Comparison of Handheld Ultrasound Devices used in Carotid and Abdominal Aortic Vascular Studies

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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.

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. Repeated measures ANOVA will be used to compare scores.

Results: Twenty-five participants met the inclusion criteria and 122 scans were studied. 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 three devices scored favorably for educational value with no statistical preference for transducer, $\chi 2(df = 2, N = 122) = 4.75$, $p = 0.09$.

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 significance between transducers, reviewers did support use of the tested handheld devices for educational purposes. Despite the variety of commercial POCUS options, additional peer-reviewed data comparing these devices is needed.