SOLCUS: Update on Point-of-Care Ultrasound in Special Operations Medicine

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ABSTRACT

Point-of-care ultrasonography has been recognized as a relevant and versatile tool in Special Operations Forces (SOF) medicine. The Special Operator Level Clinical Ultrasound (SOLCUS) program has been developed specifically for SOF Medics. A number of challenges, including skill sustainment, high-volume training, and quality assurance, have been identified. Potential solutions, including changes to content delivery methods and application of tele-ultrasound, are described in this article. Given the shift in operational context toward extended care in austere environments, a curriculum adjustment for the SOLCUS program is also proposed.

Keywords: ultrasound, point-of-care; ultrasound, prehospital; tele-ultrasound; ultrasound, clinical, Special Operator level

Introduction

As the Special Operations Forces (SOF) medical community revisits the concept of prolonged field care (PFC), an excellent opportunity is presented to reengage the discussion on point-of-care ultrasonography (POCUS) in SOF medicine. Numerous lessons have been learned since the introduction of the Special Operator Level Clinical Ultrasound (SOLCUS) concept in 2008. With the operational context of PFC shifting toward extended care in resource-constrained austere environments, the SOLCUS program is due for a review. Certain aspects merely need an adjustment; however, the issues of skill sustainment, high-volume training, and quality assurance (QA) still await resolution.

This article is intended to stimulate a discussion about POCUS in Special Operations medicine. Our goal is to focus on the SOLCUS curriculum, alternative learning environments, and the value of tele-ultrasound. We aim to engage the ultrasound experts and enthusiasts among the SOF Medics, their leadership, military physicians, and civilian faculty. Let us start this conversation via the digital venues of the PFCare.org website and continue at the upcoming Special Operations Medical Association Scientific Assembly (SOMSA) in Charlotte, North Carolina, 23–26 May 2016.

SOLCUS: Background

Eight years ago, a small group of early ultrasound adopters in the SOF medical community coined the term SOLCUS. They fielded a POCUS program designed to match the Special Forces Medical Sergeant (SFMS, 18D) scope of practice. Through trial and error, the SOLCUS curriculum debuted in full during the 2010 SOMSA. By 2013, the SOLCUS Program of Instruction unofficially became the largest of its kind within the Department of Defense. It was formally adopted at the Joint Special Operations Medical Training Center for both the Special Operations Combat Medic and SFMS/18D courses. Furthermore, ultrasound skills were added to the SFMS/18D Critical Task List. SOLCUS training is under consideration for limited inclusion in the SFMS Refresher Course that is being developed.

SOLCUS: What’s Next

With PFC on the horizon, a renewed interest in SOLCUS is certainly notable in SOF medicine. Numerous PFC exercises have repeatedly demonstrated that ultrasound is the most versatile tool available to SOF Medics. It can be successfully applied for diagnostics, procedural guidance, and patient monitoring, because it provides objective and reproducible findings. The operational mindset of PFC and the entire framework of its essential capabilities can be supported by POCUS.

Curriculum

The original SOLCUS curriculum is primarily focused on trauma and regular “sick call” applications. A series of lectures covers an introduction to POCUS, extended focused assessment with sonography for trauma (eFAST) examination, and limited renal, aorta, pelvic, scrotal, deep venous thrombosis, musculoskeletal, soft tissue, and ocular scans. It also encompasses a number of bread-and-butter procedures, such as ultrasound-guided vascular access or regional anesthesia.
As US military operations shift back toward unconventional warfare in remote and austere locations, the scope of practice for the SOF practitioner expands. We must look beyond the fundamental protocols of Tactical Combat Casualty Care (TCCC) and timely evacuations, which focus primarily on preventing mortality. Tyranny of distance dictates the necessity of providing care for up to multiple days at a time. In PFC situations, the SOF Medic must function beyond standardized planning guidelines and aim at reducing morbidity of the most seriously injured or critically ill patients. Given such abstract goals to ponder, broadening the SOLCUS curriculum to include limited cardiovascular and pulmonary applications is desired.

A growing body of literature supports the feasibility and applicability of prehospital ultrasound for focused resuscitative assessment. Admittedly, many publications pertain to physician-performed ultrasound, particularly in the European setting. Nevertheless, a number of studies have also demonstrated that nonphysician prehospital providers can be trained to obtain and interpret focused echocardiographic, pulmonary, and vascular studies.

