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.

Striking the Balance between Safety of Patients and Team Members with Effective, High-Quality Care

To the Editor:

During the coronavirus disease 2019 (COVID-19) pandemic, echocardiography departments have a unique opportunity to continue care for this vulnerable patient population given that many other cardiac imaging procedures may still not be easily available. However, with continued care comes the task of balancing the safety of team members and patients. We sought to evaluate the risk for COVID-19 transmission to our staff members who participated in direct care of patients with COVID-19 by testing for the presence of severe acute respiratory syndrome coronavirus 2 immunoglobulin G (IgG) antibody.

Recently, our team instituted focused echocardiographic examinations with a defined safe-care promise that included personal protective equipment and disinfection to balance the safety of sonographers and patients. This method was published in *JASE* in May 2020.[1] Five designated sonographers collectively performed 100 scans on critically ill patients with COVID-19, with an average in-room scan time of <20 min per examination. As guided by our safe-care promise, the sonographers self-monitored for symptoms of COVID-19; none were reported during the study period. Each of these sonographers underwent a single Abbott Architect Assay test (Abbott Laboratories, Abbott Park, IL) for the presence of severe acute respiratory syndrome coronavirus 2 IgG antibody ≥15 days after their last scan from the COVID-19 test group. These tests were analyzed in our ACL laboratory on Abbott Architect instruments. Abbott reports a positive result sensitivity of 98.7% for >14 days from exposure and a negative result specificity of 99.2%. The sonographers' IgG index results ranged between 0.01 and 0.09, indicating a nonsignificant presence of the antibody.

There was also consideration for team members who perform aerosol-generating procedures. Proper personal protective equipment guidelines and a safe-care promise were established and implemented to continue patient care through the pandemic. For treadmill stress echocardiography, no patient COVID-19 testing was performed, to prevent potential delays in care while waiting for results. Because the nursing staff spends the most time in the procedure room, seven nurses from the stress laboratory also underwent a single Abbott Architect Assay test for the presence of severe acute respiratory syndrome coronavirus 2 IgG antibody. As in the sonographer group, all test results for the nursing staff were negative for the antibody.

The results from both test groups demonstrate that with appropriate personal protective equipment use and focused protocols to limit exposure, the risk for COVID-19 transmission is minimal. More information regarding COVID-19 antibody testing can be found through the Infectious Disease Society of America.[2] Echocardiography departments should feel secure in the safety of their staff while continuing care for their patient population.

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Using Simulation to Assess Cardiology Fellow Performance of Transthoracic Echocardiography: Lessons for Training in the COVID-19 Pandemic

To the Editor:

The coronavirus pandemic (COVID-19) has caused a widespread reduction in echocardiography volumes and direct educator-trainee interactions.[1] Assessing competency in transthoracic echocardiography (TTE)[1] scanning is a core component of the Core Cardiology Training Symposium certification. Current TTE scanning competency is based on self-reported procedural volumes and feedback during image interpretation, which may be limited by the pandemic. Moreover, prior studies evaluating TTE scanning using objective measures have found only modest correlations between scanning volume and skill.[2] Simulation-based training and assessment in echocardiography can be a useful adjunct to traditional methods of education.[3-5]

Coincidental to COVID-19, we created a simulation-based scanning task using the 3D Systems U/S Mentor simulation program and mannequin (Simbionix, Airport City, Israel) at the University of Texas Southwestern Medical Center. Standardized tasks were created by the Advanced Echocardiography Training Director (A.B.): nine basic two-dimensional parasternal, apical, and subcostal views for task 1 (Figure 1) and focused images for evaluation of pericardial tamponade (task 2) and aortic stenosis (task 3). Fellows were given immediate feedback based on their performance. Two expert sonographers also completed the simulation tasks. A preset checklist for basic competency was created for all two-dimensional views and advanced techniques expected for each task by two level III Core Cardiology Training Symposium–certified echocardiographers (A.C. and A.B.) who independently scored the saved deidentified images at a later date in a blinded fashion on a four-point Likert Scale (0-3).

General cardiology fellows (13 men, 10 women; 9 first year, 7 second year, and 7 third year) who participated had a median of 100 scans performed per fellow (interquartile range: 50, 200) and a median of 3 months of echocardiography training (interquartile range: 1, 4). No significant difference was observed between first-year fellows' and senior (second- and third-year) fellows' median imaging score (24.5 vs 22.5, $P = .14$; Table 1). No difference was observed between the first-year fellows' and senior fellows' median imaging score on task 2 (14.5 vs 13.3, $P = .08$) or task 3 (11 vs 12.5, $P = .8$). When stratified by quartile of TTE scans performed, no significant trend was noted in median imaging scores for task 1 (P trend = .34). Similar results were seen for tasks 2 and 3. Sonographer median imaging scores were higher than the median scores of the overall fellowship for all tasks (Table 1). The intraclass correlation

Conflicts of Interest: None.

