Expanding Point of Care Ultrasound Education and Uncovering the Diagnostic Benefits

Dr. Justin Arnold, DO PGY-2[1,2], Heather Barnes, OMS-III[1], Dr. Charles Finch, DO[1]

[1]Midwestern University, Glendale
[2]Canyon Vista Medical Center

INTRODUCTION

Most residents do not get formal ultrasound training in medical school. In a study of military Internal Medicine (IM) residents, less than 10% had formal ultrasound training before residency (Mellor). The result is underutilization of point-of-care ultrasound (POCUS) in residency training, where it can be extremely beneficial in physician learning and care. Moreover, POCUS confidence in residents can be achieved with minimal extra hours or changes to residency curriculum. One study done in Seattle, Washington showed improvement in surgical resident competency with ultrasound after completing just 14 hours in POCUS skills training (Kotagal).

Though most residents do not have exposure to POCUS prior to entering residency, some medical schools are trying to bridge that gap, which has shown to be useful to its alumni. Midwestern University AZCOM integrates ultrasound training into their education curriculum. With this incorporation, surveys sent out to graduated students found that most are confident in performing POCUS exams, which has translated to benefit in practice as residents (Le et al).

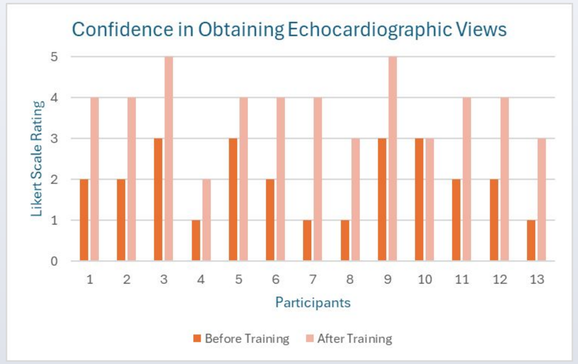
Given the demonstrated benefit in other institutions, we sought to implement more opportunities at Canyon Vista Medical Center (CVMC) for residents to acquire POCUS knowledge and refine the associated motor skills. Between 8/2024-1/2025, POCUS workshops totaled about 15 hours of ultrasonography training by the time our project was finished.

METHODS

Resident ultrasound practice sessions were established, including monthly resident-led presentations of POCUS topics followed immediately by hands-on practice. Every two months there were attending-led workshops spanning 3 hours of hands-on practice in a condensed format with an emergency medicine physician.

Surveys were distributed to IM residents (n = 13) at CVMC after 6 months of implemented US practice sessions. Residents estimated, on a Likert scale from 1-5 (1 = least confident, 5 = most confident), their confidence levels obtaining ultrasound images before and after implementation of increased ultrasound training hours. A T-test was used to compare the difference in mean confidence obtaining echocardiographic and Focused Assessment with Sonography in Trauma (FAST) exam views before and after integrated ultrasound training.

RESULTS



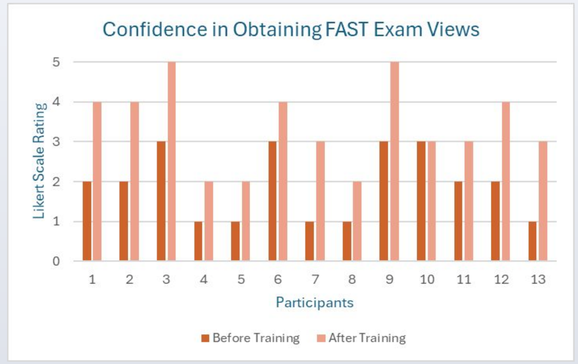
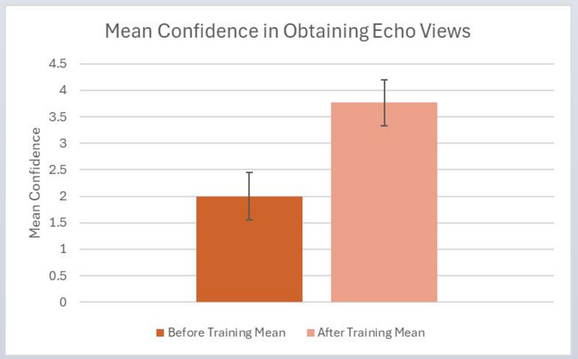


Fig 1. Confidence in obtaining echocardiographic and FAST US views graded on a likert scale from the 13 participants in the study.



