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Original Article

# The Relationship Between Lung Involvement Level And Laboratory Parameters In Covıd-19 PCR-Posıtıve Patients

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## Abstract

**Objectives:** The aim of our study is to examine the relationship between the level of uptake of the planet with cell Covid-19 PCR positivity and laboratory data in the Covid emergency polyclinic of the X University Training and Research Hospital.

**Materials and Methods**: Data from 224 Covid-19 PCR positive patients who applied to the Covid emergency outpatient clinic of X University Training and Research Hospital between March 2021 and September 2021, whose thoracic CT was taken and laboratory parameters were studied, were used.

**Results**: Of the 224 patients who participated in the study, 52.2% (n=117) were female patients, and 63.8% (n=143) were patients between the ages of 18-64. The CORADS classification of 53.6% (n=120) of the patients was 5-6 on thorax CT. As the lymphocyte level in the blood decreased, lung involvement increased on CT ($p<0.004$). As CRP, LDH, and fibrinogen levels in the blood increased, lung involvement increased ($p<0.001$). As the neutrophil/lymphocyte ratio, LDH/lymphocyte ratio and Platelet/lymphocyte ratio increased, uptake in CT increased ($p<0.001$, $p<0.001$ and $p<0.002$, respectively). As the lymphocyte/CRP ratio decreased, CT uptake increased ($p<0.001$).

**Conclusion:** Our study revealed that the increase in blood parameters such as lymphopenia, CRP, LDH, and fibrinogen increases lung involvement and increases hospitalization and intensive care unit admission. It should be kept in mind that lymphocyte, CRP, LDH and hematological rates, which are measured by investigating biochemical blood parameters in clinics where imaging is not possible, may be associated with lung involvement and prognosis of Covid-19 infection.

**Keywords:** Covid-19, CORADS, Platelet, Lymphocyte

## Introduction

Coronavirus Disease (COVID-19) is caused by the SARS-CoV-2 virus and has evolved into a global public health issue, resulting in a worldwide pandemic[1]. It has been observed to cause a range of conditions, from flu-like symptoms to life-threatening diseases such as acute respiratory distress syndrome (ARDS), acute kidney damage, myocarditis, and organ failure[2].

While microbiological and radiological examinations are used for diagnosing illness in COVID-19 infections, biochemical and hematological tests are employed for disease risk grading, follow-up, and treatment[3].

The reverse transcriptase-polymerase chain reaction (RT-PCR) test is utilized to confirm the diagnosis of COVID-19 disease. Lung involvement is higher in COVID-19 compared to other viral infections, often presenting as ground glass opacities, with consolidations seen in the peripheral and lower lobes of the lung. Abnormal findings on computed tomography (CT) were detected in up to 54% of cases, including asymptomatic cases, during the initial period of the pandemic. Therefore, CT has been integrated into the disease diagnosis[4-11]. Despite the RT-PCR test's limited accessibility and potentially delayed results, CT has been used to make quicker decisions regarding quarantine or treatment of suspicious patients, benefiting from its rapid results[4-11]. For these reasons, while CT findings do not provide a definitive alternative to the RT-PCR test, they play a significant role in emergency conditions for triaging suspected patients.

Despite reports from radiology societies (such as the American College of Radiology and the Fleischner Society) stating that CT is not suitable for use as a screening method due to its high cost, radiation exposure, infection control concerns, or in the initial evaluation of the patient,

its rapid diagnosis or support for diagnosis, and problem-solving have led to its widespread use globally[12, 13].

Radiology societies have endeavored to develop a classification system for COVID-19 to create a common language between clinicians and radiologists, facilitate evidence-based and scientific-based comparisons of lung findings, and enhance communication. One such system, the CO-RADS (COVID-19 Reporting and Data System), was developed by the German Society of Radiology to indicate suspicion of pulmonary involvement (negative/very low/low suspicious/uncertain, suspicious, typical) related to COVID-19 in Thorax CT[14].

According to the International Federation of Clinical Chemistry COVID-19 Working Group recommendations, biochemical and hematological tests are useful for diagnosing tissue-organ damage caused by infection, identifying patients at low risk of severe disease, pinpointing patients with a poor prognosis, and monitoring the disease's course.

Numerous studies have shown that an increase in LDH (lactate dehydrogenase), CRP (C-reactive protein), procalcitonin (PCT), ferritin, D-dimer levels, and a low lymphocyte count are indicators of a more severe clinical picture[15].

