Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Spotlight on Special Topics

FULLY AUTOMATED ANALYSIS OF CARDIAC POINT OF CARE ULTRASOUND: FEASIBILITY AND CLINICAL RELEVANCE IN COVID-19 PATIENTS.

Poster Contributions
For exact presentation time, refer to the online ACC.22 Program Planner at https://www.abstractsonline.com/pp8/#!/10461

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Background: Artificial intelligence (AI) image analysis is well suited to cardiac point of care ultrasound (POCUS) where maximizing the real-time information can significantly impact decisions on patient care. However, validation of AI analysis in POCUS remains limited. The aim of this study was to evaluate the feasibility and clinical relevance of AI analysis in a cardiac POCUS dataset of COVID-19 patients.

Methods: In this multisite US cohort, feasibility of AI analysis was evaluated in 570 consecutive POCUS examinations in which apical images could be evaluated without contrast in patients hospitalized with COVID-19 across 6 sites. Reliability of AI (LVEF, GLS and LV volumes) was compared with equivalent metrics and echocardiographic abnormalities from clinical reports with Pearsons' R. The clinical relevance of AI measures was evaluated against report metrics using survival analysis and logistic regression for patient outcomes of 30-day death and in-hospital sequelae.

Results: Automated analysis for all metrics was feasible in 488 (85.6%) patients. In comparison, LVEF and GLS were quantified in 267 and 80 clinical POCUS reports, respectively. Agreement between automated and clinical values were R = 0.78, ICC = 0.86 for LVEF, R = 0.73, ICC = 0.74 for GLS, R = 0.76, ICC = 0.87 for end-diastolic volume and R= 0.82, ICC = 0.91 for end-systolic volume. Patients with abnormal AI GLS (>-16%) or LVEF (<50%) had a higher proportion of wall motion abnormalities (11% vs 33% for GLS, 13% vs 47% for LVEF) and LV hypertrophy (14% vs 29% for GLS, 17% vs 34% for LVEF). Patients with abnormal GLS or LVEF were also less likely to present with "normal" LV (95% vs 83% for GLS, 95% vs 73% for LVEF) and RV (97% vs 93% for GLS, 97% vs 88% for LVEF) function compared to those without, as indicated in clinical reports. Events included death in 103 (21.1%) and cardiovascular events in 117 (24.0%). Odds ratios (95% confidence intervals) per 1% change in LVEF and GLS were 0.98 and 1.052, respectively, for death and 0.949 and 1.179, respectively ($p<0.05$), for cardiovascular events.

Conclusion: AI analysis of cardiac POCUS was highly feasible, comparable to clinical values, and stratified echocardiographic abnormalities and patient outcomes.