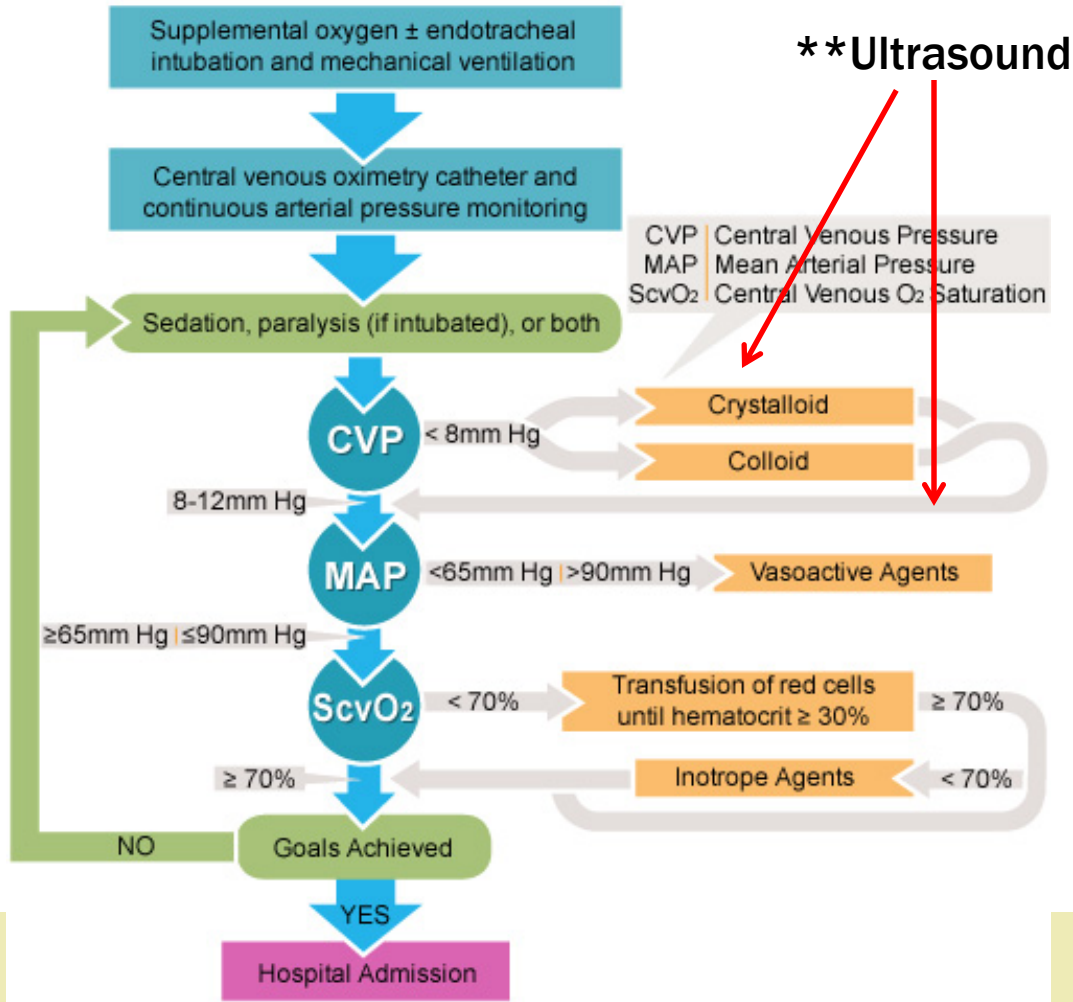


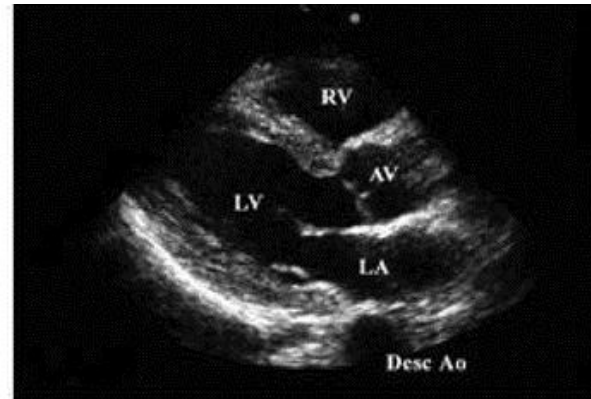
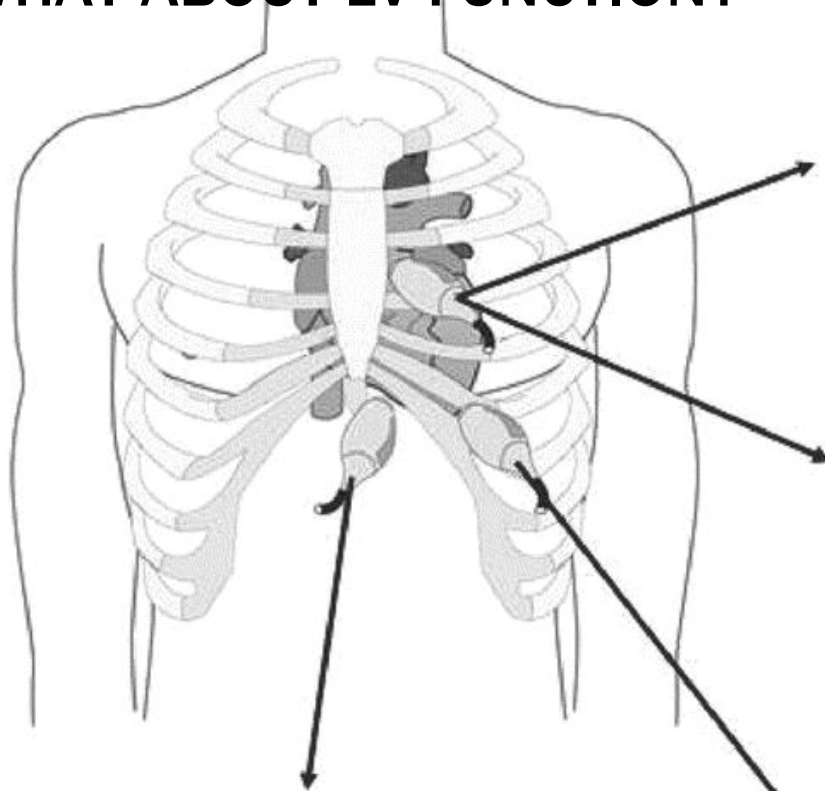
CASE

- 80 y/o male presents with 2 day history of general malaise
- BP 95/45, RR 18, HR 85, SpO2 100% RA
- With use of bedside ultrasound you will evaluate the patient for emergent causes of hypotension.

