

# Evaluation of Cardiology consultations during the COVID-19 Pandemic Period

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## ABSTRACT

In this study, we scientifically examined the consultations of the patients being hospitalized from the other departments to the cardiology department during Coronavirus Disease 2019 (COVID-19) pandemic.

Consultations to the cardiology department between 01 April-31 May 2020 and 01 April-31 May 2019 were discussed. Demographic characteristics and reasons of consultations were compared. A different approach was followed in COVID-19 patients diagnosed with compared to patients in other clinics.

The rate of consulted patients in 2019 year was 14.4% (866/5989). Its rate in 2020 year was found as 18.5% (462/2486) ( $p < 0.001$ ). A statistically significant difference was obtained in both groups. The use of drugs prolonging the QT, preoperative and increase in cardiac enzymes were found statistically significant in terms of the consultations ( $p < 0.001 - < 0.001 - 0.003 - 0.016$ , respectively). Face to face interviews were made in 29% (33/114) of the patients who were consulted from COVID-19 clinics. In 71% (81/114) patients, electrocardiography (ECG) s were evaluated digitally.

In this study, although there was a decrease in the number of hospitalized patients during the COVID-19 pandemic, we observed an increase in the number of patients being consulted to cardiology clinic. The relationship between COVID-19 disease and cardiovascular diseases and drugs being used in the treatment increased the workload of the cardiology clinic during the pandemic period.

**Keywords:** Consultation, COVID-19, cardiology, consultation, pandemic

## Introduction

Coronavirus Disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). Coronavirus 2019 disease (COVID-19) was began to appear in Wuhan province of China in December 2019, it quickly spread to other regions of China and other countries and caused a pandemic (2). Thereupon, the World Health Organization declared COVID-19 as a pandemic on 11 March 2020 (3). COVID-19 disease has been a huge burden on healthcare systems around the world. Hospital managements deliberately reduced non-emergency procedures and hospitalizations to protect bed capacity and personal protective equipment (4). In some places restrictions were imposed by the state itself. As in the rest of the world, new cautions have been taken in social life and health institutions to reduce the spread of the virus in our country. Cautions such as reducing elective surgeries, allowing drugs to be bought directly from the pharmacy and not making outpatient applications except from emergencies have been taken in our country. In our clinic, these precautions were tried

to be followed, but the cardiac effects of COVID-19 restricted our compliance with these measures.

As it is known, besides COVID-19 myocardial retention, medications such as hydroxychloroquine/chloroquine, quinolone, macrolide (azithromycin) etc. which are used in the treatment affect ventricular repolarization (5-7). This can lead to the formation of ventricular arrhythmia by prolonging QT (6, 7). Thus, we can predict that the workload increases because of the patients being consulted the cardiology department.

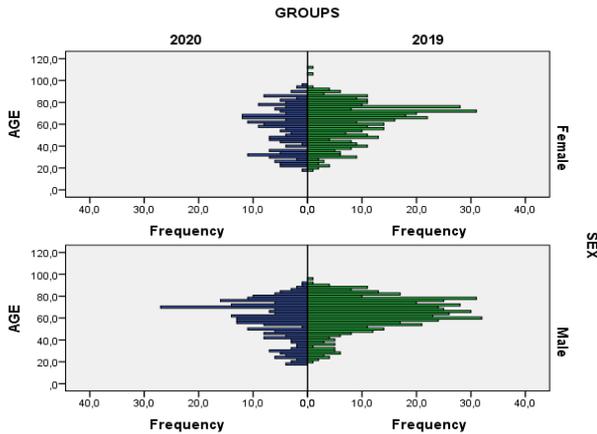
It has been observed that Covid-19 has higher mortality in patients with cardiovascular disease (8). Each patient being consulted the cardiology department may pose a risk for both the cardiology doctor and those with cardiovascular disease in the clinic.

During pandemic period, some clinical departments conducted studies on the consultations of inpatients (9, 10). No scientific study has been conducted on the quality and number of patients consulted to the cardiology department during the Covid-19 pandemic.

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**Graphical 1.** Demographic distribution of inpatient consultations compared to April-May 2019/April-May 2020

Therefore, we wanted to analyse scientifically the patients being consulted to our clinic in this year and between the same dates of the previous year. Our aim is to evaluate the causes of inpatient consultations and the impact of the cardiology clinic on the workload. Thus, when it comes to the second wave, it will guide us with the new measures being taken to determine the workload and minimize the risk of contamination.

