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RESEARCH ARTICLE

IMPACT OF COVID-19 ON PATIENTS WITH ACUTE CORONARY SYNDROME

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Abstract

The Covid-19 pandemic significantly affected the quality of life and life expectancy. This study aims to determine the impacto of Covid-19 in Acute Coronary Syndromes (ACS) patients. Data were collected from the medical records of patients with ACS admitted to the hospital in Xanxerê – SC Brazil, from 10/01/2018 to 30/09/2019, and compared with data collected from 10/01/2019 to 01/10/2020 from medical records of patients with ACS infected with Covid-19, in the same hospital. It was found that highest percentage of patients admitted to the hospital with ACS were male and aged 60 years or over, both in the pre-and in the pandemic period. SAH was the main comorbididy found in the pre-pandemic (65,6%) and pandemic (73,5%) period in patients with ACS, followed by DM2with a percentage of 30,5% and 47,1% respectively. In the Delta T assessment, with as found that during the pandemic period, a higher percentag of patients (42,2%) sought care more than 12 hours after the onset of symptons. The percentage of deaths in patients with ACS was higher in the pandemic period (14,7%) compared to the pre-pandemic period (8,1%). Covid-19 has a significant impact on hospitalizations of patients with ACS, increasing

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the risk of complications and worse outcomes among male, older patients and patients with comorbidities. There was an increase in hospital demand and hospitalizations were longer with greater severity of ACS and mortality in patients with Covid-19.

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Introduction:-

The emergence of the novel Coronavirus (SARS-CoV-2) in December 2019 in China. led to several respiratory infections caused by SARS-CoV-2, rapidly taking on global proportions, until it was declared a Pandemic in March 2020. The Covid-19 pandemic has affected various sectors of the economy, politics, health and social life. It has also had a negative impact on the proper treatment of diseases such as Acute Coronary Syndromes (ACS). During the pandemic period, there was a reported reduction of up to 70% in the number of people treated for ACS worldwide, with an increase of up to 800% in sudden deaths. The suppression of care is due to the high hospital demand generated by Covid-19, as well as the population's fear of contracting the virus when seeking care in a hospital environment (Silva et al., 2021; Guimarães et al., 2020).

In addition, patients with ACS and who have comorbidities and risk factors such as hypertension, diabetes mellitus, heart failure and chronic kidney disease, factors that contribute to higher rates of cardiovascular events, have not sought specialized care due to the potential fear of Covid-19. Leading to an increase in cardiogenic shock and deaths from ischemic heart disease during the pandemic period (Pipa et al., 2021).

It is now known that Covid-19 tends to interact with the cardiovascular system, aggravating and promoting the development of cardiovascular diseases such as myocarditis, arrhythmias, ACS and venous thromboembolism. This effect can be seen through the exacerbation of symptoms in patients with Acute Myocardial Infarction (AMI), an increase in myocardial necrosis markers, an increase in complications and a prolongation of ischemia time, leading to more pronounced myocardial damage (Campos et al., 2021; Primessnig Uwe et al., 2021).

Despite the attention paid to the management of Covid-19, other diseases have been impacted, both in terms of hospital care limited by demand, and in terms of the evolution, clinical picture and outcome determined by the interaction with the virus. Thus, the impact of Covid-19 on heart disease, such as Acute Coronary Syndrome (ACS), is still unclear. Therefore, the aim of this study was to identify the impact of Covid-19 on patients with ACS.

Methodology:-

This is a documentary, descriptive, retrospective, cross-sectional and comparative study. The study was divided into two parts. The first part was approved by the Research Ethics Committee (REC) of Unochapecó under opinion number 5.010.513 and collected data from medical records of patients admitted to the São Paulo Hospital in Xanxerê - SC, between the period from 01/10/2020 to 01/10/2021, considered a pandemic period. Thirty-four medical records of ACS-diagnosed patients were included, which met the inclusion criteria for the study, which were: having the following ICDs referring to AMI: I21 - Acute Myocardial Infarction, I21.0 - Acute Transmural Infarction of the Anterior Wall of the Myocardium, I21. 1 - Acute Transmural Lower Wall Myocardial Infarction, I21.2 - Acute Transmural Myocardial Infarction of Other Locations, I21.3 - Acute Transmural Myocardial Infarction of Unspecified Location, I21.4 - Acute Subendocardial Myocardial Infarction. In addition to these ICDs, documentation of SARS-CoV-2 infection was required, confirmed by RT-PCR or nasal antigen testing. And if previous COVID infection was suspected, serology was also considered as a screening method. Patients with negative or inconclusive RT-PCR for SARS-CoV-2, who did not have RT-PCR done in the expected window and with negative serology were excluded from the study. Patients under the age of 18 were also excluded from the sample.