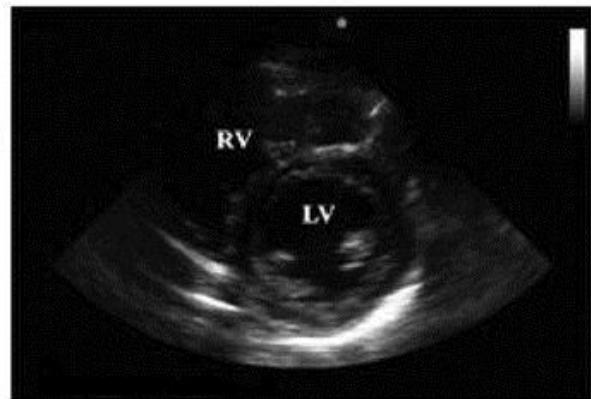
EARLY GOAL DIRECTED THERAPY



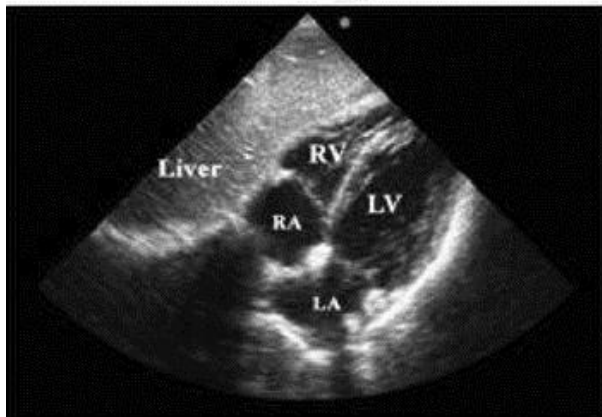
WHAT ABOUT LV FUNCTION?



