Characterization and Outcomes in Patients with SARS-CoV-2 Infection According to Body Mass Index, Fundación Valle Del Lili, Cali, Colombia 2020-2021

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Research Article

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Abstract

Introduction: SARS-CoV-2 has undergone an accelerated expansion and was declared a pandemic in 2020. It has been responsible of millions of deaths around the world. Several factors related to severity and mortality have been described, including obesity(1,2). In United States and in Latin America, obesity has grown rapidly (3). In Colombia, 56% of the population is overweight/obese. However, in the region, association studies of SARS-CoV-2 and obesity are scarce. We sought to investigate the characterization and outcomes of patients according to body mass index in a highly complex center in Colombia.

Material and Methods: The study was a prospective longitudinal observational descriptive study in patients older than 18 years treated at the Fundación Valle del Lili University Hospital in Cali, Colombia in 2020-2021, with a diagnosis of SARS-CoV-2 infection. Sociodemographic characteristics, medical history, clinical presentation, paraclinical characteristics and outcomes were described.

Results: The average age was 48 years, 53% were men, and 66.5% were overweight or obese. Dyspnea ($p = 0.003$) was the most representative symptom in overweight/obesity. The severity of the disease ($p = 0.02$), days of stay in the ICU ($p = 0.045$), overall stay ($p = 0.0037$), and mechanical ventilation ($p = 0$) had relationships directly proportional to the increase in BMI ($p = 0.022$). Obese patients had a higher frequency of sepsis ($P = 0.003$), need for vasopressor ($P = 0.001$), infectious complications ($P = 0.011$) and myocarditis ($P = 0.03$). There was no relationship with thrombotic complications.

Conclusion.

Overweight and obese patients have more severe symptoms of SARS-CoV-2, infectious complications, and requirements for invasive mechanical ventilation, general hospitalization and ICU stay than the normal weight population.

Introduction

The new SARS-CoV-2 coronavirus originated in Wuhan, China, in the second half of 2019 and expanded rapidly until it was declared a global pandemic in March 2020 (4). Six months later, 68 million people were infected, and it has been responsible for more than 1.5 million deaths worldwide (5). In Colombia, by March 2021, the number of infections amounted to more than 2 million infected and approximately 60 thousand deaths (5).

Coronavirus disease 2019 (COVID 2019), is characterized by the wide variety of its clinical presentation, from asymptomatic to fatal, and while most (80%) will present mild symptoms, 15% have severe forms of the disease, and the remaining 5% will be critical patients, with a mortality of 49% between these two latter groups (6, 7). The early detection of risk factors for the severe-critical presentation of SARS-CoV-2 infection is of vital importance to achieve prevention strategies, risk stratification and treatment (5). Several risk factors for development, severity and mortality from COVID-19 have been described, such as advanced age, chronic lung disease, cardiovascular diseases, diabetes, and obesity (7, 9).

Obesity is a disease with a wide worldwide distribution, and it is understood to be a predisposing factor for chronic non-communicable diseases such as cardiovascular disease, diabetes and hypertension (6). It has been shown to increase susceptibility to severe respiratory infections (10) and worsen acute respiratory distress syndrome (ARDS) outcomes (11). The Centers for Disease Control and Prevention (CDC) describes severe obesity (body mass index [BMI] ≥ 40 kg/m²) as a risk factor for severe COVID-19 disease (12). In Colombia, a country with approximately 50 million inhabitants, it has been estimated that 56% of the population is overweight or obese.

Overweight and obese populations are at higher risk of severe COVID-19 (8, 13, 14) and related complications. Here, we present a longitudinal descriptive study that aims to reveal the characterization and outcomes of patients according to body mass index and SARS-CoV-2 infection in a highly complex institution, Fundación Valle del Lili, Cali, Colombia.

Materials And Methods

A prospective longitudinal observational descriptive study was carried out in patients treated at the Fundación Valle del Lili University Hospital (FVL) in Cali, Colombia in the years 2020–2021, with a diagnosis of SARS-CoV-2 infection. Male and female patients over 18 years of age who were admitted to FVL in whom a molecular diagnosis of COVID 19 was made were eligible. The information on patients over 18 years of age registered in the institutional database in the REDCAP system (institutional system in which a registry of patients who undergo PCR or antigen test for SARS-CoV-2 is maintained) was obtained sequentially. Later, positive patients were selected sequentially, by admission and diagnosis, and information was collected through a review of the medical history, their in-hospital treatment was followed up, and the records of control visits after the event were reviewed to determine outcomes. We excluded pregnant patients.

