



Volume Status and Fluid Responsiveness

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超音波訓練講師



上完課就一定會

- 可以灌水嗎？
- **Volume status** :
hypovolemia vs overload
- **Fluid responsiveness** :
spontaneous breathing vs
mechanical ventilation
- **Fluid tolerance**

請問

HONDA ELECTRONICS HS-2000

DR TAHIR A SIDDIQUI NOBEL TOWN

2014/01/23
12:37

ID :

AGE:

PROBE

1:-----

2:HCS-4381
BOR 3.5MHz

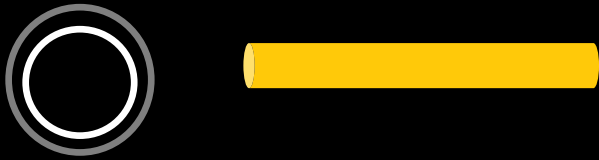
G: 84 D:78 R:100-Probe2 7.8



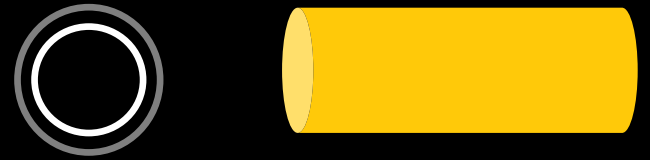
1太多 2太少 3不知道

Shock

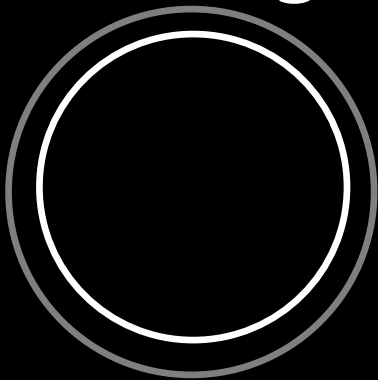
Hypovolemic



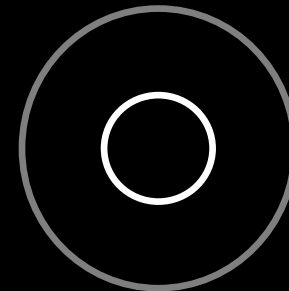
Obstructive



Cardiogenic



Distributive

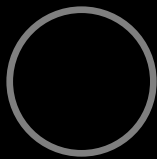


Underload

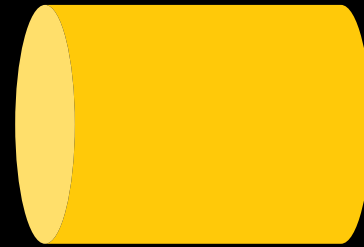
Overload



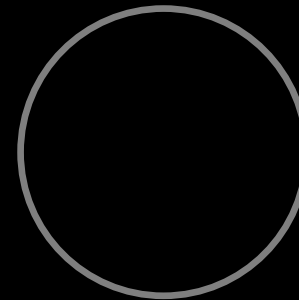
$IVC < 1CM (MV+0.5)$