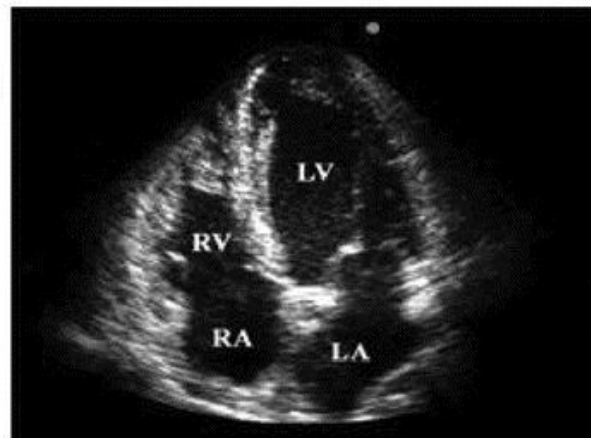
A



B



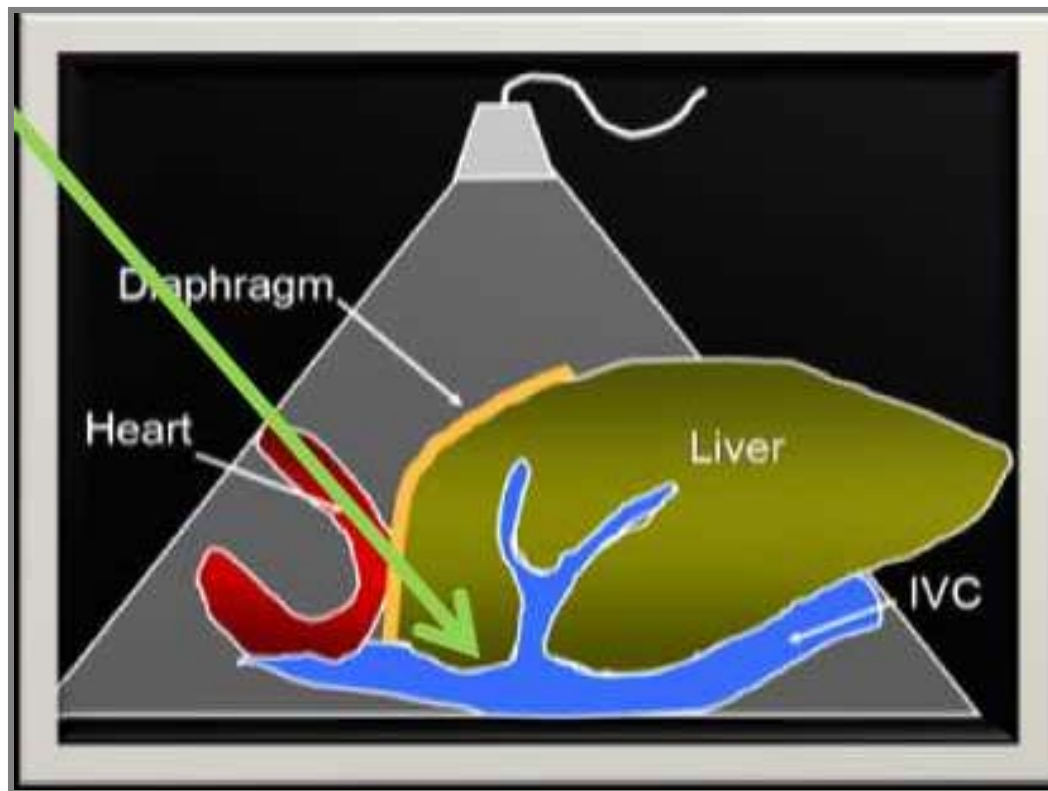
D



C

- **Prospective, observational study**
 - **51 adult patients with symptomatic hypotension**
- **LVF categorized**
 - **normal (> 55%)**
