INVASIVE HEMODYNAMICS ASSESSMENT OF AORTIC STENOSIS

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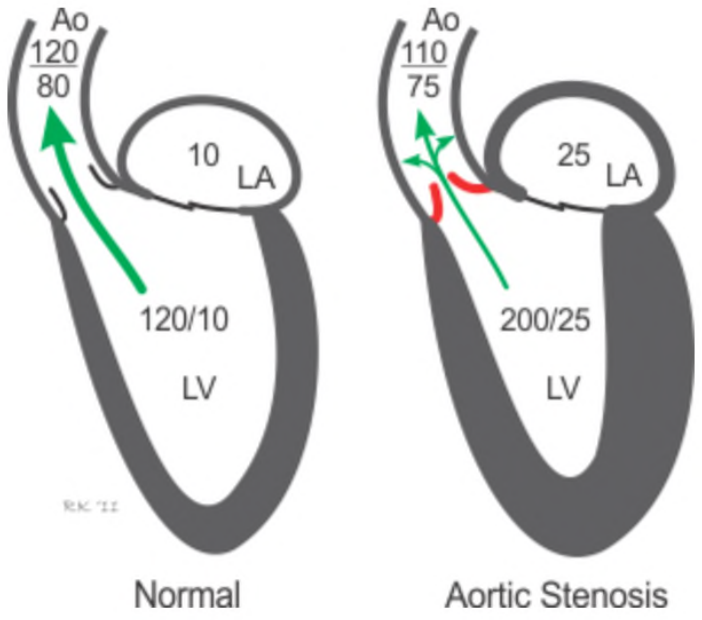
ROLE OF LHC IN AORTIC STENOSIS

