Title

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22 Ultrafest: A Novel Approach to Ultrasound in Medical Education Leads to Improvement in Written and Clinical Examinations

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Background: Medical student ultrasound (US) training is variable in medical school. As a promising adjunct to physical examination, US provides more physical data in skilled hands.

Objective: To evaluate effectiveness of training at a bedside US symposium ("Ultrafest") to improve clinical knowledge and image acquisition by medical students. Primary outcome was improvement in multiple choice question score for pulmonary or FAST (Focused Assessment with Sonography in Trauma). Secondary outcome was improvement in image acquisition in four windows on human models for pulmonary or FAST.

Methods: Prospective, before and after, cohort study of 48 volunteers (23% of 208 attendees) at "Ultrafest," a free symposium. Students attended 5 of 12 hands-on US workshops for 5 training hours. We measured each student in pulmonary US or FAST, by clinical knowledge on multiple-choice exam, and accuracy of image acquisition. We used paired sample t-tests with students as their own controls.

Results: Of 48 students, 46 (96%) had complete written test data. Pulmonary written test scores for 26 students increased by mean 10.1 points (95% CI 8.9-11.3, $p<0.00005$) from pretest 9 to post-test 19/21 possible points. Twenty-two students completed FAST pre- and post-Ultrafest written exams. FAST knowledge scores increased by mean 7.5 points (95% CI 6.3-8.7, $p<0.00005$) from pretest 8 to post-test 16/ 21. We gathered clinical skills data on 32 students (67%, 16 excluded for failure of image storage). Mean score was 1.7 pre- and 4.7/12 on post-test. Mean improvement was 3.0 points ($p<0.00005$) overall, 3.3 ($p=0.0001$) for FAST exam, and 2.6 ($p=0.003$) for pulmonary.

Conclusions: Teaching medical students US in a small group hands-on setting leads to significant improvement in tests of written knowledge and image acquisition. However, image acquisition was inadequate. Further studies will determine long-term retention or improved patient outcomes.