ORIGINAL ARTICLE

IMPACT OF COVID-19 PANDEMIC ON HEALTHCARE ACTIVITY IN CARDIAC SURGERY SERVICE IN THE SOUTHERN AREA OF THE METROPOLITAN AREA OF BUENOS AIRES

ABSTRACT

Introduction and objective: The Pandemic caused by the SARS-CoV-2 virus (COVID-19) impacted healthcare, which led surgical services to adapt their functional structure according to the different temporal phases.

This paper aims to analyze the pandemic's impact on outpatient care and surgical interventions in the Cardiac Surgery Service of a third-level public hospital in the Southern area of the Metropolitan Area of Buenos Aires, Argentina.

Methods: The consecutive medical records of 561 operated patients and the office records of 943 patients treated were retrospectively evaluated from March 2018 to December 2022. The number of consultations and surgeries, the epidemiological parameters, and the postoperative evolutions were analyzed.

Results: During the pandemic, concerning the pre-pandemic period, a significant decrease in the monthly number of consultations (18.9 vs. 14.8; $p < 0.05$) and of surgeries (12 vs. 8.3; $p < 0.0001$) was recorded. A significant increase in patients referred from the Intensive Care Unit before surgery was also observed ($p < 0.005$). Among the presurgical risk factors, a significantly higher prevalence of acute myocardial infarction (AMI) and insulin-requiring diabetes (IR-DBT) was found, as well as a more significant number of patients with deterioration of left ventricular systolic function (LVSF) ($p < 0.005$). The total amount of infections increased significantly ($p < 0.05$), with respiratory infections as the primary cause ($p < 0.05$). However, this cause was associated with COVID-19 in only one patient.

Conclusions: During the pandemic, consultations and surgeries decreased in the Cardiac Surgery Service, with more patients referred from intensive care areas. The patients who underwent surgery had a more significant history of AMI, DBT, and impaired LVFS. Infections increased, predominantly due to respiratory causes, although unrelated to COVID-19.

Keywords: *pandemic, cardiac surgery, respiratory infections.*

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INTRODUCTION AND OBJECTIVES

COVID-19 disease, caused by SARS-CoV-2 virus infection, generated the most significant health crisis in recent decades[1-3]. The World Health Organization (WHO) declared a health emergency, and its rapid spread led to its characterization as a pandemic on March 11, 2020[4,5].

In Argentina, the first case was confirmed on March 3, 2020. The rapid extension and saturation of health systems in other countries motivated the national government to decree a quarantine as of March 20, 2020, as a sanitary measure to combat COVID-19[6].

The quarantine was divided into two phases. The first one was preventive and compulsory social isolation (ASPO, for its acronym in Spanish), in which people had to remain isolated in their usual residences, with a prohibition to attending work, except for those workers considered essential[7,8]. With greater flexibility, the second phase allowed the population to circulate, work, and carry out certain activities under strict protocols. It was called social, preventive, and obligatory distancing (DISPO, for its acronym in Spanish)[9].

Due to the population density and the increase in cases, the Buenos Aires Metropolitan Area (AMBA, for its acronym in Spanish) was one of the areas of the country with the strictest and longest quarantine in the world[10]. Finally, on July 19, 2021, a progressive reopening and subsequent cessation of quarantine was announced[11].

The requirement of health care resources, directed to preventing the spread and affection of the SARS-CoV-2 virus, led various surgical services and associated critical areas to adapt their functional structure according to the different stages and needs of the pandemic[12-15].

Therefore, the present study aimed to analyze the impact of the pandemic on surgical care and intervention in the Cardiac Surgery Service of a tertiary-level public hospital located in the southern area of the AMBA.

METHODS

Consecutive medical records of patients who underwent cardiac surgery and consecutive office care records of the Cardiac Surgery Service from April 2018 to December 2022 were retrospectively evaluated.

This study's prepandemic period (PrP) was taken as April 2018-March 2020. The COVID-19 (C19) pandemic was considered from April 2020 to December 2022. In turn, the C19 was divided into 3 phases: confinement phase (CP) from April 2020 to September 2020, flexibility phase (FP) from October 2020 to June 2021, and normalization phase (NP) from July 2021 to December 2022 (*Figure 1*).