1) Perform when discrepancy between echo findings and patient's symptoms

2) Measure gradient across aortic valve and calculate aortic valve areas

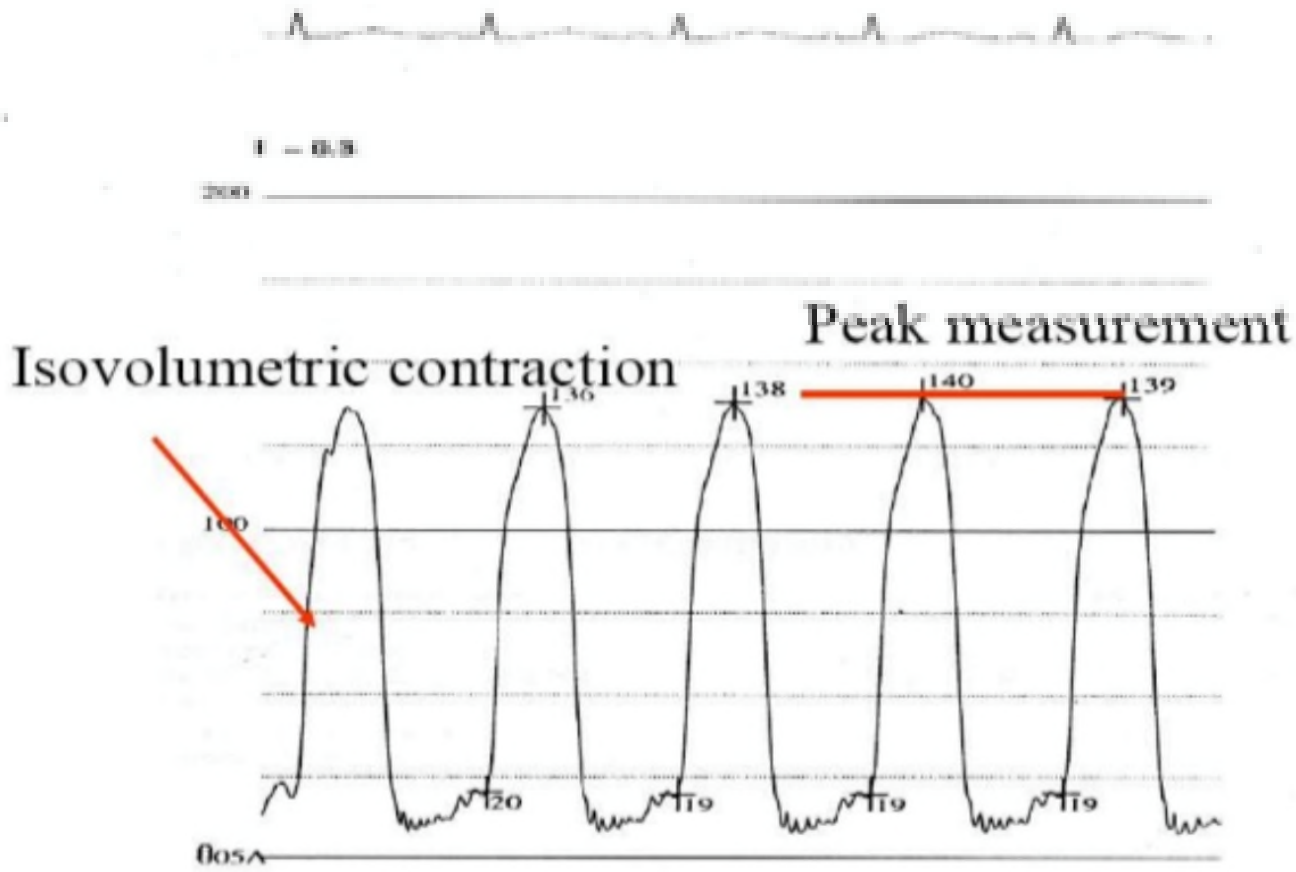
3) Identify level of obstruction



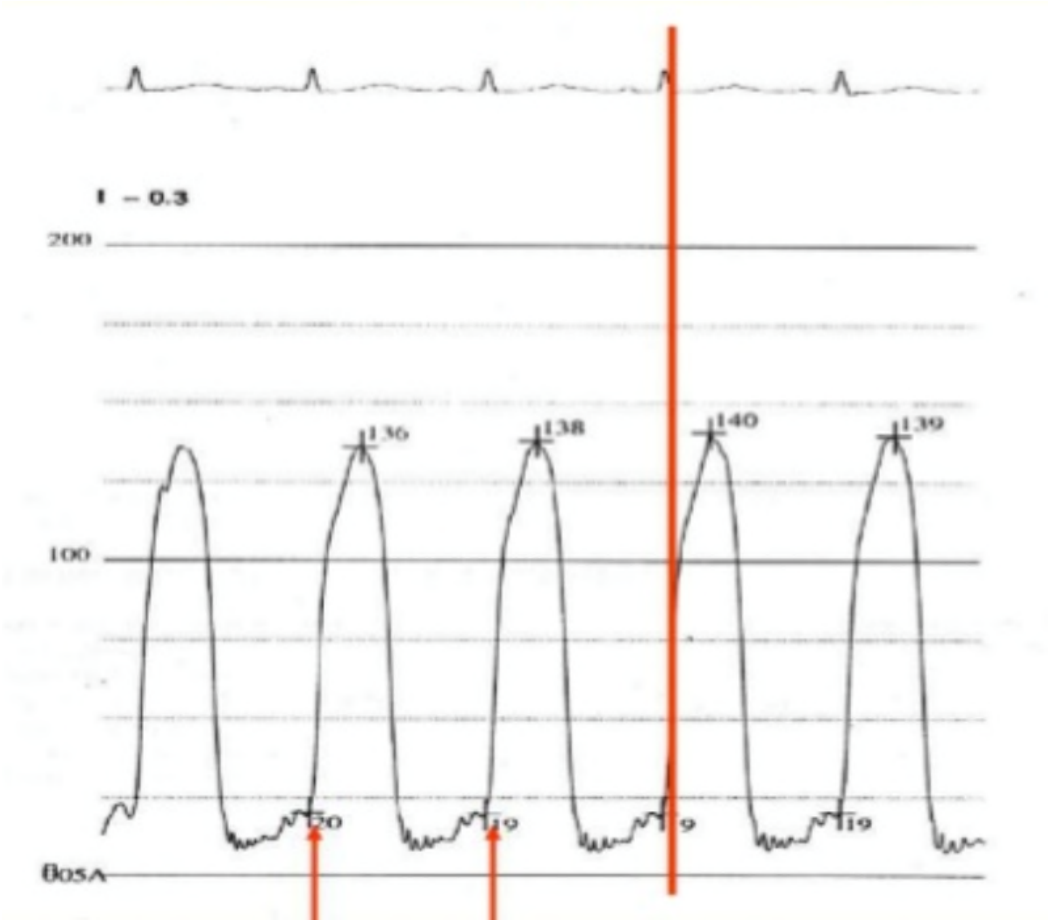
AV STUDY METHODS

METHOD	EASE OF USE
PULLBACK	+++++
FEMORAL SHEATH	+++++
DOUBLE ARTERIAL PUNCTURE	+++
PIG TAIL- DOUBLE LUMEN	+++
TRANSEPTAL	++

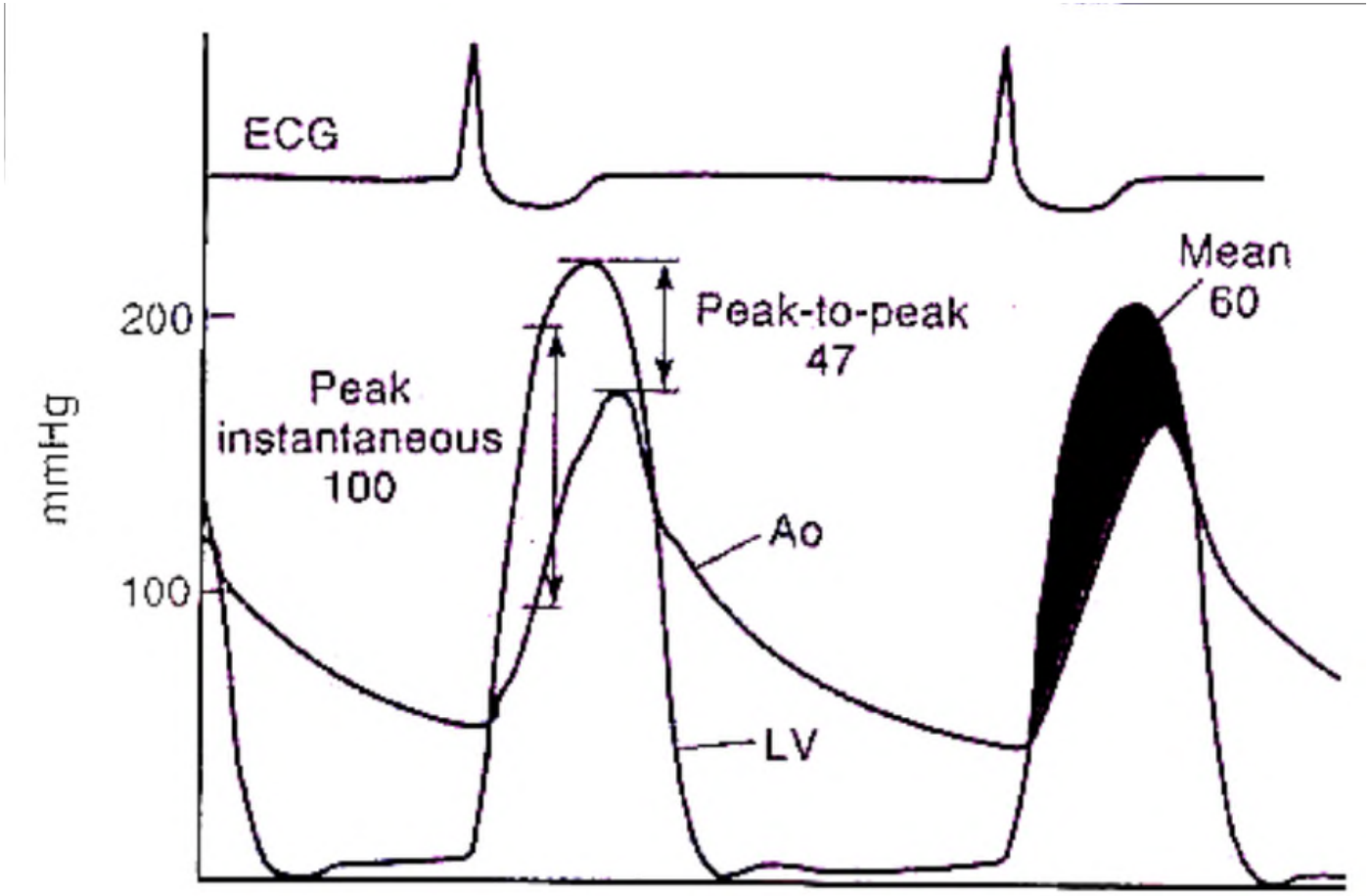
LHC BASICS


Isovolumetric contraction
Peak measurement
136
138
140
139
120
119
119
119

LHC BASICS



AV GRADIENT MEASUREMENTS



AORTIC VALVE GRADING

CLASSIFICATION	MEAN PRESSURE GRADIENT (MM HG)	AORTIC VALVE AREA (CM^2)
Normal	< 10	3.0 to 4.0
Mild	10 to 19	1.5 to 2.9
Moderate	20 to 39	1.0 to 1.4
Severe	≥ 40	< 1.0

