

*CON: Resuscitative US is not  
so essential*



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BLUE

POCUS

CORE

FEER

ACES

Which algorithm do you use!!

RUSH

EGLS

ACES

UHP

PEA

FALLS

A personal story

# History & Physical

- All studies say to do this
  - BUT is it done?
  - AND - - How carefully|
- Crucial for setting the pre-test probability
- Important or “focusing the exam”

## Example

- Pulseless arrest and large RV 10 days post debridement and stabilization of spinal abcess

# “Essential” needs after Hx & Physical

- BP
- HR
- Temp
- SAT
- ECG
- IF shock and no rapid response to fluid,  
need a central line

Role for US

# “Essential” depends on primary process?

- Trauma Essential early
- Shock  
Cardiac ECG best 1<sup>st</sup> step; US helps evaluate degree
  - Ischemic? Code STMI – has no US
  - Non-ischemic
    - » Myopathy, acute valve Important when failure of rapid improvement
    - » RV vs LV, PE, Tamponade
  - Distributive -- Less help – tells you what is not wrong
- Arrest – first step is drug for PEA or defibrillate before doing US

Can help determine if there is any activity

# RV dysfunction

- I do not find echocardiography that useful for this
- Signs are not really evident until you have already overloaded the patient

- Cardiac echocardiogram assesses cardiac function NOT cardiac output
- But tissue metabolism is about Flow

## Example

□ EDV is 400 ml and EF is 15% -- SV = 60ml

If HR is 80 b/min  $Q = 4.8$  L/min

□ EDV 110 ml and EF 50% but RV is limited (but not dilated)

If HR = 80 b/min  $Q = 4.4$  L/min



# Pre-test probability is critical for assessing significance of any test (Bayesian analysis)

## EG: test has:

Sensitivity = 90%

Specificity = 90%

**Prevalence of disease in population = 1/100:**

Result: 1/1 detected  
**10 false +ve**

**Prevalence of disease in population = 50/100:**

Result: 45 detected  
**5 false +ve**

# IVC and fluid responsive

- Fluids primarily act by increasing CO
- I thus would rather have a test that told me whether or not CO changed with the fluid bolus rather than telling me that the pt is likely to respond.
- ie a “responsive approach”

Limited echocardiography–guided therapy in subacute shock is associated with change in management and improved outcomes ☆,☆☆

Hussein D. Kanji, MD, MSc, MPH <sup>b,d</sup>, Jessica McCallum, BSc <sup>c</sup>, Demetrios Sirounis, MD <sup>a,b</sup>, Ruth MacRedmond, MD <sup>a,b</sup>, Robert Moss, MD <sup>c</sup>, John H. Boyd, MD <sup>a,b,d,\*</sup>

Journal of Critical Care 29 (2014) 700–705

Significant reduction in fluid use; more inotropes.

Positive outcome measures

But only 1 test – after that basic clinical judgement!

Was real benefit not following SEPSIS guideline's fluid rules!

Could same clinical judgement have been made without the initial echo?!

Did this just represent a change in understanding!

# Point-of-Care Ultrasonography for Evaluation of Acute Dyspnea in the ED



*Maurizio Zanobetti, MD; Margherita Scorpiniti, MD; Chiara Gigli, MD; Peiman Nazerian, MD; Simone Vanni, MD; Francesca Innocenti, MD; Valerio T. Stefanone, MD; Caterina Savinelli, MD; Alessandro Coppa, MD; Sofia Bigiarini, MD; Francesca Caldi, MD; Irene Tassinari, MD; Alberto Conti, MD; Stefano Grifoni, MD; and Riccardo Pini, MD*

CHEST 2017; 151(6):1295-1301

- 2683 pt with acute dyspnea in ER
- US (PoCUS) dx in 24 min  $\pm$  10 min vs regular in 186  $\pm$  72 min
- No significant differences in accuracy
- Standard better for PE, COPD/asthma
- PoCUS better for CHF

BUT no outcome data eg time in hospital, mortality, time in ER  
AND....


*Sami Alsolamy, MD, MPH*  
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*Riyadh, Saudi Arabia*

the ED with dyspnea, we would like to highlight an important point regarding shortening the diagnostic timeline by using PoCUS. Overall, after the initial assessment when managing a patient in the ED, using pretest probabilities for a suspected disease generates individualized suspected diagnoses for a given patient. The pretest probability is often either high enough to guarantee the diagnosis and warrant treatment or low enough to disprove the suspected diagnosis.<sup>2</sup>

