Safe Echocardiographic Practice in Hamad Medical Corporation during the Coronavirus Disease 2019 Pandemic

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic has strained our healthcare system. Certain changes in practice were mandatory to protect our sonographers who carry a very high risk of being infected, and the patients whom we serve. This article aims to share this experience with you.

Key words: COVID-19, echocardiography, safe practice

INTRODUCTION

Echocardiographic section of Hamad Medical Corporation (HMC) is the main provider of echocardiographic services in Qatar. The echocardiography staff in HMC includes 8 clerks, 4 nurse aids, 27 sonographers, 22 nurses, 4 dedicated echocardiography physicians, 9 rotating cardiology consultants, and 2–4 rotating fellows every month of the cardiology fellowship program.

The current coronavirus disease (COVID) disease was declared a pandemic by the World Health Organization (WHO), in March 2020. The coronavirus disease 2019 (COVID-19) pandemic has strained our healthcare system. It has posed a significant challenge for the echocardiography staff to prevent the spread of the COVID-19 disease in such a way that they strike a balance between their dedicated self-care and consequently patient care with a view to protecting all the patients from the pandemic. As suggested by international organizations such as the American College of Cardiology and the American Society of Echocardiography, we should follow the recommendations and guidelines endorsed by these organizations and implement certain recommended practices tailored to our resources and facilities, thereby reducing our own risk and maintaining our duties.1 These practices resulted in complete protection of our sonographers who carry a very high risk of being infected. (This has been documented by serial tests for SARS-CoV-2.)

This article aims to share this experience with you.

METHODOLOGY

Prioritization of echocardiographic orders
Transthoracic echocardiography (TTE), stress echocardiography (SE), and transesophageal echocardiography (TEE) are only performed if they are expected to provide clinical benefits. For already scheduled outpatients, a team of nurses, under the supervision of a cardiologist, triaged all requests. This was done on a case-by-case basis and involved the referring physicians if needed. There were strict criteria for repeat echocardiograms, which were
performed only if there was a clear change in clinical status\cite{1} [Figure 1].

TEE and exercise SE, and to a less extent, the dobutamine SE (DSE) inherently carry a heightened risk of spread of the SARS-CoV-2 and therefore are postponed or canceled for outpatients. For inpatients, all requests are triaged by the echocardiography physicians, and the request had to state clearly how the results would change the clinical care\cite{1} [Figure 2].

TEE was done for critically ill patients and in whom, again, the results will affect the management of the patients. Alternative imaging modalities (e.g., off–axis TTE views and ultrasound enhancing agent with TTE) which may provide the necessary information are always considered first\cite{1} [Figure 3].

**Patients’ check-in and examination**

At the facility entrance, dedicated personnel with standard personal protection equipment (PPE) will check for a special nationwide obligatory mobile application (EHTERAZ) which verifies its carrier’s infectious status and confirms their safety. After clearance, the staff record the patients’ temperature and supply them with a mask and hand sanitizer before they direct them to our clerk to check in on our system. Once they check in for the study, dedicated nurses of our section, with droplet PPE, will subject them to virtual screening and temperature measurement, while they are obtaining their vital signs. Suspected or confirmed cases with infection are referred to the infection control team for verification.

Two rooms with their machines are dedicated to the outpatients, with enough time in between studies to disinfect the machine and the room. Sonographers are provided there with droplet PPE protection\cite{2} [Figure 4].

Sonographers perform in patients with droplet PPE in their beds with dedicated machines to minimize any possible widespread or exposure to infection.

Patients with suspected or confirmed COVID-19 are placed in isolation rooms, and echocardiography is performed there with airborne PPE. TEE is done in special procedure rooms as inpatients, and all personnel are under droplet or airborne PPE according to the patient’s risk status and the performing physician choice.

**Imaging protocols**

Point-of-care ultrasound examinations performed by the clinicians who are already caring for these patients at the bedside are encouraged to screen for important cardiovascular findings, or triage patients if they are in need of full further echocardiographic services, without exposing others and utilizing additional resources.

Sonographers, who are under airborne PPE, perform

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*Figure 1:* Flowchart for prioritization of already-scheduled echocardiography appointments

*Figure 2:* Flowchart for prioritization of transthoracic echocardiography examinations for in patients
studies on patients with suspected or confirmed COVID-19 in isolated rooms. To minimize the time of exposure of the sonographers, studies were tailored according to the indication and were focused to decrease the number of images and the time needed for its acquisition; the electrocardiogram (ECG) is not mounted in most studies, and the plans for ultrasound-enhancing agent (contrast) utilization are made in advance. COVID cases were clustered and postponed, as possible, to end of the shift to make sure that the sonographer and machines can obtain the final and maximum disinfection.

**Protection**

I. Personnel: Imaging is performed according to the local standards for the prevention of virus spread. There were three levels of protection: standard which involves handwashing/sanitization and the use of gloves and surgical mask; droplet precautions which include gown, gloves, head cover, facemask, and eye-shield; or airborne and contact precautions which include an addition of a special mask (N95 respirator) that is fit tested according to the size of the staff, gown, face-shield/goggles, nitrile gloves, and shoe cover.

II. Equipment: Equipment care is critical in the prevention of transmission. Machines were cleaned after the procedures twice, once inside the room with Meliseptol wipes (70% alcohol) and outside the room with Sporicidal wipes (peracetic acid-generating wipe contains detergent). The ongoing accredited policies for protection and disinfection of the TEE probes were implemented.

III. Sonographers were divided into two teams who alternated work every 14 days. No overlap between team members was allowed.

IV. Staff who are >60 years old, have chronic conditions, are immunocompromised, or are pregnant were permitted to avoid contact with patients suspected or confirmed to have COVID-19 or to perform procedures as TEE and DSE.

V. Sonographers who are exposed accidentally without proper PPE to infectious patients were...
obligated to self-quarantine for 2 weeks at home and were advised to report any signs or symptoms as soon as possible to his/her supervisor.

VI. Keyboards, monitors, mice, chairs, phones, desktops, and doorknobs are frequently cleaned and before use.

RESULTS

During the period of March 1 to May 31, 2020, 3446 patients were examined. Table 1 shows a comparison to the same period of 2019. Numbers showed significant decline due to the rescheduling of most of the outpatients as described earlier. All sonographers were routinely screened for SARS-CoV-2 every 14 days, and none of our 27 sonographers were reported positive.

CONCLUSION

The provision of safe echocardiographic services in this difficult time of the SARS-CoV-2 outbreak is a real challenge. Early and direct supervision was important. Teamwork, taking responsibility, and dedication proved to be essential in providing high-quality care.

Minimizing risk to ourselves, our patients and the public at large were vital.

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Conflicts of interest

There are no conflicts of interest.

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