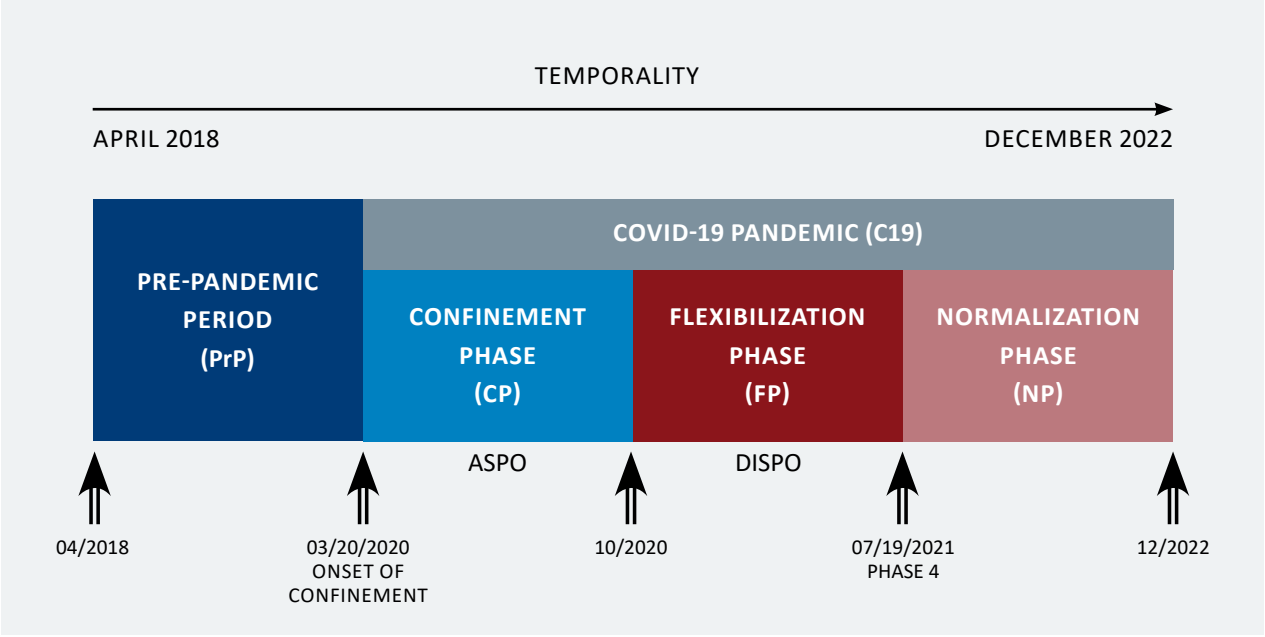

FIGURE 1. Schematic of the temporality covered by the study. The pre-pandemic stage (PrP) is shown in blue, whose data were compared with those of the COVID-19 pandemic stage (C19) (grey) and with those of each of its component phases: confinement phase (CP) in light blue; the flexibilization phase (FP), in red; and, finally, normalization phase (NP), in pink.
ASPO: preventive and compulsory social isolation (for its acronym in Spanish); DISPO: social, preventive, and obligatory distancing (DISPO, for its acronym in Spanish).

Epidemiological descriptive variables were studied: sex, the origin of patients before surgery, traditional cardiovascular risk factors (hypertension, diabetes mellitus, sedentary lifestyle, smoking, obesity), and cardiovascular history (acute myocardial infarction [AMI], angioplasties, and previous cardiac surgery). In addition, the following aspects were evaluated: results of preoperative studies (echocardiogram, cine-coronary angiography, spirometry) and postoperative evolution of all the patients who underwent surgery (postoperative extubation time, need for reintubation, requirement and time of inotropic drugs, prevalence, and type of infections).

The activities performed were evaluated: number of medical consultations (C) and cardiac surgeries (Q) and the type of surgical intervention.

Calculations and statistical analysis

Values are presented as mean ± standard deviation of the mean and percentage. Statistical analysis was performed with SPSS v24™ statistical software (IBM SPSS Statistics 24.0, 2021, IBM, NY, USA). Student's test and chi-square test were used. The significance level was established when the p-value was <0.05.

RESULTS

Between March 2018 and December 2022, 943 patients were followed by outpatient clinics, and 561 patients underwent surgery.

