Resuscitation Echocardiography

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Disclaimers

No financial conflict of interest
Disclaimers

I am not a cardiologist
65 M Emergency Ex-Lap for SBO h/o "heart murmur"

T 97.1
HR 120
RR 30
BP 90/45
$O_2$ 100% on NRB mask
Now what?

a. 500 mL LR bolus on pressure bag
b. Furosemide 40 mg IV push
c. Dobutamine at 5 mcg/kg/min
d. Metoprolol 5 mg IV push
A true craftsman never blames his/her tools.
Comprehensive vs. Point-of-Care

“Everything should be made as simple as possible, but not simpler.”

-Albert Einstein
Ask Yes/No Questions

Is there a significant pericardial effusion?

Is the systolic function normal?

Is the RV as big as the LV?

Is there severe valvular pathology?
Parasternal Long-Axis

2-3\textsuperscript{rd} intercostal space
Left sternal border
Probe marker to right shoulder
Parasternal Long-Axis

- LV
- LA
- RVOT
- AV
Parasternal Short-Axis

2-3\(^{rd}\) intercostal space
Left sternal border
Probe marker to left shoulder
Parasternal Short-Axis Mid-Papillary
Parasternal Short-Axis Mitral Valve
Parasternal Short-Axis Aortic Valve
Parasternal Short-Axis Apex

RV

LV

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Apical Four-Chamber

5-6\textsuperscript{th} intercostal space
Left anterior axillary line
(at PMI)
Probe marker to left
Apical Four-Chamber

LV
LA
RV
RA

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63 bpm
Velocity-Time Integral (VTI)
Subcostal Four-Chamber

Under xyphoid process
Probe marker to left
Subcostal IVC

Under xyphoid process
Probe marker cephalad
Can predict “volume response”

Sepsis:
Shock 2013;39(2):155

Shock:
Crit Care 2012;16:R188
AJEM 2012;30:1414 (meta-analysis)

Trauma:
J Trauma. 2007 Dec;63(6):1245

Dialysis:
Nephrol Dial Trans 1989;4:563

CHF/UF:
Intensive Care Med. 2010 Apr;36(4):692-6
SMACC: The Dark Art of IVC Ultrasound

IVC ultrasound: The Ultimate Myth

Dr Justin Bowra
Sydney Adventist & Royal North Shore Hospitals
SMACC 2013

Thanks esp to Drs Kylie Baker & Adrian Goudie
IVC US as good as CVP

Left vs right heart

If CVP wouldn’t help you,
Then IVC ultrasound won’t either

But at least you don’t need a central line
Tolerant

Fluid Responsive
NOT SURE IF I SHOULD POST INSPIRATIONAL QUOTE ON SOCIAL MEDIA

OR GO APPLY IT TO MY LIFE
65 M Emergency Ex-Lap for SBO h/o “heart murmur”

T 97.1
HR 120
RR 30
BP 90/45
$O_2$ 100% on NRB mask
### Cardiogenic
- No cardiac motion
- Asystole
- Metabolic causes ($H^+, K^+, O_2$, etc.)
- Irregular
  - Arrhythmia
    - VT/VF, SVT, afib, etc.
- Valvulopathy
  - MR, MS, AI, AS, etc.
- Low EF
- Decreased systolic function
  - CHF, acute MI
- Normal/high EF
  - Evaluate other causes →

### Obstructive
- Pericardial compression
- Underfilled ventricles
- Tamponade
- Dilated RV > LV
- Low LV preload
- PE, Tension PTX,
  - LA/PA compression,
  - RV infarct, etc.
- Small RV
- Low RV preload
- IVC compression
- SVC compression
- Small RV and LV
  - Evaluate other causes →

### Hypovolemic
- Small IVC
- Low RV preload
- Hypovolemia
- Low RV and LV EDV
- Low RV/LV preload
- Hypovolemia
- Normal filling
  - Evaluate other causes →

### Distributive
- No other explanation for hypotension
- Low SVR
- Sepsis, anaphylaxis, neurogenic shock, etc.

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