ARAŞTIRMA MAKALESİ/ORIGINAL RESEARCH

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# Evaluation of Treatment Responses of COVID-19 Patients Receiving Hydroxychloroquine Treatment: a Retrospective Analysis in a Tertiary ReferenceHospital in Turkey

## Hidroksiklorokin Tedavisi Alan COVID-19 Hastalarının Tedavi Yanıtlarının Değerlendirilmesi: Türkiye'de Üçüncü Basamak Referans Hastanede Retrospektif bir Analiz

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## ABSTRACT

**Introduction:** During the current pandemic, a great effort is being made to understand COVID-19 and find an effective treatment. Still, there is no specific drug that has been approved by the FDA for the prevention or treatment of COVID-19. This studyaims to evaluate the effect of hydroxychloroquine (HCQ) treatment in COVID-19 patients.
**Methods:** We retrospectively analyzed the clinical and radiological findings of COVID-19 patients that were treated between March 11-May 15 2020. Confirmation of a COVID-19 diagnosis was made according to a positive Real Time -Reverse Transcriptase Polimerase Chain Reaction (RT-PCR) result and/or with a consistent high-resolution computerized tomography (HRCT) findings. Following treatment, the clinical and radiological response, mortality and overall survival rates were evaluated.
**Results:** 469 patients were included in the study. 58.8% of these patients were male and 41.2% of were female. 36 patients (7.7%) did not receive HCQ and 433 patients (92.3%) received HCQ. The groups who received and did not receive HCQ were at similar ages, had a similar gender distribution and smoking habits. There is no statistically significant difference for comorbidities between these two groups. No significant difference was found when the radiological regression times of the patients were compared. Mortality rates of the non-HCQ group and HCQ group were comparable (11% vs. 11% respectively). There is no statistical difference in overall survival (OS).
**Discussion and Conclusion:** In this retrospective study, it was observed that the use of HCQ does not contribute to mortality and life expectancy in patients with Covid-19.
**Keywords:** COVID-19, pneumonia, hydroxychloroquine

## ÖZ

**Giriş ve Amaç:** İçinde bulunduğumuz pandemi sırasında COVID-19'u anlamak ve etkili bir tedavi bulmak için büyük çaba sarf edilmektedir. Yine de, COVID-19'un önlenmesi veya tedavisi için FDA tarafından onaylanmış belirli bir ilaç yoktur. Bu çalışma, COVID-19 hastalarında hidroksiklorokin (HCQ) tedavisinin etkisini değerlendirmeyi amaçlamaktadır.
**Yöntem ve Gereçler:** 11 Mart-15 Mayıs 2020 arasında tedavi edilen COVID-19 hastalarının klinik ve radyolojik bulgularını geriye dönük olarak analiz ettik. COVID-19 tanısının doğrulanması pozitif Gerçek Zamanlı -Ters Transkriptaz Polimeraz Zincir Reaksiyonu (RT-PCR) sonucuna ve / veya tipik yüksek çözünürlüklü bilgisayarlı tomografi (HRCT) bulgularına göre yapıldı. Tedaviyi takiben klinik ve radyolojik yanıt, mortalite ve genel sağkalım oranları değerlendirildi.
**Bulgular:** 469 hasta çalışmaya dahil edildi. Bu hastaların %58,8'i erkek, %41.2'si kadındı. 36 hasta (%7.7) HCQ almamış ve 433 hasta (%92.3) HCQ almıştır. HCQ alan ve almayan gruplar benzer yaştaydı, cinsiyet dağılımı ve sigara içme alışkanlıkları benzerdi. Bu iki grup arasında komorbiditeler açısından istatistiksel olarak anlamlı bir fark yoktu. Hastaların radyolojik regresyon süreleri karşılaştırıldığında anlamlı fark bulunmadı. HCQ almayan grup ile HCQ alan grubun ölüm oranları karşılaştırıldı (sırasıyla %11'e karşı %11). Genel sağkalımda (OS) istatistiksel bir fark yoktur.
**Tartışma ve Sonuç:** Bu retrospektif gözlemsel çalışmada, HCQ kullanımının Covid-19 hastalarında mortalite ve yaşam beklentisine katkı sağlamadığı gözlemlendi.
**Anahtar Kelimeler:** COVID-19, pnömoni, hidroksiklorokin