 - **depressed (25-55%)**
 - **severely depressed (< 25%)**
- **84% agreement with cardiologist**
- **Kappa 0.86 b/w EP and cards**
 - **Kappa 0.84 b/w cardiologists**

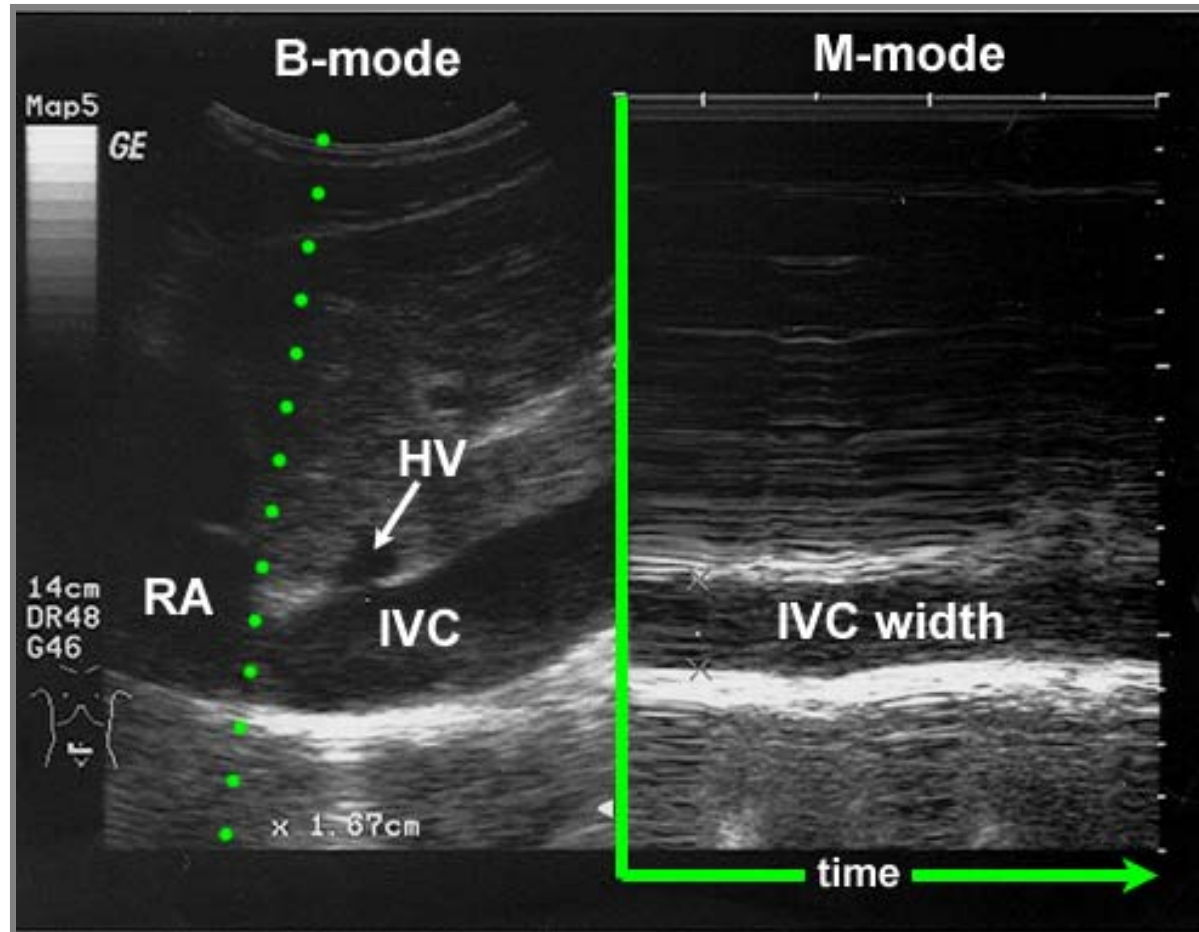
IS MY HYPOTENSIVE PATIENT VOLUME DEPLETED?