The authors have already attempted to train US SOF Medics in ultrasound-guided resuscitation. The prototype workshops included a combination of brief in-classroom and Web-based lectures, with the primary focus on hands-on education and simulated case scenarios. The initial experiences were encouraging, and the feedback from participating SOF Medics was largely positive.

**Content Delivery**

It has long been recognized that Web-based content is regularly used by health sciences students, and a growing number of resources are available as open-access digital media. The medical community at-large, including the US Army Medical Department, broadly advocates this democratization of knowledge.

Additionally, health professional education has embraced the flipped classroom model as a novel and effective approach to content delivery. The model revolves around the opportunity to preview course-related material prior to the actual class and shifts the focus toward practical problem-solving activities during the classroom encounter. Overall, the flipped classroom format facilitates independent learning and critical thinking, while promoting instructor flexibility.

It has already been shown that Web-based POCUS education constitutes a valid alternative to classroom-based learning. An e-curriculum offers greater flexibility, while resulting in similar knowledge retention. Combining prerecorded lectures or case-based e-modules with hands-on training in the classroom setting potentially saves time while offering a comparable educational benefit.

By extrapolation, the authors propose to redesign the SOLCUS curriculum according to the flipped classroom model. We are developing the SOLCUS education project as an SOF-specific and open-access online resource that accompanies the hands-on classroom content. The duration of the video lectures is generally limited to 5 minutes and has the potential to allow for shorter, yet effective, SOLCUS courses. Additionally, the materials can be accessed at various times. It facilitates spaced repetition, which is a recognized determinant of knowledge sustainability.

**Tele-ultrasound**

An SOF Medic has the capacity to function independently in the PFC settings; however, tele-consultation services must be available and easily accessible. That is why we suggest the clinical and educational benefit of remotely mentored tele-ultrasound. Thanks to rapidly evolving technology, video and image transmission can be used to offer remote supervision in the ultrasound training and patient-care settings. Global POCUS mentoring requires only Internet connectivity and initiative. It is neither costly nor technically challenging, although more robust military-grade infrastructure could likely improve the quality of visual data transmission.

Access to experienced educators is a limiting factor to any POCUS program. It is particularly problematic within the military environment because of the low supply of instructors, high rate of personnel turnover, and the many time zones in which SOF conducts operations. Low-cost smartphone- and laptop-based systems can be successfully used to guide minimally trained or even ultrasound-naive examiners, including midlevel providers and paramedics. Remote teaching is potentially as effective as in-person coaching and permits a small number of faculty to supervise a large number of trainees. Incorporating telesupervision into the SOLCUS flipped classroom could offer a viable solution to delivering high-volume ultrasound training. Furthermore, it would likely benefit SOLCUS skill sustainment and QA interventions.

Remote POCUS guidance is also applicable in the clinical setting. This concept seems particularly attractive from the perspective of an SOF Medic delivering extended care in a low-resource environment. Despite limited experience and minimal training, an SOF provider could be telementored to obtain high-quality, clinically useful ultrasound images. Additionally, a
tele-ultrasound consultant could offer assistance with image interpretation\textsuperscript{15,36} and resultant medical decision-making or even lifesaving interventions.\textsuperscript{37}

**Conclusion**

Neither SOLCUS nor PFC is a new concept, yet we are facing a new challenge to empower the SOF Medic with PFC-relevant ultrasound skills. As we propose curriculum adjustments, flip the SOLCUS classroom, and transition to open-access digital learning venues, we welcome your questions and concerns. We hope to stimulate a debate on tele-ultrasound capabilities in support of training, QA, and patient-care missions.

PFC is a broad interservice concept. Therefore, the revitalized SOLCUS program must maintain an SOF-wide level of PFC relevance. For this reason, we encourage the SOF Medics and their leadership across the respective Special Operations commands to share their experiences and suggestions. We also invite the civilian providers with prehospital POCUS expertise to the prospective Special Operations commands to share their insights and suggestions. We hope to stimulate a debate on tele-ultrasound capabilities in support of training, QA, and patient-care missions.

Disclosures

The authors have nothing to disclose.

**References**


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SFC Loos is currently an SFMS Course instructor at the Joint Special Operations Medical Training Center in Fort Bragg, NC, and he is very involved with the Prolonged Field Care Working Group. He is also the primary administrator for the group’s blog site, an educational outlet dedicated to improving patient care in resource-constrained environments.