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PRELIMINARY AND SHORT COMMUNICATION / ПРЕТХОДНО И КРАТКО САОПШТЕЊЕ

ECHOS survey on echocardiography in Serbia during the COVID-19 pandemic

Gordana Krljanac[1,2], Maja Stefanović[3,4], Zorica Mladenović[5,6], Marina Deljanin-Ilić[7,8], Aleksandra Janićijević[9], Milica Stefanović[9], Danijela Trifunović-Zamaklar[1,2], Aleksandar N. Nešković[1,9], Ivan Stanković[1,9]

[1]University of Belgrade, Faculty of Medicine, Belgrade, Serbia;
[2]Clinical Centre of Serbia, Cardiology Clinic, Belgrade, Serbia;
[3]University of Novi Sad, Faculty of Medicine, Novi Sad, Serbia;
[4]Institute of Cardiovascular Diseases of Vojvodina, Sremska Kamenica, Serbia;
[5]University of Defense, Medical Faculty, Belgrade, Serbia;
[6]Military Medical Academy, Belgrade, Serbia;
[7]University of Niš, Faculty of Medicine, Niš, Serbia;
[8]Niška Banja Institute for Treatment and Rehabilitation, Clinic of Cardiology, Niška Banja, Serbia;
[9]Zemun Clinical Hospital Centre, Department of Cardiology, Belgrade, Serbia

SUMMARY

Introduction/Objective The purpose of the current Echocardiographic Society of Serbia (ECHOS) survey was to assess echocardiography practice in Serbia during the Coronavirus disease 2019 (COVID-19) pandemic.

Methods An online survey consisting of 12 questions about the usa of echocardiography, the availability of portable ultrasound devices and personal protective equipment (PPE) was sent to all ECHOS members.

Results Overall, 126 ECHOS members (43%) answered the survey. One-third of respondents (36%) were physicians from specialized COVID-19 centers. During the pandemic, indications for echocardiographic examination were restricted in both COVID-19 and non-COVID-19 centers. In COVID-19 centers, 41% of respondents performed lung ultrasound to each patient versus 26% in non-COVID-19 centers. Transesophageal echocardiography was not performed in suspected or confirmed COVID-19 cases in any center. Portable ultrasound devices were available to 66% of respondents from COVID-19 versus 44% of respondents from non-COVID-19 centers ($p = 0.018$). The respondents reported regular use of PPE, regardless of the patient's COVID-19 status and found their personal knowledge about protective measures and use of PPE satisfactory.

Conclusion During the COVID-19 pandemic in Serbia, indications for echocardiography were restricted to clinical scenarios in which the results of examination were expected to alter patient management. In both COVID-19 and non-COVID-19 centers, the use of PPE was in line with national and international recommendations. A wider availability of portable ultrasound devices and application of lung ultrasound could improve patient management in similar situations in the future.

Keywords: echocardiography; survey; COVID-19; Serbia

INTRODUCTION

The novel coronavirus 2019 or severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) that results in COVID-19 has reached pandemic level in March 2020 [1]. During the pandemic in Serbia, several hospitals were turned into specialized COVID-19 centers and have been providing care only to confirmed COVID-19 patients, while the remaining centers continued providing health services, including echocardiography, to presumably COVID-19-negative patients.

Apart from causing pneumonia, SARS-CoV-2 may also affect the cardiovascular system, resulting in poorer prognosis [2]. Consequently, in COVID-19 centers, a clinical suspicion of cardiovascular involvement in patients with severe COVID-19 disease is likely to trigger cardiac diagnostic work-up that typically includes echocardiography, as it was the case with other respiratory viruses in the past [3].

Cardiologists and other health care personnel performing echocardiography at both COVID and non-COVID-19 centers were at risk of getting infected, and the availability of personal protective equipment (PPE) and the training on its proper use were of paramount importance to minimize the risk of infection [4, 5, 6]. The aim of the current Echocardiographic Society of Serbia (ECHOS) survey was to assess the use of echocardiography and the availability of PPE during the pandemic in Serbia, in both COVID and non-COVID-19 centers.