Sociodemographic identification was included: age, sex, type of affiliation to the health system, medical history such as hypertension, diabetes, HIV, heart, lung, rheumatological and neurological diseases, history of transplantation, oncological disease, use of drugs with inhibitors of the angiotensin converting enzyme (ACE), angiotensin 2 receptor antagonists (ARA 2), and steroids. Additionally, variables of the physical examination such as weight, height, body mass index, PAFI, oxygen saturation, and respiratory rate were obtained, and clinical presentation such as presence of cough, dyspnea, diarrhea, headache, fever, odynophagia, abdominal pain, dysgeusia, and loss of smell were recorded. Laboratory variables such as levels of ferritin, D-dimer, and fibrinogen were also taken into account. Variables related to management, need for invasive mechanical ventilation, necessity of management with inotropics and vasopressors, the duration of mechanical ventilation, days of management in the intensive care unit and days of hospitalization were calculated. Complications such as pulmonary thromboembolism, myocarditis, arrhythmias, coronary event, kidney failure requiring dialysis and infectious processes were evaluated; severity on admission and mortality were determined. The protocol was approved by the institutional ethics committee, all methods were performed in accordance with the relevant guidelines and

regulations. At the end of the data recording, the information was transferred to Excel16, and data analysis was performed in version 14.

For statistical analysis, categorical variables are presented as absolute values and percentages. Continuous variables are reported as means or medians and measures of dispersion, standard deviation or interquartile range depending on the distribution of the data, followed by evaluation with the Shapiro Wilk test and non-parametric tests (Mann Whitney or Wilcoxon test) or parametric tests (t-student or ANOVA), depending on the case. Statistically significant differences were considered if they had a p value < 0.05. The length of hospitalization in the ICU and length of stay in the hospital in days, both in intensive care and in general wards, was analyzed in a complementary way, according to BMI and severity of infection.

Results

Of the initial 997 patients with SARS-CoV-2 infection that were admitted to the institution between 01.03.2021 and 31.01.2021, we excluded 190 patients because BMI could not be calculated, 22 pregnant women and 20 patients with double charts due to a second admission for clinical deterioration. We included the episodes in which clinical status was more compromised. Finally, 765 patients were analyzed (Fig. 1)

The average age of these patients was 48, with a range between 18 and 97 years. Overall, 53% were male patients (406/765). The most common comorbidities in this cohort were arterial hypertension 26.4% and diabetes mellitus 12.2%, followed by chronic renal disease and oncologic disease with 6.2% and 5.9%, respectively. Overall, 40.84% of patients were overweight (BMI 25-29.9), and 25.65% were obese, distributed in grades I, II and III. Among the underlying pathologies, hypertension had a significantly lower prevalence among patients with normal weight compared to grade II and III obese patients. The frequency and distribution of the other comorbidities and their relationships with BMI are shown in Table 1. In total, 17 % of patients used ARA2.

In relation to the clinical presentation of COVID-19, the most frequent symptoms were cough (56.4%), fever (53.5%), fatigue (45.7%) and dyspnea (40.4%), the latter being the statistically significant manifestation in patients with higher significant BMI. Additionally, the obese group had a lower oxygen saturation with an average of 93.5% in patients with BMI > 40 versus 97% in participants with normal weight (p 0.001). The PAFi was lower in overweight and obese patients (P = 0.0015) and lower than 200 in those with BMI > 30. (Table 2). Among the biomarkers studied, there was no statistically significant difference in D-dimer, ferritin or fibrinogen values according to BMI (P 0.2182). The evaluation of the APACHE and SOFA scores in populations that required intensive care hospitalization indicated no significant association between BMI and their scores.

Among the clinical outcomes studied, we found that 52% of the patients had a mild manifestation of the disease, while 19.2% and 28.8% had moderate and severe involvement, respectively. The proportion of

patients with severe disease increased as BMI increases, being 41.4% in the group with BMI 36–40 and up to 50% when BMI was greater than 40 (p 0.022), see Fig. 2.

