

facility closures.⁴ Failure to utilize CR, however, is likely to be associated in patients with a higher burden of disease, reduced participation, and possibly increased mortality.¹⁰ Telerehabilitation approaches could help to address the increasing need for treatment of people with CVD and could provide rehabilitations services during pandemic periods.¹¹

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“Unlocking Physical Activity” During COVID-19 in Cardiac Device Patients

Since the start of the COVID-19 pandemic, the general population and public health officials focused largely on implementing infection control procedures. The daily hassles and increased lifestyle burden for the average American were multiplied, and levels of physical activity (PA) may have been particularly impacted. International large-scale lockdown measures have promoted projected decreases in PA and increases in sedentary behavior among the general population.¹ Similar decrements in patients with pre-existing cardiac conditions could mean acceleration of disease progression and heightened disease burden. The purpose of this article was to review the current literature on COVID-19 and PA among adult patients with cardiovascular implantable electronic devices (CIEDs), including pacemakers, implantable cardioverter defibrillators (ICDs), cardiac resynchronization therapy devices, and implanted cardiac monitors, and its implications. This population of patients was selected because of the continuous PA monitoring data available in CIED patients.

METHOD

A PubMed search was conducted to identify articles referring to PA in adult patients with a cardiology device during the COVID-19 pandemic. The search was limited to studies using passive data collection among CIED patients with the presence of an accelerometer. A total of eight articles with 36907 adult CIED patients were included in this review. Two additional articles focused on pediatric CIED patients were noted but excluded from the review. Data captured from CIEDs differ in metrics by device manufacturers with units such as minutes of PA, steps, or % active time.

RESULTS

Rosman et al examined the full host of CIEDs in a large US (North Carolina) cohort of patients (N = 3453).² Daily PA levels, obtained from accelerometer data, showed an overall 15% decrease in PA during the lockdown period relative to the pre-COVID period (2019). Post-lockdown, PA remained 14% lower and only 23% of patients returned to their 2019 levels. Similar findings among CIED patients in Italy showed PA decreasing significantly from pre- to post-lockdown periods. Most patients (89%) reduced their overall PA, and a reduction in PA by >25% was observed in just under half (43%) of the sample.³ Among patients in Italy with ICDs specifically, a 25% reduction in PA was also observed during the mandated 40-d home confinement period.⁴ In a Saudi Arabian sample, slightly larger reductions in overall PA were exhibited among CIED patients with heart failure, with overall PA declining by 27% compared with pre-pandemic levels and daily exercise decreasing from 1.8 to 2.4 hr.⁵

Multiple studies have reported changes in PA by daily minutes. In the largest cohort study (N = 21660) to date conducted among CIED patients at Mayo Clinic, daily PA

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decreased by an average of 24 min compared with pre-pandemic levels, with more than half of the sample experiencing a reduction of >10 min in PA from March to August 2020.⁶ Male and female patients across all ages exhibited significant declines in PA, with older patients (>80 yr) demonstrating diminished ability to return to pre-pandemic levels.⁶ Cunha et al⁷ examined changes in PA profiles among US CIED patients with congestive heart failure over three periods: baseline, lockdown, and post-lockdown. These authors divided patients into four distinct groups based on pre-lockdown levels of PA. All patients demonstrated a statistically significant decrease in time spent engaging in PA with an approximate overall decline of 39 min/d compared with pre-lockdown. Individuals with the highest PA levels pre-lockdown exhibited significant declines in PA but were able to return to pre-lockdown levels of PA following lockdown. Similar findings were demonstrated in UK patient populations, with a mean reduction in PA by approximately 20 min/d.⁸ Despite some studies indicating a return to pre-lockdown PA levels, among a group of CEID patients in New York City and Minneapolis-Saint Paul area (N = 11 102), median reductions in PA during the lockdown ranged from 14 min (15%) to 26 min (26%) compared with pre-lockdown levels, and reductions were found to persist for as much as 5 mo after restrictions were lifted.⁹ These findings emphasize the long-lasting consequences of COVID-related lockdowns and the potential need for providers to target and encourage PA engagement among this patient population.

DISCUSSION

The current literature review indicated that CIED patients significantly reduced their PA levels ranging from 15-27% depending on the stage of the lockdown. There was variable return to pre-pandemic PA levels, with historically highly active patients better able to return to pre-pandemic levels. Lowered PA was found to persist beyond lifts on COVID-related restrictions, especially among vulnerable groups, exhibiting broad dampening effects on PA in this at-risk group of cardiac patients. These results suggest that the pandemic may have enduring effects on physical deconditioning and cardiorespiratory fitness in CIED patients. The unique ability to download PA data from CIEDs provides an objective window on PA in these patients.

As demonstrated from the literature, COVID-19 and associated lockdowns resulted in notable reductions in PA among CIED patients, increasing the possibility of disease progression and adverse patient outcomes. In a study examining 48 440 adult patients with COVID-19, Sallis and colleagues¹⁰ found that patients who were not meeting prior PA guidelines demonstrated elevated risk for hospitalization, admission to the intensive care unit, and death. These outcomes may be particularly salient to CIED patients as they represent an at-risk population that largely may not have been meeting current PA guidelines. Among risk of COVID-specific adverse outcomes, increases in physical inactivity among this population may present concerns of disease progression and management going forward. Jamé et al¹¹ found an increased risk of heart failure/death hazard ratio of 3.6 for those with 50% decline in weekly average PA levels compared with those who had not dropped below the 50% decline in PA levels. Elevated fears of infection risk, widespread societal and financial disruption, pre-existing fears of exertion, and psychosocial difficulties during this time likely further amplified disengagement in PA and cardiovascular disease management among this patient population.

CONCLUSIONS

The profound impact of the COVID-19 pandemic on human behavior from the general public and our patients with cardiovascular disease remains to be fully evaluated. Given the current research, clinical attention should be paid to assessing PA levels and the adaptation of formal exercise plans that will improve the lives of patients with cardiac device in the aftermath of the current pandemic.

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