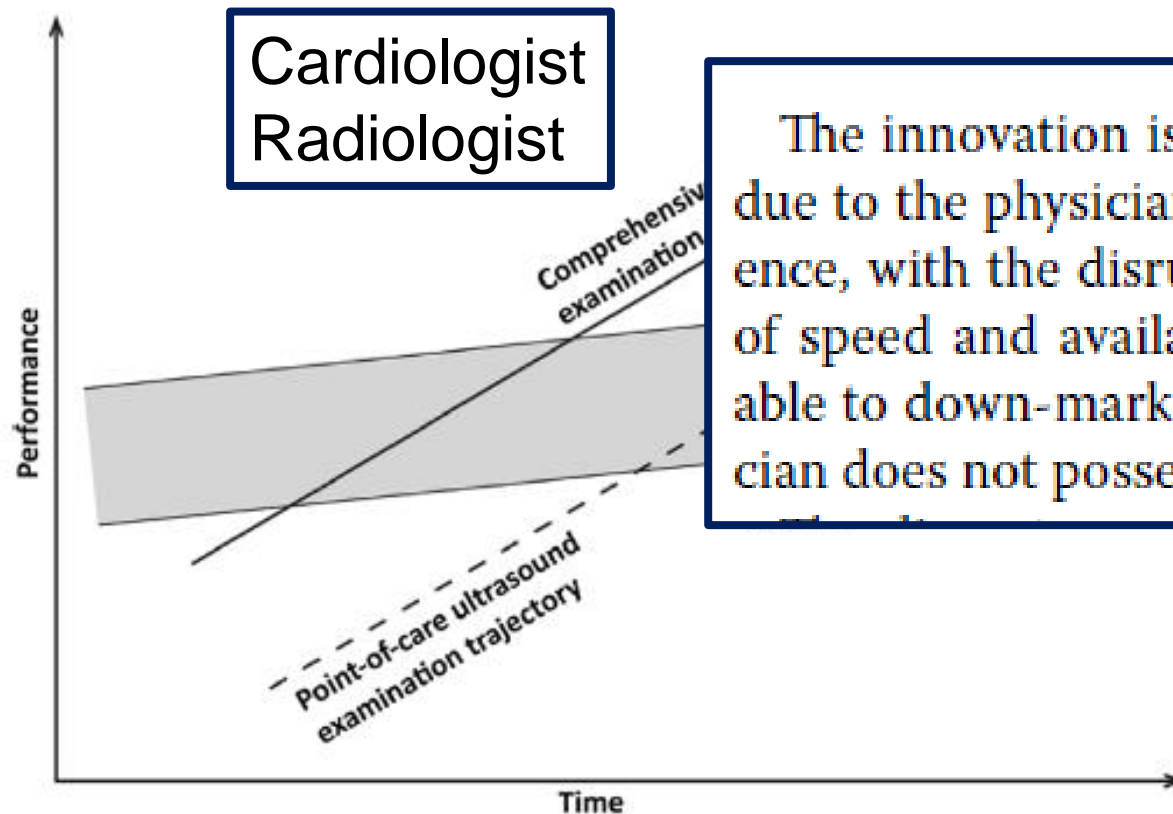
In other words were dx actually made by physicians but yet called uncertain.

*Key issue of pretest probability*

# Is point-of-care ultrasound disruptive innovation? Formulating why POCUS is different from conventional comprehensive ultrasound

Jesper Weile<sup>1,2\*</sup> , Jacob Brix<sup>3</sup> and Anders Broens Moellekaer<sup>1,2</sup>

Weile *et al. Crit Ultrasound J* (2018) 10:25



The innovation is vulnerable to up-market movements due to the physician performing over the means of existence, with the disruptive innovation losing the strengths of speed and availability. The innovation is also vulnerable to down-market movement if the performing physician does not possess sufficient competency.

# Transthoracic echocardiography for cardiopulmonary monitoring in intensive care

*European Journal of Anaesthesiology* 2004; 21: 700–707

M. B. Jensen, E. Sloth, K. M. Larsen, M. B. Schmidt

## Focused assessed transthoracic echo protocol FATE

- 210 ICU pts
- 4 cardiac views
- Views successful in 97% of pts
- **BUT:** subcostal 58%, apical 80%, parasternal 69%
- Supplemental in 37% and supportive in 36% and decisive in 25%

# Significance of failure to obtain all images

- Very important to decide before you image what are the key things you are looking for

In other words:

- you need a clinical hypothesis

limits your conclusion

- Knowing what your looking for makes you more sensitive to abnormalities



Loss of other skills

# Access

- Yes – even without direct guidance it is useful to know that the vein is there
- However, there has been a loss of the ability to do a quick line when a machine is not immediately available

# Distraction

- “only takes 5 to 10 minutes!

For an acutely ill patient that is a long time!

# Summary

- The value of US in resuscitation depends upon the patient population
  - (highest in trauma)
- Must not forget basic initial assessment
- Importance of pre-test probability
- Avoid distraction and obsession when imaging is not simple

US is NOT **SO** essential for resuscitation

But it certainly can be helpful!