METHODS

The survey was conducted from April 22 to April 30, 2020. All ECHOS members (293 at

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Correspondence to:
Ivan STANKOVIĆ
Department of Cardiology
Zemun Clinical Hospital Centre
Vukova 9
11080 Belgrade, Serbia
future.ivan@gmail.com

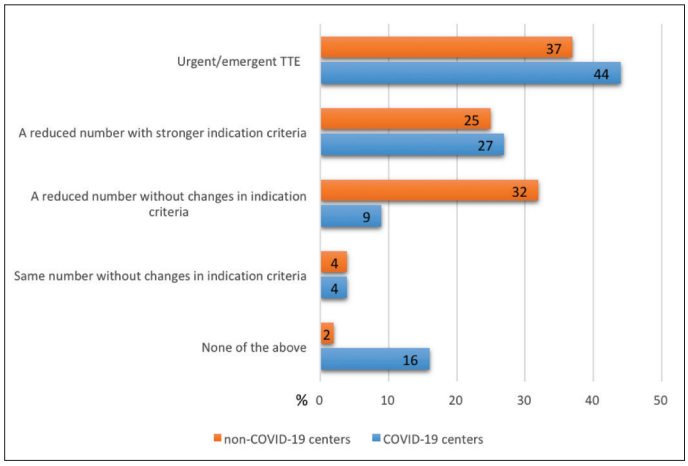

Figure 1. Transthoracic echocardiographic examinations in Serbia during the COVID-19 pandemic

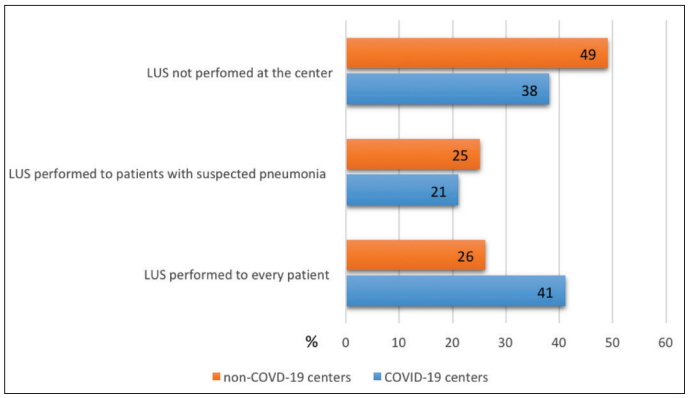

Figure 2. Lung ultrasound during the COVID-19 pandemic

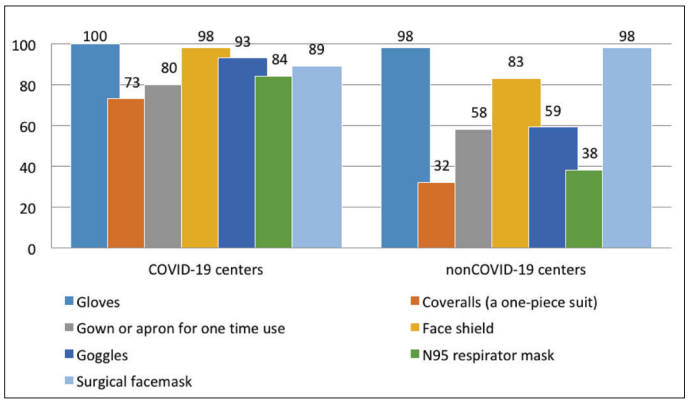

Figure 3. Summary of available personal protection equipment

the time of the survey) were invited to anonymously complete an online questionnaire consisting of 12 questions about the use of echocardiography during the COVID-19 pandemic, the availability of portable echocardiographic devices, PPE, and education regarding the use of PPE. The data was collected and analyzed using commercially available software (PASW Statistics 18, version 18, SPSS, Inc., Chicago, IL, USA). Categorical data was summarized by proportions and compared using a Fisher's exact test. The test was two-tailed, and a p-value < 0.05 was considered significant.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS

Overall, 126 ECHOS members (43%) from all regions of Serbia, answered the survey. Approximately one-third of respondents (36%) were from the COVID-19 centers. After the outbreak of the pandemic in Serbia, indications for echocardiographic examinations were restricted in COVID-19 as well as in non-COVID-19 centers, as shown in Figure 1.

Transesophageal echocardiography (TEE) was not performed in suspected or confirmed cases of COVID-19 at any center – in patients in whom COVID-19 was not suspected, TEE was performed in 2% in COVID-19 and in 4% in non-COVID-19 centers. In COVID-19 centers, lung ultrasound (LUS) was performed in every patient by 41% respondents, only when pneumonia was suspected by 21% respondents, while 38% of respondents did not perform LUS at all. In non-COVID-19 centers these percentages were 26%, 25%, and 49%, respectively (Figure 2).