Hematological values such as neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR), LDH-lymphocyte ratio (LLR), and lymphocyte-CRP ratio (LCR) are considered new inflammatory indicators. Studies have found that an increase in NLR, PLR, and LLR rates[16, 17, 18], along with a decrease in the LCR rate, is associated with a more severe clinical course in COVID-19 disease and has a negative impact on prognosis[19].

The purpose of this study is to investigate the correlation between the extent of lung involvement and laboratory parameters in patients with COVID-19 PCR positivity who visited X University Training and Research Hospital's COVID emergency outpatient clinic.

**Materials and Methods**

Our study is a descriptive study conducted with the data of COVID-19 PCR-positive patients who underwent thorax CT and had their biochemical blood parameters examined at the Covid emergency outpatient clinic at X Hospital.

The SPSS 22.0 statistical package program was utilized for data analysis. Descriptive statistics for data evaluation include numbers and percentages for categorical variables, and mean and standard deviation for numerical variables.

The normal distribution conformity of groups was assessed using the Kolmogorov-Smirnov test. The ANOVA test was employed for the comparison of three or more independent groups when the normal distribution condition was met, and the Kruskal Wallis test was used when it was not. In cases of significant differences in the Kruskal Wallis Test, post hoc comparisons were adjusted with Bonferroni. The chi-square test was used for comparing qualitative data. The statistical alpha significance level was set at $p<0.05$.

Our study utilized the data of COVID-19 PCR-positive patients who visited the Covid-19 emergency department of X Hospital between March 2021 and September 2021, underwent thorax CT, and had their laboratory parameters studied. Patients were categorized based on their CORADS grades on CT and compared with laboratory parameters.

Inclusion criteria for our study were: patients aged 18 years and older with a thorax CT scan, COVID-19 PCR, and complete hemograms, biochemistry, coagulation, cardiac markers, CRP, ferritin, fibrinogen, and D-dimer. Exclusion criteria encompassed those with active infections other than COVID-19, pulmonary embolism, hemochromatosis, myocardial infarction, coumadin use, malignancy, and chronic liver disease.

The data of 272 patients who visited the COVID Emergency Outpatient Clinic were analyzed. Twenty-seven of these patients were excluded due to COVID-19 PCR test negativity. Four patients were excluded for lacking a thorax CT scan, and two patients did not have laboratory parameters. All 15 patients were excluded based on exclusion criteria. Our study was conducted with 224 patients (Figure 1).

The study was reviewed and approved by the Recep Tayyip Erdogan University Faculty of Medicine Ethics Committee for Non-Invasive Clinical Research, with decision number 2022/55.

**Results**

The study comprised 224 patients, of whom 52.2% (n = 117) were female, and 63.8% (n = 143) were aged between 18 and 64. The CORADS classification on thorax CT for 53.6% (n=120) of the patients was 5-6. In cases of vaccination, 1-2 doses of the Sinovac vaccine were the most common, accounting for 17.9%, while 38.4% had no vaccine or their vaccination status was unknown. Among the accompanying chronic diseases, hypertension was the most prevalent at 58.9%, followed by Diabetes Mellitus at 31.3%. Details about the participants'

sociodemographic characteristics, CORADS classification, vaccination status, and chronic diseases are provided in Table 1.

**Table 1.** Corads Classification, Vaccination Status, Chronic Diseases, and Sociodemographic Characteristics of the Participants

Considering the vaccination status against COVID, 51% of the 138 vaccinated patients received only the Sinovac vaccine, 28% received Sinovac+Biontech, and 21% received only the Biontech vaccine. Figure 2 illustrates the distribution of vaccine doses.

In COVID-19 positive patients, an increase in the Corads score on thorax CT imaging, indicating increased lung involvement, correlated with higher rates of hospitalization and intensive care admissions, and this correlation was statistically significant ($p<0.001$). Table 2 presents the associations between the patients' hospitalization status, COVID vaccination, Corads score, and chronic diseases.

**Table 2.** The Relationship Between the Hospitalization Status of the Patients and Vaccination, Corads, and Chronic Diseases

When the averages of blood parameters were examined, a decrease in the lymphocyte level corresponded to increased lung involvement in CT, and this was statistically significant ($p<0.004$). As CRP, LDH, and fibrinogen levels in the blood increased, lung involvement also increased, and these correlations were statistically significant ($p<0.001$). Regarding the troponin value, lung involvement increased as troponin decreased ($p<0.02$). Considering the ratios obtained from blood parameters, the uptake in CT increased as the neutrophil/lymphocyte ratio, LDH/lymphocyte ratio, and Platelet/lymphocyte ratio increased ($p<0.001$, $p<0.001$, and $p<0.002$, respectively). As the lymphocyte/CRP ratio decreased, CT uptake increased, and this was statistically significant ($p<0.001$). Table 3 details the association between CT uptakes and blood parameters.

