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.

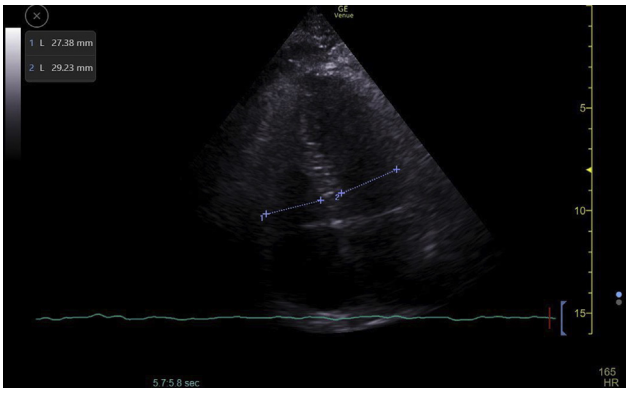

Figure 1 The apical four-chamber view and ventricular diameter measurements.

left ventricular end-diastolic diameter, RV systolic performance by tricuspid annular plane systolic excursion, and pulmonary artery systolic pressure from the tricuspid regurgitation peak Doppler velocity.

We used this approach in eight patients to assess cardiac performance. In only one case was the quality of the ultrasound view poor, and this was in a patient with a markedly increased body mass index of 60 kg/m^2.

In our experience during the current severe acute respiratory syndrome coronavirus-2 outbreak, prone-position TTE is feasible and provides sufficient information to monitor some basic aspects of cardiac performance.

Enrico Giustiniano, MD
Eleonora Padua, MD
Katerina Negri, MD
Department of Anesthesia and Intensive Care Units
Humanitas Clinical and Research Hospital
IRCCS
Milan, Italy

Renato Maria Bragato, MD
Echocardiography Unit
Humanitas Clinical and Research Hospital
IRCCS
Milan, Italy

Maurizio Cecconi, MD, FRCA, FFICM, MD(Res)
Department of Anesthesia and Intensive Care Units
Humanitas Clinical and Research Hospital
IRCCS
Milan, Italy
Humanitas University
Department of Biomedical Science
Milan, Italy

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Safety of Ultrasonic Enhancing Agents in Patients with COVID-19

To the Editor:

Patients admitted with coronavirus disease 2019 (COVID-19) due to infection with severe acute respiratory syndrome coronavirus-2 present with a variety of respiratory and chest symptoms. Distinct and severe cardiovascular manifestations of COVID-19 have been reported.[1] Echocardiography is the mainstay of noninvasive cardiac assessment in these patients because of its immediate bedside availability, as the feasibility and safety of other diagnostic modalities may be limited. Prior studies have indicated that up to 30% of unenhanced echocardiographic examinations may have limited diagnostic utility in critical care settings.[2] This number is possibly higher in critically ill patients with COVID-19 because of respiratory distress syndrome and a high positive end-expiratory pressure requirement. Prior studies have consistently shown that the use of ultrasonic enhancing agents can significantly improve the diagnostic yield of echocardiographic studies and influence decision-making, but safety has not been established in patients with COVID-19.[3,4] We aimed to study the immediate safety of ultrasonic enhancing agents in patients with COVID-19, including critically ill patients.

In this retrospective study, we enrolled consecutive patients hospitalized at Mount Sinai Morningside Hospital (New York, NY) with COVID-19 who underwent clinically indicated echocardiographic examinations. Echocardiograms were obtained using portable ultrasound machines (CX50 [Philips Medical Systems, Bothell, WA] and Vivid S70 [GE Medical Systems, Milwaukee, WI]) and followed a focused, time-efficient protocol with appropriate use of personal protective equipment and limited viral exposure time. The ultrasonic enhancing agent was prepared in advance and was immediately available for the sonographer if needed. Contrast-enhanced images were obtained using contrast-specific, low–mechanical index settings after the administration of an ultrasonic enhancing agent, either Definity (perflutren lipid microsphere; Lantheus Medical Imaging, North Billerica, MA) or Optison (perflutren protein type-A microspheres; GE Healthcare, Little Chalfont, United Kingdom). The following were recorded as adverse events if they occurred in close temporal proximity (within 1 hour) to ultrasonic enhancing agent administration: sustained arrhythmic event, deterioration of respiratory status including endotracheal intubation, cardiac arrest, and death.

A total of 33 patients underwent contrast-enhanced echocardiography for clinical indications, including 14 patients on mechanical ventilation and 19 patients who did not require mechanical ventilation at the time of echocardiographic evaluation. The mean age

Conflicts of interest: None.