Collapsible



$LVEDA < 10CM^2$



$IVC > 2CM (MV+0.5)$
Non-collapsible



$LVEDA > 20CM^2$

Systole



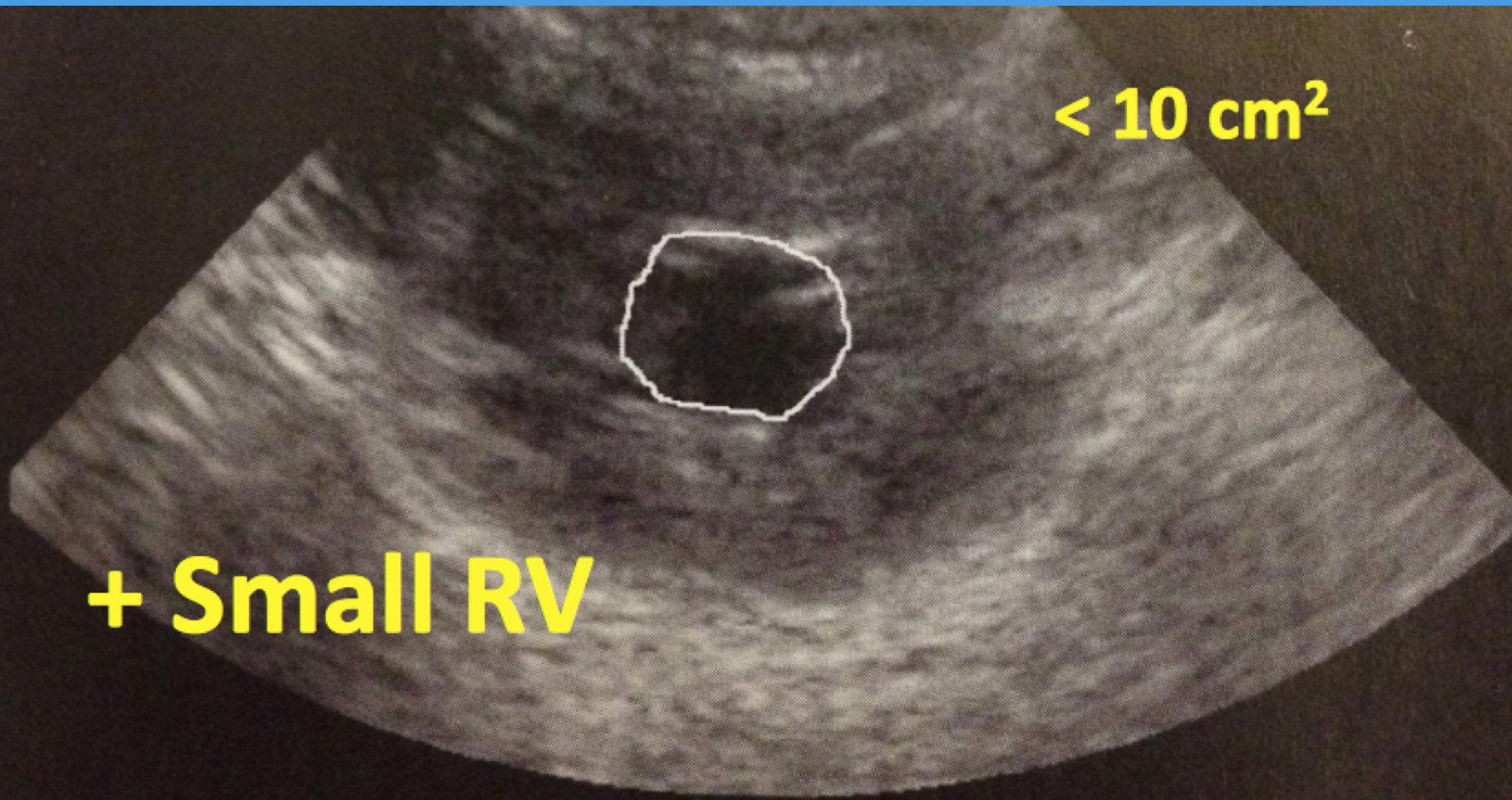
LVEDA

< 10 cm²

+ Small RV

Diastole

AV 3.30cm²



IVC

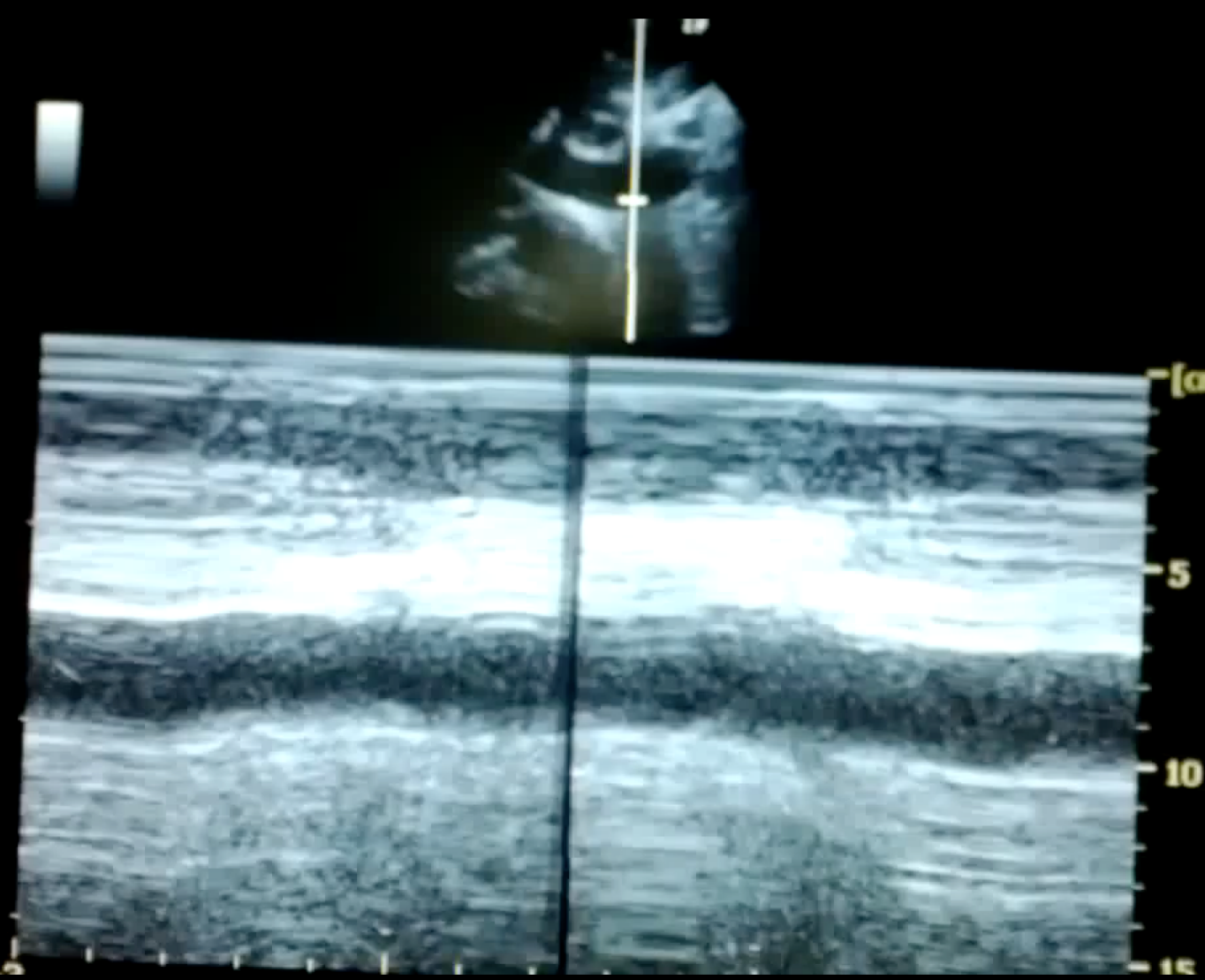
- Collapsible



- Non-Collapsible



730 (4.3:16.6 s)
ession
leaflet
Worksheet



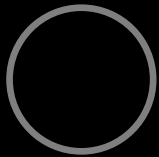
B CHI
Frq 3.0
Gn 60
E/A 1/2
Map N/O
D 16.0
DR 81
FR 44
AO 100