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## INTRODUCTION

In December 2020, pneumonia due to the newly identified SARS-CoV-2 pandemic, in which Wuhan, China is the center, was identified as the Coronavirus Disease 2019 (COVID-19) (1). The World Health Organization (WHO) identified COVID-19, which it described as a global emergency public health problem on January 30, 2020, as a pandemic on March 11 (2,3). With an infection-induced mortality rate estimated to be between 0.6- 1%, it is at least 5-10 times a more deadly infectious disease than influenza, where this rate is less than 0.1% (4). For these reasons, finding an effective anti-viral treatment is a top priority for the entire scientific world, and numerous clinical trials are still ongoing.

Chloroquine (CQ) and hydroxychloroquine (HCQ) are aminoquinolines that have been used to treat malaria for 50 years. Due to both its anti-inflammatory and antiviral effects, these drugs are recommended in the treatment of COVID-19 (5-7). Certain cellular functions and molecular paths, both playing a role in immune activation, inhibit local PH by raising it and partly accumulating in the endosome / phagosomes of cells (8). When the COVID-19 pandemic began, HCQ was thought to be effective with these mechanisms, in SARS-COV-2, which is taken into the cell with endosomes. Besides, in vitro studies conducted in kidney-borne Vero E6 cells at the beginning of the COVID-19 pandemic showed that CQ and HCQ were also highly effective against SARS-COV-2 (9-12). HCQ has been widely used all over the world, including in our country, for the treatment of COVID-19, which is a fatal disease and has no effective treatment, is still in use due to these data as well as its use in different indications and their proven safety in humans.

In the pandemic process, numerous clinical trials have been conducted internationally on the course of COVID-19, the effectiveness and reliability of the treatments applied, and the independent risk factors associated with treatment failure. The effectiveness and reliability of HCQ, the first drug recommended by the Republic of Turkey, Ministry of Health guide, has also been a subject of debate in this context. In this study, where we examined patients diagnosed with COVID-19 and followed up as inpatients and outpatients, we aimed to evaluate and compare the treatment responses of patients receiving HCQ treatment together with their clinical, laboratory and radiological data.

## MATERIALS AND METHODS

### Study Design

This study was approved by both the Scientific Committee of our hospital and the Ministry of Health COVID-19 Scientific Research Evaluation Committee date / number22.05.2020/4393.

### Patient Selection

For this retrospective, non-interventional, single-center cohort study, we enrolled all patients diagnosed as confirmed or probable COVID-19 who applied between March 11, 2020, and May 15, 2020. The probable and definite diagnosis of COVID-19 and all treatment strategies were based on the Guidelines by the Scientific Committee of the Ministry of Health (12). All patients underwent a nasopharyngeal swab test for the SARS-CoV-2 virus using Real-Time Reverse-Transcriptase- Polymerase-Chain-Reaction (RT-PCR). A positive result according to the RT-PCR assay of nasal and pharyngeal swab specimens was accepted as a laboratory-confirmed patient. Patients with a history of contact in the last 14 days and / or symptoms such as cough, fever, shortness of breath, and the cases whose CT were compatible with COVID-19 pneumonia were evaluated as possible cases. The severity of the dis-

ease is based on the Guidelines by the Scientific Committee of the Ministry of Health (13,14).