**Table 3.** The Relationship Between CT Uptakes and Blood Parameters

When the hospitalization status was compared with the blood parameters, it was observed that hospitalization increased as the lymphocyte level decreased ($p<0.001$). An increase in the neutrophil level corresponded to increased hospitalization ($p<0.01$). As CRP, Troponin, and fibrinogen levels increased, hospitalization also increased, and these correlations were statistically significant ($p<0.001$). Similarly, as AST and LDH levels increased, hospitalization

and intensive care stays increased (p<0.001). An increase in the Neutrophil/Lymphocyte ratio, Neutrophil/Platelet ratio, and Platelet/Lymphocyte ratio corresponded to increased hospitalization (p<0.001, p<0.001, and p<0.02, respectively). As the LDH/Lymphocyte ratio increased, hospitalization and intensive care stays increased (p<0.001). A decrease in the lymphocyte/CRP ratio corresponded to increased hospitalization (p<0.001). Table 4 compares the mean blood values and hospitalization status.

**Table 4.** Comparison of Hospitalization Status with Mean Blood Parameters

There was no statistically significant difference between the COVID vaccination statuses and the Corads scores (p value 0.552). The relationship between vaccination status and CT involvement is shown in Table 5.

**Table 5.** The Relationship Between Vaccination Status and Lung Involvement

**Discussion**

In this study consisting of patients who applied to the COVID-19 emergency outpatient clinic, we revealed that there is a relationship between hematological values such as Lymphocyte, CRP, LDH, Fibrinogen, Neu/Lymph-Plt/Lymph-LDH/Lymph-Lymph/CRP ratios, and Thorax CT involvement and hospitalization status.

Wasilewski et al.[20] discovered in 2020 that patients with a high involvement score on thorax CT have increased rates of mortality, morbidity, and hospitalization. In our study, the duration of hospitalization could not be evaluated, but we found that patients with high involvement scores had higher hospitalization rates. The increase in the lung involvement score increases the suspicion and severity of COVID-19, and as a result, the hospitalization rates increase as expected.

A systemic inflammatory response is observed in COVID-19 disease, and most patients hospitalized with COVID-19 have abnormal inflammatory biomarkers[21]. C-reactive protein (CRP), a positive acute phase protein, is an inflammatory biomarker synthesized by hepatocytes in the liver and widely available[22]. CRP levels increased in COVID-19 patients in response to proinflammatory cytokines, which had previously been documented to increase in previous research.

Troponin is a biomarker for myocardial injury, most notably myocardial infarction or myocarditis. High troponin levels are prevalent in COVID-19 individuals and have been linked

to fatal outcomes[23]. High troponin levels have been reported to be common in COVID-19 hospitalized patients, and individuals with high troponin levels have a longer hospital stay[24]. Consistent with the studies conducted in our study, it was observed that as the troponin level increased, hospitalizations and intensive care unit admissions increased. The reason for this may be the worsening of the clinical condition of the patient with the elevation of troponin and the increase in the need for hospitalization as a result of this worsening.

Various studies have been published that found that ALT, AST, bilirubin, and albumin, which reflect LDH and liver function, differ in severe patients and in non-severe patients[25, 26]. We found a relationship between LDH and AST levels, which are the parameters we evaluated in our study, and hospitalization status. From the point of view of CT involvement, we found that only LDH level was correlated with the literature. The relationship between hospitalization status and CT involvement with these blood parameters suggests that abnormal values of the liver may be due to the progression of the COVID-19 disease towards an unfavorable outcome and worsening of the prognosis.

In the meta-analysis of Pourbagheri-Sigarood et al.[27] conducted with 2988 cases from 19 studies, leukocytosis, lymphopenia, neutrophilia, thrombocytopenia, and anemia are laboratory findings that are more common in severe patients than in non-severe patients. In our study, we discovered a statistically significant link between CT involvement and patient lymphocyte and neutrophil levels. Only the difference in lymphocyte counts and hospitalization status was shown to be significant. As lymphopenia and neutrophilia are poor prognostic markers of COVID-19 disease, the increase in CT involvement and hospitalizations was an expected finding.

