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Essay

Ultrasound for anesthesiologists[☆]



Julián Esteban Quintana Puerta^{*}

Medical Universidad CES, Anesthesiologist Universidad CES, Academic Vocal Antioqueña Society of Anesthesiologists, Medellín, Colombia

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ABSTRACT

Over the entire world, point of care ultrasonography has gained evidence and acceptance between clinicians of multiple specialties. Even when it has multiple uses, there are a lot of barriers for its implementation. With this document, I pretend to incentivate its disseminated use among colombian anesthesiologists.

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RESUMEN

En el mundo entero, la ecografía hecha por el clínico (o “point-of-care ultrasonography”) es una herramienta que gana más evidencia y aceptación. Aunque sus usos son múltiples, existen muchas barreras para su implementación. A través de esta reflexión se pretende incentivar el uso de la ecografía hecha por el clínico entre los anestesiólogos colombianos.

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^{*} Corresponding author at: Avenida El Poblado, Edificio Sudameris, piso 20, Sindicato Antioqueño de Anestesiología, Medellín, Colombia. Tel.: 57 (4) 3135081.

E-mail address: julianestebanquintana@gmail.com

Introduction

Point of care ultrasonography is the use of an ultrasound machine by the treating physician in order to obtain a quick answer to the questions that come up during the physical examination, instead of waiting for the results of a scan performed and interpreted at a later date by a practitioner who is not directly involved with managing the patient. It also improves the safety of the procedures, and enables repeat assessment in order to evaluate the effectiveness of the interventions.^{1,2} It is targeted to the organ or system believed by the physician to be involved, while scans performed by imaging specialists tend to be more extensive and systematic.^{1,2} Ultrasound has become more widely used by clinicians in recent years because devices are less expensive, more portable and have better resolution. Although that is still not the situation in our setting, there are a growing number of courses and rotations, and plenty of training resources on line.³

Some see in ultrasound an extension of the physical exam, while there are others that argue that ultrasound is the stethoscope of the 21st Century.^{1,3} However, when they are compared, for most diseases ultrasound is more sensitive and specific than the stethoscope, and even easier to learn.²⁻⁴ In this regard, the literature suggests that, except for cardiologists, most clinicians have very poor skills at heart auscultation.^{5,6}

Given all these considerations, and in view of the avalanche of publications on ultrasound use by clinicians, anesthesiologists included, a manual search was conducted in the issues of the last five years in the *Colombian Journal of Anesthesiology* of the words "echography", "ultrasound" and "ultrasonography". The search resulted in a total of seven articles, most of them case reports, but only in three of them was ultrasound used by the anesthesiologist.⁷⁻⁹ This reflection was prepared with the goal of promoting a greater use of ultrasound.

Why anesthesiologists are not competitors for other specialists

For specialties that use it as a diagnostic tool, ultrasound is a static tool. Clinicians tend to use point-of-care ultrasound as a dynamic tool that provides them with an initial image to support the diagnosis suggested by the clinical findings, followed by other images to monitor response to treatment.^{1,2} In this way, it becomes a tool for physiologic monitoring, something with which anesthesiologists work every day.

In this context, it is not very probable to find radiologists and/or cardiologists ready to go to the operating rooms or the intensive care units after hours and to be present throughout the treatment of the patient.^{1,2} For example, when a septic patient is admitted in the early hours of the morning and the decision is made to proceed to ultrasound-guided resuscitation, probably none of them will be willing to attend immediately and remain by the bedside during the initial hours of resuscitation until there is certainty that physiological goals have been achieved.

Clinicians who use ultrasound also do it for very specific interventions in their areas. If an anesthesiologist is trained to do regional anesthesia or interventional pain procedures, the use of ultrasound guidance adds safety but in no way does it place the clinician in competition with an imaging specialist who may not even be familiar with the procedure.^{1,2,10}

On the other hand, most anesthesiologists are not interested in leaving their usual areas of influence: operating rooms, recovery rooms, intensive care units and interrupt care of acutely ill patients in order to perform lengthy elective ultrasound scans in stable patients.^{1,2} Although it is true that ultrasound skills learnt in one area may be applied in others, in practice, the focused training received by a clinical specialist is not enough to perform these types of scans that require a steeper learning curve.²

Can we learn to use ultrasound correctly?

