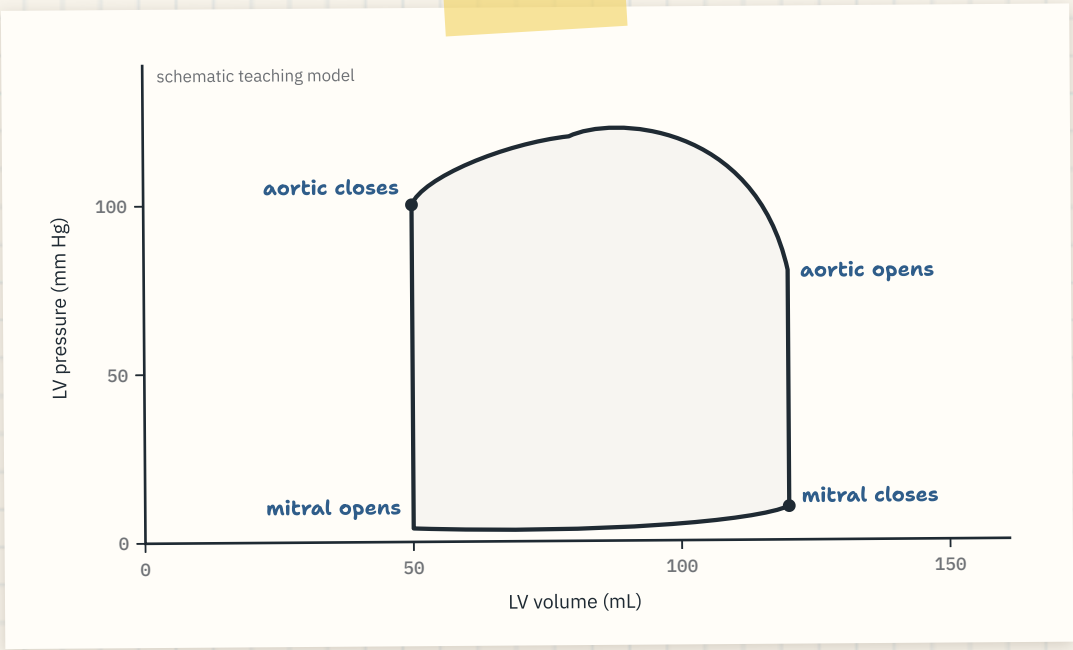
The PV loop in one beat

Four phases, four valve events, read SV and EF



Step by step

1. Isovolumetric contraction: vertical right side, pressure up
2. Ejection: across the top, volume falls, peak ≈ 120 mm Hg
3. Isovolumetric relaxation: vertical left side, pressure down
4. Filling: along the bottom at low pressure

Corner	Event	Marks
Bottom right	Mitral closes	EDV ≈ 120 mL · S1
Top right	Aortic opens	≈ 80 mm Hg (aortic diastolic)
Top left	Aortic closes	ESV ≈ 50 mL · S2
Bottom left	Mitral opens	LV < LA pressure

Corners (anticlockwise from bottom right)

READ THE LOOP

$$SV = EDV - ESV \qquad EF = SV / EDV$$

Width = SV · area = stroke work · 120 − 50 = 70 mL; 70 / 120 ≈ 58%

Doors and corners

Mitral = the bottom corners; aortic = the top corners.

Both doors shut = vertical side (volume can't change).

A door opens only when the pressure behind it is higher.

Exam traps

- The loop runs anticlockwise, not clockwise.
- ESV / EDV is the fraction left behind, not the ejection fraction.
- EF divides by EDV alone, not by EDV + ESV.
- Stroke volume is in mL, not a percentage.

Pressure-volume loop explained: four phases, four valve events

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/cardiovascular/pressure-volume-loop

For exam study only, not medical advice. Follow local guidelines and your lab's ranges.
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