



Developing an ultrasound Curriculum for Anesthesia-Critical Care Trainees

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Disclosures

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My experience with ultrasound

- Using point-of-care ultrasound in critically ill patients for more than 5 years
- Completed the 'certificate of completion' course in critical care ultrasound developed by the American College of Chest Physicians
- A testamur of the NBE's Examination of special competence in adult echocardiography (the cardiology echo boards)
- Started an ultrasound curriculum for ICU fellows at MGH
- Teach ultrasonography at local, regional and national levels

Outline

- What do we mean by 'focused' or 'point-of-care' ultrasound (FoCUS)?
- What questions can we ask with FoCUS?
- What guidelines exist to assist the development of curricula?
- Basic vs. advanced training
- Creating an ultrasound course at your department – what do you need in terms of:
 - Expertise
 - Infrastructure
- Should basic critical care ultrasound become a mandatory part of Anesthesia-ICU fellowship training?

BLUF (Bottom line up front)

- Focused ultrasound adds a useful and versatile tool to the arsenal of anesthesia and ICU clinicians
- I believe that FoCUS should be part of the required curriculum in Anesthesia-CCM programs
- The single most important requirement for setting up a FoCUS program is having intensivists who use FoCUS routinely in clinical practice

Why use ultrasound in the ICU?

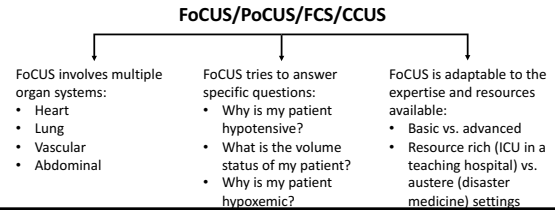
- FoCUS has become increasingly popular in intensive care settings, but many clinicians remain underwhelmed
- Ultrasound is not an ideal monitor (there is no single, ideal monitor)
- It is a great adjunct to tools we routinely use in the ICU/OR, and adds another dimension to our ability to assess our patients' physiology
- It is non-invasive, can be performed immediately, and can be repeated as needed



What is the scope of FoCUS?

FoCUS is a **focused** examination of the **cardiovascular system** performed by a physician using ultrasound as an **adjunct to the physical examination** to recognize specific ultrasonic signs that represent a **narrow list of potential diagnoses in specific clinical settings.** (ASE Consensus statement 2010)

I am not a huge fan of this narrow definition

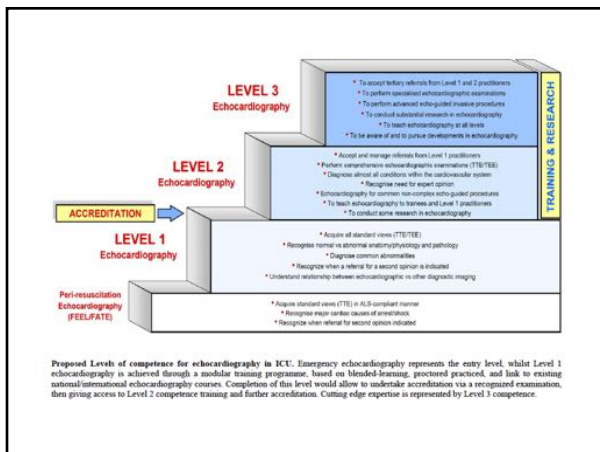


Current status of FoCUS training

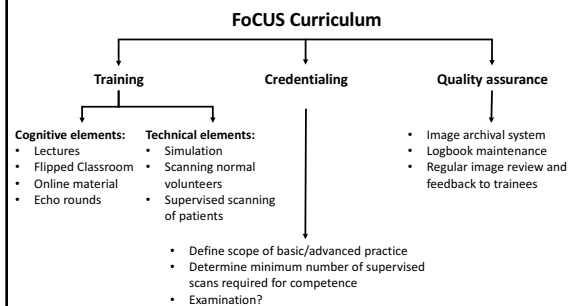
- Many societies have published recommendations for training in focus – among them ACCP/SCCM/ESCIM/WINFOCUS/SOCCA
- There is general agreement that a formal certification process is NOT necessary for BASIC FoCUS (although some certification processes exist, such as the CoC by the ACCP in the US).
- Basic FoCUS training and credentialing can be handled at the level of the individual hospital/department
- Basic FoCUS training has now been incorporated in Pulmonary Critical Care medicine fellowships
- However, standards of training across hospitals vary widely
- Anesthesiology programs have years of experience with training in TEE/periooperative echo and the use of ultrasound for regional anesthesia and vascular access, but training standards for FoCUS vary quite dramatically

Basic and Advanced FoCUS

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| <p>• Basic FoCUS</p> <ul style="list-style-type: none"> ▪ Heart/Lung/Vascular/Abdominal ultrasound ▪ Cardiac exam limited to: <ul style="list-style-type: none"> ▪ 5 standard views ▪ No use of doppler ▪ Limited measurements (IVC diameter, etc) ▪ Local certification/credentialing | <p>• Advanced FoCUS</p> <ul style="list-style-type: none"> ▪ High level of facility with basic exam ▪ The ability to do a comprehensive echo exam with all views ▪ Familiarity with various doppler modes/M mode ▪ Facility with quantification as needed (SV, RVSP, TAPSE) ▪ Experience with TEE ▪ National Certification system (NBE) |
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Elements of a Basic FoCUS Curriculum



Training – what does a program need?

- Only about 36% of Anesthesiology programs had some elements of FoCUS training, according to a recent survey (Conlin F, et al. *J Cardiothorac and Vasc Anesth* 2016)
- In our experience, the following factors are helpful in beginning a FoCUS program:
- **Essential:** Anesthesiologists who use FoCUS at the bedside, and 24/7 availability of a FoCUS capable machine in the ICU
- **Helpful:** Image archival systems, simulators, a good relationship with the cardiology division

My own biases

- What kind of machine?
 - Should ideally be capable of M mode, color and spectral doppler, tissue doppler and image transmission/storage
 - Handheld machines are great for codes across the hospital, but too limited for routine use
- Image archival is critical
- Teach concepts rather than algorithms
- Get buy-in from department/division leadership
- Invest in developing a nucleus of ultrasound experts

Leverage locally available expertise

- Cardiac anesthesiologists
- Emergency medicine ultrasound experts
- Pulmonary Critical Care Specialists who have integrated ultrasound into their ICUs
- Pool expertise in neighboring institutions for joint ultrasound rounds/teaching sessions
- Send one or two 'ultrasound leaders' to a high quality national or regional ultrasound course to create the nucleus of an ultrasound group in your hospital

Pitfalls and challenges

- Lack of utilization – if residents and fellows do not see FoCUS utilized in real patients, they will not have an incentive to learn
- Lack of appropriate equipment – a hand-held scanner is NOT ideal, although it has some utility (in code teams, for example). The better the machine, the more versatile it's utility
- Lack of archival systems
- Lack of institutional support or resistance from other specialties (cardiology)
- An unrealistic standard for evidence to support 'improved outcomes' with FoCUS before adopting it
- Lack of a national certification system at the advanced level: The NBE is expected to introduce certification in advanced critical care echocardiography within the next year

Should FoCUS be a mandatory part of anesthesia/ICU training?

- YES!!!
- Medical schools are exploring ultrasound use in clinical practice
- Residents are increasingly interested in ultrasound
- Fellowships that do not teach ultrasound will be at a competitive disadvantage
- FoCUS skills may start to become more sought after in the job market
- Ultrasound is a great tool to improve understanding of deranged physiology in ICU patients!

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Thank you!