Underload

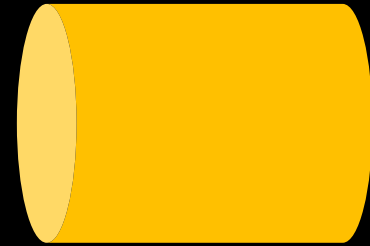
Overload



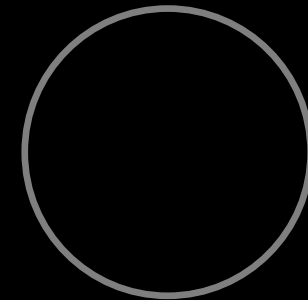
$IVC < 1CM (MV+0.5)$
Collapsible



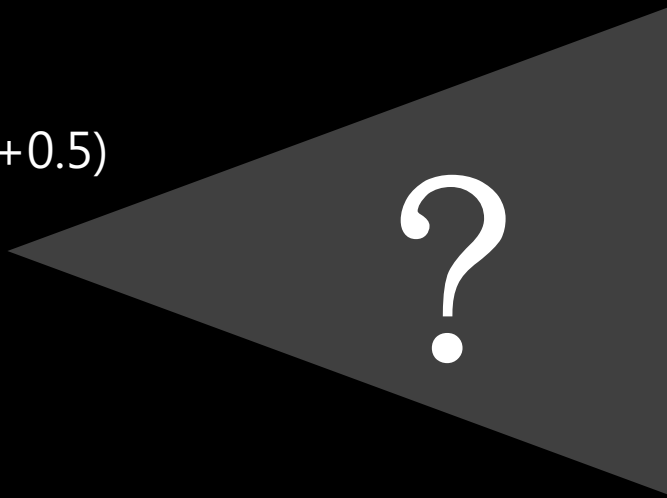
$LVEDA < 10CM^2$



$IVC > 2CM (MV+0.5)$
Non-collapsible



$LVEDA > 20CM^2$



Fluid Responsiveness

Increase of **stroke volume** of 10-15%
after 500 ml of crystalloid

灌水有效！！

Fluid Responsiveness



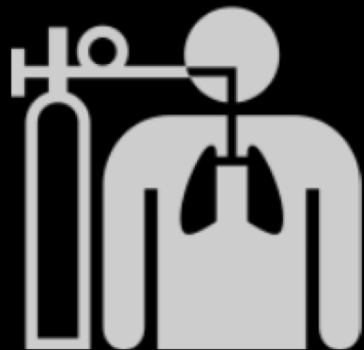