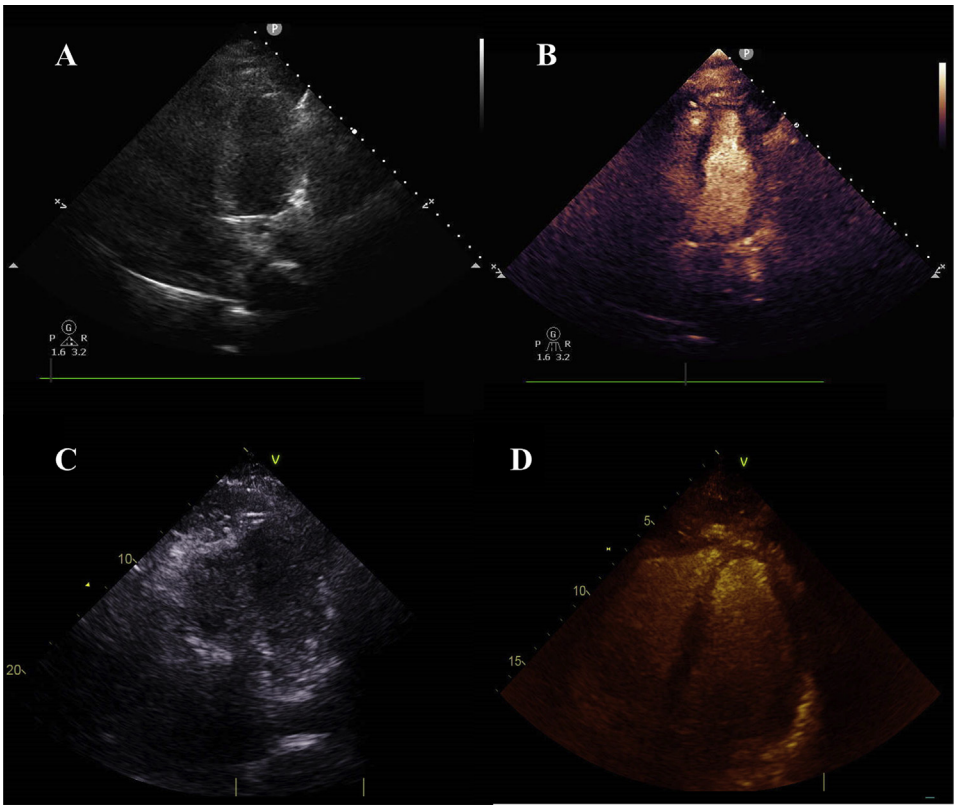

Figure 1 Diagnostic utility of contrast-enhanced echocardiography in patients with COVID-19. Patient 1: unenhanced attempted four-chamber view with poor left ventricular endocardial border definition **(A)**. Contrast-enhanced four-chamber view with adequate opacification of the left ventricular cavity and excellent endocardial border definition **(B)**. Patient 2: unenhanced attempted four-chamber view with poor left ventricular and right ventricular visualization **(C)**. Contrast-enhanced four-chamber view with adequate opacification of both left and right ventricles **(D)**.

was 66 years, with a male predominance (58%). Twelve patients (36%) had body mass index > 30 kg/m^2. Ten patients (30%) had decreased left ventricular ejection fractions, and 13 patients (39%) had evidence of right ventricular enlargement. On unenhanced examinations, 27 studies (82%) were classified as technically difficult, defined as more than two myocardial segments not visualized from any acoustic window, and six studies (18%) were deemed uninterpretable, defined as poor left ventricular visualization without the ability to report the ejection fraction. In 32 of 33 studies (97%), adequate left ventricular opacification was achieved after the administration of an ultrasonic enhancing agent (Figure 1). Right ventricular assessment was feasible in 30 patients (91%), with contrast opacification aiding the visualization of the right ventricular contours (Figure 1).

The patients' charts were reviewed for adverse events in close temporal proximity to ultrasonic enhancing agent administration. None of the patients experienced adverse events within the specified time frame.

This was a small, retrospective, single-center study of the immediate safety of ultrasonic enhancing agents from New York, the epicenter city of COVID-19. None of the studies were performed in a prone position.

In conclusion, a focused, time-efficient protocol incorporating the use of ultrasonic enhancing agents increases the diagnostic yield of bedside echocardiography, as seen in the present study. In addition, the study provides the first evidence of the immediate safety of ultrasonic enhancing agents in patients with confirmed COVID-19, including critically ill patients.

Edgar Argulian, MD
Karan Sud, MD
Chandrashekar Bohra, MD
Birgit Vogel, MD
Vaani Garg, MD
Soheila Talebi, MD
Stamatios Lerakis, MD, PhD
Jagat Narula, MD, PhD
Mount Sinai Heart
Icahn School of Medicine at Mount Sinai
New York, New York

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Use of a Protective Shield Successfully Prevents Exposure to Aerosols and Droplets during Transesophageal Echocardiography

To the Editor:

Coronavirus disease 2019 (COVID-19) has been declared a pandemic and is affecting health care professionals all over the world. With several reports suggesting potential myocardial damage in patients with COVID-19,[1] cardiologists and especially cardiac imaging services are also facing the challenge of this pandemic. The American Society of Echocardiography has recently published recommendations regarding echocardiography during the current pandemic and stated that need for transesophageal echocardiography (TEE) should be carefully evaluated, and when necessary, TEE should be performed with special caution.[2] However, despite careful screening and deferral of nonurgent cases, in some situations TEE is indispensable to guide diagnosis and further treatment.