Task 1: Basic images	0 = wrong image/unable to obtain	1 = suboptimal image/unable to utilize for diagnostic interpretation	2 = suboptimal image/able to utilize for diagnostic interpretation	3 = perfect image (as compared to ideal image optimized and obtained by experts)
Parasternal long axis	○	○	○	○
RV inflow view in the parasternal long axis	○	○	○	○
Parasternal short axis at LV apex	○	○	○	○
Parasternal short axis at papillary muscles	○	○	○	○
Apical 4 chamber	○	○	○	○
Apical 5 chamber	○	○	○	○
Apical 2 chamber	○	○	○	○
Subcostal IVC view	○	○	○	○

Task 2: Pericardial effusion	0 = wrong image/unable to obtain/did not obtain	1 = suboptimal image/unable to utilize for diagnostic interpretation	2 = suboptimal image/able to utilize for diagnostic interpretation	3 = perfect image (as compared to ideal image optimized and obtained by experts)
RV free wall M mode in PLAX or subcostal view	○	○	○	○
PW doppler inflow of mitral valve	○	○	○	○
PW doppler inflow of tricuspid valve	○	○	○	○
Sweep speed changed	○	○	○	○
Subcostal four chamber view	○	○	○	○
IVC view	○	○	○	○

Task 3: AORTIC STENOSIS	0 = wrong image/unable to obtain/did not obtain	1 = suboptimal image/unable to utilize for diagnostic interpretation	2 = suboptimal image/able to utilize for diagnostic interpretation	3 = perfect image (as compared to ideal image optimized and obtained by experts)
View of LVOT for measurement	○	○	○	○
Short axis view of aortic valve	○	○	○	○
Color flow assessment of aortic valve	○	○	○	○
CW of LVOT in either apical 3 or 5 chamber	○	○	○	○
PW of LVOT in either apical 3 or 5 chamber	○	○	○	○

Figure 1 Images required for tasks 1-3 with scoring system. *CW*, Continuous wave; *IVC*, inferior vena cava; *LV*, left ventricle; *LVOT*, left ventricular outflow tract; *PLAX*, parasternal long axis; *PW*, pulse wave; *RV*, right ventricle.

coefficient between the reviewing cardiologists was 0.93 (95% confidence interval, 0.66-1.00) for all task scores.

Training level and number of scans performed did not translate to significant differences in TTE scanning skill when assessed via simulation. Simulation-based training was sensitive to skill differences between expert sonographers and trainees and provided an opportunity for efficient, targeted, and direct feedback. Simulation-based tasks can be modified and repeated over the course of training to document longitudinal progress objectively. Given the challenges of the COVID-19 era that may extend into the foreseeable future, simulation may offer an alternative method of training and assessment without sacrificing valuable time in fellowship training and with minimal risk of exposure. Simulation for TTE education should be considered as a curricular complement for cardiology fellowships.

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Table 1 Median scores of fellows and sonographers on assigned tasks

Demographic	Task 1: Basic images	Task 2: Pericardial effusion	Task 3: Aortic stenosis
Overall fellowship	23.0 [21.5, 26.0]	13.5 [11.0, 15.5]	11.5 [10.0, 13.0]
Sonographers	26.3 [26, 26.5]	17.8 [17.5, 18.0]	14.5 [14.0, 15.0]
P value	.04	.06	.04
Training year			
First year	24.5 [22, 25.5]	14.5 [13.5, 17.0]	12.5 [11.5, 13.0]
Senior	22.5 [21.5, 24]	13.3 [8.5, 14.0]	11.0 [10.0, 13.0]
P value	.14	.08	.80
Gender			
Men	23.0 [21, 24]	14.5 [12.5, 17.0]	13.0 [10.0, 13.5]
Women	22.8 [21.5, 24.5]	13.3 [11.0, 13.5]	11.0 [10.0, 12.5]
P value	.88	.10	.26
Fellows scoring 0 on any item,* %	13	61	39
First year, *n*	2	4	4
Senior, *n*	1	10	5

Data are reported as median [interquartile range]. The maximum possible score for task 1 was 27, for task 2 was 18, and for task 3 was 15.
*Fellows were assigned a score of 0 for any image on the task per the scoring system detailed in Figure 1. The percentage listed represents the percentage of overall fellowship with numbers of first and senior fellows detailed as above.

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