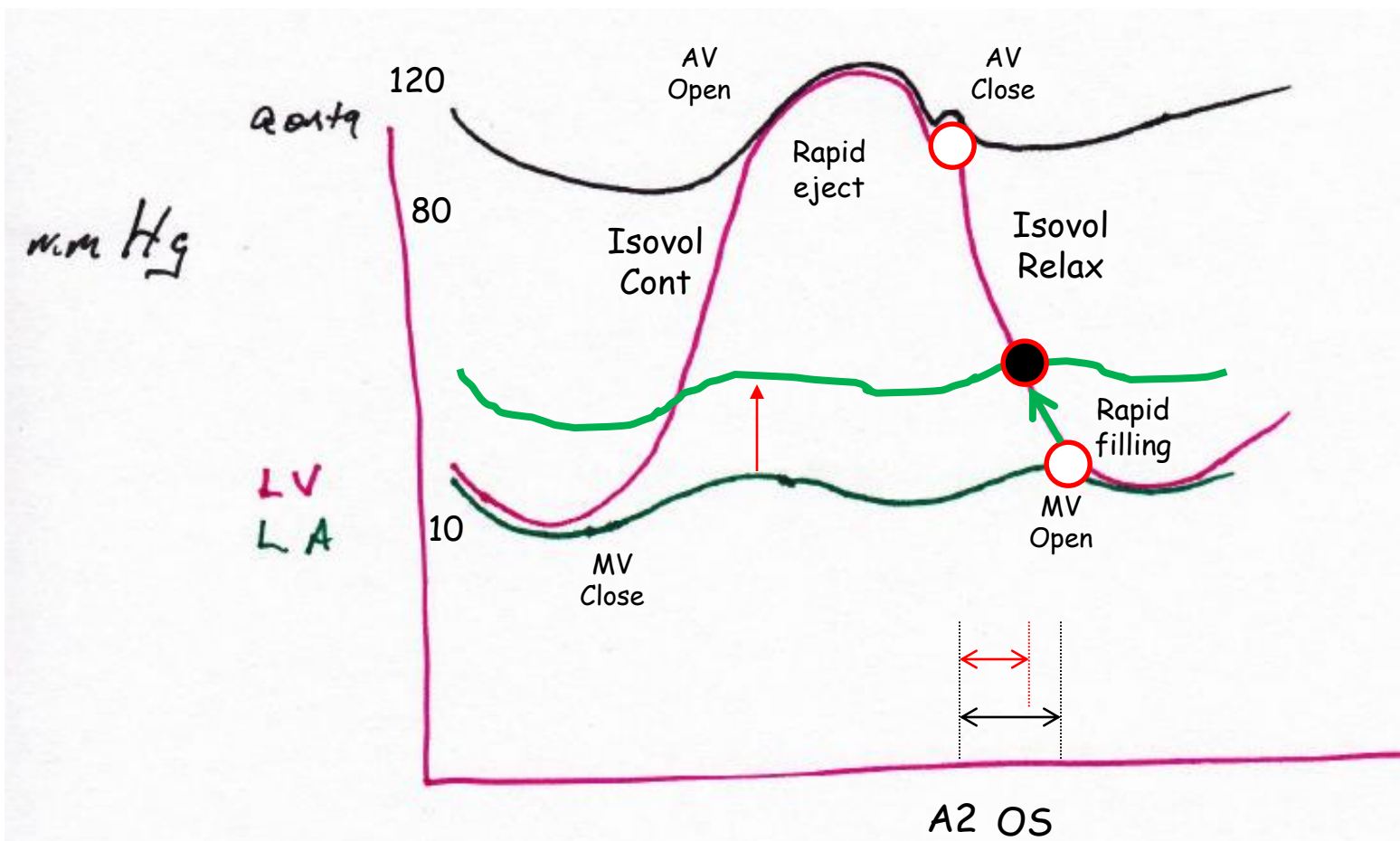
Mitral Stenosis Hemodynamics II



Mitral Stenosis Hemodynamics II