**Material and Method**

During the pandemia, patients being consulted our cardiology department between April 1 and May 31, 2020 were discussed. These patients were divided into two groups as COVID-19 diagnosed/high suspects and non- COVID-19 patients. Face-to-face interviews were conducted with non- COVID-19 patients. Patients diagnosed with COVID-19/highly suspicious were divided into two according to the reasons for consulting. These are patients who have been consulted for QT-prolonged drug use and those who have been consulted for other reasons. Only electrocardiography (ECG) examination was performed in patients being consulted for the use of drugs prolonging QT. In patients being consulted for other reasons, face-to-face interviews were held with the patient by taking necessary precautions.

Our study did not include oncological, pregnant, non-approved patients and children.

Our study is a prospective study. A prospectus database has been created. Data were collected for 61 days. These data are based on age, gender, consulting department and reasons for consulting (acute coronary syndrome, heart failure, hypertension, arrhythmia, preoperative, ischemic

stroke etiology, stable angina pectoris, cardiac enzyme elevation, the usage of drugs that prolong qt interval and others).

Hospital database was used to compare the data we obtained. The data of patients who were consulted the cardiology department on April 1 - May 31, 2019 were collected.

The study protocol was performed in accordance with the Declaration of Helsinki as revised in 2000. The study was approved by the Local Medical Ethics Committee of Van Yuzuncu Yil University. All subjects were informed about the study protocol, and each volunteer signed the written informed consent

**Statistical Analysis:** Descriptive statistics were presented as Median and Interquartile range (IQR) for the continuous variables, while count and percentages for the categorical variables. For determination relationships between categorical variables, Chi-square test was performed. In addition, Fisher’s Exact p value was considered in crosstabs with expected count less than 5. Two proportions test was used to compare proportions. Statistical significance level was considered as 5% and IBM SPSS version 22 (IBM, Armonk, NY) sstatistical program was used for all statistical computations.

**Results**

Table 1 and graphical 1 show the demographic characteristics of the consultations. There was no significant difference in terms of gender distribution between 2 groups (p: 0.728). A statistically significant difference was found between ages (p<0.001). The average age of patients consulted in 2020 was lower than in 2019 (57.3-62.5 years). The average age of women was found to be two years less than the average age of men (2019: 61.4-63.4 years, 2020: 55.7-58.5 years). Since the mean age of patients with COVID-19 was lower (49.1 years), the average age was lower in 2020.

Table 2 shows the ratio of the number of inpatients per period to the number of patients consulted. In 2019, the rate was found to be 14.4% (866/5989). Its rate in 2020 was found to be 18.5% (462/2486) (p<0,001).

In Table 3, there are departments in both periods that are consulted. In Urology, Plastic Surgery, Orthopaedics, Internal Medicine, Cardiovascular Surgery, Ophthalmology, Thoracic Surgery, Emergency Department, Infectious Diseases, Dermatology and Anaesthesia were not

**Table 1.** Demographic distribution of inpatient consultations in April-May 2019/April-May 2020

	April-May 2020	April-May 2019	p value
Total patients	462	866	
Age (year) Mean (Min-Max)	57,3 (18-98)	62,5 (18-111)	<0,001
Median (IQR)	60 (26,3)	65-21	
Male; age years (mean)	58,5	63,4	0,002
Female; age years (mean)	55,7	61,4	0,001
Sex, n (%)	n (%)	n (%)	0,728
Male	264 (57,1)	486 (56,1)	
Female	198 (42,9)	380 (43,9)	0,720

Chi-square test

**Table 2.** April-May 2019 / April-May 2020 Number of inpatients and number of patients consulted

	2019	2020	p value
Total number of inpatients (A)	5989	2486	0,001
Number of patients consulted (B)	866	462	
B/A %	%14.4	%18.5	0.001

Chi-square test

statistically different in both groups (p: 0.15-0.664- 0.16- 0.607-1- 0.596-0.17-0.38-0.671-0.546-0.29, respectively). A statistically significant difference was obtained in both groups, in Neurology, Otolaryngology, Obstetrics and Gynaecology, Pulmonology, General Surgery, COVID-19 department and neurosurgery (p: 0.003 - <0.001 - <0.001 - 0.44 - <0.001 - <0.001 - 0.006, respectively). In 2020, the number of patients consulted in all departments being compared to the previous period decreased. An increase in the number of consulted patients hospitalized in the Obstetrics and Gynaecology department was observed 2019: 2.7% (23/886) - 2020: 7.6% (35/462).

There are reasons for consultation in both periods of Table 4. Acute coronary syndrome (ACS), ischemic stroke etiology, arrhythmia, heart failure, stable angina pectoris and others were not statistically significant (p: 0.238 - 0.101 - 0.168 - 0.256 - 0.573 - 0.169 respectively). The use of drugs that prolong the qt, preoperative and cardiac enzyme elevations were found meaningful statistically in consultations (p: <0.001 - <0.001 - 0.003 - 0.016, respectively). Although the number of patients consulted with acute coronary syndrome decreased compared to the previous period, it was not statistically significant (111/235 - p: 0.238).