AVA EQUATIONS

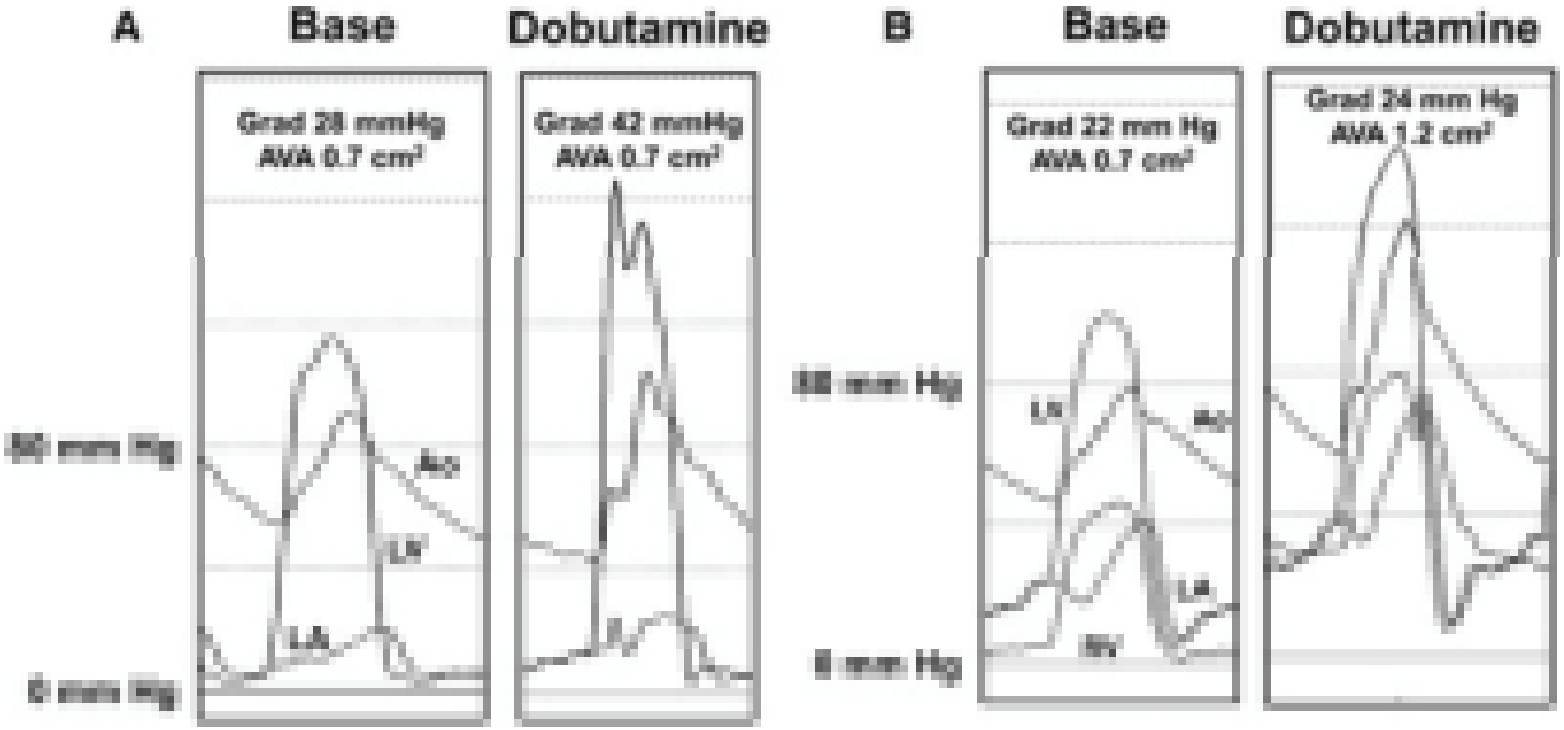
Gorlin Equation

$$\text{Aortic Valve Area} = \frac{(\text{C.O. } L/min * 1000) \,/\, (\text{SEP } sec/beat * \text{heart rate})}{44.5 * \sqrt{\text{mean gradient}}}$$

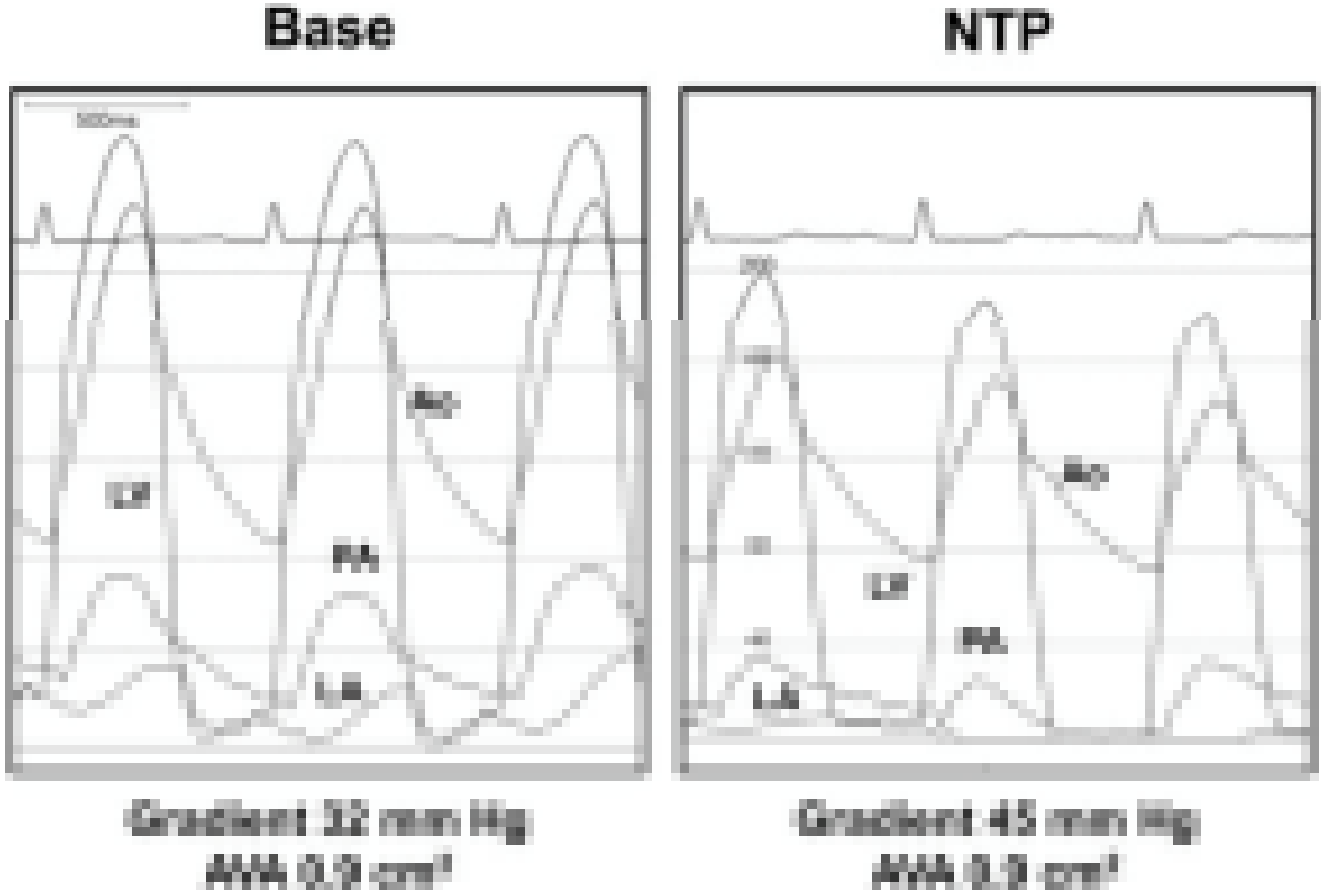
Hakki Equation

$$\text{Valve Area} = \frac{\text{C.O. (L/min)}}{\sqrt{\text{peak to peak pressure gradient}}}$$