The presence of sepsis was higher in patients with a BMI greater than 25 (P 0.003), with an increased vasopressor requirement in this population (P 0.001). Additionally, the development of renal failure necessitating renal replacement therapy was evidenced in patients with increased BMI (P 0.009). No relationship was found between BMI and inotropic use (P 0.13). Patients with a BMI greater than 25 required higher rates of ICU hospitalization (P 0.007) and a longer overall hospital stay (P 0.0037) than those with a BMI less than 25. There were no differences in ventilation (MV) requirements between the different groups. However, of the patients who underwent invasive mechanical ventilation (IMV), patients with BMI < 25 required a lower number of days (P 0.0383), Table 3.

Regarding complications, statistical significance was found in the presentation of myocarditis (P 0.03) and infectious complications (P 0.011) in patients with an increased BMI. Thrombotic conditions, arrhythmias and requirement for renal replacement therapy did not have an increased distribution in the groups with higher BMI.

Discussion

The COVID-19 disease is caused by the new coronavirus SARS-CoV-2, which is characterized by a wide and variable clinical spectrum ranging from asymptomatic to fatal infection (5). The identification of risk factors at the time of diagnosis has allowed risk stratification and the establishment of appropriate management. Several risk factors have been described for the development of severe disease and mortality from COVID-19 (6), among them being obesity, which is identified as an independent risk condition and is also a predisposing agent for entities such as hypertension and diabetes (5), increasing the possibility of adverse outcomes.

Obesity is a public health problem worldwide, and the global prevalence has been estimated at 1.9 billion adults, of which 39% are overweight and 13% are obese, with an annual increase in people with this diagnosis, constituting an epidemic worldwide (13). In Colombia, according to the National Health Survey, 55.9% of the population is overweight and obese (14). This is a metabolic disease characterized by increased fat tissue, insulin resistance, elevated glucose, alteration of adipokines and chronic inflammation (15); alterations can predispose individuals to infections, and SARS-CoV-2 is no exception. A study using data from the UK Biobank (n = 285,817) showed that being overweight increases the risk of infection by this virus by 44% (RR = 1.44; CI 1.09–1.92; p = 0.01), and for obesity it almost doubles this value (RR = 1.97; 95% CI 1.46–2.65) (16).

In our study, the average age of patients with SARS-CoV-2 infection was 48 years, similar to that reported in Wuhan (22), Germany and Switzerland (23) cohorts and lower than that reported in a New York series (22). Regarding gender, a greater proportion was observed in men, 53%, which was lower than in the New York (21) and Wuhan (22) areas. A total of 25.65% of the cohort had a lower percentage of obesity than the reference series (24), similar to that in Switzerland (25). The prevalence of arterial hypertension was

found to be significantly associated with an increase in BMI, and there was also a high use of ARA 2 in our population, which is of vital importance when considering risk factors for mortality from SARS-CoV-2 (22).

In terms of clinical presentation, dyspnea was the most significant, occurring in a higher proportion in the obese population (7), while in previous series, cough and fever have been the predominant symptoms (10). However, this observation could be related to lower oxygen saturation and PAFI on admission in these patients, which are parameters associated with greater severity, a situation that has been described in previous studies by an OR of 2.31 (95% CI of 1.3–4.12) (23).

Obesity has been documented to increase the risk of being hospitalized. In our study, 39% of patients admitted to the ICU were overweight, and 34% were obese. This result is slightly lower than that reported in the New York City cohort, in whom 42.7% of those hospitalized had obesity. In this regard, different publications have found an OR of 2.13 (95 CI, 1.74–2.60; $p < 0.0001$) for hospitalization in obese patients (26). Other analyses published to date describe that this pathology increases the risk of being admitted to the ICU by 68% (OR = 1.68%; 95% CI, 1.46–2.08; $p < 0.0001$) (23); in our case the higher the BMI, the greater the need for hospitalization in the ICU and overall stay in hospitalization.

At the beginning of this pandemic, the documentation of acute kidney injury secondary to SARS-CoV-2 infection was widely variable (33). However, it began to consolidate as a common outcome in several case series with high dialysis requirements, predominantly in populations outside of China and in patients hospitalized in the intensive care unit (33). However, there is insufficient information on the development of this BMI-guided outcome. In our sample of patients, a higher prevalence of renal failure with a requirement for replacement therapy was evidenced in patients with a higher BMI ($P = 0.009$).