The data extracted from the medical records were: name, date of hospitalization, age, gender, type of AMI (STEMI or NSTEMI), severity of AMI (according to TIMI Risk), time elapsed between institution of therapy (thrombolysis or invasive strategy) and whether there was reperfusion of the artery blamed for the AMI with thrombolytic therapy, coronary artery affected and thrombotic load (quantification of the lesion, quantification of the thrombotic load and whether there are lesions in other coronary arteries through angiography), Killip classification, type of stent placed (drug-eluting or conventional), rate of in-hospital reinfarction after definitive treatment, medications previously used, time elapsed between Covid-19 infection and the development of AMI, severity of SARS-CoV-2 infection as

defined by the Sanford Guide, laboratory data on admission (troponin, lymphocytes, creatinine, CRP), number of deaths in patients with AMI, post-AMI ejection fraction, risk factors for CAD (family history of coronary artery disease, diabetes mellitus, hypertension, obesity and body mass index (BMI), history of smoking, dyslipidemia), presence of chronic kidney disease and stage as defined by KDIGO.

The second part of the study was approved by the Research Ethics Committee (CEP) under opinion number 5.485.701, and was configured as a comparative segment. To this end, 285 medical records of patients who were admitted to the hospital with a diagnosis of AMI between October 1, 2018 and September 30, 2019 were selected by lottery. The sample selected had a margin of error of 5%, a confidence level of 95% and was obtained using the Epi Info statistical software. Medical records with the same AMI ICDs as in the previous stage were included (CDC Centers for Disease Control and Prevention, 2011).

The medical records selected were read and transcribed into a database. The following information was extracted: name, date of admission, age, gender, type of ST-elevation AMI (STEMI) or non-ST-elevation AMI (NSTEMI), severity of AMI (according to TIMI Risk), time elapsed between institution of therapy (Delta T), coronary artery affected and thrombotic burden, Killip classification, whether a stent was placed, reinfarction rate after definitive treatment instituted, laboratory data on admission (troponin, lymphocytes, creatinine, Creatine Kinase/ Creatine Kinase Myocardial Band (CK/CKMB), post-AMI ejection fraction, risk factors for coronary artery disease (CAD), family history of CAD, diabetes mellitus (DM), systemic arterial hypertension (SAH), obesity, history of smoking, dyslipidemia and others, presence of chronic kidney disease (CKD) and death records of patients hospitalized for AMI.

Descriptive statistics were used to analyze the data, including frequency (absolute and percentage), measures of position (mean and median) and measures of dispersion (standard deviation), as well as tables and graphs. Inferential statistics were used to test possible differences between groups and/or subgroups. To this end, the quantitative variables were tested for the nature of their distribution (normality) using the Shapiro-Wilk test. The Student's t-test and Mann-Whitney test were used to compare means or medians. In addition, the Chi-squared test was used to check for possible associations between qualitative variables. The tests were carried out using SPSS v. 22 statistical software (IBM, 2014).

Results:-

The total number of patients treated with a diagnosis of AMI in the period from 01/10/2018 to 30/09/2019 was 863 admissions, with an average stay of 20 days, while in the pandemic period (01/10/2020 to 01/10/2021) there were 1,138 admissions with an average stay of four days, according to statistical reports provided by the hospital. The sample consisted of 285 medical records in the pre-pandemic period and 34 in the pandemic period. In the pre-pandemic period, the majority of patients were male (65.3%), with an average age of 62.9 years and comorbidities such as systemic arterial hypertension (SAH) (65.6%), smoking (42.8%) and type 2 diabetes mellitus (DM2) (30.5%). Post-treatment heart attacks were recorded in 12.6% of cases and deaths in 8.1% (Table 1).

In the sample collected during the pandemic, the majority of patients were also male (55.9%) with an average age of 59.88 years, with SAH (73.5%), DM2 (47.1%), dyslipidemia (29.4%) and smoking (26.5%) (Table 1).