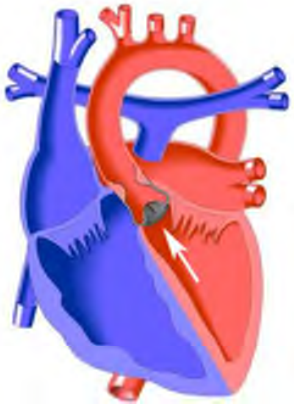
LOW OUTPUT LOW GRADIENT AORTIC STENOSIS EVALUATION



PARADOXICAL LOW GRADIENT AORTIC STENOSIS WITH NORMAL LVEF

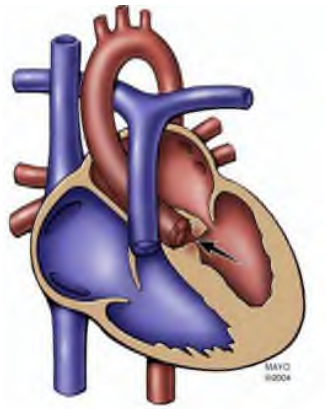


LOCATION OF OBSTRUCTION



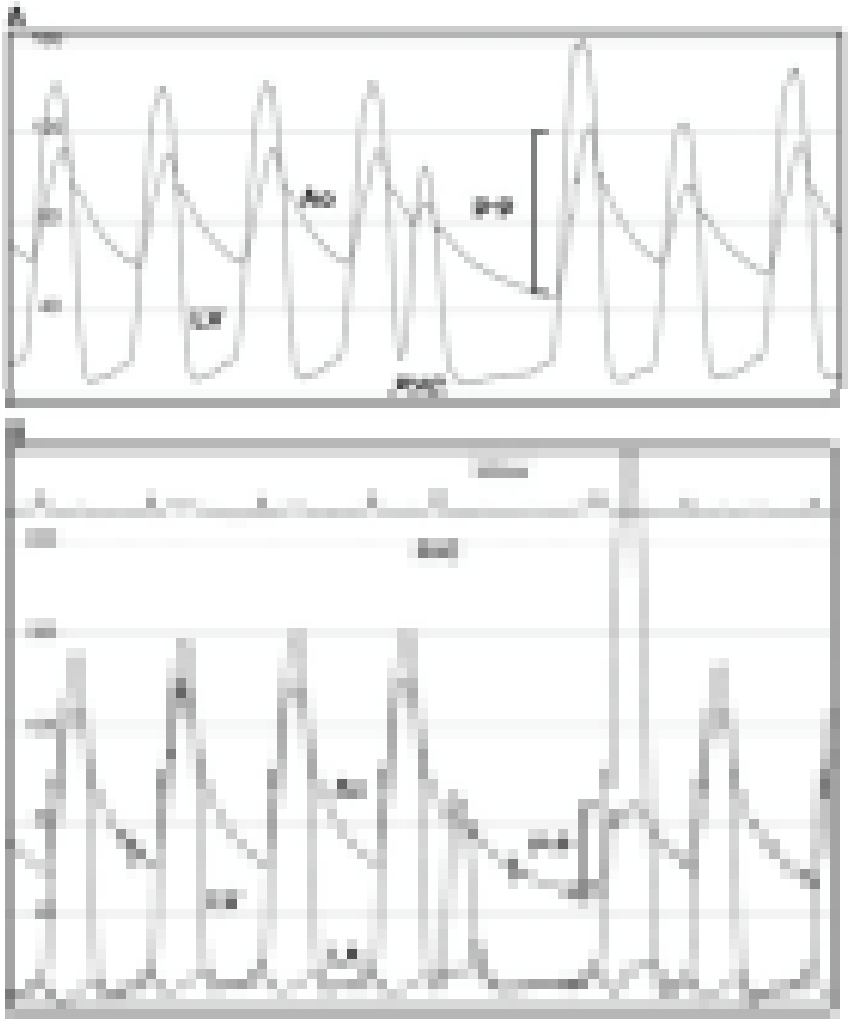
Supravalvular stenosis

Valvular stenosis