Some ratios, such as neutrophil/lymphocyte, platelet/lymphocyte, and monocyte/lymphocyte ratio, have aided researchers in the diagnosis and prognosis of numerous inflammatory disorders in recent years[28]. These hematological rates, which were also mentioned in our study, can be used as an inflammatory predictor in the diagnosis of COVID-19-positive patients.

Shang et al.[16] stated in a retrospective review of clinical data from 443 COVID-19 patients that NLR, CRP, and platelets can assist assess illness severity and that all of these indicators should be addressed in the clinic, but NLR is the strongest predictor of them. In our study, Shang et al. Similar results were obtained in his study.

Ding et al.[29] attempted to establish a relationship between hospitalization time and hematological blood parameter follow-ups in a retrospective analysis of 72 hospitalized COVID-19 patients. While leukocyte and neutrophil counts, as well as the neutrophil-lymphocyte ratio (NLR), were significantly greater in non-severe patients, lymphocyte counts were consistently lower in severe patients. Many studies have shown that lymphopenia and neutrophilia, among other symptoms, are present in COVID-19 cases. While the increase in neutrophils indicates the acute inflammatory response associated with the cytokine storm, lymphopenia mostly reflects the effect of cell-mediated immunity in the early phase of COVID-19[30]. A decrease in CD4 and CD8 T cells, B cells, and natural killer cells causes lymphopenia. Therefore, lymphopenia and a high neutrophil-lymphocyte ratio are good indicators for predicting COVID-19-related deaths[31].

In our study, patients who were not hospitalized had a significantly higher lymphocyte count and a significantly lower neutrophil-lymphocyte ratio. According to the findings, NLR can be used to assess the prognosis and severity of clinical symptoms in COVID-19 patients.

In this context, hemogram-derived ratios such as the neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) have been proposed to measure the spread of systemic inflammation. NLR has been linked to poorer outcomes in people with SARS-Cov-2 infections. PLR has been demonstrated to be a marker of not just acute inflammatory and prothrombotic states, but also the degree of cytokine release, which may be relevant as a prognostic predictor in severe COVID-19[17]. In our study, hospitalization and lung involvement on CT were higher in correlation with the height of NLR and PLR.

In our investigation, we found a link between LDH-lymphocyte ratio (LLR) and hospitalization status. Guojun Li et al.[18] have shown that LLR can be a valuable predictor of poor outcome in severe COVID-19 patients.

Rangel et al.[19] concluded that the Lymphocyte/CRP ratio was substantially reduced in severe COVID-19 infections in a meta-analysis. In our research, it was found that as the lymphocyte/CRP ratio decreased, there was an increase in hospital service, intensive care admissions, and the level of lung involvement on CT. Lymphopenia and increased CRP were expected findings in COVID-19 because they are poor prognostic markers of the disease. Therefore, we can say that the decrease in the lymphocyte/CRP ratio is one of the reasons for the increase in CT involvement and hospitalizations.

No significant correlation was found between the vaccination status of the patients and their lung involvement. We were able to obtain vaccination status information for 138 of the 224 patients included in the trial, but we may not have made a statistically significant result because we were unable to obtain vaccination status information for all patients.

**Conclusion**

As a result of this research, in which the events in the time period from the emergence of the COVID-19 disease to the present, are revealed and evaluated in the light of scientific and current sources, it has been revealed that lymphopenia, CRP, LDH, and fibrinogen increase, which is one of the blood parameters, increase lung involvement and increase hospital and intensive care hospitalization.

It should be kept in mind that lymphocyte, CRP, LDH and hematological rates measured by investigating biochemical blood parameters in clinics where imaging is not available in primary health care services may be associated with lung involvement and the prognosis of COVID-19 infection.