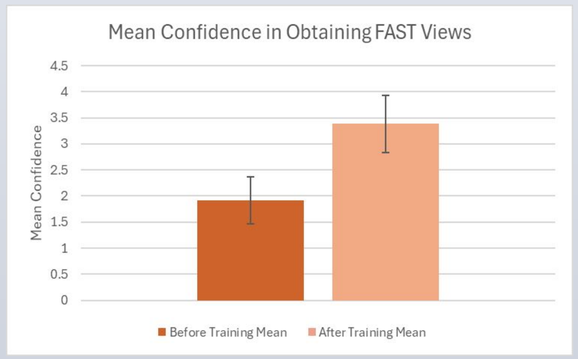


Fig 2. Confidence rating averages with 95% confidence interval bars.

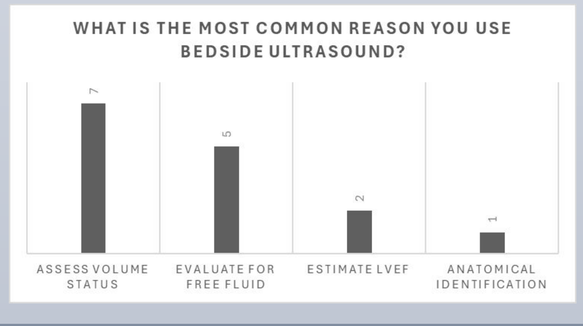


Fig 3. Categorization of how residents utilize bedside ultrasound.

RESULTS

Surveys were collected from 13 residents. On a scale of 1-5, the estimated mean confidence level of residents before 7/1/2024 in obtaining echocardiographic views was 2.0 [CI 95%, 1.556-2.443]. Residents estimated their level of confidence obtaining these views after 1/1/2025 at a mean of 3.769 [CI 95%, 3.335-4.204]. This increase in average confidence was statistically significant (P < 0.0001). Residents estimated their level of confidence obtaining FAST views before 7/1/2024 at 1.923 (95% CI, 1.473-2.373). After 1/1/2025, their confidence averaged 3.385 (95% CI, 2.839-3.930). This increase in average confidence was statistically significant (P < 0.0007).

DISCUSSION

As expected, confidence in obtaining ultrasound views after integration of hands-on learning increased significantly. IM residents are exposed to bedside ultrasound for invasive procedures, such as thoracentesis, paracentesis, and central line placement. However, echocardiographic views and FAST exams are not routinely practiced. After 15 hours of practice with these views over 6 months, residents felt much more comfortable performing these scans. This increase in confidence has led to better patient care, as demonstrated in one case where a CVMC resident discovered a pericardial effusion with impending tamponade. This diagnosis was discovered sooner as a result of bedside echocardiography performed by the resident, leading to more rapid intervention and stabilization..

An additional free response question was asked, relating to what the residents' most common use of bedside ultrasound was, excluding use of ultrasound as a guiding tool for invasive procedures. Over half endorsed using bedside ultrasound to assess fluid status (IVC compressibility), followed by assessing for free fluid (pericardial effusion, peritoneal free fluid).

Our data suggests that as little as 3 hours of POCUS exposure every two months can drastically improve confidence in the utilization of bedside ultrasound. As a result, CVMC will continue to integrate structured ultrasound workshops into their didactic curriculum. More research can be performed to understand how these refined skills translate to hands-on patient care, but the original goal of creating more comfort in utilizing POCUS has been achieved.

RESOURCES/REFERENCES

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