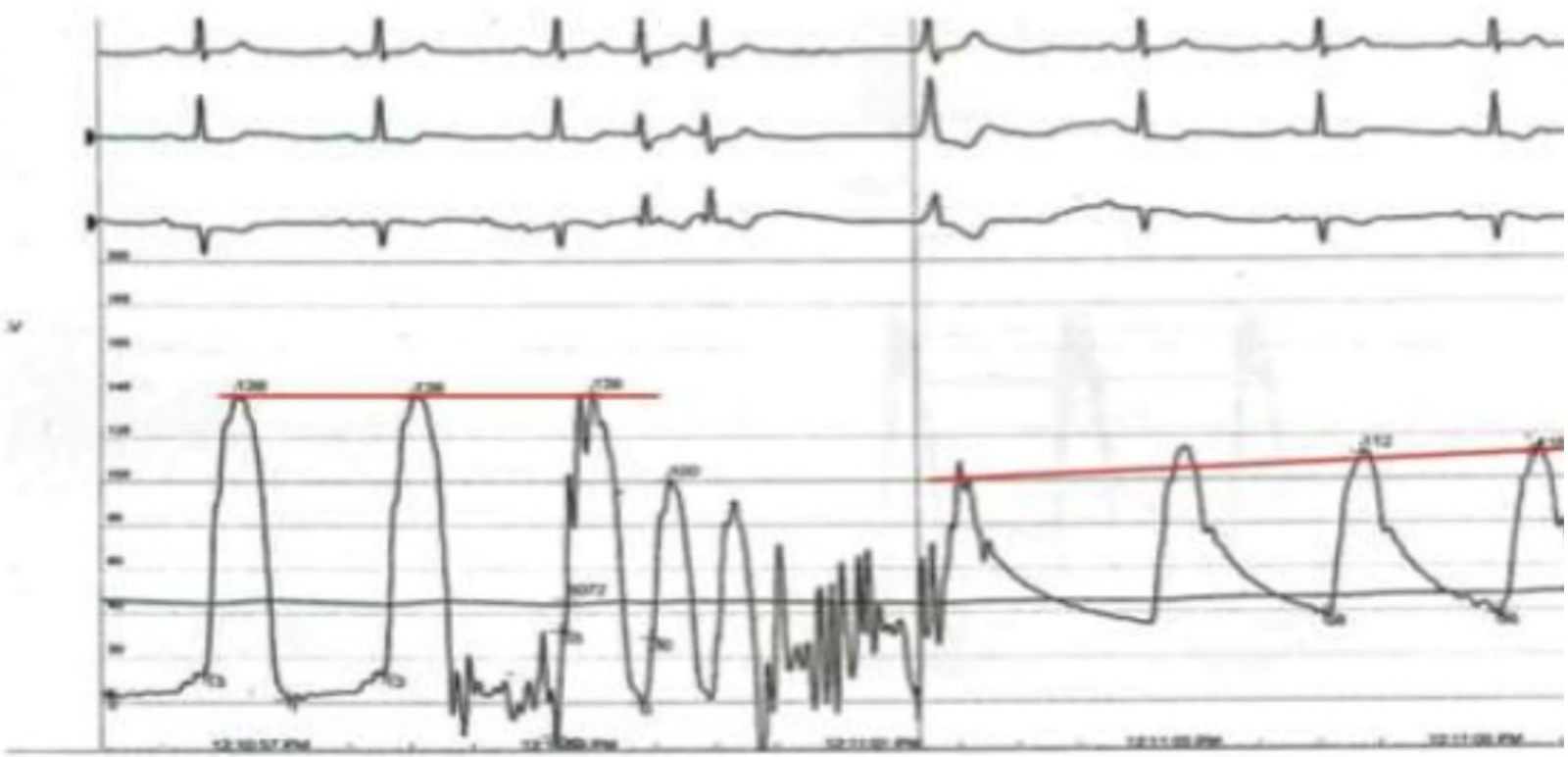


Subvalvular stenosis

BROCKENBROUGH-BRAUNWALD-MORROW SIGN

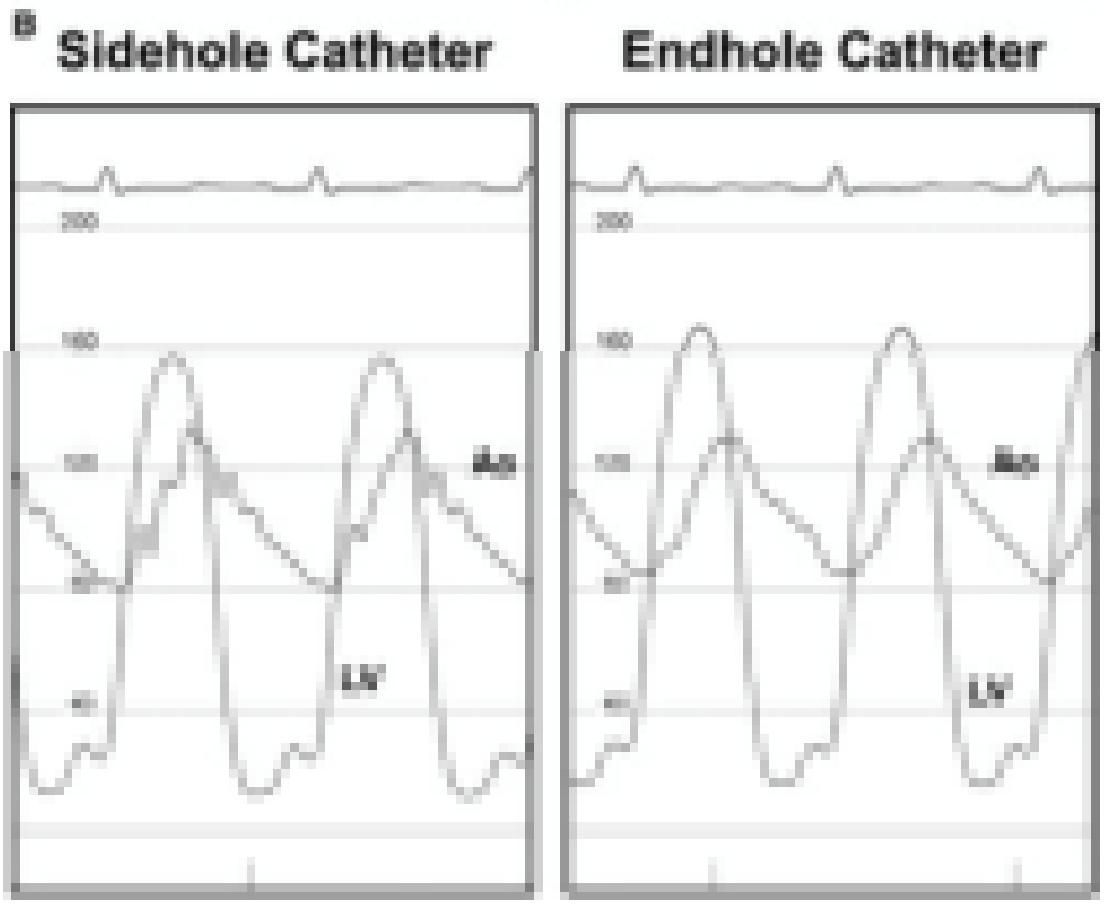


ARTIFACTS

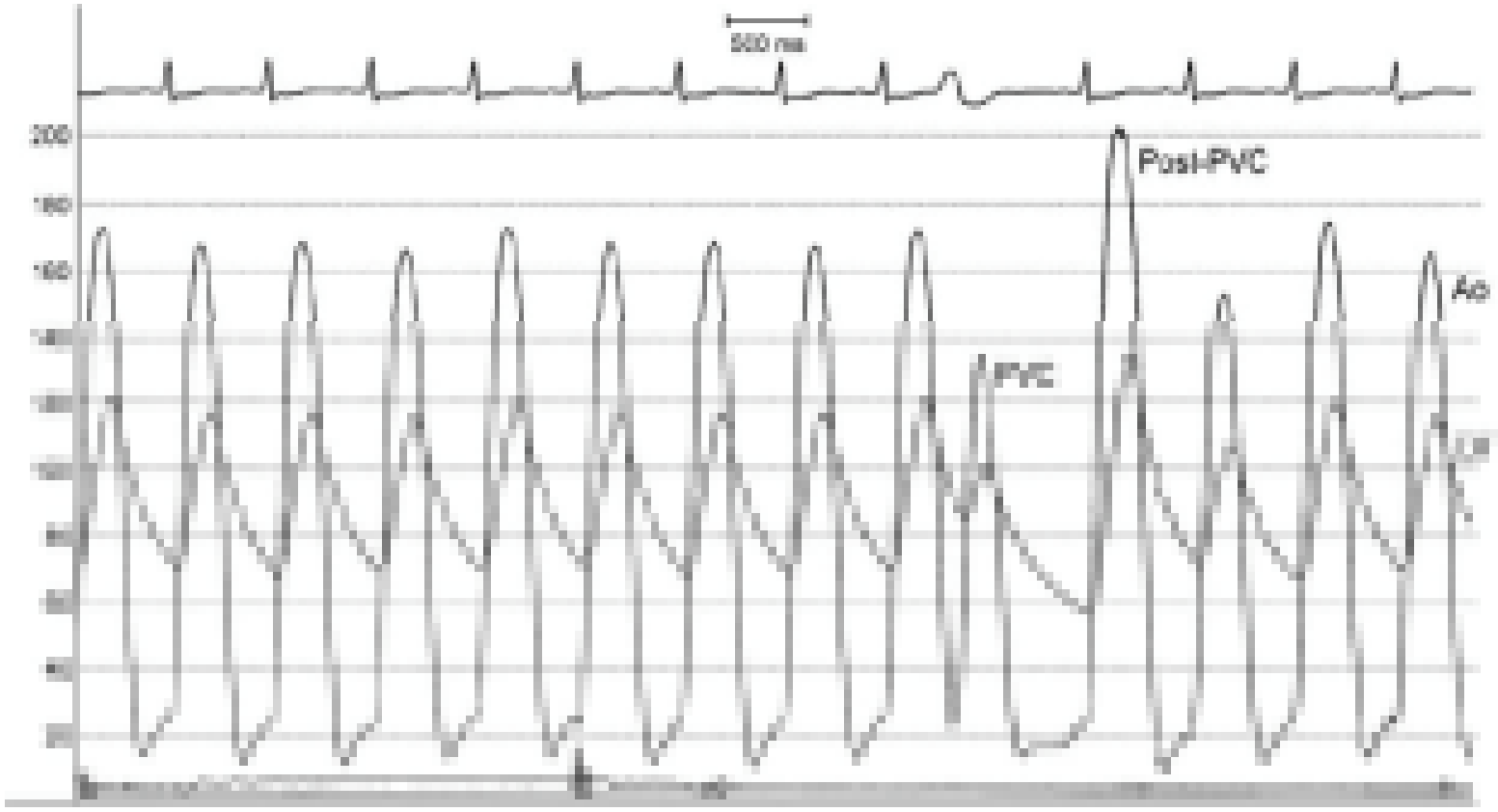


DAMPENING

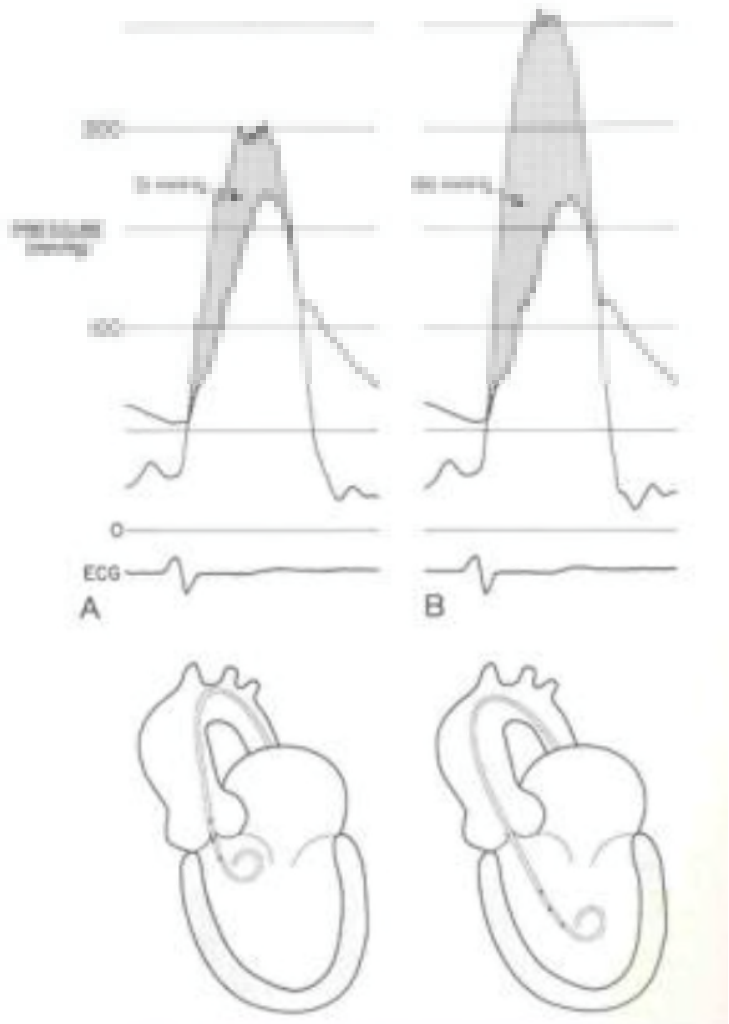
DAMPENING



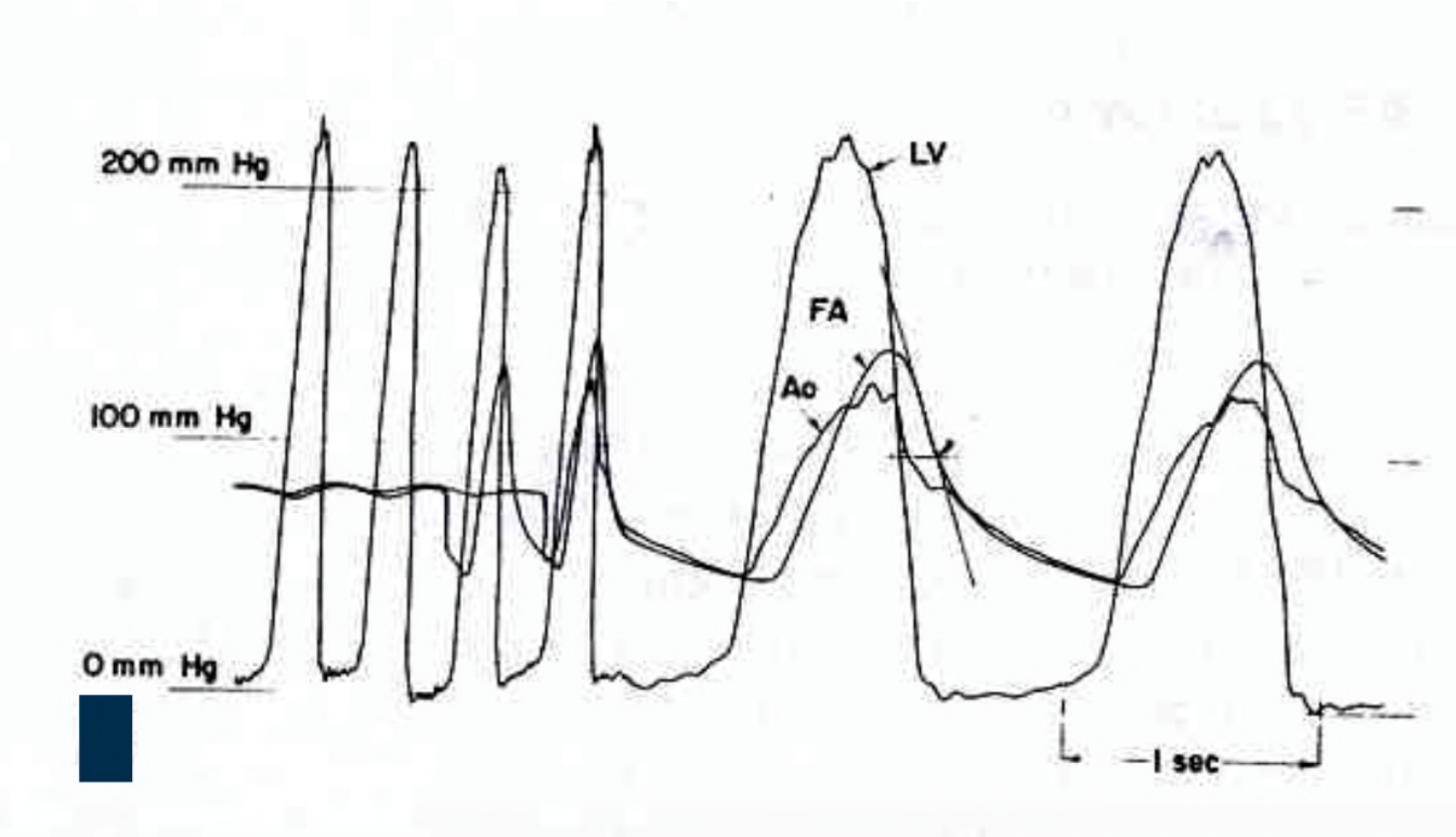
PVC GRADIENTS