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**Table 1.** Corads Classification, Vaccination Status, Chronic Diseases and Sociodemographic Characteristics of the Participants

| | n | % |
|---|---|---|
| **Gender** | | |
| **Female** | 117 | 52.2 |
| **Male** | 107 | 47.8 |
| **Age** | | |
| **18-64** | 143 | 63.8 |
| **65 and above** | 81 | 36.2 |
| **Corads** | | |
| **1-2** | 49 | 21.9 |
| **3-4** | 55 | 24.5 |
| **5-6** | 120 | 53.6 |
| **Vaccination status** | | |
| **1-2 dose sinovac** | 40 | 17.9 |
| **3-4 dose sinovac** | 30 | 13.4 |
| **1-2 dose biontech** | 26 | 11.6 |
| **3 dose biontech** | 13 | 5.8 |
| **2 dose sinovac 1 dose biontech** | 29 | 12.9 |
| **No vaccination & unknown** | 86 | 38.4 |
| **Chronic disease** | | |
| **Hypertension** | 132 | 58.9 |
| **Diabetes mellitus** | 70 | 31.3 |
| **Cardiovasculer diseases** | 43 | 19.2 |
| **Cerebrovascular diseases** | 12 | 5.4 |
| **Chronic respiratory diseases** | 21 | 9.4 |
| **Others** | 147 | 65.6 |

**Table 2**. The Relationship Between the Hospitalization Status of the Patients and Vaccination, Corads, and Chronic Diseases

| | ***No hospital admission (n:46)*** | ***Service admission (n:151)*** | ***Intensive care insertion (n:27)*** | ***P value**** |
|---|---|---|---|---|
| ***Gender*** | | | | |
| ***Female (n:117)*** | *24 (20,5)* | *83 (70,9)* | *10 (8,5)* | *0,229* |
| ***Male (n:107)*** | *22 (20,6)* | *68 (63,6)* | *17 (15,9)* | |
| ***Age*** | | | | |
| ***18-64 (n:143)*** | *33 (23,1)* | *96 (67,1)* | *14 (9,8)* | *0,231* |
| ***65 and above (n:81)*** | *13 (16,0)* | *55 (67,9)* | *13 (16,0)* | |
| ***Corads*** | | | | |
| ***1-2 (n:49)*** | *26 (53,1)* | *22 (44,9)* | *1 (2,0)* | ***<0,001*** |
| ***3-4 (n:55)*** | *11 (20,0)* | *38 (69,1)* | *6 (10,9)* | |
| ***5-6 (n:120)*** | *9 (7,5)* | *91 (75,8)* | *20 (16,7)* | |
| ***Status of vaccination*** | | | | |
| ***1-2 dose sinovac (n:40)*** | *9 (22,5)* | *29 (72,5)* | *2 (5,0)* | *0,904* |
| ***3-4 dose sinovac (n:30)*** | *5 (16,7)* | *21 (70,0)* | *4 (13,3)* | |
| ***1-2 dose biontech (n:26)*** | *6 (23,1)* | *17 (65,4)* | *3 (11,5)* | |
| ***3 dose biontech (n:13)*** | *2 (15,4)* | *9 (69,2)* | *2 (15,4)* | |
| ***Sinovac + biontech (n:29)*** | *7 (24,1)* | *20 (69,0)* | *2 (6,9)* | |
| ***No vaccination & unknown (n:89)*** | *17 (19,8)* | *55 (64,0)* | *14 (16,3)* | |
| ***Chronical disease*** | | | | |
| ***Hypertension (n:132)*** | *25 (18,9)* | *91 (68,9)* | *16 (12,1)* | *0,774* |

| | | | | |
|---|---|---|---|---|
| ***Diabetes mellitus (n:70)*** | *10 (14,3)* | *55 (78,6)* | *5 (7,1)* | *0,054* |
| ***Cardiovascular diseases(n:43)*** | *9 (20,9)* | *29 (67,4)* | *5 (11,6)* | *0,994* |
| ***Cerebrovascular diseases (n:12)*** | *3 (25,0)* | *9 (75,0)* | *-* | *0,484* |
| ***Chronic respiratory diseases (n:21)*** | *3 (14,3)* | *14 (66,7)* | *4 (19,0)* | *0,530* |
| ***Others (n:147)*** | *25 (17,0)* | *105 (71,4)* | *17 (11,6)* | *0,157* |