Patients' epidemiological, demographic, clinical, laboratory, treatment, and treatment response data were documented from the hospital computer data system. Patients' comorbidities, ambient air oxygen saturations, ECGs, full blood count, serum biochemical tests (kidney and liver function, lactate dehydrogenase and electrolytes), myocardial enzymes, and serum ferritin values were recorded. Chest radiography and / or lung CT scans were performed. Patients were divided into three categories: (1) Those who are asymptomatic; (2) Those with upper respiratory tract infection (URTI) presenting with rhinitis, pharyngitis, or isolated low-grade fever and myalgia; and (3) Those with lower respiratory tract infection (LRTI) presenting with symptoms of pneumonia or bronchitis (14). Clinical and radiological response evaluations were performed after the treatment. The mortality data were obtained from the hospital's e-information and operating system.

**Treatment Protocol**

Patients with a possible and definitive Covid-19 diagnosis were treated alone with HCQ, or in combination with azithromycin or moxifloxacin in inpatient or outpatient clinics. All patients were prescribed oral HCQ sulfate 400 mg two times on the first day as the loading dose and, 200 mg two times per day for the following four days. Azithromycin 500 mg was prescribed as the loading dose on the first day and 250 mg once per day for the following four days. Moxifloxacin was prescribed for 7 days as 400 mg tablets.

The patients administered HCQ were closely monitored for intermittent QT prolongation with ECG. Those with a corrected QT of >500 were not administered HCQ, initially. In the follow-up, HCQ was discontinued in those with an increase of 60 msec in corrected QT compared to the basal value.

Initial clinical and radiological data and post-treatment data were planned to be compared as assessments of the treatment responses.

Disease progression was defined as clinical worsening, radiological progression, worsening of markers, especially in inflammatory markers of laboratory parameters, and / or respiratory failure during or after the treatment of HCQ, HCQ and / or azithromycin, HCQ and/or moxifloxacin. Patients detected with radiological regression and improved clinical and laboratory parameters were defined as improvement.

**Statistical Analysis**

The normal distribution for numerical variables was tested by the Kolmogorov Smirnov Test. Categorical variables were defined as frequency and percentage, and continuous variables with normal distribution as means and standard deviations. Numeric variables without normal distribution were presented as medians with inter-quartile range A Chi-square test (or Fisher's Exact Test) was used to define the relationship between the two categorical variables. The two independent means were compared by the Stu- dent's t-test, two independent medians were compared by the Mann-Whitney-U Test, and two dependent medians were compared by the Wilcoxon Test. Time to event data was evalu ated with Kaplan Meier method and compared with Log Rank test. A p-value lower than 0.05 was selected to show the statistically significant difference between the parameters examined.

## RESULTS

469 patients were included in the study. 58.8% of these patients were male and 41.2% were female. The median age of the non-HCQ group was 45 (32–63) and the median age of the HCQ group was 51 (39 –63). While 368 of the 469 (78.5%) patients were under 65 years old, 101 (21.5%) of the 469 patients were over 65 years old. The median time of follow-up was146 days (2–182).