Small, portable echocardiographic machines or hand-held ultrasound devices were available to 52% of respondents (66% from COVID-19 centers *vs.* 44% from non-COVID-19 centers, p = 0.018). Available PPE in both types of centers is summarized in Figure 3. N95 respirator mask was more frequently available at COVID-19 compared to non-COVID-19 centers (84% *vs.* 38%, p < 0.00001). The protocols of cleaning and disinfection of echocardiographic machines and probes were affected by the pandemic in both COVID and non-COVID-19 centers. A thorough disinfection of echocardiographic equipment regardless of COVID-19 status was performed in 35% of COVID-19 and 46% of non-COVID-19 centers (p = 0.25). Respondents from both types of centers found their personal knowledge about protective measures and the use of PPE satisfactory but the majority stated that they could benefit from additional education, as shown in Table 1.

Table 1. Summary of personal educational preferences regarding personal protection equipment during echocardiographic examinations

Personal educational stand	COVID-19 centers	Non-COVID-19 centers
My knowledge is complete	29%	20%
My knowledge is satisfactory but I need further education	60%	69%
My knowledge is insufficient	11%	11%

DISCUSSION

This survey was carried out by ECHOS around the peak of the pandemic in Serbia. At the time of the survey, there were a few national and global recommendations on cardiac imaging during the pandemic based on expert opinion, national guidelines, and available evidence [4–12].

After the outbreak of the corona virus pandemic in Serbia, indications for echocardiographic examinations were restricted in COVID-19 and non-COVID-19 centers alike. This is in accordance with the cardiac imaging societies' recommendations, which advised that only essential echocardiographic studies should be performed, focusing solely on the acquisition of images needed to answer the clinical question that is likely to change the management strategy [5, 12]. The avoidance of performing TTE, and particularly TEE in patients in which the test results are unlikely to change the management strategy is recommended [5, 12]. The TEE increases the risk of spread of COVID-19 due to the exposure of health care personnel to aerosolization of large viral load [6, 12]. Therefore, it should not be performed if an alternative imaging modality is available [12]. In line with this, TEE was not performed in suspected or confirmed cases of COVID-19 at any center, but it was still performed when needed in selected COVID-19 negative cases.

Small, laptop-sized, portable machines and hand-held ultrasound devices were at disposal to 52% of respondents. This data, as the measure of quality of echocardiography practice in critically ill patients, at the time being, is not at the satisfactory level in Serbia. The "point of care" ultrasound, focus cardiac ultrasound, and critical care echocardiography could be preferred bedside imaging options and effective alternatives for initial assessment and treatment guidance of cardiovascular complications of COVID19 infection [5, 8, 12].

In COVID-19 centers, LUS has been done by 62% of respondents, while 38% did not perform LUS at all, suggesting that the usage of the LUS is not at a desirable level in Serbia. The current clinical evidence suggests that LUS may be useful for the diagnosis and prognosis of COVID-19 pneumonia [8]. However, limited evidence exists for the use of LUS to differentiate acute respiratory distress syndrome from heart failure [8].

During echocardiographic examinations, the N95 respirator mask was more often available at COVID-19 than non-COVID-19 centers. Worldwide, the level of PPE depended on the risk level of the patient with regard to COVID-19 status [13].

The Institute of Public Health of Serbia issued a series of recommendations for health care personnel providing care to suspected or confirmed COVID-19 patients as well as non-COVID-19 patients [14]. Over time, these national recommendations were updated according to the new data. Thus, in COVID-19 centers, health care personnel should be protected by wearing a N95 respirator mask, coveralls or impermeable coat with cap, gloves, and goggles, or a face shield [14, 15]. In non-COVID-19 centers, PPE consisting of surgical facemask, a single use gown, gloves, and a face shield was considered sufficient [14, 15]. In our survey, a lower degree of protection was present in non-COVID-19 centers, which was in accordance with these recommendations.