During C19, there was a significant decrease in C per month relative to PrP (C19: 14.8 vs. PrP: 18.9; p <0.05). This reduction was even more critical in FC (PrP: 18.9 vs. FC: 5.6; p <0.0001; FC: 5.6 vs FF: 14.1 p<0.001). There was also a significant monthly Q reduction in C19 (C19: 12 vs PrP: 8.3; p <0.0001). FC was the phase with the most significant decrease in Q per month (PrP 12 vs FC: 3.7; p <0.0001). However, within this comparison of the PrP and C19 period, no significant differences were found between PrP and FN about C (C: PrP: 18.9 vs. FN:18.3; pns) and Q per month (PrP:12 vs. FN:10.4; pns) (*Figure 2*).

The origin of patients operated on in C19 from the Intensive Care Unit (ICU) increased significantly concerning PrP (C19: 9.49% vs PrP: 3.5%; p <0.005); this increase was even more significant in FP (PrP: 3.5% vs FP: 10.9%; p <0.005). Patient referral from services within the hospital increased considerably in C19 (C19: 48.6% vs. PrP: 35.9%; p <0.005), being even more in FF (PrP 35.9% vs FP: 55%; p <0.0001). There was a significant decrease in outpatients in C19 compared to PrP (PrP: 72.5% vs. C19: 52.9%; p <0.005), being even more evident in FP (PrP: 72.5% vs FP: 39.1%; p <0.005) (*Figure 3*).

Within the risk factors and cardiovascular history of the population operated on in C19, the only parameters found with significant differences were insulin-requiring diabetes (IR-DBT) (FP: 10.1% vs. PrP: 5.2%; p <0.05) and AMI (FP: 70.3% vs PrP: 56.8%; p <0.05).

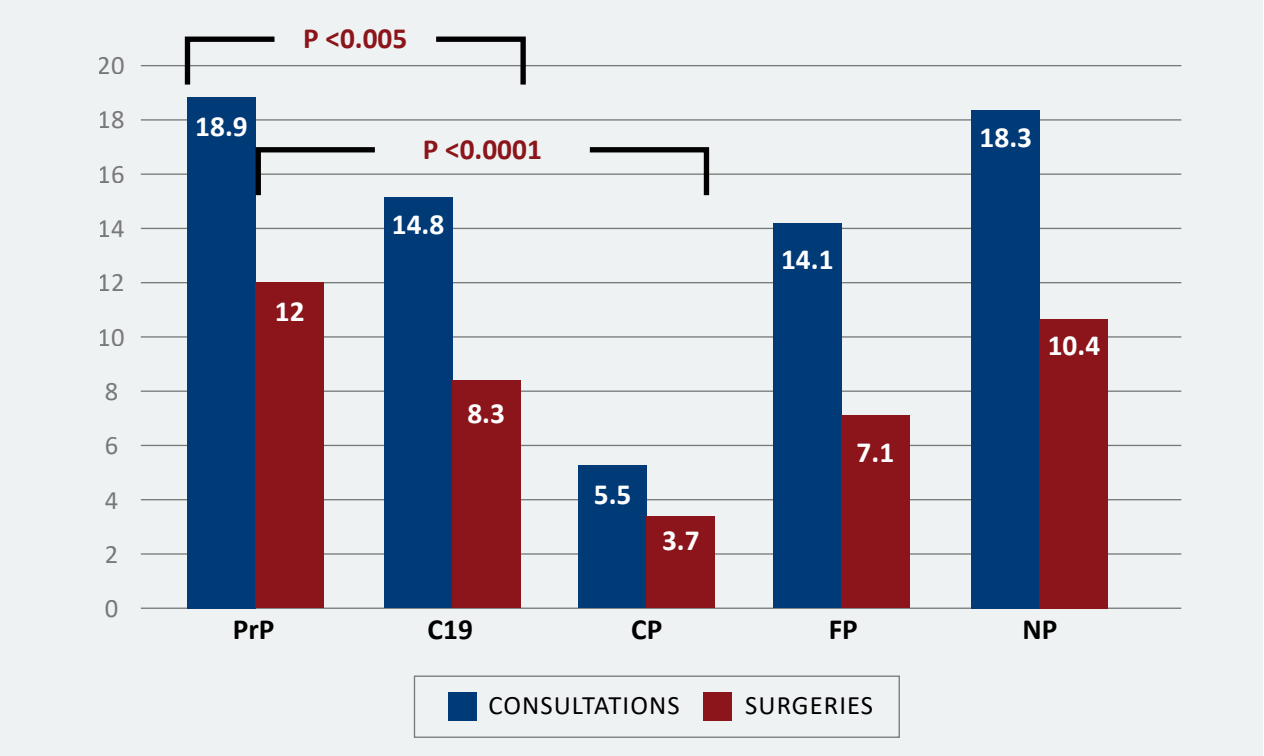

FIGURE 2. Average number of consultations (blue) and surgeries (red) per month during the pre-pandemic stage (PrP) and COVID-19 (C19) stages and the confinement (CP), flexibilization (FP), and normalization (NP) phases .