Table 1:-Demographic profile, comorbidities of patients admitted and outcome of hospitalizations diagnosed with Acute Coronary Syndrome at the São Paulo Regional Hospital in Xanxerê, during the pandemic period and before.

Variables evaluated	Profile 2018/2019		Profile 2020/2021	Significance
Gender	Female Male	99 (34,7%) 186 (65,3%)	15 (44,1%) 19 (55,9%)	X^2=1,16 p= 0,28
Age	Average	62,9 (26-95)	59,88 (32-77)	t=1,34 p = 0,18

Length of stay	Average	4,7 days (1-29)	NI**	_
Comorbidities	Chronic Kidney Disease	11 (3,8%)	2 (6,1%)	
	Family history of CAD[1]	43 (15%)	0 (0%)	X^2= 14,6 p = 0,01*
	SAH[2]	187 (65,6%)	25 (73,5%)	
	DM2[3]	87 (30,5%)	16 (47,1%)	
	Dyslipidemia	57 (20%)	10 (29,4%)	
	Smoking	122 (42,8%)	6 (26,5%)	
	Obesity	28 (9,8%)	NI***	_
Post-treatment reinfarction		36 (12,6%)	NI***	_
Death	Yes No	23 (8,1%) 262 (91,9%)	5 (14,7%) 29 (14,7%)	X^2 = 1,67 p = 0,19

(1) Coronary artery disease.
(2) Systemic arterial hypertension.
(3) Diabetes Mellitus typo 2.
(*) Represents significance.(***) NI (Not informed).Source: the authors.

As for the classification of ACS in the pre-pandemic period, 56.1% of cases were diagnosed with STEMI and 37.5% with STEMI. Severity, according to Timi Risk, was classified as moderate in 58.6% and severe in 26% of cases. The Killip scale was used to assess post-AMI prognosis and 84.2% of cases were classified as Killip I. With regard to the time between the first symptoms and the AMI being treated (Delta T), 21.4% were more than 12 hours old (Table 2).

In the pandemic period, 58.8% of cases had STEMI and 32.4% had NSTEMI. On the Killip scale, the majority of cases (90.9%) fell into classification I. Delta T in the majority of cases (41.2%) was greater than 12 hours (Table 2).

With regard to coronary artery disease in the pre-pandemic period, 37.2% of cases had multi-arterial involvement, 31.6% single-arterial and 21.0% double-arterial. Of the arteries affected, the anterior descending artery (ADA) stood out with 71.9%, the right coronary artery (RCA) with 64.2% and the circumflex artery (CA) with 47.7%. Of the patients who underwent catheterization, 65.3% had a low thrombotic load. In terms of ejection fraction, 31.9% had preserved cardiac function viability (Table 2).

In the pandemic period, 44.1% had a single-artery lesion, 23.5% had a double-artery lesion and 23.5% had a multiple-artery lesion. The RCA was the most affected (44.1%), followed by the LAD (38.2%). Furthermore, 79.4% of the patients had a low thrombotic load and 47.1% preserved cardiac function (Table 2).

Table 2:- Clinical and laboratory profile of patients hospitalized with Acute Coronary Syndrome at the São Paulo Regional Hospital in Xanxerê, in the pandemic and previous periods.

Variable	**Results**	**2018/2019**	**2020/2021**	**Significance**
Troponin	Average	9,47 ng/mL (0,01 – 77,41)	18,24 ng/mL (0,58 - 52,4)	U = 2019,5 p = 0,05