It should also be underlined that the risk of infection remains in the examination rooms and therefore the equipment should be frequently sanitized [12, 16]. However, the cleaning and disinfection of echocardiographic machines and probes were performed slightly less frequently at COVID centers than in non-COVID-19 centers, which was probably due to the impression that the risk of cross infection at COVID-19 centers was lower. Local standards vary, but echocardiogram machines and probes should be thoroughly cleaned, ideally in the patient's room and again in the hallway [12, 16]. Respondents from both types of centers found their personal knowledge of protective measures and the use of PPE satisfactory but needed additional education.

Although less than 50% of ECHOS members participated in the survey, this response rate is comparable to our previous and similar international surveys [17, 18, 19]. In addition, our survey was conducted several weeks after the outbreak of the epidemic is Serbia – it is, therefore, possible that the initial shortages of PPE, which was a global phenomenon occurring even in more performant health care systems, were not captured by the current survey. It would be worthwhile to repeat the current survey at the end of the pandemic and to include a larger number of participants.

CONCLUSION

This survey revealed that the usage of echocardiography during COVID-19 pandemic in Serbia was in line with international standards. In both COVID-19 and non-COVID-19 centers, the use of PPE was in line with national recommendations. A wider availability of portable ultrasound devices and usage of LUS could facilitate patient management in similar situations in the future.

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Conflict of interest: None declared.

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Анализа спроведене анкете EXOC у Србији током пандемије *COVID*-19

Гордана Крљанац[1,2], Маја Стефановић[3,4], Зорица Младеновић[5,6], Марина Дељанин-Илић[7,8], Александра Јанићијевић[9], Милица Стефановић[9], Данијела Трифуновић-Замаклар[1,2], Александар Н. Нешковић[1,9], Иван Станковић[1,9]

[1]Универзитет у Београду, Медицински факултет, Београд, Србија;
[2]Клинички центар Србије, Клиника за кардиологију, Београд, Србија;
[3]Универзитет у Новом Саду, Медицински факултет, Нови Сад, Србија;
[4]Институт за кардиоваскуларне болести Војводине, Сремска Каменица, Србија;
[5]Универзитет одбране, Медицински факултет, Београд, Србија;
[6]Војномедицинска академија, Београд, Србија;
[7]Универзитет у Нишу, Медицински факултет, Ниш, Србија;
[8]Институт „Нишка Бања", Клиника за кардиоваскуларне болести, Нишка Бања, Србија;
[9]Клиничко-болнички центар Земун, Служба кардиологије, Београд, Србија

САЖЕТАК

Увод/Циљ Национална анкета Ехокардиографског удружења Србије (EXOC) спроведена је са циљем да се процени примена ехокардиографије у Србији током пандемије вируса корона 2019.

Методе Анкета која се састојала од 12 питања о примени ехокардиографије, доступности преносивих ехокардиографских уређаја и личне заштитне опреме (ЛЗО) послата је електронским путем свим члановима EXOC-а.

Резултати Укупно је 126 чланова EXOC-а (43%) одговорило на анкету. Око трећина испитаника (36%) били су лекари из специјализованих центара COVID-19. Током пандемије, индикације за ехокардиографски преглед биле су редуковане и у центрима COVID-19 и у центрима не-*COVID*-19. У центрима *COVID*-19 41% испитаника је ултразвук плућа радило сваком болеснику, док је тај проценат у центрима не-*COVID*-19 износио 26%. Трансезофагеална ехокардиографија није рађена сумњивим или потврђеним случајевима заразе вирусом корона ни у једном центру. Доступност преносивих ултразвучних апарата пријавило је 66% испитаника у центрима COVID-19 наспрам 44% испитаника у центрима не-*COVID*-19 ($p = 0,018$). Испитаници су пријавили редовну употребу ЛЗО, без обзира на статус болесника у вези са вирусом корона и сматрали су да је њихово знање о мерама заштите и употреби ЛЗО задовољавајуће.

Закључак Током пандемије *COVID*-19 у Србији, индикације за ехокардиографију биле су редуковане и ограничене на случајеве где се очекивало да ће резултати прегледа утицати на ток лечења болесника. Како у центрима *COVID*-19 тако и у центрима не-*COVID*-19 употреба ЛЗО била је у складу са националним и међународним препорукама. Шира доступност преносивих и ручних ехокардиографских апарата и употреба ултразвука плућа могу бити од великог значаја за успешно превазилажење сличних ситуација у будућности.

Кључне речи: ехокардиографија; анкета; COVID-19; Србија