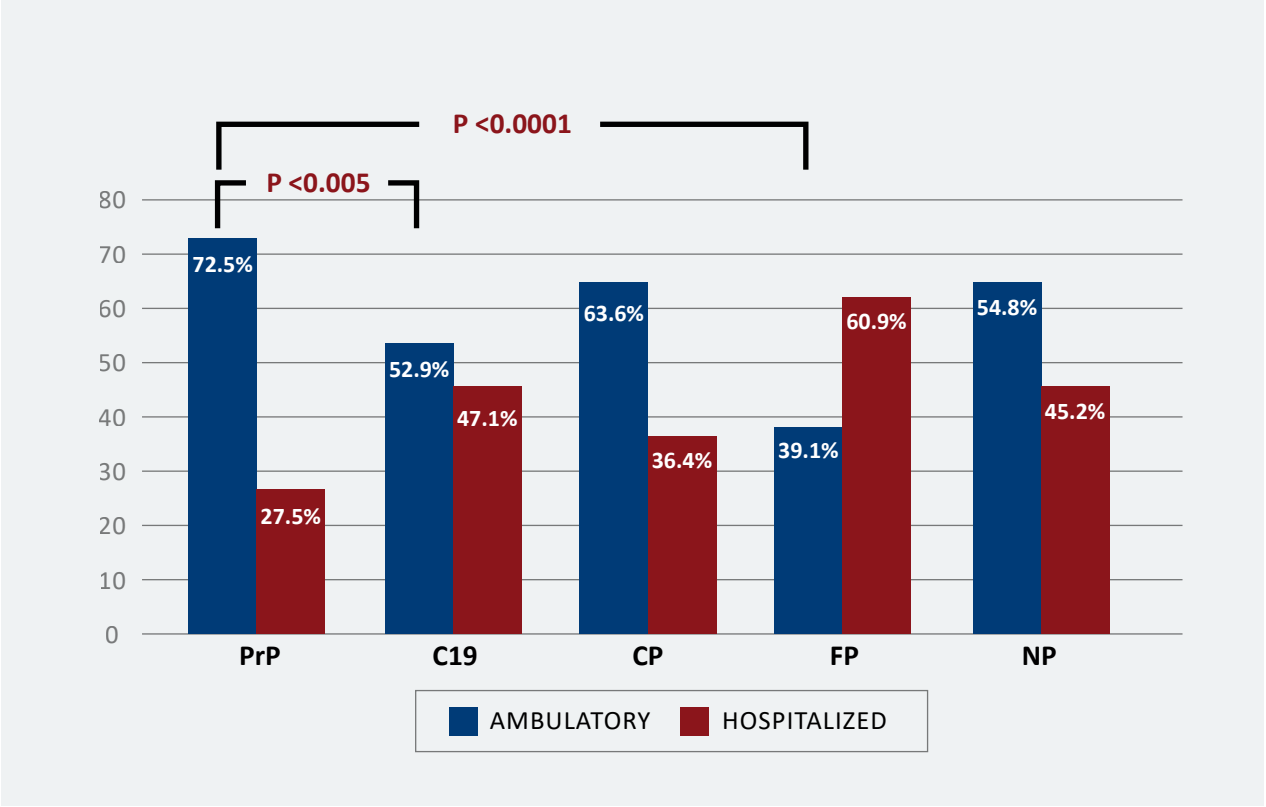

FIGURE 3. Percentage of origin of patients admitted to cardiac surgery, ambulatory (blue) and hospitalized (red) during the pre-pandemic (PrP) and COVID (C19) stages, and the confinement (CP), flexibilization (FP), and normalization (NP) phases.

There was no significant difference between the findings in C19 vs PrP regarding the lesions described in the cine-coronary angiography. Regarding preoperative complementary studies, the practice of spirometry decreased considerably in C19 (C19: 58.4% vs. PrP: 87.1%; p <0.05), being significantly lower in CP (CP: 36.4 vs PrP 87.1%; p <0.05). At the echocardiogram level, a lower number of patients with preserved left ventricular systolic function (LVSF) was observed in C19 about PrP (C19:53.3% vs PrP: 61.7%; p <0.05) (*Figure 4*).