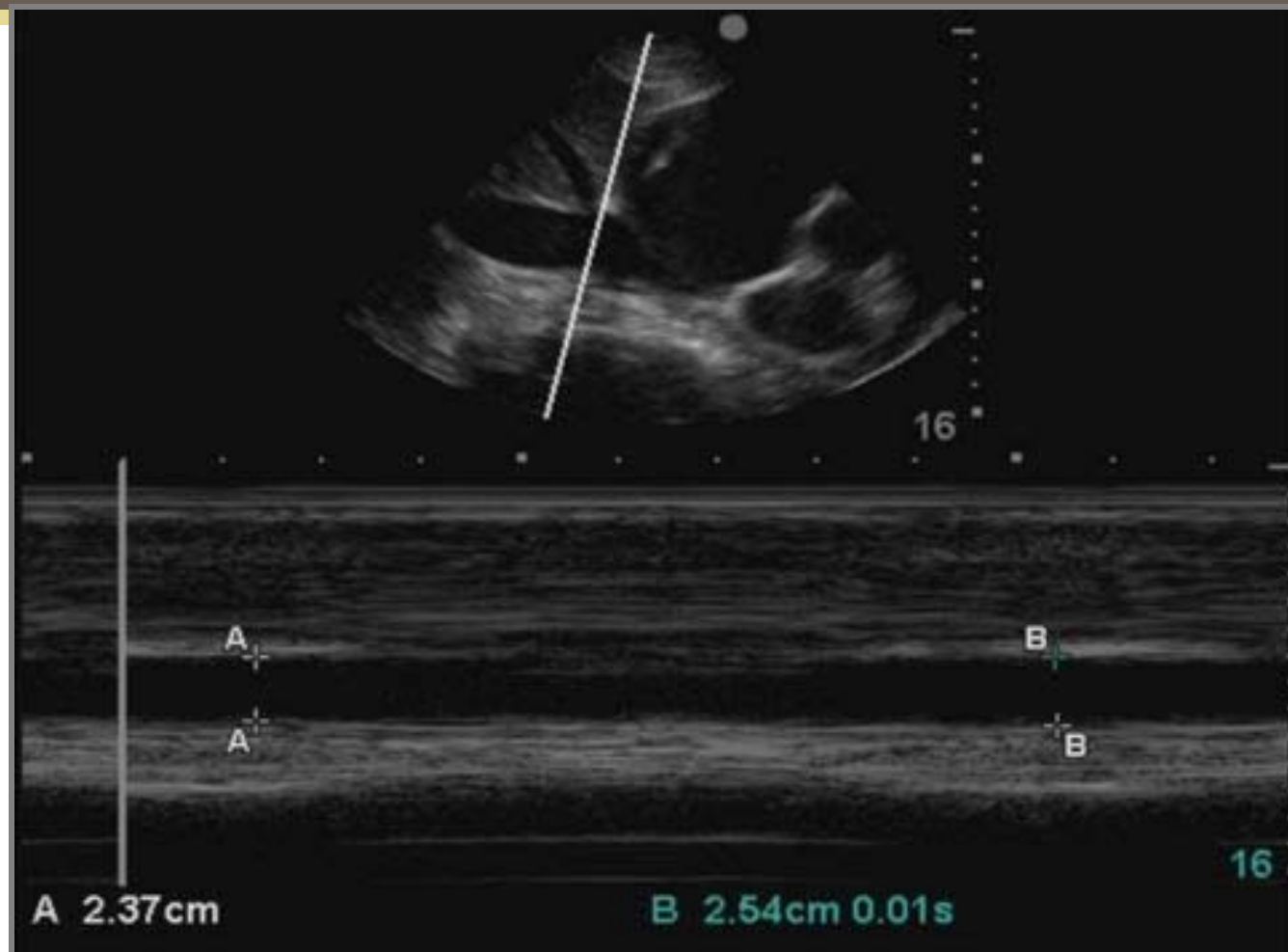
IS MY HYPOTENSIVE PATIENT VOLUME DEPLETED?