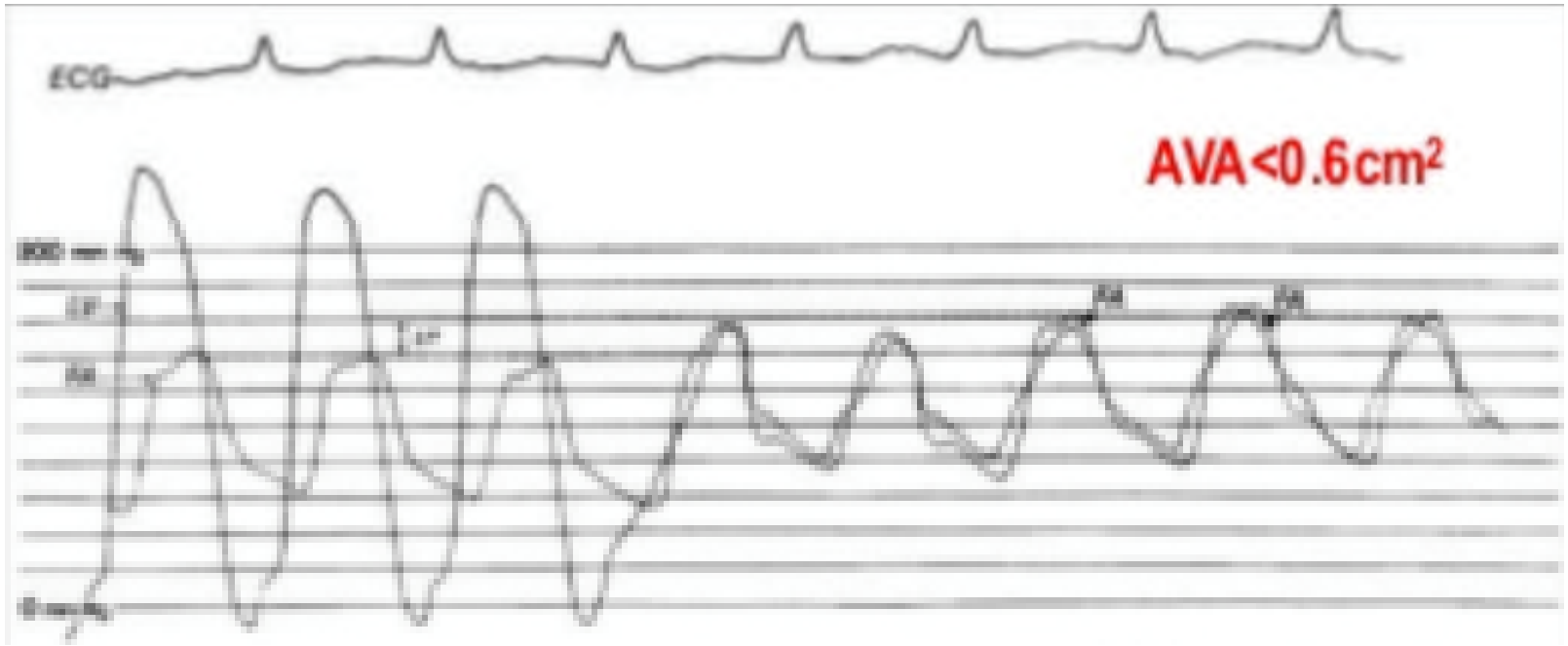
IMPROPRE POSITION



PERIPHERAL AMPLIFICATION



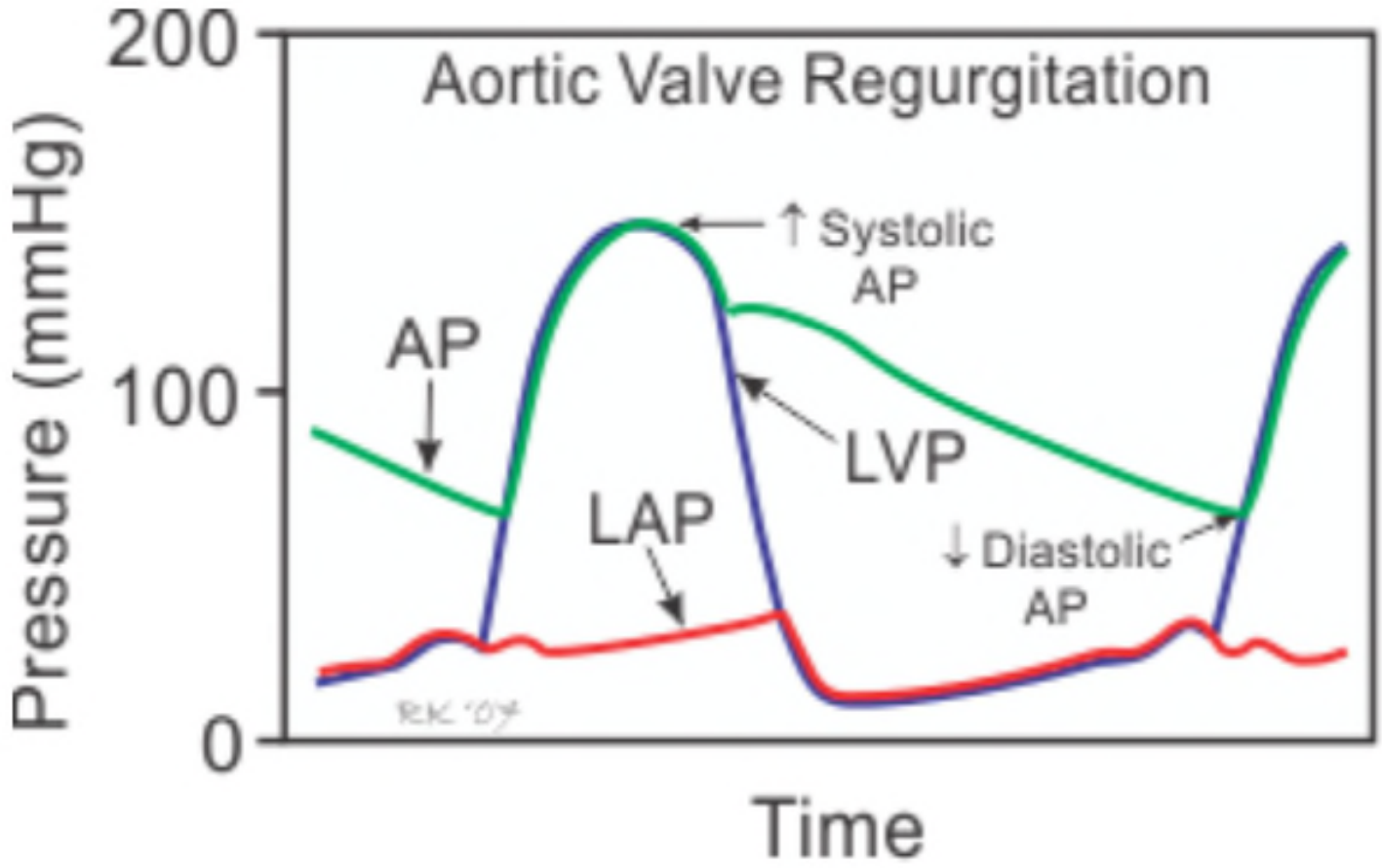
CARABELLO SIGN



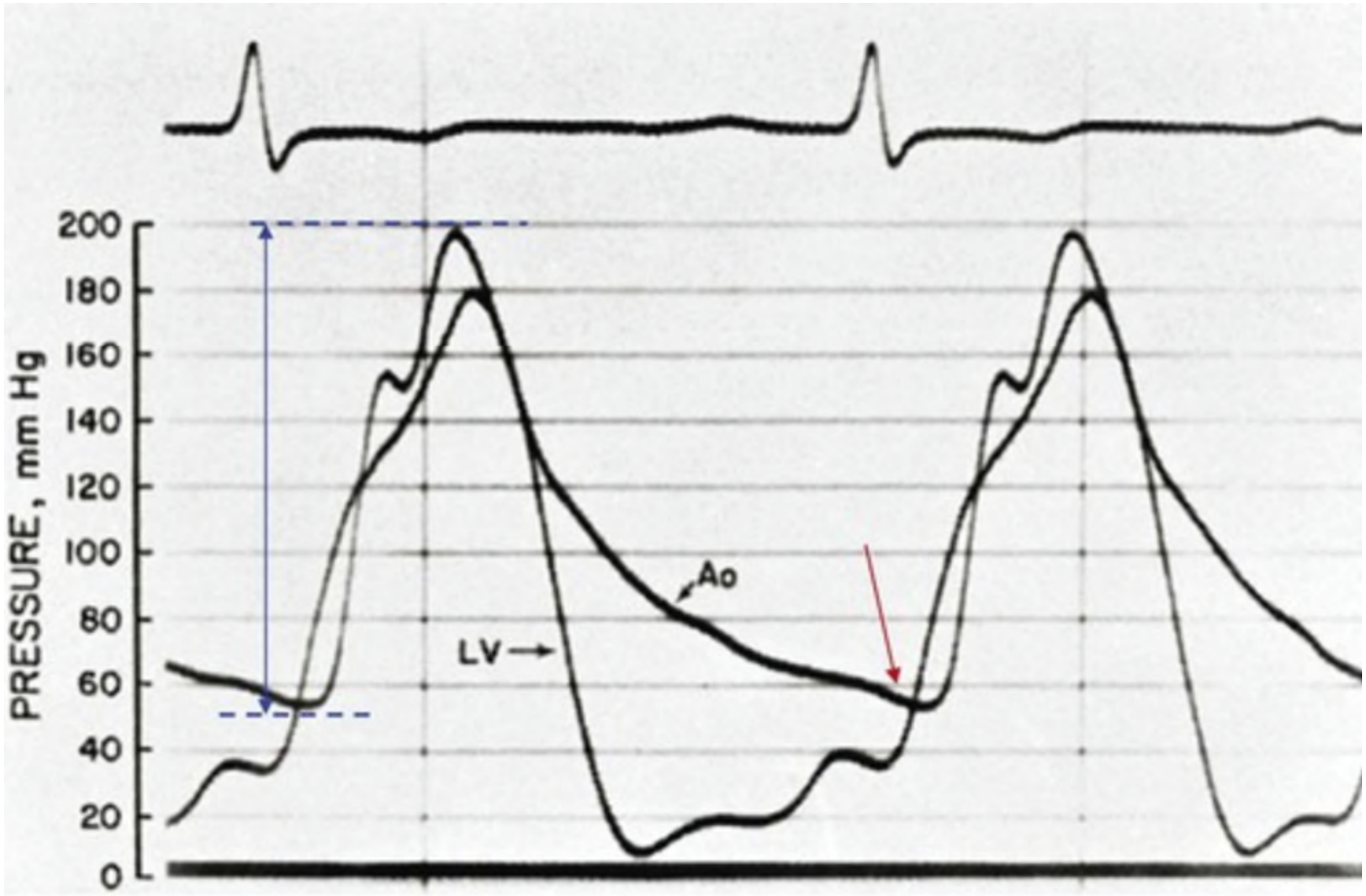
TIPS AND TRICKS

- Flush catheters frequently
- Ensure transducer height at level of heart
- Zero transducers prior to measuring pressures