**Table 1: Comparison of Clinical Characteristics of The HCQ Group and Non-HCQ Group**

| | Non-HCQ (n=36) | HCQ (n=433) | Total (n=469) | p Value |
|---|---|---|---|---|
| Female | 12 (33.3) | 181 (41.8) | 193 (41.2) | 0.32 |
| Male | 24 (66.7) | 252 (58.2) | 276 (58.8) | |
| <65 y of age | 27 (75) | 341 (78.8) | 368 (78.5) | 0.60 |
| >65 y of age | 9 (25) | 92 (21.2) | 101 (21.5) | 0.60 |
| Never smoked | 236 (54.5) | 257 (54.8) | 21 (58.3) | |
| Ex-smoker | 112 (25.9) | 119 (25.4) | 7 (19.4 ) | |
| Active smoker | 72 (16.6) | 78 (16.6) | 6 (16.6 ) | 0.73 |
| Presence of Comorbidities | 21 (58.3 ) | 201 (46.4) | 222 (47.3) | 0.17 |
| COPD | 5 (13.8 ) | 41 (9.5) | 46 (9.8) | 0.39 |
| CHD | 3 (8.3 ) | 43 (10) | 46 (9.8) | 0.75 |
| HT | 10 (27.7 ) | 97 (22.4 ) | 107 (22.8) | 0.47 |
| DM | 7 (19.4 ) | 60 (13.8 ) | 67 (14.3) | 0.36 |
| Asthma | 3 (8.3 ) | 16 (3.7 ) | 19 (4.1) | 0.17 |
| Cerebrovascular Disease | 0 | 8 (1.8 ) | 8 (1.7) | 0.41 |
| Malignancy | 1 (2.7 ) | 41 (9.5 ) | 42 (9) | 0.17 |
| Fever | 17 (47.2) | 147 (34) | 164 (35) | 0.10 |
| Headache | 3 (8.3) | 44 (10.1) | 47 (10) | 0.72 |
| Cough | 21 (58.3) | 261 (60.3) | 282 (60.1) | 0.82 |
| Sore throat | 10 (27.8) | 73 (16.8) | 83 (17.7) | 0.10 |
| Weakness | 7 (19.4) | 164 (38) | 171 (36.5) | **0.027** |
| Sputum | 7 (19.4) | 42 (9.7) | 49 (10.4) | 0.06 |
| Hemoptysis | 0 | 7 (1.6) | 7 (1.5) | 0.44 |
| Dyspnea | 13 (36.1) | 164 (35.4) | 177 (37.7) | 0.83 |
| Nausea/Vomiting | 2 (5.5) | 38 (8.7) | 40 (8.5) | 0.50 |
| Diarrhea | 3 (8.3) | 31 (7.1) | 34 (7.2) | 0.80 |
| Myalgia | 4 (11.1) | 88 (20.3) | 92 (19.6) | 0.18 |
| Anosmia | 0 | 22 (5.1) | 22 (4.7) | 0.16 |
| Loss of appetite | 0 | 58 (13.4) | 58 (12.3) | **0.019** |
| HRCT Signs | 34 (94.4) | 365 (89.2) | 399 (89.7) | 0.56 |
| Radiological Regression Duration (day) | 8 (5-21) | 10 (6-20) | 10 (6-21) | 0.28 |
| Hospitalization Duration (day) | 5 (4-5) | 7 (5-10) | 7 (5-10) | **<0,001** |
| Total Treatment Duration (day) | 5 (5-5) | 5 (5-10) | 5 (5-10) | **0.001** |
| Mortality, 3 months | 4 (11) | 46 (11) | 50 (11) | 1 |
| Number of outpatients | 0 | 61 (14.1) | 61 (14.1) | 0.16 |
| Number of in patients Clinic | 33 (91.7) | 318 (73.4) | 351 (75) | 0.30 |
| Number of in patients ICU | 3 (8.3) | 54 (12.5) | 57 (12.1) | |

*Data are present as median (IQR)*

*AST: Aspartate Aminotransferase, ALT: Alanine Aminotransaminase, a PTT: Activated Partial Thromboplastin Time , LDH: Lactate Dehyd- rogenase, CRP: C-Reaktive Protein*

We divided the patients into two groups, as the HCQ group and the non-HCQ group. 36 patients (7.7%) did not receive HCQ and 433 patients (92.3%) received HCQ. Due to ethical rules, we did not decide on patients' medication use. These patients either did not want to use medication because of their own wishes or HCQ could not be given due to

additional cardiac disorders.

The age, gender distribution, and smoking habits of the groups who received and did not receive HCQ are shown in Table 1. There was no statistically significant difference between the groups for these variables. (Table 1)

All of the 36 patients in the non-HCQ group were hospitalized, on the other hand 372 of 433 (85.9%) patients in the HCQ group were hospitalized. In the non-HCQ group, 3 (8%) patients were admitted to the intensive care unit (ICU), whereas 54 (12.5%) patients were admitted to ICU in the HCQ group. There is no statistically significant difference between the treatment and control groups in terms of hospitalization or admission to ICU (Table 1).

