

Abstract:

Introduction: Point-of-Care Ultrasound (POCUS) has become common in many clinical care settings. Many devices exist with several different, mostly overlapping functions. This study is one of the first studies to compare the image quality of commercially available handheld POCUS devices and their potential role in vascular ultrasound as well as educational utility.

Methods: A prospective study was conducted to evaluate the image quality and clinical utility of the Butterfly IQ, GE Vscan Air, Phillips L12-4 (Linear), and Phillips S4-1 (Phased array) devices. An expert panel of reviewers examined the compiled images and answered a survey-based questionnaire. ANOVA single factor and Chi-squared analysis was used to compare scores.

Results: Twenty-five participants met the inclusion criteria. Most participants were female (52%). Mean BMI was 23.70 ± 3.71 . When scored on a 0-10 Likert scale, examinations performed with the GE Vscan Air resulted in comparatively higher quality studies for both the carotid (5.24, $p = 0.03$) and aortic (4.91, $p = 0.04$) protocols when compared to the Butterfly IQ+ and Lumify devices. All devices scored favorably for educational value with no statistical preference for transducer, $\chi^2(2, N = 122) = 4.75, p = 0.09$.

Conclusion: Although the GE Vscan Air resulted in statistically significant and higher recommendation scores, all three device groups globally scored low on recommendability. While lacking statistical difference between transducers, reviewers did support use of the tested handheld devices for educational purposes. The primary limitations of this study include underpowered data due to limited reviewers, single-rater bias, and no comparisons with gold

standard vascular laboratory studies. Despite the variety of commercial POCUS options, additional peer-reviewed data comparing these devices is needed.