- Understand catheter waveforms and expected deflections
- Monitor for unexpected waveform changes frequently

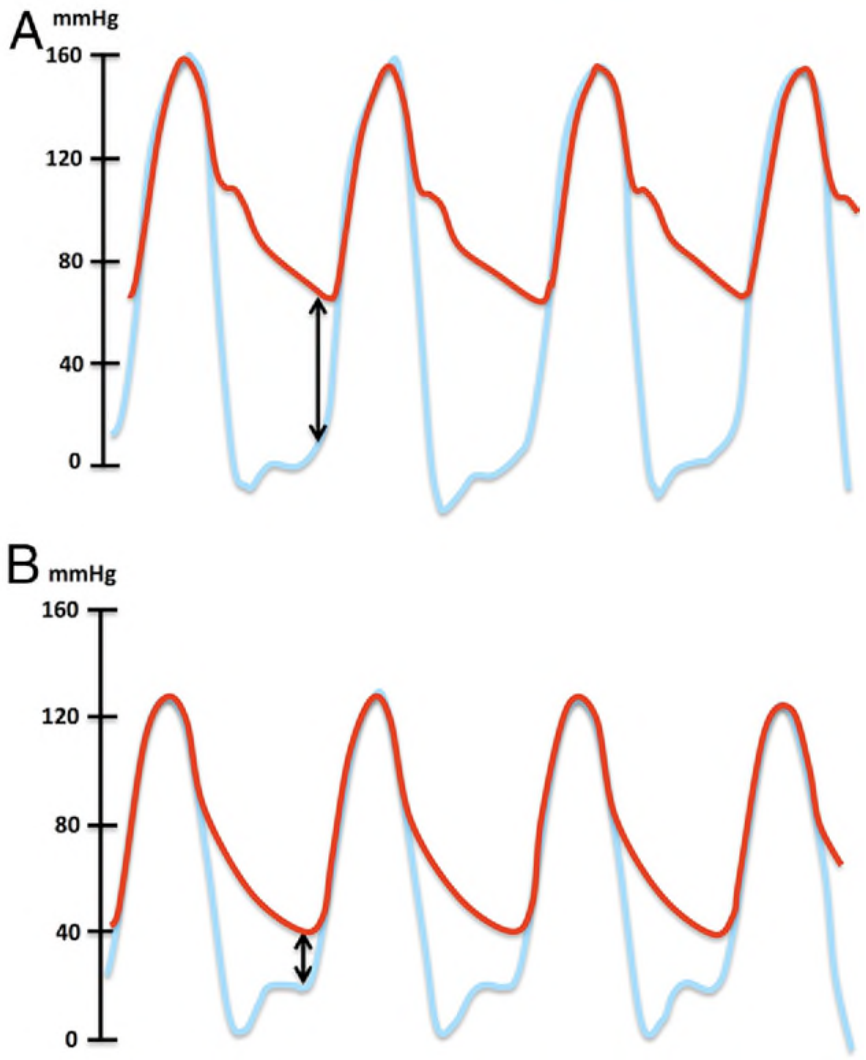
LHC IN CHRONIC AORTIC REGURGITATION



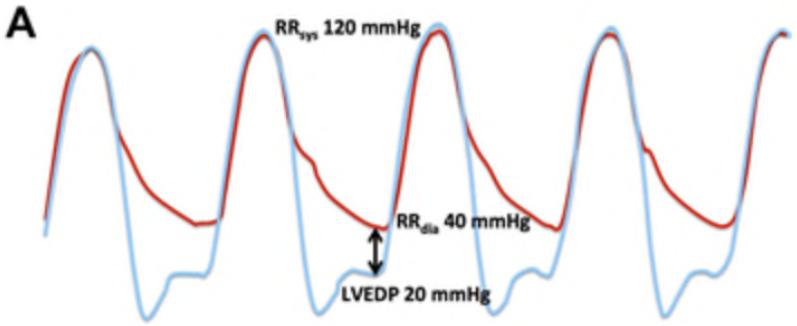
LHC IN ACUTE AORTIC REGURGITATION



LHC IN AORTIC REGURGITATION ASSESSMENT POST TAVR

