Cardiac pacing procedures during coronavirus disease 2019 lockdown in Southern Italy: insights from Campania Region

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Background Aim of our study was to assess the association between COVID-19 lockdown and cardiac pacing (CP) procedures rates in Campania Region, the third-most-populous region of Italy with about 5.8 million residents.

Methods Data about type of CP procedures and unit admissions were obtained from 14 CP centers throughout Campania Region from March 10th and May 4th 2020 and compared with the same time frame in 2019.

Results A remarkable reduction in both temporary (reduction rate: −62.5%), definitive pacemaker (reduction rate: −30.2%), ICD (reduction rate: −48.3%) and CRT (reduction rate: −48.4%) implantation and in CRT replacement (reduction rate: −88.8%) procedures has been shown between the two observation periods among 951 hospitalized patients. Planned hospitalizations showed a reduction rate of 69.3%. Conversely, urgent intra-hospital admissions (increase rate +430%; P<0.001) increased during COVID-19 lockdown and no significant difference in attendance rate to the emergency department (increase rate +6.7%; P = 0.254) has been shown.

Conclusion COVID-19 lockdown was associated with a remarkable decrease in CP procedures due to the reduction of planned hospitalizations in Campania Region; however, no significant difference in emergency department admission rate was shown.

J Cardiovasc Med 2021, 21:000–000

Keywords: Cardiac Pacing, ICD, Pacemaker, Replacement, COVID-19, Lockdown, Hospitalization, Remote Monitoring

Letter to the Editor

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly pathogenic human coronavirus recognized as the cause of the coronavirus disease 2019 (COVID-19). The outbreak started in China and rapidly spread worldwide, reaching a devastating pandemic proportion with alarming morbidity and mortality. Italy is among the countries majorly hit by COVID-19, with more than 241,956 laboratory-confirmed cases by 8 July 2020 and more than 34,889 deaths. Following the outbreak of COVID-19, from 10 March to 4 May 2020, the Italian government adopted strict rules characterized by lockdown and social distancing as an attempt to contain the virus diffusion. The aim of our study was to assess the association between COVID-19 lockdown and cardiac pacing procedure rates in Campania Region, the region of Southern Italy majorly hit by COVID-19, with more than 8900 laboratory-confirmed cases.

Materials and methods

This is a multicenter retrospective observational study. Data about the type of cardiac pacing procedures and cardiac pacing center admissions were obtained from 14 cardiac pacing centers throughout Campania Region from 10 March and 4 May 2020 and compared with the same time frame in 2019. Assessed cardiac pacing procedures
were pacemaker, implantable cardioverter defibrillator (ICD), and cardiac resynchronization therapy (CRT), either implantation or replacement, and temporary pacemaker implantation. The admissions to cardiac pacing centers were differentiated into: emergency department (symptomatic patients self-referred either to emergency department or delivered by out-of-hospital emergency system); urgent unplanned hospitalization (as soon as possible following outpatient follow-up visit), planned hospitalization (organized by physicians according to patients’ and hospital needs), urgent intra-hospital admission (in-hospital symptomatic patients). The study was approved by the Local Ethics Committee and is in accordance with 1976 Declaration of Helsinki and its later amendments. All data are presented as either number and percentage, in the case of categorical variables, or median and interquartile range for what concerns continuous variables, after appropriately testing their distribution by the Shapiro–Wilk and Kolmogorov–Smirnov goodness-of-fit tests. Differences between variables were either assessed by the chi-square test for categorical variables or the nonparametric Mann–Whitney U test. In addition, an appropriate Generalized Linear Model with Log Linear Poisson regression for modeling count data was implemented to compute Incidence Rate Ratios for all single procedures (reduction and increase rates, respectively). A P value less than 0.05 was considered as statistically significant. All analyses were performed by SPSS Software, Version 24 (IBM, Armonk, New York, USA) and STATA 14.0 software (StataCorp. 2015. College Station, Texas, USA: StataCorp LP).

**Results**

Nine hundred and fifty-one hospitalized patients who underwent cardiac pacing procedures over the two observation periods were enrolled in the study, of which 367 were during the lockdown for COVID-19 outbreak and 584 during the same time period in 2019. Patients treated during the COVID-19 lockdown were significantly older than those treated in 2019 [median age 77 years (IQR: 70–82) vs. 74 years (IQR: 67–81.8); P = 0.004], whilst both subgroups were equally distributed for sex. Overall procedures were 702 in 2019 vs. 405 in 2020, with a reduction rate of 42.3%. There was a remarkable reduction in both temporary (reduction rate: −62.5%), definitive pace maker (reduction rate: −30.2%), ICD (reduction rate: −48.3%) and CRT (reduction rate: −48.4%) implantation and in CRT replacement (reduction rate: −88.8%) procedures between the two observation periods.

Population-specific data are shown in Table 1. Elective cardiac pacing procedures disclosed a significant decrease (331 in 2019 vs. 161 in 2020; reduction rate: −51.4%; P = 0.001). As for the type of admission to cardiac pacing centers, the highest reduction rate was observed in planned hospitalizations (reduction rate: −69.3%; P < 0.001), followed by a reduction in urgent unplanned hospitalizations (reduction rate: −27.4%; P = 0.015). Conversely, urgent intrahospital admissions (increase rate +430%; P < 0.001) increased during the COVID-19 lockdown and no significant difference in the attendance rate to the emergency department (increase rate +6.7%; P = 0.254) has been shown. All data are graphically expressed in Fig. 1. A significantly increased rate of cardiac pacing procedures was noticed in patients followed by remote monitoring (increase rate: +211%, P = 0.006), mainly driven by a remarkable increase in pace maker replacement procedures (4 in 2019 vs. 63 in 2020; P < 0.001).

**Discussion**

Campania was the region of Southern Italy majorly hit by COVID-19, with more than 8900 laboratory-confirmed cases. Our findings suggest that the COVID-19 lockdown was associated with a significant reduction rate in all CIEDs implantation and in CRT replacement procedures, more likely because of the reduction in planned hospitalizations following Italian government measures to contain SARS-CoV-2 diffusion. No significant
difference in both pace maker and ICD replacement procedures has been shown among our study population, more likely because of the increase in urgent unplanned hospitalizations. In contrast to reports from Northern Italy hospitals,\textsuperscript{7,8} which showed a trend towards a reduction in hospital admission because of cardiovascular diseases leading to both temporary and definitive pace maker implantation procedures, and differently from the pattern of hospital admission because of myocardial infarction,\textsuperscript{9,10} our data did not show any significant difference in the emergency department admission rate for patients in need of cardiac pacing procedures. The remarkable increase in cardiac pacing procedures noticed in patients followed by remote monitoring might be explained by the increasing use of remote monitoring for the follow-up of pace maker patients during the COVID-19 lockdown.\textsuperscript{11} A reorganization of the cardiac pacing centers healthcare model would be desirable to better manage the patients in urgent need of cardiac pacing procedures and the follow-up of CIEDs patients during the COVID-19 pandemic.\textsuperscript{12}

**Conclusion**

The COVID-19 lockdown was associated with a remarkable decrease in cardiac pacing procedures because of a reduction in planned hospitalizations in Campania Region; however, no significant difference in the emergency department admission rate was shown. CIEDs remote monitoring seems to be an important driver for timely device replacement in spite of the pandemic.

**Acknowledgements**

We acknowledge the Arrhythmias and COVID-19 Campania Study Group.


**Conflicts of interest**

There are no conflicts of interest.

**References**