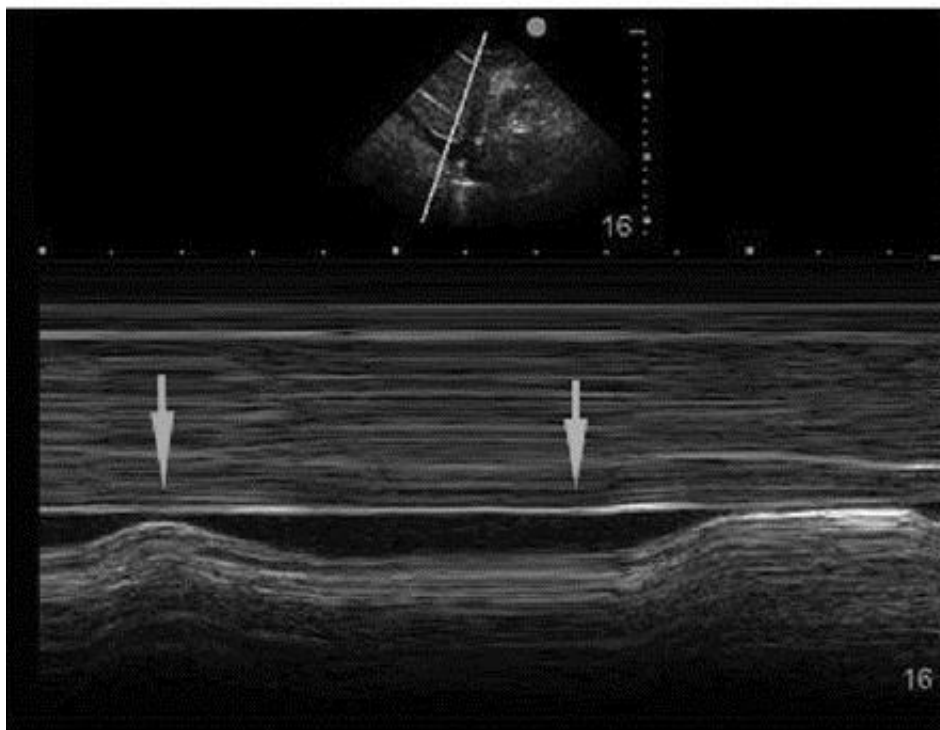
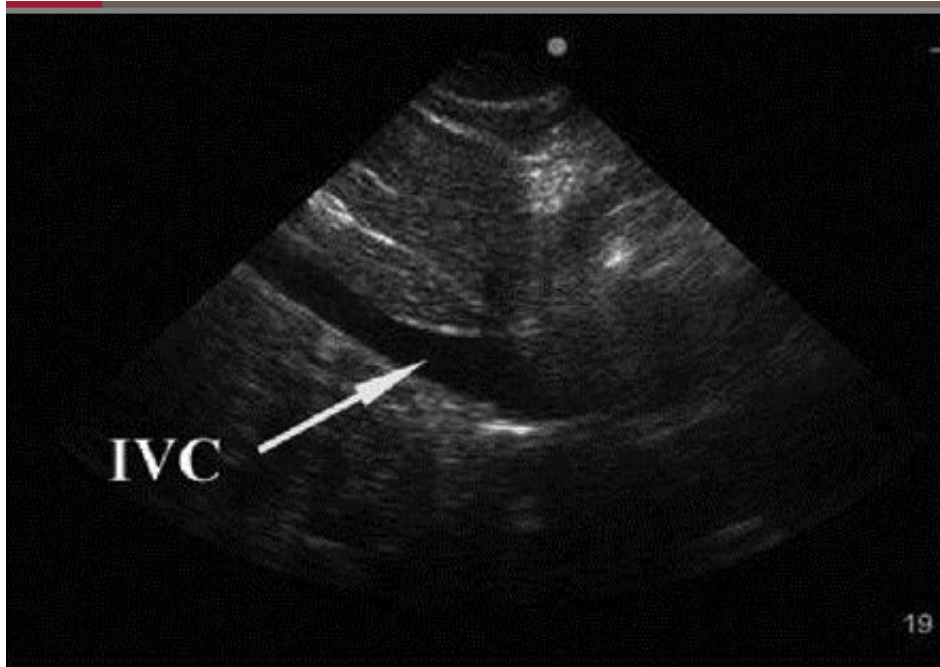


