

Symposium

Introduction

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Symposium Editors

Point-of-Care Ultrasonography in Critical Care: Part 1

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Medical ultrasonography uses high-frequency sound waves directed at specific tissues and organs to produce black-and-white images of the body's internal structures. It has been used now for more than 60 years and its use continues to expand and redefine how illness and injuries are diagnosed and treated.

Recent advances in ultrasonography technology have eliminated many of the historical barriers to its use. The improvements in equipment and image quality and the development of new technologies have made it possible for more widespread adoption of ultrasonography. Ultrasonography equipment has become smaller, more powerful, and efficient, allowing it to be used in point-of-care settings. The machines are now pocket-sized handheld devices that can be brought to the patient's bedside, allowing them to be adjunct to the physical examination. Bedside ultrasonography image acquisition and interpretation is painless, requires minimal or no preparation, and does not use radiation. Additionally, the cost of ultrasonography equipment and its use is significantly less compared with other radiologic diagnostics.

The rapid adoption of point-of-care ultrasonography (POCUS) over the past 20 years in the intensive care unit (ICU) has allowed it to become an increasingly used adjunct in the care of the critically ill patient. In the past, ultrasonography was the preferred modality for the assessment of critically ill patients believed to be too unstable for transport to the radiology department; now it is a preferred bedside modality because of its convenience. It has become a routine component of training for ICU providers at many levels, including the training of critical care advanced practice providers.

Point-of-care ultrasonography is a portable and repeatable modality with both diagnostic and therapeutic applications. It allows for bedside imaging-guided procedures such as diagnostic aspiration, biopsy, drainage of fluid collections, and catheter placement. The portability of ultrasonography allows it to be performed as clinical questions arise and to be rapidly repeated as a clinical scenario mandates.

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Point-of-care ultrasonography is an operator-dependent modality, and technical difficulties do exist in certain patient populations such as those who are obese or when an optimal acoustic window is not available. Although many critical care providers have found formal POCUS training invaluable to their current practice of patient care, the integration of ultrasonography as a standard component of advanced practice provider fellowship programs is fairly recent. The theme of this symposium is the role of ultrasonography in the ICU and will provide the critical care advanced practice provider with an overview of the breadth of its application in the care of their patients. The symposium will be presented in 2 consecutive issues of *AACN Advanced Critical Care*. This issue, Part 1, will contain articles covering the introduction to ultrasonography use in critical care, cardiac ultrasonography, pulmonary ultrasonography and the Focused Assessment with Sonography in Trauma (FAST) examination. Each article will outline the indications for ultrasonography,

relevant anatomy and physiology, scan techniques, clinical pearls, pitfalls, and suggestions for documentation of the examination.

Although we believe the symposium will be a valuable adjunct to formal ultrasonography education, we advocate that critical care providers pursue formal in-person ultrasonography training and associated local ultrasonography credentialing. Like all things related to health care, POCUS is an ever-changing and dynamic field. Today's ultrasonography offers better ergonomics, high-contrast resolution, high-fidelity transmission, 1-touch image optimization, noise reduction, automation, and stunning image detail. All of this will evolve over time, and the future possibilities for POCUS are amazing and unlimited. Enjoy Part 1 of the symposium series and look for Part 2 in the following issue, which will cover the role of ultrasonography in the critical care setting for patients with abdominal, vascular, soft tissue, and obstetrical issues as well as procedural uses in the ICU.