When analyzing the surgical procedures performed, there was only a significant difference in the increase of aortic valve replacement (AVR) in NP (NP: 20.2% vs PrP: 11.5%; p <0.005).

Regarding postoperative evolution, there was no significant difference in extubation time, need for reintubation, time, and requirement of inotropic drugs. Regarding the prevalence of infections, a substantial increase in total infections was observed in CP concerning PrP (CP: 36.4% vs. PrP 18.8%; p <0.05) at the expense of respiratory infections (CP: 27.3% vs PrP 8.7%; p <0.05) (*Figure 5*). However, only one positive case of SARS-CoV-2 virus was detected.

Regarding respiratory infections, it was observed that patients who had them in CP had a history of smoking (CP: 100% vs. PrP: 44%; p <0.01) and referral from another institution (CP: 83.3% vs FN: 42.9%; p <0.05).

CONCLUSIONS

During C19, a decrease in the monthly C and Q numbers in the Cardiac Surgery Service was observed. However, no differences were found between PrP and NP. In addition, there was a decrease in outpatient consultations and, in contrast, a more significant referral of patients from the ICU, mainly in the FP.

Among the risk factors and cardiovascular history, a higher prevalence of previous AMI and IR-DBT was found.

Throughout C19, fewer previous spirometries were performed in operated patients, and a more significant deterioration of LVSF, assessed echocardiographically, was observed.

Finally, there was an increase in total infections at the expense of respiratory infections related to smoking and referral from other institutions.

Declarations
The authors declare no conflict of interest.

