

LETTER TO THE EDITOR

Cardiac point-of-care ultrasound curriculum for anesthesia residents: the time is now



Dear Editor,

As an ultrasound (US) point-of-care modality, Focused Cardiac US (FOCUS) is defined as the use of US at the bedside to evaluate the unstable patient and, within a specific list of diagnoses, individualizing the clinical treatment for a given situation based on the findings using binary and qualitative questions.

However, in terms of training, there is no current consensus on what perioperative FOCUS comprises of, and no national curriculum in Brazil. To date, the only published national US curriculum is from the Association of Anaesthetists of Great Britain and Ireland and the Intensive Care Society,¹ however these curricula were developed without any distinctions for trainees in anesthesia or intensive care streams respectively.

In order to acquire the skills required to perform the FOCUS technique, there is a distinct need to develop a training curriculum that considers the different training phases (handling of the device and acquisition of images, interpretation of images, and correlation with the clinical situation). To successfully progress from one phase to the next, the student would need to clearly demonstrate proficiency in the previous stage. Additionally, there should be considerations made for the different phases of training, development, and experience within the anesthesia residency program, and what is the best time (if any) within the program for the introduction of the curriculum.

To learn the FOCUS technique, there should be an integration of two essential factors: the technical skills (acquisition, image optimization), and the interpretation of US findings in the context of the patients' clinical status.

Adult Learning Theory, or "Andragogy", was described by Malcolm Knowles² and is defined as the "art and science of helping adults learn". It is based on five assumptions about how adults learn and their motivation and attitude towards this process:

1 Adults are independent in their learning process.

- 2 They bring broad experience to the new learning process.
- 3 They value learning with practical results.
- 4 They are more interested in problem-centered approaches.
- 5 They bring an internal motivation to learn something new.

Constructivism³ is one of those learning theories based on the idea that learners actively construct or make their knowledge using previous experience as a foundation and build on it with new things that they learn. The application of Constructivism to develop a new model of FOCUS training is based on some of the principles that make it the ideal theory for the development of a training model for anesthesia residents: 1. Learners "construct" their knowledge based on what they already know; 2. The teacher is viewed not as a transmitter of knowledge but rather as a guide who facilitates learning.

Acquisition of practical skills is an essential element in health professions education, and traditionally, procedures were taught using a see one – do one approach, meaning that a teacher demonstrates and describes a procedure. Afterward, the students are asked to practice the same task. Although this approach has been prevalent and is still used in some situations, it is an unsystematic and unstructured approach that does not follow the current principles of adult learning and can sometimes put the patient at risk.⁴ A more recent method described by Walker and Peyton describes a stepwise teaching approach consisting of four different steps: demonstration, deconstruction, comprehension, and performance.⁵

The creation of a training model based on the Constructivism Theory considers the basic knowledge of the anesthesia resident regarding the use of US for central venous access and regional nerve blocks. This base would then be extrapolated with the goal of diagnosis and management of many common causes of hemodynamic changes in the perioperative period using a point-of-care approach.

Based on all concepts exposed above, the curriculum for training anesthesia residents in FOCUS modality should be based on a horizontal program to be applied to all anesthesia residents, respecting the different training stages, and composed of the phases below.

<https://doi.org/10.1016/j.bjane.2021.09.020>

© 2021 Sociedade Brasileira de Anestesiologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Phase 1

Program of formal classes with topics related to image acquisition, optimization, handling the device, choice of the probe, and most common clinical scenarios found in the operating room. Progression to the second training stage is granted after the student participates in the entire class program and is theoretically assessed using multiple-choice questions (MCQ) with a satisfactory result.

Phase 2

Acquisition and interpretation of images performed using simulation to familiarize the student with the handling of the device and what to expect from the technique. After training in the simulator with their proficiency assessed, progress to phase 3 is achieved.

Phase 3

The final part of the training would consist of examinations performed on actual, low risk, or stable patients undergoing elective surgical procedures while being under the direct supervision of the instructor. When proficiency of the technique is demonstrated likely after a logbook of 30 exams, as suggested in the literature,⁶ there would be further practical progression. This evolution would include exam performance in unstable patients with a correlation of the exam findings and decision making.


The development of a training program aimed at the anesthesia resident must consider the particularities of the specialty (routine within the operating room) and the type of situations that can be encountered in daily clinical practice (e.g., hemodynamic instability that requires diagnosis and immediate treatment). Despite any difficulties, learning and being proficient in the US point-of-care modality is a fundamental skill to optimize the care for hemodynamically unstable patients, and the new generations of anesthesiologists should acquire this skill.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Ultrasound in anaesthesia and intensive care: a guide to training. 2011-07. Available from: <http://www.aagbi.org/publications/publications-guidelines/ultrasound-anaesthesia-and-intensive-care-guide-training>.
2. Kaufman DM. Abc of learning and teaching in medicine: applying educational theory in practice. *BMJ*. 2003;326:213–6.
3. Brandon AF, All AC. Constructivism theory analysis and application to curricula. *Nurs Educ Perspect*. 2010;31:89–92.
4. Grantcharov TP, Reznick RK. Teaching procedural skills. *BMJ*. 2008;336:1129.
5. Giacomino K, Caliesch R, Sattelmayer KM. The effectiveness of the Peyton's 4-step teaching approach on skill acquisition of procedures in health professions education: a systematic review and meta-analysis with integrated meta-regression. *Peer J*. 2020;8:e10129.
6. Spencer KT, Kimura BJ, Korcarz CE, et al. Focused cardiac ultrasound: recommendations from the American Society of Echocardiography. *J Am Soc Echocardiogr*. 2013;26:567–81.

Fabio de Vasconcelos Papa  a,b,c,*,
Luiz Guilherme Villares da Costa^{c,b}

^a *University of Toronto, Dalla Lana School of Public Health, Toronto, Canada*

^b *Hospital Israelita Albert Einstein, Departamento de Anestesia, São Paulo, SP, Brazil*

^c *Takaoka Anestesia, São Paulo, SP, Brazil*

* Corresponding author at: University of Toronto, Dalla Lana School of Public Health, Toronto, Canada.

E-mail: fabio.vasconcelos@mail.utoronto.ca (F.V. Papa).

10 May 2021 19 September 2021