There was no statistical difference between the treatment and control group in terms of values such as median leukocyte count, lymphocyte count, C-reactive protein, D-dimer, and PaO2/ FiO2. However, Aspartate Transaminase (AST), Ferritin, Lactate, PaCO2, and aPTT values were statistically significantly different between the treatment and control group (Table 2). But these differences are probably due to the nonrandomized design of the study.

**Table 2: Comparison of Laboratory Values of the HCQ Group and Non-HCQ Group**

| Variable | Non-HCQ | HCQ | p Value |
|---|---|---|---|
| Hemoglobin (mg/dL) | 13.10 (12-15) | 13.20 (12-15) | 0.84 |
| Leukocyte count (/µL) | 7850 (5400-10700) | 6700 (5100-9100) | 0.12 |
| Lymphocyte count (/µL) | 1400 (900-2300) | 1200 (900-1700) | 0.11 |
| Neutrophil count (/µL) | 5150 (3700-7750) | 4150 (3200-6900) | 0.13 |
| Platelet count (x$10^3$/ul) | 247,5 (185-320) | 233 (189-302) | 0.60 |
| AST (U/L) | 18 (14-25) | 21 (16-30) | **0.040** |
| ALT (U/L) | 17 (13-27) | 21 (15-34) | 0.10 |
| Ferritin (ml/µg) | 74 (33-240) | 215 (102-502) | **0.014** |
| Lactate (mmoL/L) | 0.8 (0.8-1.3) | 1.9 (1.2-2.6) | **0.047** |
| PaCO2 (mmHg) | 55 (41-57) | 35.2 (31-39) | **0.027** |
| PaO2/fiO2 | 261 (95-295) | 247 (164-293) | 0.92 |
| d-Dimer (µg/L) | 663 (412-1709) | 723 (425-1384) | 0.70 |
| aPTT (sec) | 28.8 (28-52) | 25.9 (24-28) | **0.001** |
| LDH (U/L) | 199 (180-277) | 223 (180-299) | 0.34 |
| CRP (mg/dL) | 1.7 (0.5-8.7) | 4.3(0.9-11.6) | 0.06 |

In the HCQ group, we measured the QT times of 98 patients. In addition, we measured the control QT time of 33 patients. We found median QT time as 397 msec in the first measurement and a median QT time of 400 msec in thecontrol measurement. There was no statistically significant difference between these values.

The HRCT findings of the patients were similar, and there was no significant difference when their radiological regression times were compared. The median duration of stay in the ward was found to be 5 ( 4-5) days in the non-HCQ and 7 (5-10) days in the HCQ group ($p<0.0001$, Table 1).

90 days mortality rates of the non-HCQ group and HCQ group were similar (11% vs. 11% respectively, Table 1).

90 days median survival time was 82 (95%CI: 74-90) in Non-HCQ group and 83 days (95% CI: 81-85) in HCQ group (log-rank p=0.87, Figure 1). Overall 90 days median survival time

was 83 days (95%CI: 81-85).

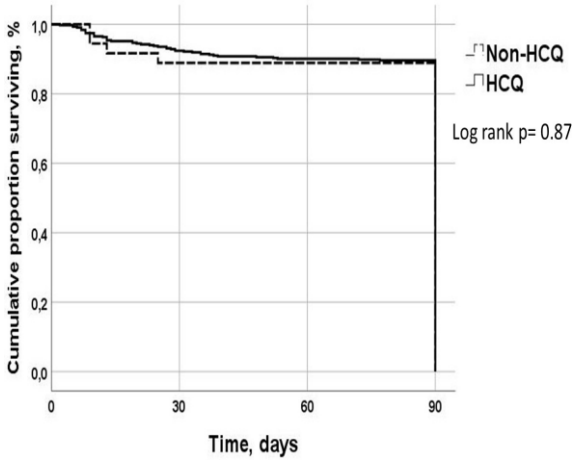


**Figure 1: Survival of the HCQ group and non-HCQ group with Kaplan Meier Method**

## DISCUSSION

This study shows that the mortality rates and overall survival time of COVID-19 patients receiving HCQ treatment did not differ from the patients who were not treated with HCQ, despite longer hospitalization and total treatment duration that may lead to increased costs.