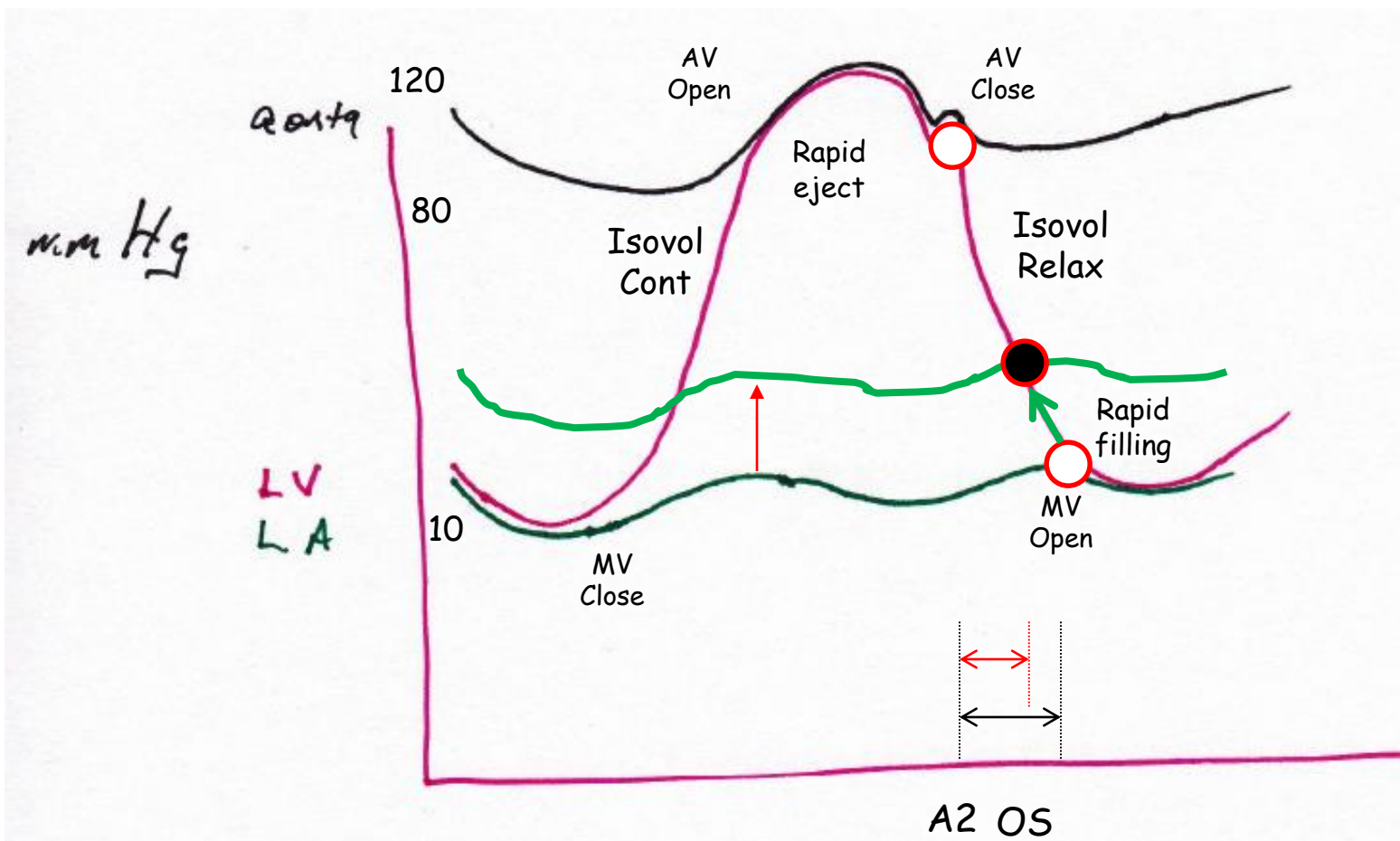


Mitral Stenosis Hemodynamics II

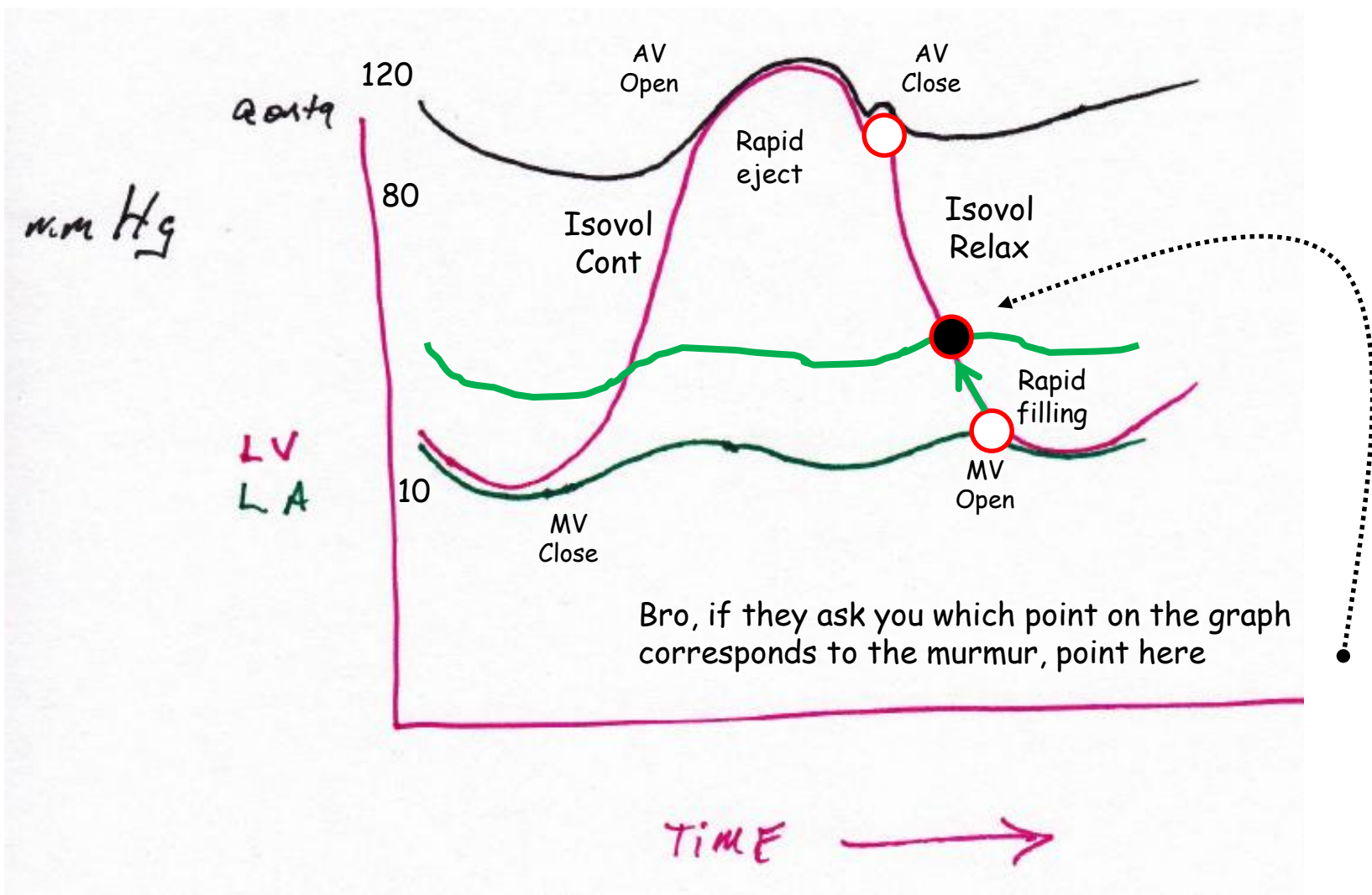


A2:OS ratio narrows with worsening MS
Reflects elevating LA pressures; **Negative Prognosticator**

