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EDITORIAL COMMENT

Cardiovascular Testing During COVID-19

Chaos of an Orchestra Rehearsal But Signs of a Harmonious Symphony*

Pranav M. Patel, MD

The INCAPS (International Atomic Energy Agency Division of Human Health Non-invasive Cardiology Protocols Study) coronavirus disease-2019 (COVID-19) investigators group conducted a worldwide survey that assessed the changes in cardiovascular procedure volumes attributed to COVID-19 (1). This large-scale global survey examined data from 108 countries (including 33 Asian countries) comparing data for March and April 2020 with data from March 2019. On review of their data, the investigators suggested the diagnostic procedure volumes for cardiovascular disease decreased from the pre-pandemic time of March 2019 to pandemic periods of March 2020 and April 2020. They suggested that the pandemic had really challenged health care delivery and health care systems internationally.

In this issue of *JACC: Asia,* a substudy of International Atomic Energy Agency-INCAPS COVID-19 survey from Kudo et al (2) sought to evaluate the effects of the early phase of the COVID-19 pandemic on cardiovascular diagnostic procedures and safety practices in Asia. The authors of the study suggested that Asian countries saw cardiovascular procedural volumes decreased by 47% from March 2019 to March 2020, but also showed recovery from March to April 2020 in eastern Asia, and particularly in China. The greatest reductions in precision what volumes are observed in lower income countries, where volumes decreased 81% from March 2019 to April 2020. The investigators noted that (as with other regions in the world) that the majority of centers in Asian countries canceled outpatient activities and increased the time for study (time spent cleaning, disinfecting, and eliminating protocols requiring close social contact). This was in conjunction with international practice changes and the implementation of social distancing and other COVID-19 pandemic restrictions.

Although the findings of this substudy are concerning and concur with international experience during this time (1), the authors should be commended for their efforts to explore how particular regions around the world have been affected by the pandemic and the influence of international cardiovascular public health policies. As emphasized in their discussion, their subanalysis revealed that many effects of the COVID-19 pandemic were similar in Asia compared to other regions of the world. However, there were certain disparities that were also noted. The authors noted that: 1) there was early recovery in the number of cardiovascular tests performed and this was specific to the Eastern Asia subregion; 2) there were important regional differences in the extent of the impact of the pandemic, with Eastern Asia experiencing a smaller effect; and 3) lower-income countries were more adversely affected and had lower procedure volumes.

The deleterious influence of the pandemic was reflected by a reduced number of diagnostic procedures and clinical safety practices (eg, physical distancing and patient screening) limiting patient volumes. Small centers and low-income countries were most negatively impacted by the pandemic. Similar consequences were observed between Asia and other countries. The authors suggest that decreases in cardiac examinations correlated with the increase in prevalence of patients with COVID-19. In addition, the Eastern Asian region experienced some recovery of procedure volume from March to April 2020. This observation may be attributable to the temporal spread of COVID-19 in Asia. It is possible that reduced

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From the Division of Cardiology, Cardiac Catheterization Lab, University of California-Irvine, Irvine, California, USA.

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volume reflects a proactive measure as centers prepared for the arrival of the first wave, rather than a reactive response to the pandemic.

The investigators suggested that although cardiovascular procedure volumes decreased by 47% of March 2020 compared to March 2019, there was some recovery (by nearly 1%) noted between March 2020 and April 2020. This may have been an indication that the reduced volume may have reflected proactive measures to prepare for the first wave of COVID-19. It also leads us to consider the assumption that counties were trying to follow public health policy and public messaging, which is a positive affirmation of the collaboration between countries for support of global health policies. However, we also learn now that some of this delay (of certain types of testing) may have had a deleterious effect with untreated cardiovascular disease resulting in worse outcomes.

The recovery in Asia was very different from the rest of the world where there was a continuous decline of 32% between March 2020 and April 2020. This recovery was driven by countries in eastern Asia whereas the 3 other subregions of Southern, Western and Central Asia showed no recovery. The subregion of eastern Asia included data from China, Korea, and Japan. The increase in volume (and subsequent recovery) observed in April 2020 was mainly driven by China (58% increase) where the first COVID-19 wave had already peaked; therefore, subsequently, clinical safety protocols may have been loosened. By analyzing procedures per center there was no recovery between March 2020 and April 2020, but the decline in testing did slow; and in April 2020, procedure numbers increased in Asia (in some cases these numbers were significantly larger than those and the rest of the world).

When examining the difference between types of centers in the various regions, it appears that university-affiliated teaching facilities showed a smaller reduction in testing (45%) compared with the nonteaching centers (55%); and smaller hospitals had greater reductions than larger hospitals. These results were similar to those identified in the rest of the world, and all the reductions tended to be smaller in Asia. There were also differences observed and procedure reductions based on economic data. Asian countries with lower per capita income experienced greater procedure reductions than high income Asian countries across all procedure types. The authors speculate that the reason for this relationship between income and procedure may be related to health care funding, but it requires further analysis.

Although the results reinforce data that suggest that the pandemic may have had important indirect and negative effects on cardiovascular outcomes, I believe the results may also imply some encouraging and positive aspects for the global policy that led to these reductions. First, with the onset of the pandemic, various professional cardiovascular societies had made expert consensus recommendations and guidelines which had restricted and influenced cardiovascular testing. These guidelines were created to limit exposure to COVID-19 for both patients and providers. There was a push to postpone less-urgent procedures and procedures that would put individuals at more risk (especially aerosol-producing procedures). We also understand that there were a smaller number of cardiovascular procedures, testing, and patient delays as a way to contain the spread of COVID-19. It appears that as countries developed better management strategies for this pandemic (and with the onset of a vaccine), the authors also noted that certain Asian countries were also starting to detect an increase in volume after the initial surge of the pandemic. In eastern Asia, there was a recovery in procedure volumes (observed predominantly in China), whereas there was further decline in other regions (which may have been from a later wave). Obviously, further study of this is warranted.

There were differences observed and procedure reductions based on economic data. Asian countries with lower per capita income experienced greater procedure reductions than high-income Asian countries across all procedure types. The initial INCAPS COVID-19 survey showed greater procedure volume declines in low-income countries than in high-income countries. Much of this data were driven by data from Asia. The reasons for this relationship remain unclear, but may have been because Asia was the first region to be affected by COVID-19. It may also be related to health care funding, but this also requires further analysis. This also indicates a major limitation of the study which is the narrow temporal range of data. Continued data collection and analyses are needed to clarify those effects, and the authors admit this. Another limitation is that participation in the survey was voluntary; therefore, the density of the variable data between countries may not be generalizable.

This pandemic and cardiovascular health policy has taught us a great many lessons and studies such as this suggest that we have met some of the challenges placed upon us. We have become connected from a global perspective and certainly are more efficient in providing health care. We have quickly adapted and changed policies and health care models so that the impact to patient care and business is limited. There is hope that although COVID-19 initially turned global

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cardiovascular testing into a chaotic process (analogous to the disordered rehearsal of an orchestra), later responses suggest that countries and policies may now be moving towards a more harmonious composition (albeit not completely a symphony at this time). These new challenges with the pandemic are improving our skills and teaching us how to can enhance cardiovascular care. As with the current study, we should also encourage further research until we truly understand the global impact of this pandemic on the cardiovascular care of our patients.

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ADDRESS FOR CORRESPONDENCE: Dr Pranav M. Patel, Division of Cardiology, Cardiac Catheterization Lab, University of California-Irvine, 333 City Blvd. West, Suite 400, Orange, California 92868, USA. E-mail: pranavp@hs.uci.edu.

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