IVC Collapsibility

$$\Delta IVC = 100 \times \frac{(IVC_{exp} - IVC_{insp})}{IVC_{exp}}$$

>40~50%

扁超過一半

Fluid Responsiveness

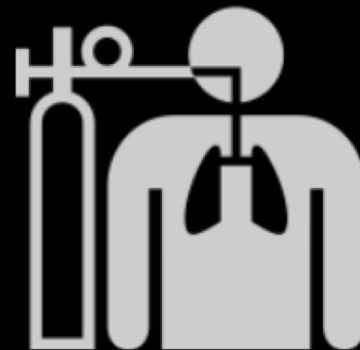


IVC Variation

$$vIVC = 100 \times \frac{IVC_{max} - IVC_{min}}{IVC_{mean}}$$

>12%

扁超過九分之一



IVC Distensibility

$$\Delta IVC = 100 \times \frac{(IVC_{insp} - IVC_{exp})}{IVC_{exp}}$$

>18%

扁超過六分之一

Passive Leg Raising test



Semi-recumbent position



Passive leg raising

等同灌水效果！！



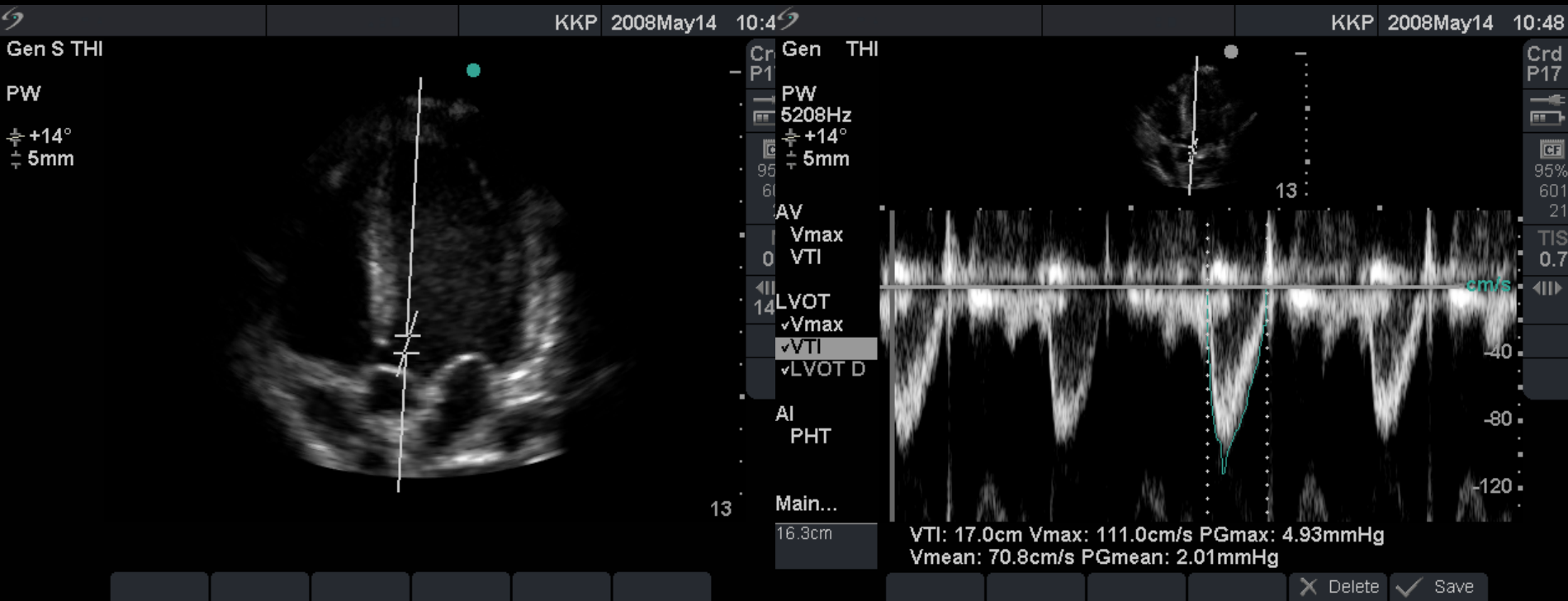
PLR mimics fluid challenge



**Unlike fluid challenge, no fluid is infused,
and, the effects are reversible and transient**

Before and After PLR

LVOT Velocity Time Integral

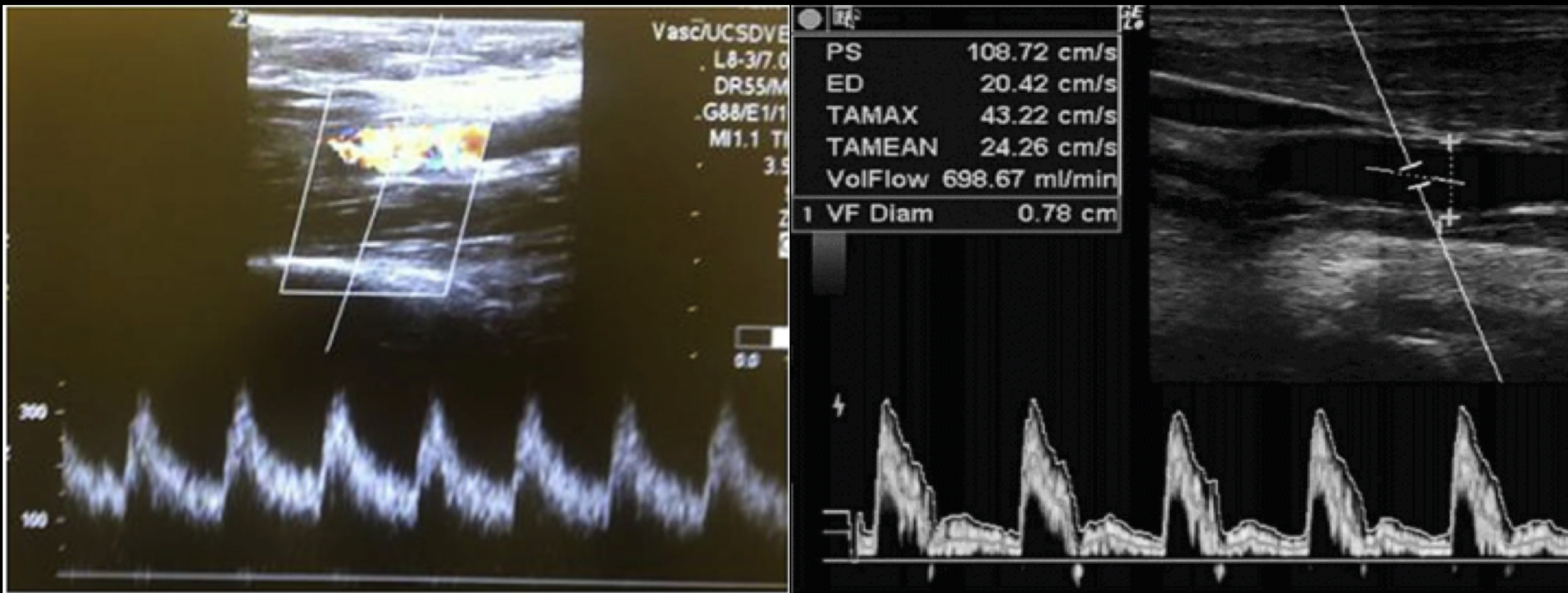


>12.5%

Peripheral artery Peak velocity variation

Brachial artery peak velocity

Carotid artery peak velocity