Table 5 presents the clinical and demographic parameters of the patients consulted in COVID services. Face-to-face interviews were conducted in 29% (33/114) of the patients. In 71% (81/114)

patients, their ECGs were evaluated digitally. The mean age of the patients consulted was 49,1. While the rate of female patients was 47/114, the number of male patients was 67/114.

## Discussion

In this study, although there was a decrease in the number of hospitalized patients in the COVID-19 duration, we observed an increase in the number of patients being consulted to cardiology in rate.

Studies have concluded that the incidence of the virus is effective on mortality and that mortality is proportional to the burden of health care (11). Therefore, when the virus spread rapidly worldwide, many hospitals changed their working order. Surgical branches especially postponed elective cases (12-14). There was a serious decrease in the rate of preoperative patients consulted. Our work supports this situation. Serious changes were observed in non-surgical departments. Therefore, there was no patient consulted in some departments. We have also seen a significant reduction in the number of patients consulted to investigate an acute ischemic stroke etiology. The data we found support the reduction in the number of patients admitted to the hospital with acute ischemia stroke in studies (15).

The department where the patient is consulted the most is the emergency department (16). In our study, it was observed that the number of patients consulted decreased compared to the previous

**Table 3.** Departments where patients consulted between 1 April-31 May 2019/1 April-31 May 2020

	April-May 2020	April-May 2019	p value
Total patients	462	866	
Consulting service	n (%)	n (%)	
Urology	11 (2,4)	46 (5,3)	0,15
Plastic surgery	1 (0,2)	4 (0,5)	0,664
Orthopaedics	19 (4,1)	52 (6)	0,16
Neurology	32 (6,9)	105 (12,1)	0,003
Internal medicine	22 (4,8)	48 (5,5)	0,607
Otolaryngology	1 (0,2)	29 (3,3)	0,001
Cardiovascular surgery	2 (0,4)	3 (0,3)	1
Obstetrics and gynaecology	35 (7,6)	23 (2,7)	0,001
Eye department	4 (0,9)	11 (1,3)	0,596
Pulmonology	10 (2,2)	38 (4,4)	0,044
Thoracic surgery	0 (0)	5 (0,6)	0,17
General surgery	22 (4,8)	99 (11,4)	0,001
Physiotherapy department	0 (0)	11 (1,3)	0,011
Emergency department	182 (39,4)	364 (42)	0,38
Infectious diseases	1 (0,2)	5 (0,6)	0,671
Dermatology	0 (0)	2 (0,2)	0,546
COVID-19 department	114 (24,7)	0 (0)	0,001
Neurosurgeon	1 (0,2)	17 (2)	0,006
Anaesthesia	5 (1,1)	4 (0,5)	0,29

Chi-square test

**Table 4.** Reasons for consultation between 1 April-31 May 2019/1 April-31 May 2020

	April-May 2020	April-May 2019	p value
Total patients	462	866	
Reason for consult, n (%)	n (%)	n (%)	
The use of drugs that prolong the qt	81 (17,5)	0 (0)	0,001
Acute coronary syndrome	111 (24)	235 (27,1)	0,238
Preoperative	45 (9,7)	253 (29,2)	0,001
Ischemic stroke ethology	37 (8)	94 (10,9)	0,101
Arrhythmia	37 (8)	52 (6)	0,168
Hypertension	40 (8,7)	39 (4,5)	0,003
Heart failure	24 (5,2)	33 (3,8)	0,256
Stable Angina Pectoris	13 (2,8)	19 (2,2)	0,573
Cardiac Enzyme Height	23 (5)	21 (2,4)	0,016
Others*	51 (11)	120 (13,9)	0,169

\* Infective endocarditis, syncope, regulation of treatment, pulmonary embolism, pericardial effusion, ICD/PACE activation, cor pulmonale, pulmonary hypertension, cardiomyopathy and cardiac arrest.

Chi-square test

year, even though the patient was the most consulted department. In studies conducted, the number of patients admitted to the hospital with ACS and heart failure has decreased significantly during the pandemic period (17-19). Since the studies on the fate of these patients are inadequate, this raises the question of whether

these patients died at home. The same question was asked in similar studies (17).