Reports of small samples have associated obesity with an increased risk of requiring IMV. One of the first reports in this regard was a study carried out in the city of Seattle in critical patients, which reported that 85% of obese patients required MV. Other studies have shown an increased risk for MV of 66% (OR = 1.66%; 95% CI, 1.38–1.99; $p < 0.0001$) (10, 23, 24), and in our study, 75% of the patients on MV were overweight or obese, with a higher proportion having higher BMI; thus, 12.1% of the participants with normal weight required MV versus 43.8% of those with BMI ≥ 30 kg/m².

In relation to prognosis, the association described between SARS-CoV-2 infection and obesity is complex, and some reports have documented an increase in hospital mortality by up to 48% (OR = 1.48%; 95% CI, 1.22–1.80; $p < 0.0001$) (21, 27, 29, 30, 31). Our report does not allow us to determine such an association, since the differences found were not statistically significant.

Obesity represents a risk for severe presentation of the disease and its adverse outcomes, which has been aggravated by measures implemented to combat the pandemic, with a collateral effect of generating favorable conditions to enhance weight gain; strategies such as “stay at home” have increased sedentary lifestyles and unhealthy eating, which translates into an increase in the population BMI (31) for some sites, increasing the risk of these two entities.

Conclusion

The COVID-19 disease quickly established itself as a global pandemic and forced hasty behavior to be taken to treat these patients. Obesity is a risk factor for acquiring the infection. In our study, it was found that obese patients have more compromised oxygenation parameters, a higher requirement for invasive mechanical ventilation, and higher rates of general hospitalization and ICU. However, obesity was not associated with a worse prognosis.

Declarations

Ethics approval and consent to participate:

this study was reviewed and approved by the Fundacion Valle del Lili Ethics committee.

Consent for publication:

not applicable

Availability of data and materials:

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests

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Authors' contributions:

G.G. and K.F. conceived of the presented idea. V.M. developed the theory. M.U. performed the computations and verified the analytical methods. All authors discussed the results and contributed to the final manuscript.

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Tables

Table 1

General characteristics of the population with SARS-CoV-2 infection according to BMI

General, n = 764	BMI					P valor	
		< 25 n = 256	25-29.9 n = 312	30-35 n = 151	36-40 n = 29		> 40 n = 16
Age, years							
Median (RIC)*	47.5 (33.5-60)	41 (28-60)	52 (36-61)	47 (36-58)	43 (35-56)	53.5 (43-68)	0,0001
Mean $\pm$ DS**	48 $\pm$ 17.4	45.9 $\pm$ 20.2	49.8 $\pm$ 16.1	47.7 $\pm$ 15.1	45.8 $\pm$ 14.4	54.1 $\pm$ 15.3	
Range (Min-Max)	18-97	18-97	20-94	18-87	25-85	28-77	
Sex, male, n (%)	406 (53%)	111 (43.3%)	187 (59.9%)	82 (54.3%)	19 (65.5%)	7 (43.8%)	0,001
Medical history, n (%)							
Hypertension	202 (26.4%)	52 (20.3%)	82 (26.3%)	48 (31.8%)	13 (44.8%)	7 (43.8%)	0,006
Diabetes mellitus	93 (12.2%)	23 (9.0%)	38 (12.2%)	24 (15.9%)	5 (17.2%)	3 (18.8%)	0,167
Cerebrovascular event	13 (1.7%)	4 (1.6%)	6(1.9%)	3 (2.0%)	0 (0%)	0 (0%)	0,972
COPD	9 (1.2%)	26 (0.8%)	3 (1.0%)	3 (2.0%)	1 (3.4%)	0 (0%)	1
ASTHMA	15 (2.0%)	2 (0.8%)	7 (2.2%)	4 (2.6%)	2 (6.9%)	0 (0%)	0,775
Coronary disease	20 (2.6%)	7 (2.7%)	9 (2.9%)	3 (2.0%)	1 (3.4%)	0 (0%)	0,649
Atrial fibrillation	6 (0.8%)	2 (0.8%)	3 (1.0%)	1 (0.7%)	0 (0%)	0 (0%)	1
Chronic kidney disease	47 (6.2%)	21(8.2%)	20 (6.4%)	3 (2.0%)	2 (6.9%)	1 (6.3%)	0,085
Cancer	45 (5.9%)	18 (7.0%)	16 (5.1%)	8 (5.3%)	1 (3.4%)	2 (12.5%)	0,55
LES	5 (0.7%)	3 (1.2%)	1 (0.3%)	1 (0.7%)	0 (0%)	0 (0%)	1
AR	1 (0,1%)	0 (0%)	1 (0.3%)	0 (0%)	0 (0%)	0 (0%)	0,357
Vasculitis	3 (0.4%)	3 (1.2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1