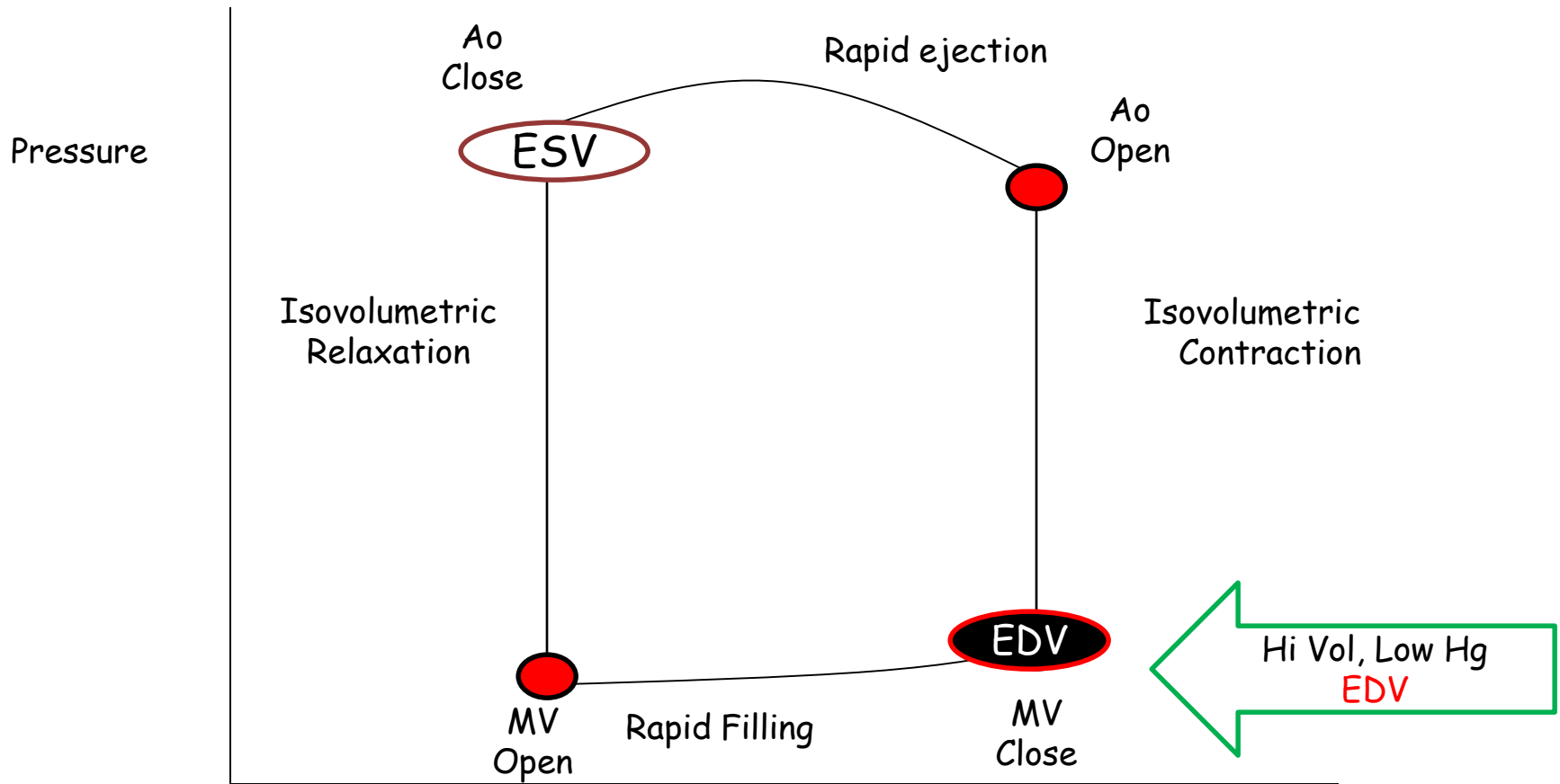
Mitral Stenosis Hemodynamics II



What correlates best with severity of MS:
Murmur grade or **A2:OS** ratio???

