

Ultrasound Training in Surgical Critical Care Fellowship: A Survey of Program Directors

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OBJECTIVE: Surgical critical care (SCC) fellows are expected to receive training in critical care ultrasound (CCUS) but training is sporadic and there is no standardized curriculum to guide educators. Previous studies show wide variation in CCUS training during fellowship across specialties but SCC has been underrepresented. This study was performed to assess SCC program directors' views regarding CCUS during fellowship training.

DESIGN: Adult SCC program directors were surveyed regarding the role of CCUS in fellowship training. This survey assessed how CCUS training was performed, perceived barriers to education, and importance of specific studies. Survey responses were measured using a Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree).

SETTING: Web-based survey.

PARTICIPANTS: Adult Surgical Critical Care Fellowship Program Directors.

RESULTS: A total 67 of 108 (62%) SCC program directors responded to the survey. Over 75% felt that CCUS during training should be a priority. Fifteen (24.6%) programs required a specific number of ultrasounds to be performed. Five programs (7.5%) provided no CCUS training at all. Over 75% felt that training in FAST, transthoracic echocardiography, inferior vena cava assessment, and US for procedures (line placement, thoracentesis, and paracentesis) were either important or very important but experience in transesophageal echocardiography, assessment for deep vein thrombosis, and pulmonary US were not important. Lack of time (63.8%) and trained faculty (51.2%) were the most cited barriers to training.

CONCLUSIONS: There is a wide variation in how CCUS training is performed during SCC fellowship. SCC programs will need trained faculty, appropriate time allocation, and implementation of a standardized curriculum to provide consistent and high-quality CCUS education during fellowship. (J Surg Ed ■■■■-■■■. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: echocardiography, ultrasonography, curriculum, critical care, surveys and questionnaires

COMPETENCIES: Systems-Based Practice, Practice-Based Learning and Improvement

INTRODUCTION

The role of ultrasound (US) in the intensive care unit (ICU) has evolved beyond line placement, with intensivists across specialties now using critical care ultrasound (CCUS) across a wide range of applications, evaluating shock or hypoxia, determining fluid responsiveness, and improving procedural safety.¹⁻⁴ Given the obvious advantages of portability, lack of ionizing radiation, and diagnostic usefulness, CCUS adoption is increasing exponentially, especially considering several studies showing that CCUS leads to new diagnoses and alters treatment plans.^{2,5-7} In recognition of the important role of CCUS in modern ICU care, the Society of Critical Care Medicine (SCCM) and American College of Chest Physicians (ACCP) both called for mandatory CCUS education during fellowship.⁸ Similarly, the Accreditation Council for Graduate Medical Education has required that US be part of critical care fellowship training.^{1,9}

An international position statement on CCUS training has been published,⁸ as have statements from the ACCP and SCCM regarding the minimum standards for competence.^{10,11} Unfortunately, CCUS training in the United

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States lacks standardization, varies in availability, and there is no “certification” pathway with an outside agency recognizing one’s competence.¹¹ In addition to these limitations, there is no agreement on how to perform CCUS training during fellowship and various impediments exist which make acquiring this skill more difficult.¹²

Even with the expanding role of US in the surgical ICU, the literature regarding the training of surgical critical care (SCC) fellows is limited to 1 paper describing an initial experience with a CCUS curriculum.⁷ The perspective of SCC program directors is not well represented in previous studies. Eisen et al.¹³ published results of one of the first surveys, which described barriers to US training, but this article focused on medical critical care fellowships. Mosier et al.⁹ surveyed a cross-section of fellowship directors, but that study included only 13 surgeons. Subsequently, this study was designed to evaluate the specific practices and opinions of SCC program directors regarding CCUS education during fellowship.

MATERIALS AND METHODS

This descriptive study was performed using a 25-question survey created from topics within the existing CCUS training literature, previous survey questions, and through informal discussion with those involved in CCUS training. Survey questions were reviewed by an expert in surgical CCUS (H.F.) and a pilot survey was sent out to several critical care surgeons (nonprogram directors) to test clarity and relevance. The survey was created using an on-line program (Survey Monkey, Inc. Seattle, WA. <http://www.surveymonkey.com>) and was divided into several sections, beginning with program characteristics, number of faculty with CCUS training, and specifics of how CCUS training was performed.

The next section focused on program directors’ opinions regarding various CCUS studies, including focused assessment with sonography for trauma (FAST), extended FAST, echocardiography, vascular access, venous US for thrombosis, inferior vena cava assessment for fluid responsiveness, thoracic US for lung pathology or thoracentesis, abdominal US for biliary pathology or paracentesis, and soft tissue US for identification of abscesses. The survey also explored the general views of program directors regarding the training of SCC fellows in CCUS, as well as perceived barriers to CCUS training. Survey responses were measured using a 5-point Likert scale with responses ranging from 5 (strongly agree) to 1 (strongly disagree).

A list of all SCC programs in the United States was created using the February 2015 National Resident Matching Program (NMRP) Match Results on the NRMP website (<http://www.nrmp.org/wp-content/uploads/2015/02/Results-and-Data-SMS-2015.pdf>). Each program director’s contact information was obtained from the respective institution’s website and e-mails were sent to request

participation in this survey. If a program director agreed to participate, a consent form and survey were sent to her or him. Completion of the survey implied consent to the study and no compensation was offered. A link to the survey, or alternatively a PDF version, was sent to each participant beginning in March of 2015. Data collection was completed in November of 2015. Completed surveys were deidentified and the results kept anonymous. To maximize responses, a reminder e-mail was sent every month for 3 months with one additional reminder during the last month of data collection. This study was approved by the institutional review board of the Medical College of Wisconsin.

RESULTS

A total of 67 of 108 (62%) SCC program directors completed at least part of the survey. [Table 1](#) summarizes

TABLE 1. Program Characteristics of Survey Respondents

Characteristic	N (%)
Total survey respondents	67 (62)
Hospital location (N = 67)	
Northeast	19 (28.4)
South	24 (35.8)
Midwest	12 (17.9)
West	12 (17.9)
Level 1 trauma center (N = 67)	66 (98.5)
Hospital type (N = 67)	
University based	53 (79.1)
Community based	10 (14.9)
Government institution	4 (6.0)
Number of fellows/year (N = 67)	
1 to 2	52 (77.6)
3 to 4	9 (13.4)
> 4	6 (9.0)
Description of fellowship (N = 66)	
Surgical critical care (1 year)	37 (56.1)
Trauma and critical care (1-2 years)	20 (30.3)
Acute care surgery (2 years)	9 (13.6)
Ultrasound available in ICU? (N = 67)	
Yes	63 (94)
How is ultrasound training provided? (N = 67)	
Hands-on training alone	17 (25.4)
Formal didactics and hands on	43 (64.2)
On-line didactics and hands on	2 (3.0)
No training provided	5 (7.5)
Do you require a certain number of ultrasounds? (N = 61)	
Yes	15 (24.6)
No	46 (75.4)
How many faculty are trained in CCUS? (N = 65)	
0-1	13 (20)
2-3	31 (47.7)
≥ 4	21 (32.3)
How did faculty obtain CCUS training? (N = 64)	
Training at national organization (ACS, SCCM, ACCP)	26 (40.6)
Training during fellowship	21 (32.8)
Training by colleagues	9 (14.1)
No formal training	3 (4.7)
Other	5 (7.8)

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