Historically, the primary application for perioperative ultrasound in anesthesia was transesophageal echocardiography; however, it is performed by cardiovascular anesthesiologists, who, as subspecialists, require skills similar to those of cardiologists and radiologists. Some authors are of the view that, paradoxically, this very specialized application aimed at reducing the risks of invasive procedures meant that ultrasound remained out of the realm of general anesthesia for a very long time. Even in such a specialized application, there is evidence showing that cardiovascular anesthesiologists have good diagnostic skills.^{2,11}

However, ultrasound applications within the access of the anesthesiologists are simpler than transesophageal echocardiography. Simplified protocols are advocated for ultrasound use in acute care settings; these are focused on finding answers to simple questions that the clinician seeks during patient treatment. For example, in transthoracic echocardiography, the American Society of Echocardiography (ASE) requires, in its consensus on basic views, the use of 20 different views in order for an examination to be considered complete. However, one of the protocols used for critically-ill patients, the FATE protocol (Focused Assessment in Transthoracic Echocardiography), requires only four views that are much easier to learn and can be used by the clinician to find answers on specific questions.¹²

Echocardiographic applications for acutely ill patients are based primarily on pattern recognition. The idea of the protocols is to perform short scans, focusing on abnormal ultrasound patterns that provide information on severe life-threatening conditions. The idea is not by any means to perform quantitative ultrasound. Short learning curves have been shown with these simplified protocols and with the help of short training courses (mainly workshops with healthy patients), with adequate retention of the acquired skills. Some simulators have also been used successfully.^{1,2}

There are two different schools of thought on how pervasive ultrasound should be. There are those who believe that any anesthesiologist should be able to receive training in this area, while there are others who believe that training should be restricted only to highly specialized practitioners. Some articles refer to an expertise pyramid where the base consists

of easy-to-learn, general applications for most anesthesiologists who may, with advanced training, gradually go up the pyramid toward more specialized uses. Diagnostic knowledge may perhaps increase with the continuous use of ultrasound, allowing anesthesiologists to use the skills they have acquired for more demanding applications.²

Can ultrasound be used for diagnostics as well as interventions?

In Colombia, Law 657 of 2001 governs the medical specialty of radiology and diagnostic imaging. Article 4 of the law states that "... physicians specialized in radiology and diagnostic imaging are the ones authorized to practice that specialty". However, in a subparagraph, the same Article clarifies that "diagnostic imaging may also be performed by those specialists who, as part of their academic training or study courses, have received training in the management and interpretation of the electromagnetic spectrum, ultrasound in particular, as well as of ionizing radiation for the purpose of diagnosis and/or treatment of diseases pertaining to their specialties; and, for this purpose, they are required to accredit their certification".¹³

The above implies that anesthesiologists could be authorized to use ultrasound, as long as this technique is considered absolutely necessary for the practice of their profession and provided they receive appropriate training. Scientific societies are responsible for regulating the knowledge required of their specialists. To this date, there is no consensus by the Colombian Society of Anesthesiology that defines the scope of ultrasound for anesthesiologists, and the only scientific society in Colombia that has a consensus on this matter is the Colombian Association of Urgency and Emergency Specialists (ACEM) (awaiting publication).

Regarding training requirements, Article 16 of Law 30 of 1992 mandates that only higher education institutions may offer graduate training.¹⁴ That being the case, ultrasound training for anesthesiologists must be part of their graduate education, and universities are free to include the necessary courses in their academic programs in order to comply with the requirements of the scientific societies. That is how gynecologists, for example, certify their ability to perform obstetric ultrasound.

It is also important to bear in mind that there are excellent guidelines (the NICE guidelines in the UK or the IOM guidelines in the United States) that require the use of ultrasound for any type of vascular approach.^{1,2} Along these same lines, there is already a documented case in the Colombian jurisprudence in which sentence was passed against an anesthesiologist for performing invasive monitoring without ultrasound guidance that resulted in pneumothorax. Despite the fact that this ruling may be highly controversial, it is based on the existing scientific literature.

The future: conclusions and the author's opinion

There are already medical schools that teach the use of ultrasound during the undergraduate years. Perhaps this may be

the strategy that will pave the way to encourage the generalized use of ultrasound in the medium term.^{1,2} In Colombia, there are legal barriers,¹³ but several specialties have begun to conduct workshops on the different applications of ultrasound throughout the country, and some centers have been able to place ultrasound machines outside the radiology suite. This shift must come from graduate programs, whose involvement is a must. With time, specific rotations must be developed, with certified instructors who can, in turn, certify their residents.

Anesthesia & Analgesia, a high impact journal, publishes a monthly section under the title of "Echo didactics", with reviews on ultrasound and echocardiography for anesthesiologists. Perhaps we might think of having a section devoted exclusively to ultrasound in our *Colombian Journal of Anesthesiology*, or of publishing literature-based consensus that encourage the use of this tool and provide clear definitions about its scope and the training required.

Only a couple of decades ago, electrocardiography was an interpretation tool reserved exclusively for cardiologists; today, no general practitioner may graduate without basic knowledge of this tool. We are still in time to avoid falling by the side road and being the last to adopt a tool that is routinely used in many places.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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