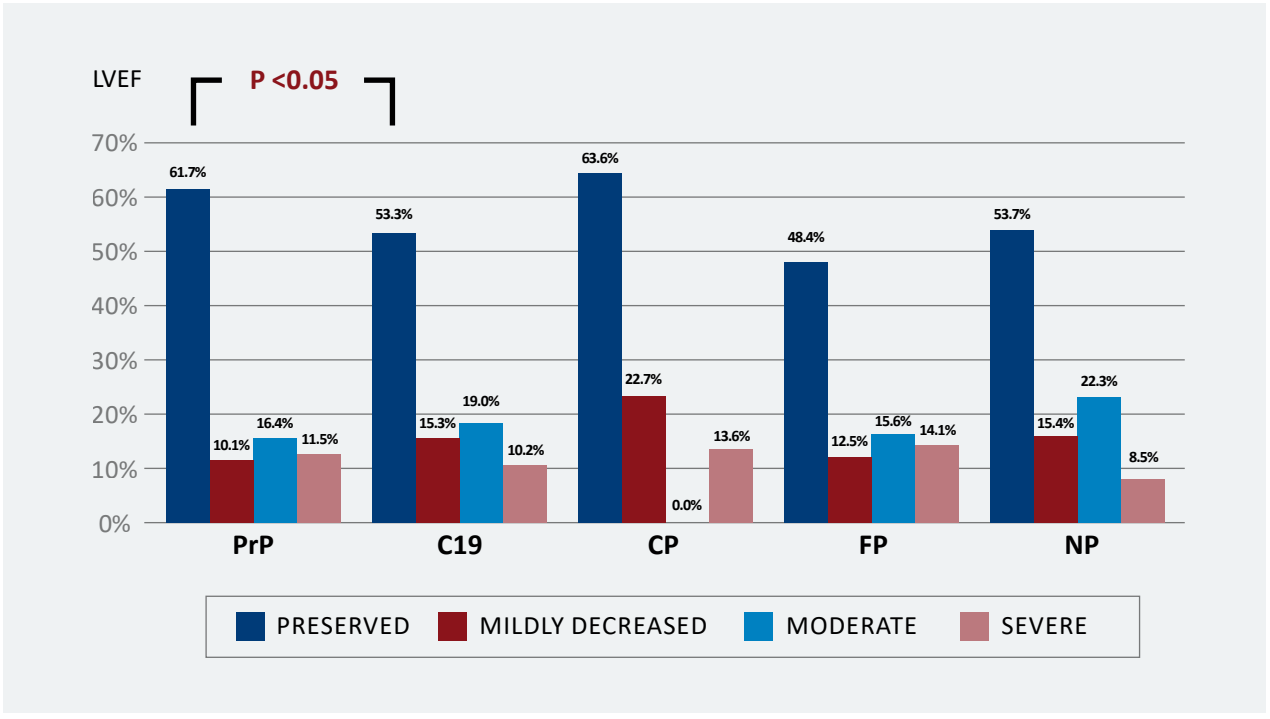

FIGURE 4. Ventricular function in the operated patients, assessed by echocardiography with left ventricular ejection fraction (LVEF), distributed according to the values found in LVEF preserved: ≥50% (blue) and mildly decreased: 49-40% (red), moderate: 39-30% (light blue) and severe: <30% (pink) during the pre-pandemic (PrP) and COVID (C19) stages, and the confinement (CP), flexibilization (FP), and normalization (NP) phases.

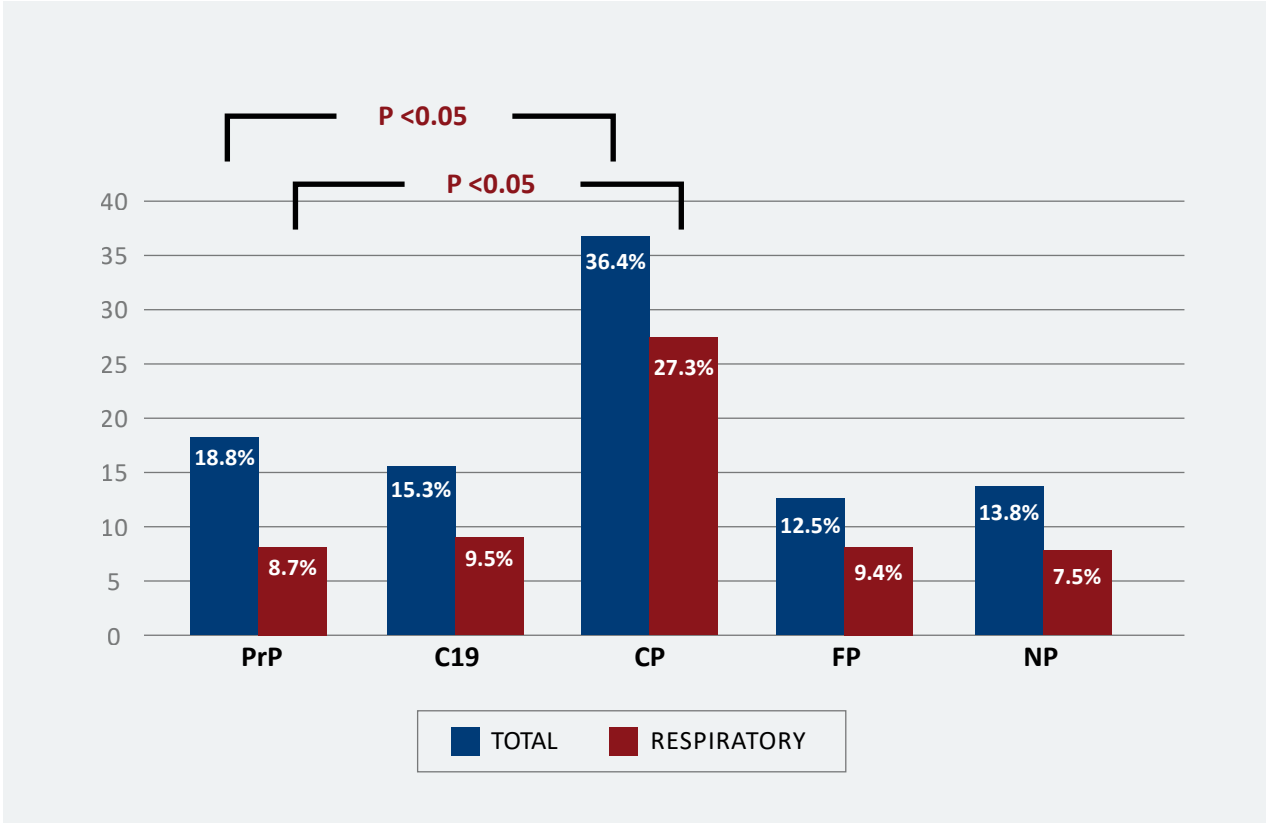

FIGURE 5. Prevalence of infections in operated patients (total in blue and respiratory in red) during the pre-pandemic (PrP) and COVID-19 (C19) stages, and the confinement (CP), flexibilization (FP) and normalization (NP) phases.

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