General, n = 764	BMI					P valor	
		< 25 n = 256	25-29.9 n = 312	30-35 n = 151	36-40 n = 29		> 40 n = 16
Smoking	18 (2.4%)	3(1.2%)	9 (2.9%)	5 (3.3%)	0 (0%)	1 (6.3%)	0.016
Formerly smoking (> 1 year)	23 (3.0%)	1 (0.4%)	13 (4.2%)	8 (5.3%)	1 (3.4%)	0 (0%)	
Organ transplant	36 (4.7%)	14 (5.5%)	15 (4.8%)	4 (2.6%)	3 (10.3%)	0 (0%)	0,333
HIV	4 (0.5%)	1 (0.4%)	0 (0%)	3 (2.0%)	0 (0%)	0 (0%)	0,091
Home O2 user	7 (0.9%)	5 (2.0%)	2 (0.6%)	0 (0%)	0 (0%)	0 (0%)	0,361
PREVIOUS MEDICATIONS							
Steroids	46 (6.0%)	18 (7.0%)	18 (5.8%)	5 (3.3%)	4 (13.8%)	1 (6.3%)	0,398
ACE	13 (1.7%)	5 (2.0%)	4 (1.3%)	2 (1.3%)	2 (6.9%)	0 (0%)	0,297
ARA2	133 (17.4%)	31 (12.1%)	57 (18.3%)	33 (21.9%)	8 (27.9%)	4 (25%)	0,028
Valores reportados como número absoluto (porcentaje). *Reportado como mediana (RIC: rango intercuartilico). ** Reportado como promedio (desviación estándar). IMC: índice masa corporal. HTA: hipertensión arterial. DM: diabetes Mellitus. ECV: enfermedad cerebro vascular. EPOC: enfermedad pulmonar obstructiva crónica. FA: fibrilación auricular. ERC: Enfermedad renal crónica.LES: Lupus Eritematoso sistémico. AR: artritis reumatoidea. VIH: virus inmunodeficiencia adquirida. ICECA: inhibidores de la enzima convertidora de angiotensina. ARA2: Antagonistas del receptor angiotensina 2.							

Table 2
Clinical and laboratory characteristics of patients with SARS-CoV-2 infection according to BMI at admission.

Characteristics	General, n = 764	< 25 n = 256	25-29.9 n = 312	30-35 n = 151	36-40 n = 29	> 40 n = 16	P valor
Clinic Presentation, n(%)							
Dyspnea	309 (40.4%)	85 (33.2%)	125 (40.1%)	73 (48.3%)	15 (51.7%)	11 (68.8%)	0,003
Fever	415 (54.3%)	137 (53.5%)	172 (55.1%)	84 (55.6%)	15 (51.7%)	7 (43.8%)	0,902
Cough	431 (56.4%)	131 (51.2%)	174 (55.8%)	95 (62.9%)	20 (69.0%)	11 (68.8%)	0,079
Rhinorrhea	167 (21.9%)	63 (24.6%)	67 (21.5%)	26 (17.2%)	9 (31.0%)	2 (12.5%)	0,266
Odynophagia	231 (30.2%)	76 (29.7%)	98 (31.4%)	45 (29.8%)	10 (34.5%)	2 (12.5%)	0,59
Fatigue	349 (45.7%)	104 (40.6%)	143 (45.8%)	79 (52.3%)	16 (55.2%)	7 (43.8%)	0,171
Arthralgia	141 (18.5%)	48 (18.8%)	55 (17.6%)	26 (17.2%)	9 (31.0%)	3 (18.8%)	0,496
Anorexia	42 (5.5%)	13 (5.1%)	18 (5.8%)	9 (6.0%)	1 (3.4%)	1 (6.3%)	0,978
Abdominal pain	43 (5.6%)	15 (5.9%)	17 (5.4%)	8 (5.3%)	1 (3.4%)	2 (12.5%)	0,726
Diarrhea	135 (17.7%)	46 (18.0%)	53 (17.0%)	28 (18.5%)	3 (10.3%)	5 (31.3%)	0,516
Nauseas	29 (3.8%)	9 (3.5%)	15(4.8%)	3 (2.0%)	2 (6.9%)	0 (0%)	0,444
Vomit	30 (3.9%)	11 (4.3%)	11 (3.5%)	6 (4.0%)	1 (3.4%)	1 (6.3%)	0,874
Taste disturbance	86 (11.3%)	34 (13.3%)	35 (11.2%)	14 (9.3%)	3 (10.3%)	0 (0%)	0,524
Respiratory rate**							
> 30 min	122 (16.0%)	29 (11.3%)	44 (14.1%)	36 (23.8%)	9 (31.0%)	4 (25.0%)	0.03
Oxygen saturation**	96 (91- 98)	97 (94- 98.5)	96 (91- 98)	95 (87- 98)	93 (77- 96)	93.5 (90- 96)	0,0001
PAFI	271 (114- 352)	308 (124- 390)	289 (142- 357)	191 (94- 300)	153 (75- 321)	150(99- 326)	0,0015