The Turkish Ministry of Health established a Scientific Board in the period when the outbreak had not yet reached our country, referred to the counseling of this Board on the measures to be taken, the methods to be followed in themanagement of the pandemic, and prepared and published regularly updated diagnostic and treatment guides. The recommendations in these guides were created in light of the experience in the world and the data of scientific studies published in increasing numbers during the period when the guide was prepared. These guides recommended that all patients with a definitive or possible diagnosis of COVID-19 be treated according to the definitions they include (13,14).

In an in vitro study published from China in the early periods of the pandemic and a clinical trial from France involving 36 patients, findings were reported that HCQ could provide effective viral clearance in the SARS-CoV-2 infection (12,15,16). The same French group later published an observational study on the clinical results of HCQ therapy. In this study, which did not include a control group, all PCR (+) patients were given a combination of HCQ + azithromycin regardless of the presence of symptoms, 91.7% of whom were clinically healed on the 10th day and viral clearance was provided. At dthe presentation, it was reported that the CT results were normal or showed normal involvement in 77% of the patients, and 95% had low-risk scores (17). This data in the early period of the pandemic were found promising for the effectiveness of HCQ, and HCQ began to be used in the treatment of COVID-19 in many countries, including Turkey evidence regarding its effects in patients is limited. This study aims to evaluate the efficacy of hydroxychloroquine (HCQ However, some studies in larger patient populations published in the following period showed that HCQ did not accelerate clinical recovery and did not re- duce mortality rates.

The study of Tang et al. is the first randomized controlled trial in China to evaluate HCQ practice in COVID-19 patients. The findings do not contribute to the PCR negativization rate (85.4% vs 81.3%) and the alleviation duration of symptoms on the 28$^{th}$ day of adding HCQ to standard care in patients hospitalized with mild to moderate COVID-19 (18).

The negative results of the antiviral effectiveness of HCQ obtained in this study contradict encouraging in vitro results and recently reported promising results from a non-randomized study of 36 patients with COVID-19(10,12,19).

Tang's study showed a delay with a median of 16 days between symptom onset and the HCQ treatment, so he could not assess whether its effectiveness would change if the antiviral activity of HCQ started within 48 hours of

the onset of the disease. However, the data from Tang's study provides no evidence to support the use of HCQ in this population, especially when increased side effects are taken into account. Moreover, although the administration of HCQ in high doses (a loading dose of 1200 mg, then 800 mg for 2-3 weeks) increased the rate of side effects in this study, the use of higher doses of HCQ is unlikely to have additional antiviral effects (18). In our study, HCQ was administered in much lower doses and, although the drug was started as soon as the symptoms started, there was no difference in the effectiveness and mortality in patients who were not given the drug. However, the incidence of side effects was also quite low.

Magagloni's study found that the use of HCQ alone or in combination with azithromycin did not improve mortality or reduce the need for mechanical ventilation. Mortality due to all causes was found to be higher in the HCQ group. However, this was linked to the use of HCQ, and the combination of HCQ and azithromycin in more severe patients (20). In our study, when patients using HCQ were divided into groups as "HCQ", "HCQ and azithromy-cin", and "HCQ and moxifloxacin", the results were worse in the moxifloxacin group, but there was no statistically significant difference in effectiveness and mortality among these groups. Also in our study, both HCQ and the combined use of HCQ and other drugs were given as the severity of the disease increased.

In addition to studies showing that HCQ is ineffective, in the study of Mikami aimed at identifying mortality risk factors retrospectively covering eight centers, the use of HCQ was associated with low mortality (21).

In the study of Geleris, no difference was found in the risk of intubation, and mortality between those who received HCQ and those who did not receive HCQ. In this observational single-centered study, which included 1,376 patients, the patients hospitalized and given HCQ consisted of more severe patients (pO2/FiO2 223 vs 360). Similar to our study, they have concluded that the use of HCQ could not be supported with these results (22).