Creatinine	Average	1,03 mg/dL (0,21 - 7,16)	0, 89 mg/dL (0,49 - 1,53)	U = 11979,5 p = 0,52
Lymphocytes	Average	1913,95/ mm³ (170 - 19560)	NI***	_
Killip	Killip I Killip II Killip III Killip IV	240 (84,2%) 32 (11,2%) 2 (0,7%) 11 (3,8%)	30 (90,9%) 2 (6,1%) 0 (0%) 1 (3,0%)	$X^2 = 1,18$ p=0,75
Types of SCA	STEMI [1] NSTEMI [2] Angina Not specified	160 (56,1%) 107 (37,5%) 6 (2,1%) 12 (4,2%)	20 (58,8%) 11 (32,4%) 3 (8,8%) NI***	$X^2 = 4,89$ p = 0,08
CAD Severity (TIMI Risk)	Mild Moderate Severe	44 (15,4%) 167 (58,6%) 74 (26%)	NI*** NI*** NI***	_
Delta T (n=20)	Over 12 hours Up to 12 hours No information	61 (21,4%) 40 (14%) 184 (64,6%)	14 (41,2%) 6 (17,6%) 14 (41,2%)	$X^2 = 8,00$; p = 0,02*
Affected artery	ADA[3] CA[4] RCA [5] No injuries	205 (71,9%) 136 (47,7%) 183 (64,2%) 22 (7,7%)	13 (38,2%) 3 (8,8%) 15 (44,1%) 3 (8,8%)	$X^2 = 6,94$ p = 0,14
	LCT[6]	10 (3,5%)	NI***	_
	No information	7 (2,4%)	NI***	_
Coronary artery disease	No Injury	29 (10,2%)	NI***	_
	Single Arterial Bi-arterial Multi-arterial	90 (31,6%) 60 (21,05%) 106 (37,2%)	15 (44,1%) 8 (23,5%) 8 (23,5%)	$X^2 = 6,94$ p = 0,14
Thrombotic load	Low High	186 (65,3%) 69 (24,2%)	27 (79,4%) 7 (20,6%)	$X^2 = 3,08$ p = 0,21
	No information	30 (10,5%)	NI***	_
Viability of cardiac function	Preserved Reduced No information	91 (31,9%) 14 (4,9%) 180 (63,1%)	16 (47,1%) 3 (8,8%) 15 (44,1%)	$X^2 = 4,75$ p = 0,09

(1) ST-Elevation Myocardial Infarction.
(2) Non-ST-Elevation Myocardial Infarction.
(3) Anterior descending artery.
(4) Circumflex artery.
(5) Right Coronary Artery.
(6) Left Coronary Trunk.
(*) Represents significance.(***) NI (Not informed).Source: the authors.

As for laboratory tests in the pre-pandemic period, the averages for Troponin were 9.47 ng/mL, creatine 1.03 mg/dL and lymphocytes 1913.95 mm³ (Table 2). In addition, CK/CKMB proteins were altered in 78.2% of cases. Creatine was altered in 14.4% and troponin was divided into high risk for myocardial damage (>1.5 nanog/ml) in 62.5% and moderate risk (between 0.1 and 1.5 nanog/ml) in 20.4% (Table 3).

In the pandemic period, mean troponin levels were 18.24 ng/mL and creatinine 0.89 mg/dL (Table 2). Creatinine was considered normal in 76.5% of cases and troponin was considered high risk in 70.5% (Table 3).

Table 3:- Reading of laboratory tests from samples of patients hospitalized with Acute Coronary Syndrome at the São Paulo Regional Hospital in Xanxerê, in the pandemic period and before.

Variable	Results	2018/2019	2020/2021	Significance
CK/CKMB	Altered	223 (78,2%)	NI***	_
	Normal	58 (20,4%)	NI***	
	No information	4 (1,4%)	NI***	
Creatinine	Altered	41 (14,4%)	5 (14,7%)	$X^2 = 9,99$ p= 0,007*
	Normal	241 (84,6%)	26 (76,5%)	
	No information	3 (1,1%)	3 (8,8%)	
Troponin	High risk	178 (62,5%)	24 (70,5%)	$X^2 = 2,73$ p = 0,25
	Moderate risk	58 (20,4%)	4 (11,8%)	
	Normal	23 (8,1%)	5 (14,7%)	
	No test	26 (9,1%)	1 (2,9%)	

(*) Represents significance.(***) NI (Not Informed).Source: the authors.
Associations were found for Delta T (p= 0.02) and creatine (p = 0.007). The other variables compared showed no significant association in the two periods analyzed.

Discussion:-

Covid-19 is known to affect not only the respiratory system but also the cardiovascular system, leading to serious complications and worsening the condition of patients. In view of this, the pandemic has had an impact on the clinical profile, laboratory changes and outcome of patients with ACS. Thus, the main factors associated with the development of ACS in patients with Covid-19 can be established, such as comorbidity, age and gender, length of hospitalization, number of deaths and changes in the main markers of myocardial damage (Guzik et al., 2020).

With regard to the clinical profile, it was found that there was a predominance of male patients, aged over 60 and with comorbidities. Among the comorbidities, there was an increase in hospitalizations among patients who previously had hypertension, diabetes, dyslipidemia and chronic kidney disease. This profile corroborates

Nascimento et al. (2022), showing that the presence of comorbidities is associated with worsening ACS, greater need for intensive care and a higher mortality rate in these patients.