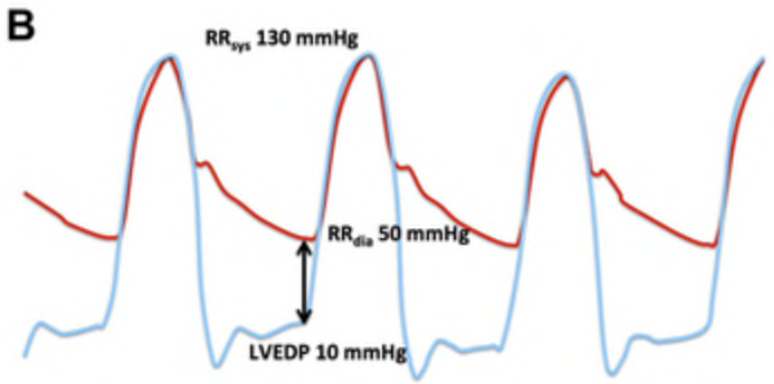


AR INDEX POST TAVR



Aortic Regurgitation Index = $[(RR_{dia} - LVEDP) / RR_{sys}] \times 100$

= $[(40 - 20) / 120] \times 100 =$ **16.7**



Aortic Regurgitation Index = $[(RR_{dia} - LVEDP) / RR_{sys}] \times 100$

= $[(50 - 10) / 130] \times 100 =$ **30.8**