Rosenberg's study found that HCQ was not effective however, due to the severe and more accompanying chronic diseases of the group of patients receiving HCQ; a definitive judgent could not be made. The lack of observed benefit of HCQ associated with intra-hospital mortality following correction for pre-existing disease and severity of the disease in hospitalization is consistent with data reported from other observational studies (20,22). Rosenberg's study is the largest one reporting side effects of HCQ use among COVID-19 patients. Cardiac arrest was found to be more frequentin patients who received HCQ with azithromycin (23). In our study, the incidence of side effects was found to be quite low.

In a study in which HCQ started to be administered within the first 5 days from the onset of symptoms, doses similar to those in our study were used. It was seen that the early start of treatment did not affect reducing the viral load on the nasopharyngeal swab. In other words, there was no difference in terms of reducing the viral load when compared with those who did not receive HCQ. It was found that the use of HCQ in mild COVID-19 cases did not provide any benefits (24). In our study, although HCQ was tried to be given as soon as the symptoms started, but no difference was found in terms of activity.

Similar to our study, Arshad et al., HCQ alone and HK + azithromycin were associated with a significant reduction in mortality in hospitalized patients due to COVID-19. The Cox Regression Analysis showed that life expectancy was also longer in those who used HCQ alone and those who used HCQ combined with azithromycin. In this cohort, it was reported that the efficacy of the drug

could be due to the earlier start of the drug compared to other studies, using it in a safe dose, better determining the criteria for inclusion, and it was also indicated that a higher rate of systemic steroids was usedin the group that benefited from HCQ (25).

In a study conducted in Belgium, HCQ was similarly given at a total dose of 2400 mg in 5 days. This dose was defined as low. In patients receiving HCQ, in hospital mortality wasfound to be lower than in the group that did not receive HCQ (26). The limitation of this study was not having the primary goal of investigating the effectiveness of HCQ. It was an observational study of data collected using standard case-forms to monitor the pandemic and determine risk factors at the most criticalstage of the pandemic in Belgium. Similarly, inour study, the data were obtained by the retrospective collection of case forms at the beginning of the pandemic.

Cavalcanti's study was constructed as a multicentric, randomized controlled trial. The use of HCQ alone and combined with azithromycin in hospitalized patients with mild-to-moderate COVID-19 was seen to have no additional benefit to clinical recovery compared withstandard care (27).

In October, the Recovery trial found that HCQ was not an effective treatment in patients hospitalized for COVID-19. In addition, it was observed that the duration of hospital stay ofthose receiving HCQ was longer (28). In our study, it was also found that those who received HCQ had a longer median hospital stay than those who did not receive HCQ, but this mayhave been related to the use of HCQ in more severe patients early in the pandemic.

In early December, another randomized controlled trial conducted by the National Institutes of Health (NIH) was published. In this study, no clinical benefit of HCQ was observed in any primary or secondary evaluation param- eters of hospitalized COVID-19 patients (29).

Currently, a study on the clinical consequences of the use of HCQ has not been published in our country.

Our study has several limitations. First it is a retrospective study and this may have led to a selection bias. Second it is a single center study so the results cannot be generalized to other centers. Last but not least, some data were incomplete for some patients due to the overwhelming workload resulting from the pandemic.

In conclusion, although HCQ, which was used in the treatment of COVID-19 due to its mechanism of action at the beginning of the pandemic, was found to be effective in some retrospective observational studies, recent prospective randomized controlled trials concluded that it was ineffective. It is still heavily used in our country and no study has not been published in our country on its effectiveness. Although our study was also a retrospective observational study, it was observed that the use of HCQ had no effect on mortality and life expectancy in patients with COVID-19.

**Ethics Committee Approval**: İzmir Valiliği 2020-4393 Hospital Ethics Committee 2007-39-
**Authors' Contributions:** All stages of this study were performed by a single author.
**Conflict of Interest:** None
**Fundings:** None
**Informed Consent:** This is a retrospective study.

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