According to Estrela et al. (2020), 70% of patients who died from Covid-19 had some kind of chronic disease, the main one being diabetes. There was also a higher prevalence of non-survival (ranging from 22 to 31%) among these individuals compared to non-diabetics. Corroborating this information, the data from this study showed an increase in the hospitalization rate (from 30.5% to 47.1%) of diabetic patients with an ischemic cardiac event previously infected with Covid-19, demonstrating the risk and vulnerability of this profile (CuschieriandGrech, 2019).

It was also possible to verify that SAH is the chronic disease that predominated among patients with ACS in the pre-pandemic (65.6%), and in the pandemic period (73.5%). The structural and functional changes generated by the disease in target organs increase the susceptibility of the coronavirus to the risk of unfavorable outcomes, increasing the risk of worsening and fatality of the disease twofold compared to patients infected with Covid-19 without hypertension (Ribeiroand Uehara, 2022).

As for the types of ACS, it was possible to see similar percentages of STEMI during the two periods (pre-pandemic with 56.1% and during the pandemic with 58.8%). The study by Pinheiro et al (2022) pointed to a reduction in the demand for hospital medical care for patients with cardiac events during the pandemic, increasing the time between the onset of symptoms and admission to hospital. The increase in time for STEMI cases was 40% compared to the period before the pandemic. The decrease in seeking health services increased home deaths from AMI by 15.56%. Similarly, Alharbi et al. (2023) highlight the increase in hospitalization time and hospital mortality in patients with STEMI infected with Covid-19 (Pinheiro et al., 2022; Alves et al., 2020; Alhardi et al, 2023).

One factor that was associated in the study was the time between an ischemic event and its prognosis and treatment, also known as Delta T, which is a determining factor in cardiovascular outcomes. There was an increase in the percentage of patients who took more than 12 hours to seek hospital care, before the pandemic this figure was 21.4%, increasing to 41.2% during the pandemic. Among the reasons for this is the concern about the virus spreading during medical care, as shown by a study which recorded a 30.5% drop in the admission of ACS patients during the pandemic. Another factor is the overload on the health system due to the large number of Covid-19 patients, affecting the availability of hospital beds and procedures (Kiris et al., 2022).

Among the cardiac markers that are used for diagnosis, troponin shows rapidly detectable changes, providing crucial information for clinical decision-making. Although in this study this marker did not reach statistical significance, Kiris et al. (2022) point out that troponin levels were higher during the Covid-19 period compared to the previous period.

Unlike troponins, creatine kinase (CK) is a late marker of muscle damage. This enzyme is found in all types of muscle tissue and is made up of 3 different forms: CK-MM, CK-BB and CK-MB. The test that measures all the isoforms is called CK-total and, despite being found in smaller quantities in skeletal muscle, CK-MB is the most sensitive for indicating heart damage and, for this reason, is the most commonly used in the diagnosis of heart attacks. Despite the lack of comparative statistical data on this inflammatory parameter, Martins-Filho (2020) showed that elevated CK-MB was associated with an increased risk of death in patients with Covid-19 infection.

According to Nascimento et al. (2022), with regard to the increase in inflammatory markers, the mechanisms are not yet fully understood. The proposed theories include situations such as possible direct infection of cardiac cells by the Covid-19 virus, as well as indirect changes resulting from the systemic inflammatory response, generated by the cytokine storm, and cardiac stress induced by respiratory failure and hypoxemia.

Regarding the laboratory marker of serum creatinine, despite the result found in this study, there was no significant difference when comparing the periods, nor was there a significant difference in the average between the periods. Data from the Hypertension Detection and Follow-up Program (HDFP) showed, for the first time, a correlation between creatinine levels and cardiovascular mortality. The creatinine levels found in this study can be considered more important risk predictors when compared to other factors assessed. Thus, creatinine monitoring in the assessment of renal dysfunction is a factor related to cardiovascular risk (Martin and Franco, 2005).