USING M-MODE TO MEASURE CAVAL INDEX AT RA AND IVC JUNCTION



“SNIFF TEST” MEASURE CAVAL INDEX DURING INSPIRATION AND EXPIRATION





Have patient sniff and measure greatest and smallest distance; This represents max and min diameter of IVC, difference is “caval index”

IS MY HYPOTENSIVE PATIENT VOLUME DEPLETED?

IVC measurement	% IVC collapse during inspiration	Estimated central venous pressure (CVP)
< 1.5cm	> 50%	0 – 5mm Hg
1.5 – 2.5cm	> 50%	5 -10 mm Hg
1.5 – 2.5cm	< 50%	10 – 15 mm Hg
> 2.5cm	Little	15 – 20+ mm Hg

IS MY HYPOTENSIVE PATIENT VOLUME DEPLETED?

IVC	cm	insp collapse	CVP
Probably needs fluid load	< 1.5	Complete	< 5
Possible Right Heart Failure	>2.5	No Collapse	>20

NONINVASIVE ESTIMATION OF RIGHT ATRIAL PRESSURE FROM THE INSPIRATORY COLLAPSE OF THE INFERIOR VENA CAVA.

- “Caval Index” (% collapse with inspiration)
 - < 20%
 - 38% sensitive, 100% specific for RAP > 10
 - > 80%
 - 98% sensitive, 14% specific for RAP < 10