TEE is an aerosol- and droplet-producing examination, and thus for the examiner it bears a high risk for exposure and infection. Because access to standard personal protective equipment (PPE) is not ensured everywhere, we have recently designed a mobile protective shield to increase protection for examiners during TEE. It is made of two pieces of acrylic glass mounted on a metal frame. The two pieces of acrylic glass are connected by two screws embedded in a slot. In this way the small shield can glide vertically, and the height of the protective shield can be adjusted individually (Figure 1A).

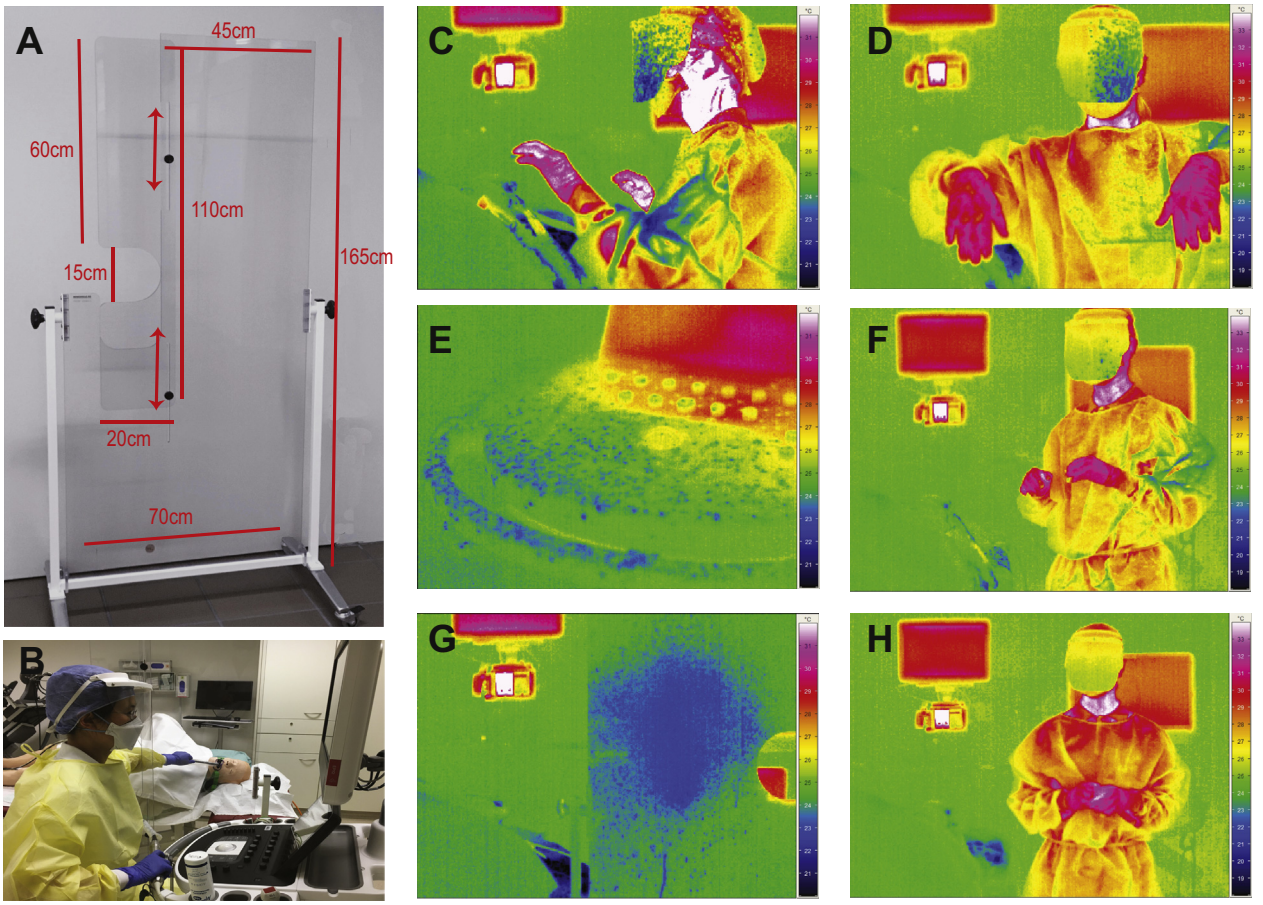

Figure 1 **(A)** Construction plan of the protective shield used for TEE. **(B)** Experimental setup. **(C)** Using infrared detection, water droplets are depicted as blue spots. Performing TEE while sitting, droplets are detected on the lateral side of the face shield, mask, cap, and left forearm. **(D)** The left side of the examiner, which faced the patient, is extensively contaminated. **(E)** The surface of the ultrasound machine is also contaminated. **(F)** Performing TEE in a standing position reduces potential contamination of the head. Droplets were found only on the left arm and the gloves. **(G, H)** When placing the protective shield between the mannequin and the examiner, droplets were blocked by the shield. Contamination was found only on the left forearm, which was placed in front of the shield.

Conflicts of interest: None.