Characteristics	General, n = 764	< 25 n = 256	25-29.9 n = 312	30-35 n = 151	36-40 n = 29	> 40 n = 16	P valor
Dimer D	0.79 (0.47- 1.43)	0.903 (0.46- 1.42)	0.79 (0.5- 1.55)	0.73 (0.42- 1.21)	0.7 (0.51- 1.52)	1.16 (0.723- 2.61)	0,2182
Ferritin	982 (487- 1723)	1083.5 (502- 2467)	892 (483- 1623)	1149 (550- 1537)	889 (356- 1521)	436 (252- 1474)	0,274
Fibrinogen	598 (450- 734)	690 (451.5- 752)	567 (433- 690)	675 (567- 812)	614 (416- 784)	277.1 (15.2- 539)	0,2003
SOFA	3 (2-5)	2 (1-4)	3 (2- 4.5)	3.5 (2-5)	3 (2-4)	4.5 (3-6)	0,1547
APACHE	10 (6- 16)	11 (7- 17)	9 (6-16)	10 (7- 14)	8.5 (3- 12)	12.5 (11- 18)	0,3372
Vasopressor	112 (14.7%)	27 (10.5%)	39 (12.5%)	32 (21.2%)	9 (31.0%)	5 (31.3%)	0,001
Inotropic	32 (4.2%)	11 (4.3%)	9 (2.9%)	8 (5.3%)	2 (6.9%)	2 (12.5%)	0,13

Table 3
Outcomes of patients with SARS-CoV-2 infection according to BMI at admission

Characteristic	General, n = 764	BMI					P valor
		< 25 n = 256	25-29.9 n = 312	30-35 n = 151	36-40 n = 29	> 40 n = 16	
Death n(%)	65 (8.5%)	25 (9.8%)	27 (8.7%)	8 (5.3%)	1 (3.4%)	4 (25.0%)	0,08
Mechanical ventilation	128 (16.8%)	31 (12.1%)	45 (14.4%)	35 (23.2%)	10 (34.5%)	7 (43.8%)	0
Days on mechanical ventilation	11 (6-20.5)	6 (2-14)	14 (8-25)	12 (7-18)	13.5 (8-15)	10 (6-27)	0,0383
TEP n(%)	10 (1.3%)	3 (1.2%)	2 (0.6%)	5 (3.3%)	0 (0.0%)	0 (0.0%)	1
Sepsis n(%)	168 (22.0%)	43 (16.8%)	68 (21.8%)	41 (27.2%)	7 (24.1%)	9 (56.3%)	0,003
Renal injury with kidney replacement therapy n(%)	56 (7.3%)	12 (4.7%)	23 (7.4%)	14 (9.3%)	2 (6.9%)	5 (31.3%)	0,009
Myocarditis n(%)	4 (0.5%)	0 (0.0%)	1 (0.3%)	1 (0.7%)	2 (6.9%)	0 (0.0%)	0,011
Arrhythmias n(%)	25 (3.3%)	6 (2.3%)	11 (3.5%)	6 (4.0%)	2 (6.9%)	0 (0.0%)	0,529
ICU stay (days) Median (RIC)	9 (5-19)	6 (2-11)	10 (5-19)	10 (6-23)	14.5 (7.5-22)	14.5 (5-23)	0,0454
Global stay (days) Median (RIC)	1 (0-8)	0 (0-6)	1 (0-8)	2 (0-11)	4 (0-14)	7 (4-24.5)	0,0037

Figures

Figure 1

Flow chart of study patients.

Figure 2

Severity of COVID 19 according to Body Mass Index BMI: body mass index, n: number of patients. P= 0.022