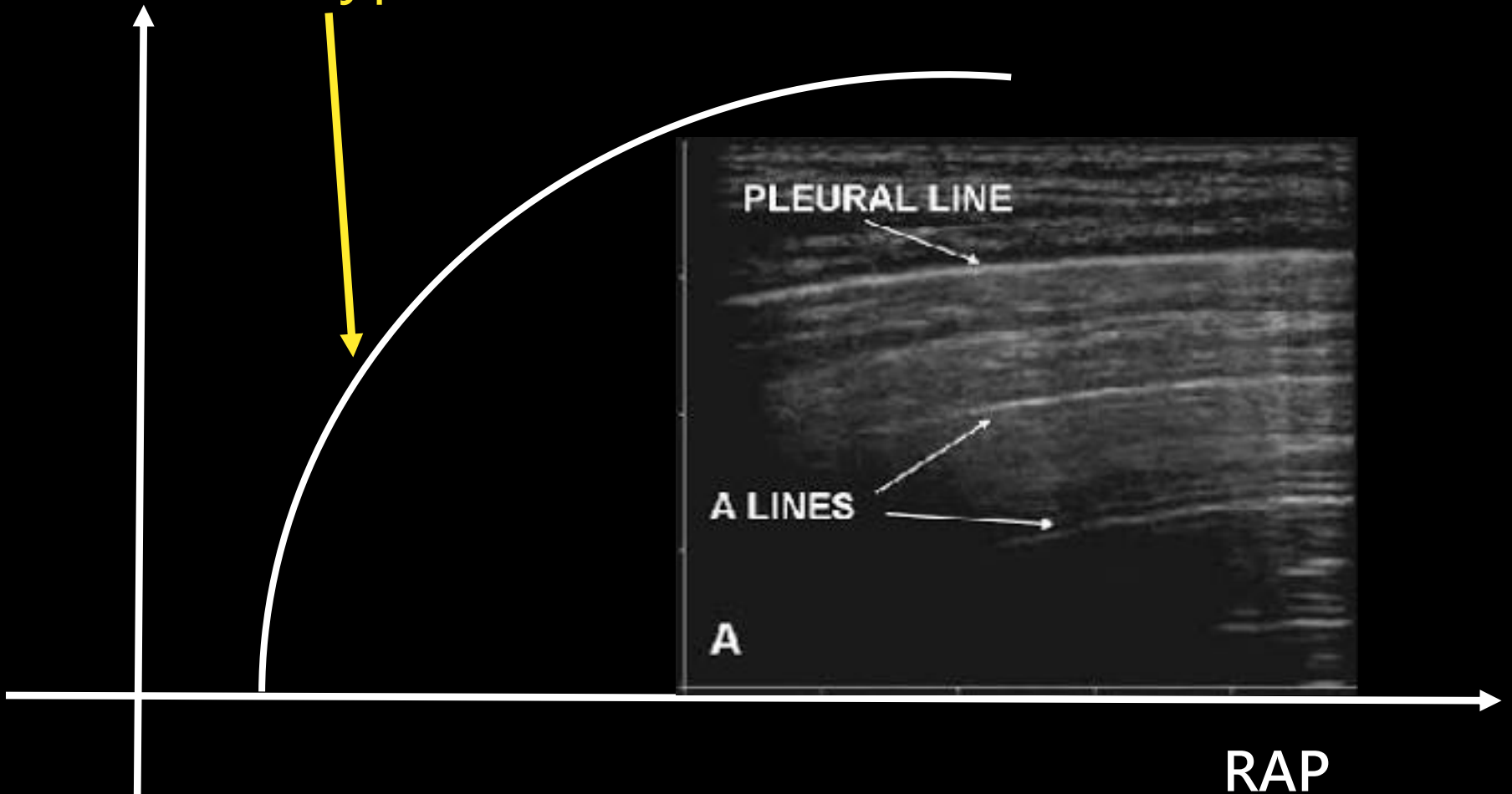


>10%

Fluid Tolerance

CO

Hypotension + No B lines = Fluid tolerant



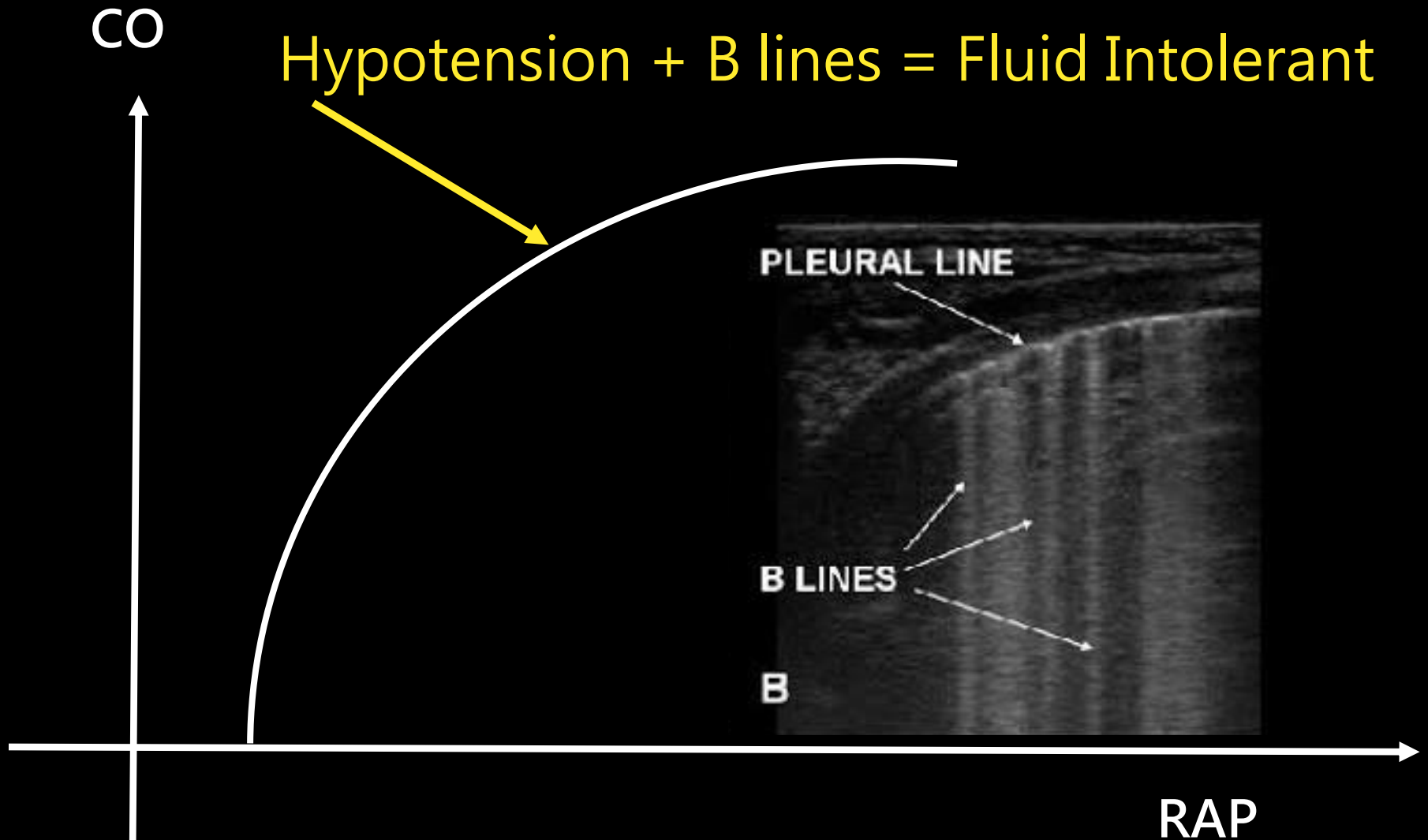
PLEURAL LINE

A LINES

A

RAP

Fluid Tolerance



Fluid Responsiveness



Heart

- Obstructive??
- LVEDA小嗎？

IVC

- $<1\text{cm?}$ $>2\text{cm?}$
- SB扁一半 MV扁六分之一
- PLR後LVOT VTI或 Artery peak velocity

B line

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