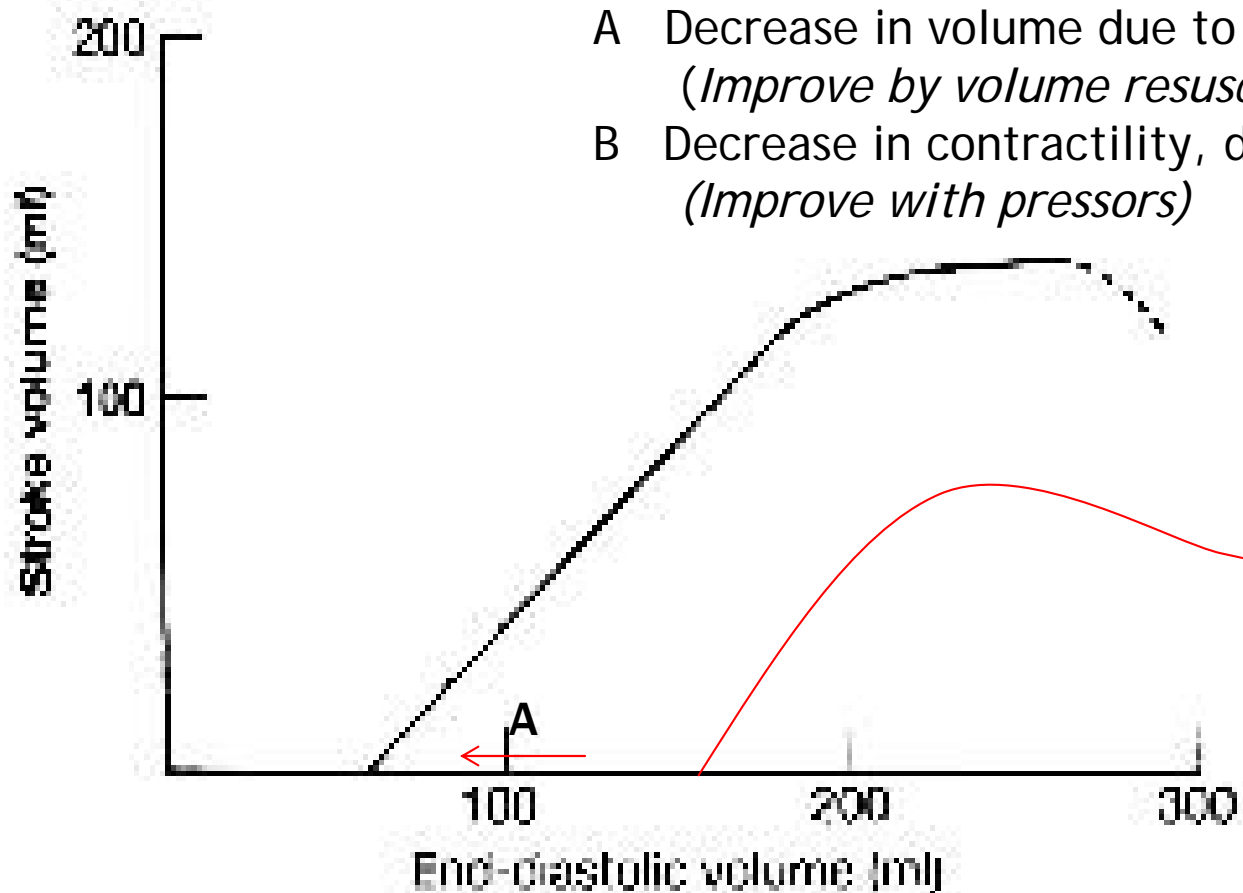
INTENSIVIST USE OF US TO MEASURE IVC COLLAPSIBILITY IN ESTIMATING INTRAVASCULAR VOLUME STATUS: CORRELATIONS WITH CVP

- IVC exams performed by intensivists
 - 3 hours of didactics
 - 25+ proctored exams
 - Compared to invasive CVP catheters
- Best correlation with low and high collapsibility ranges
 - Correlation was significant in all three ranges measured (<20%, 20-60%, >60%)

A COMPARISON BY MEDICINE RESIDENTS OF PHYSICAL EXAMINATION VERSUS ULTRASOUND FOR ESTIMATION OF RIGHT ATRIAL PRESSURE.

- Limited training session
 - 4 hours didactic
 - 20 bedside exams
- 40 patients had RA Pressure estimated
 - Ultrasound 90% accurate
 - JVD 63% accurate
 - Cardiac cath performed within 1 hour of exam as gold standard

CHANGES IN CARDIAC FUNCTION DUE TO SEPSIS



- A Decrease in volume due to third spacing
(*Improve by volume resuscitating*)
- B Decrease in contractility, decrease SV, CO
(*Improve with pressors*)