Studies have shown that increased blood pressure in COVID-19 patients (20). In our study, we found that the number of patients consulted due to hypertension increased while comparing to the

**Table 5.** Demographic characteristics and reasons for counselling of patients diagnosed with COVID-19 consulted on April 1-May 31, 2020

	April-May 2020	
Number of patients consulted with COVID-19	114	
Electrocardiography examined (%)	81(0,710)	
Face to face interviewed patients (%)	33(0,289)	
Male (n)	67	
Female (n)	47	
Age year Mean (min-max)	49,1(18-86)	
Causes of counselling with COVID-19,	n (%)	p value
The use of drugs that prolong the qt	81 (71,1)	0,001
Acute coronary syndrome	6 (5,3)	0,001
Preoperative	0 (0)	0,001
Ischemic stroke etiology	1 (0,9)	0,001
Arrhythmia	3 (2,6)	0,016
Hypertension	5 (4,4)	0,082
Heart failure	3 (2,6)	0,223
Stable Angina Pectoris	3 (2,6)	1
Cardiac Enzyme Height	6 (5,3)	0,809
Others*	6 (5,3)	0,025

\* Pulmonary embolism, pericardial effusion, ICD/PACE activation, cor pulmonale and cardiac arrest  
Chi-square test

same period of the previous year. And the majority of patients consulted consisted of non-COVID-19 patients. We know that anxiety and stress increase blood pressure (21). The increase in blood pressure in inpatients made us think that it may be related to the fear of infecting with COVID-19. No studies about this issue have been done.

On the other hand, severe respiratory infection decreases oxygen delivery in the myocardium by hypoxi (22). Many patients infected with COVID-19 have been shown to have elevated cardiac enzymes due to respiratory failure (23, 24). In addition, by keeping the myocardium COVID-19 itself, it makes cardiac enzyme (5, 24). In our study, we found an increase in the rate of patients consulted with the height of cardiac enzymes compared to the same period of the previous year.

COVID-19 treatment is still unclear. Treatment protocols differ between countries. In studies conducted in the first case series hydroxychloroquine/chloroquine has been shown to reduce mortality (25). Hydroxychloroquine has been shown to be more effective by showing a synergistic effect with azithromycin (26). We know that when azithromycin is used against Ebola virus, it prevents the development of serious respiratory infections (27). In the light of these studies, most of the patients diagnosed with

COVID-19 were given combination therapy with hydroxychloroquine and azithromycin in our country. There are studies in which hydroxychloroquine and azithromycin prolong QT (6, 28). Studies have shown that it extends QT more when the combination of the two is used (29). As a result, malignant arrhythmias can develop. To prevent this, strict ecg follow-ups were performed in our country. Daily ECG follow-up was performed in patients with long QT. This situation increased the number of patients consulted proportionally.

Cardiology department has an important place in the follow-up and treatment of patients in COVID-19 pandemic (30). we can explain this for four important reasons. These are listed as follows. The virus is transmitted faster in people with cardiovascular diseases(CVD) (31). The virus is more mortal in individuals with CVD (8). COVID-19 disease causes myocarditis, type 2 MI and thromboembolism (5, 24, 32). The treatment leads to malignant arrhythmias by prolonging QT (6, 28, 29). These reasons increase the consultations to the cardiology department of inpatients. This creates a workload. Besides, percutaneous coronary intervention is recommended instead of coronary artery bypass grafting surgery, as hospitals may need intensive care beds, which is an extra workload for the

cardiology department (30) In our study, patients with COVID-19 constitute a significant portion of the patients being consulted. Our study supports the increasing workload and risk of transmission. We can also say that this risk is based on patients who are not diagnosed with COVID-19 because most of the COVID-19 cases are asymptomatic or slightly symptomatic (33, 34). In studies conducted, it was seen that the risk of transmission is among the most uninsulated individuals. (34, 35). Face to face interviews with patients consulted at non- COVID-19 services may increase the risk of transmission of the virus.

**Study Limitations:** It is one of the limitations of our study to be done in a short time period. In addition, the lack of a conclusion that could lead to the efficacy and effectiveness of the preventive measures taken by our clinicians, who are involved in diagnosis and treatment, is the limitation of the study. Our control group is one of the limitations that the data belong to a past period. Finally, it is one of our limitations that we do not follow up on the results of the consultations. Since the mechanism of the virus's effect on the body is not clear, our study has produced inexplicable results about the cardiac effects.

As a result, we found in our study that the inpatients increased workload through the consultations to the cardiology department. Due to consultations, the risk of infection increases both for the cardiology clinics and for the patients followed in the departments. Although alternative methods such as telehealth have been on the agenda recently, distant diagnosis and treatment may be insufficient in patients admitted or outpatient due to the nature of CVD (acute coronary syndrome, decompensated heart failure, emergency hypertensive crisis, malignant arrhythmias, etc.) (36). It is recommended that necessary studies should be carried out to reduce the risk of transmission on the cardiology clinic of Covid-19.

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