In comparison with the study by Montero et al. (2022), the average length of stay for patients with Covid-19 and ACS was 9.5 days, higher than that found in the period prior to the pandemic, with an average of 4.7 days of hospitalization. As for the value of the thrombotic load and the number of arteries affected, this study showed no statistical significance. However, according to Choudry et al. (2020), there was an increase in thrombotic load in STEMI patients infected with Covid-19 compared to those who were not infected, demonstrated by an increase in multiple thrombotic lesions and an increase in the severity of thrombi, leading to greater myocardial damage. This is due to the thrombogenic environment that the infection promotes, both through platelet activation and endothelial dysfunction, resulting in the occurrence of ACS (Montero-Cabezas et al., 2022; Choudry et al., 2020).

In hospitalizations for ACS in which it was possible to perform an echocardiogram and thus measure the ejection fraction of pumping in the ventricle, it was found that in patients previously infected with Covid-19, there was an increase in cases in which the ejection fraction was reduced. Silva et al. (2021) found a drop in admissions for ACS during the pandemic (a reduction of around 40%), while there was also an increase in cases of ACS with reduced ejection fraction, due to the severity in which patients presented when they sought medical help (Silva et al., 2021).

With regard to the severity of ACS, observed through the Timi-Risk score, the study by Peesapati and Roa (2021) showed that 37% of patients infected with Covid-19 had a high TIMI score, higher than this study, in which 26% of patients had a high TIMI score in the period before the pandemic. The TIMI-Risk score is an index that was developed with the aim of identifying and assessing the risk of 30-day mortality in patients who suffer AMI. A high-risk TIMI score is directly associated with a significant increase in mortality, as well as the risk of a new infarction or severe recurrence of ischemia within 14 days (PeesapatiandRoa, 2021).

Another relevant parameter is the Killip classification, which evaluates patients who have suffered an MI and the risk of 30-day hospital mortality (I-6%; II-17%; III-38%; IV-81%), based on the presence or absence of physical examination findings indicating left ventricular dysfunction and heart failure. Although this study did not show significance in this data, the study by Lopes et al. (2020) showed that the Killip III/IV score was significantly higher in patients with Covid-19 (Mello et al., 2014; Lopez et al., 2020).

As for hospital demand, there was an increase in the admission records, from 863 before the pandemic to 1,138 during the pandemic. In the study by Souza and Zanin (2023), a decrease in hospitalizations of patients with chronic cardiovascular diseases during the pandemic was observed. However, there was a discrepancy regarding patients with ACS, maintaining a consistent trend in hospital admissions and an abnormal pattern in mortality rates. This shows that during the pandemic period, hospital demands remained and even increased for patients with ACS (SouzaandZanin, 2023).

Finally, the mortality rate among hospitalized patients with ACS was higher (14.7%) during the pandemic period compared to the previous period (8.1%). These results support a cohort study that observed higher mortality in patients infected with Covid-19 (23.1%) compared to those uninfected (2.9%), demonstrating the increased risk of death that Covid-19 exposes patients to, especially those with cardiovascular events (Salinas et al., 2021).

Final considerations

The Covid-19 pandemic had a substantial impact on hospitalizations of patients with Acute Coronary Syndrome (ACS) in the assessed context. Male patients, older individuals, and those with comorbidities are more vulnerable and have a higher risk of developing ACS and progressing to death. This underscores the necessity of strategic care delivery and tailored interventions for these high-risk patients during pandemics.Additionally, the presence of chronic diseases, particularly diabetes and hypertension, increased the number of ACS hospitalizations in patients with Covid-19, being associated with a worse prognosis and higher risk of cardiovascular complications.

Regarding the impact on care, there was an increase in hospital demand during the pandemic, with a rise in hospitalizations of ACS patients, as well as a longer time before seeking medical care (Delta T). Regarding outcomes, these patients had a longer average hospital stay and presented greater severity of ACS (according to the TIMI-Risk score), resulting in increased mortality. This suggests that Covid-19 infection is associated with more severe outcomes in patients with ACS.

Regarding cardiac markers, such as troponin and CK-MB, these proved useful in identifying myocardial injury in patients with ACS and Covid-19. There was an increase in troponin levels during the pandemic, indicating a higher

incidence of cardiac damage.

Thus, it is concluded that Covid-19 affected the clinical profile, increasing the severity of the disease and medical-hospital demands, as well as contributing to higher morbidity and mortality among cardiac patients. Effective management of cardiovascular health during the pandemic is essential, with an emphasis on the prevention and proper treatment of comorbidities, educating patients about the importance of seeking timely medical care, and understanding the mechanisms through which Covid-19 affects the cardiovascular system. This can help improve clinical outcomes and reduce the impact of the pandemic on heart disease.

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