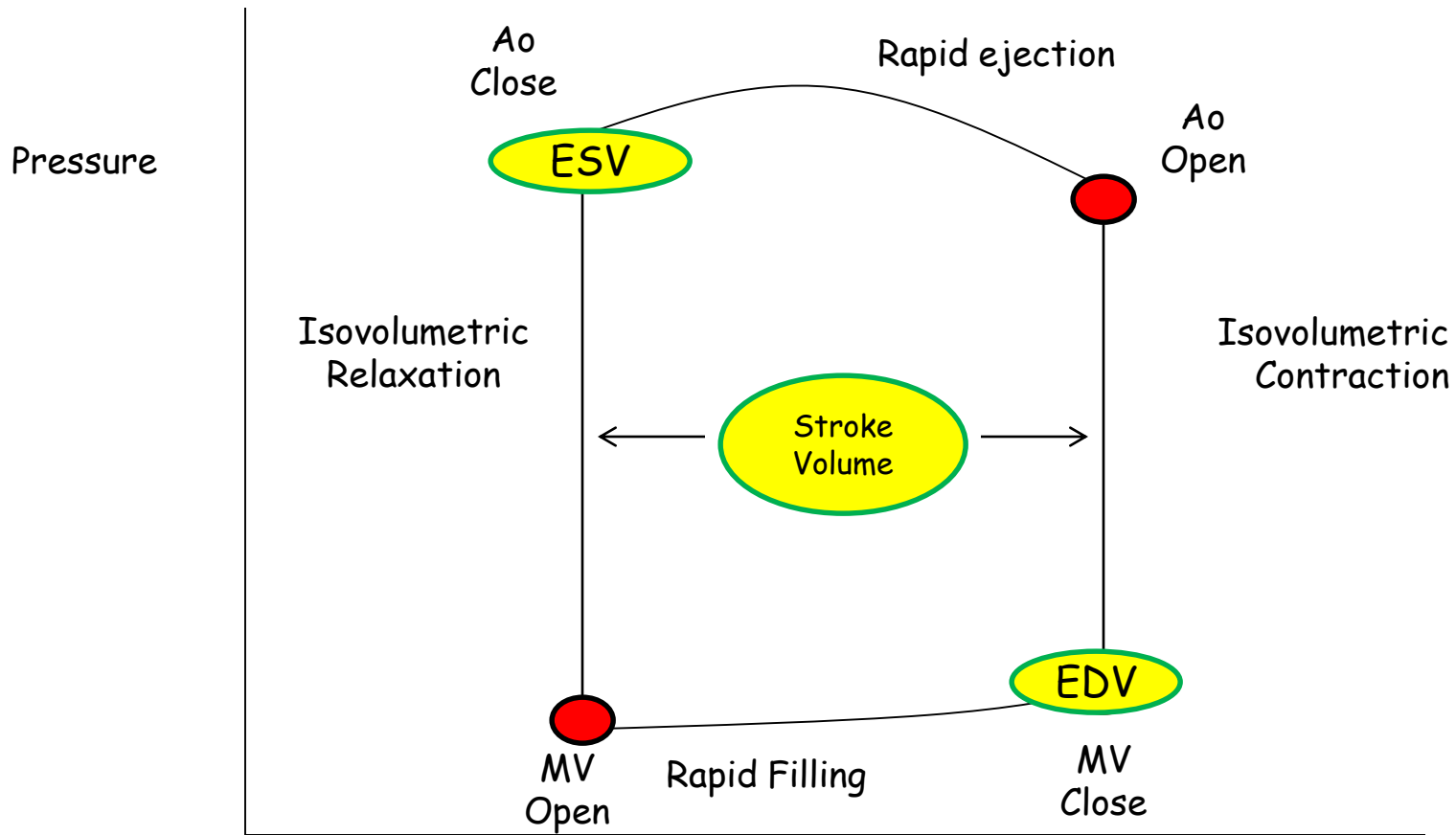


Mitral Stenosis Hemodynamics III



LV Pressure-Volume Loop

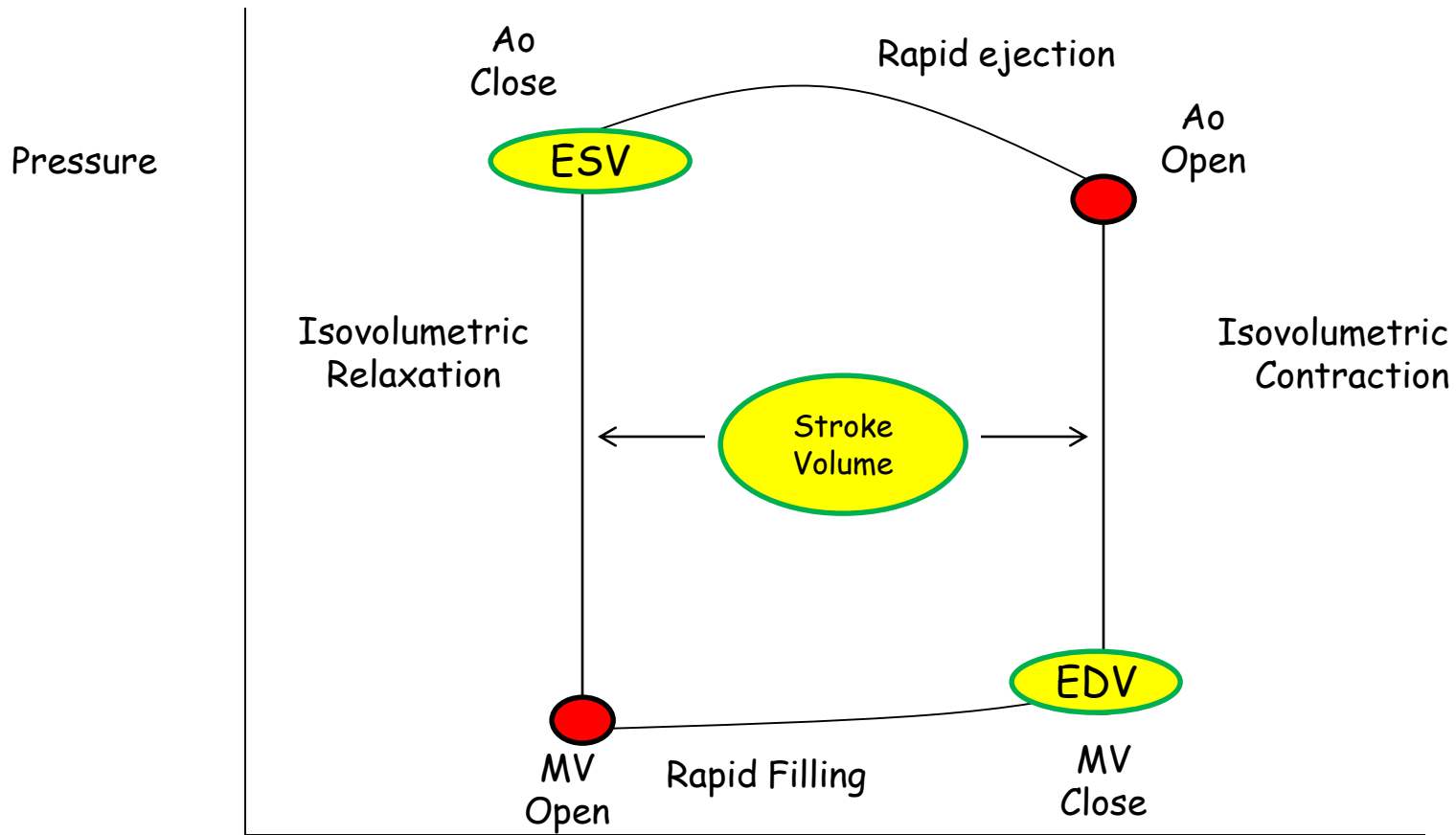
Mitral Stenosis Hemodynamics III



$$SV = EDV - ESV$$

Volume

Mitral Stenosis Hemodynamics III

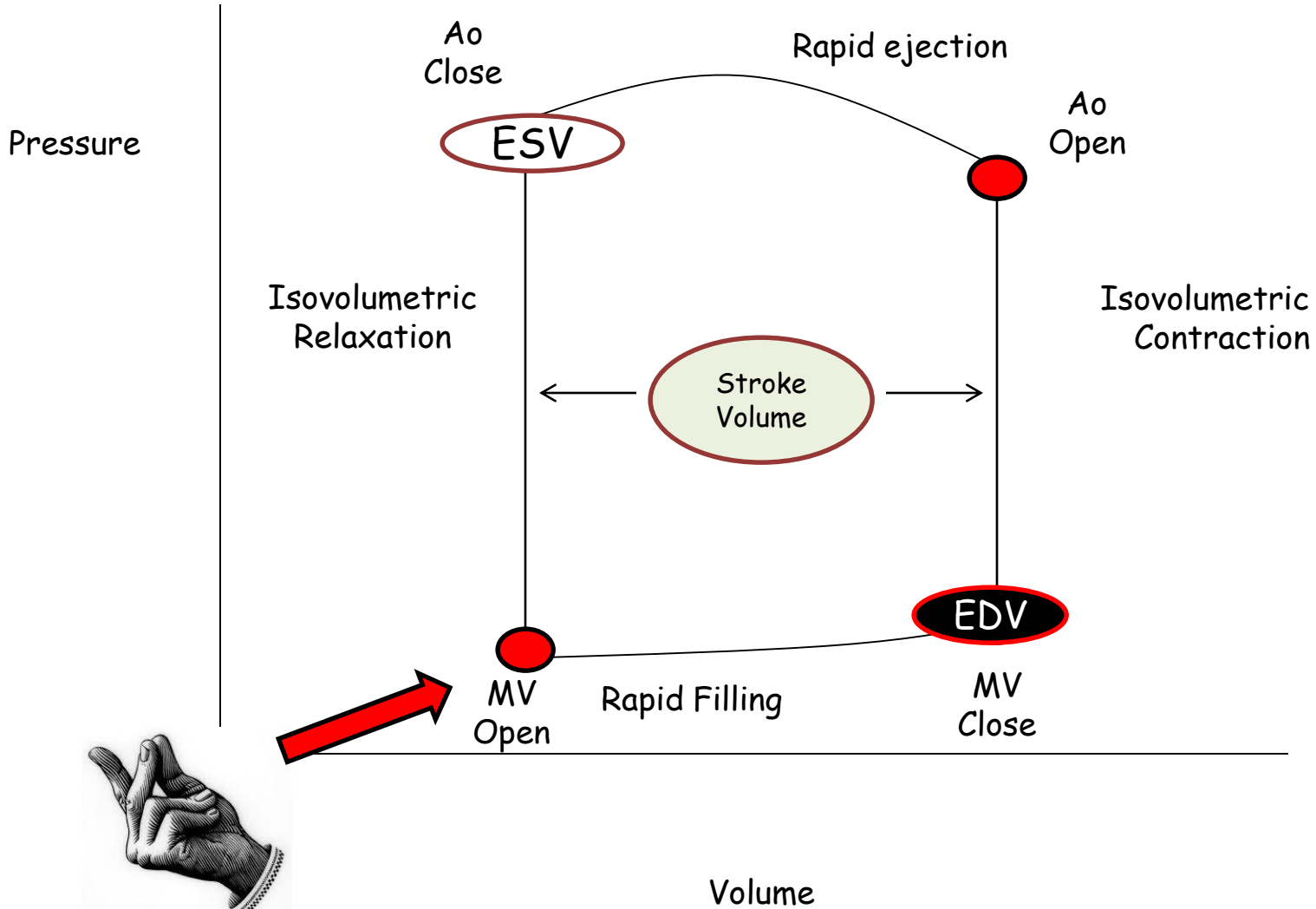


$$SV = EDV - ESV$$

$$EF = (EDV - ESV) / EDV$$

Volume

Mitral Stenosis Hemodynamics III



Mitral Valve, Stenosis:

Location

Diastolic

Hemodynamics:

PCWP

Cardiac Cycle

Pressure Volume Curve

Opening Snap

Pathology

Microbiology (Rheumatic Fever)

Complications (A fib and derivatives)



Cardiology

Mitral Stenosis and Derivatives:
Opening Chapter

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the Sounds