**Chi-square test*

**Table 3.** The Relationship Between CT Uptakes and Blood Parameters

| Parameters Of Blood | CORADS 1-2 | CORADS 3-4 | CORADS 5-6 | P values* |
|---|---|---|---|---|
| WBC(10^3/ml) | 7,04±2,98 | 6,37±2,57 | 7,34±3,78 | 0,459 |
| LENF(10^3/ml) | 1,72±1,51[a] | 1,63±1,76[a,b] | 1,18±0,59[b] | **0,004** |
| NEU(10^3/ml) | 4,91±2,76 | 4,40±2,00 | 5,76±3,61 | 0,053 |
| HGB(gr/dl) | 12,97±2,33 | 13,00±1,77 | 12,92±1,79 | 0,963** |
| PLT(10^3/ml) | 201,18±101,37 | 188,84±61,18 | 217,00±89,92 | 0,222 |
| CRP(mg/l) | 39,71±53,62[a] | 73,01±58,37[b] | 98,19±75,86[b] | **<0,001** |
| ALT(U/L) | 32,96±33,74 | 37,09±47,91 | 54,08±95,38 | 0,088 |
| AST(U/L) | 41,76±53,95 | 57,34±102,44 | 50,64±49,95 | 0,059 |
| LDH(U/L) | 230,72±78,31[a] | 314,47±208,42[b] | 367,81±141,64[c] | **<0,001** |
| INR | 1,10±0,28 | 1,02±0,38 | 0,99±0,27 | 0,195 |
| TROP(ng/l) | 37,18±139,21[a] | 27,57±64,73[b] | 20,18±77,41[a,b] | **0,020** |
| FIBRINOJEN(mg/dL) | 386,13±156,77[a] | 448,06±167,21[a] | 529,53±175,06[b] | **<0,001** |
| D-DİMER(mg/ml) | 1,18±1,92 | 0,68±0,50 | 0,73±0,78 | 0,902 |
| NEU/LENF | 5,55±7,92[a] | 3,69±2,23[a] | 6,14±5,34[b] | **0,001** |
| NEU/PLT | 0,03±0,04 | 0,02±0,01 | 0,03±0,01 | 0,292 |
| PLT/LENF | 171,87±140,72[a] | 158,07±78,84[a] | 218,28±130,41[b] | **0,002** |
| LDH/LENF((U/L)/(10^3/ML) | 223,79±283,10[a] | 334,47±424,89[a] | 401,31±273,67[b] | **<0,001** |
| LENF/CRP((10^3/ML)/(mg/l) | 0,32±0,47[a] | 0,11±0,30[b] | 0,09±0,28[b] | **<0,001** |

**Kruskal Wallis test, **One-way ANOVA test*

**Table 4.** Comparison of Hospitalization Status with Mean Blood Parameters

| Parameters of blood (mean) | No hospital admission (n:46) | Service admission (n:151) | Intensive care admission (n:27) | P values* |
|---|---|---|---|---|
| WBC(10^3/ml) | 6,36±2,56 | 7,10±3,33 | 7,87±4,48 | 0,382 |
| LENF(10^3/ml) | 1,83±1,47[a] | 1,33±1,13[b] | 1,17±1,08[b] | **<0,001** |
| NEU(10^3/ml) | 4,15±2,27[a] | 5,38±3,12[b] | 6,31±4,05[b] | **0,010** |
| HGB(gr/dl) | 13,53±1,97 | 12,76±1,85 | 12,98±2,02 | 0,057** |
| PLT(10^3/ml) | 211,52±79,17 | 207,51±90,85 | 193,33±79,23 | 0,288 |
| CRP(mg/l) | 25,65±30,19[a] | 87,51±68,57[b] | 123,57±84,60[b] | **<0,001** |
| ALT(U/L) | 34,91±36,07 | 44,19±60,45 | 69,11±158,65 | 0,694 |
| AST(U/L) | 31,61±21,08[a] | 53,86±77,10[b] | 62,59±54,04[c] | **<0,001** |
| LDH(U/L) | 225,64±79,89[a] | 327,66±159,0[b] | 476,26±139,00[c] | **<0,001** |
| INR | 0,99±0,29 | 1,02±0,32 | 1,07±0,23 | 0,413 |
| TROPONIN(ng/l) | 4,69±4,86[a] | 28,80±90,31[b] | 44,36±155,43[b] | **<0,001** |
| FIBRINOJEN(mg/dL) | 394,16±180,12[a] | 496,26±173,4[b] | 520,00±168,6[b] | **0,001** |
| D-DIMER(mg/ml) | 0,79±1,12 | 0,72±0,74 | 1,36±2,18 | 0,066 |
| NEU/LENF | 2,93±2,32[a] | 5,84±5,84[b] | 7,21±6,62[b] | **<0,001** |
| NEU/PLT | 0,02±0,02[a] | 0,03±0,02[b] | 0,03±0,02[b] | **<0,001** |
| PLT/LENF | 142,56±61,81[a] | 203,27±133,75[b] | 224,37±133,1[b] | **0,020** |
| LDH/LENF((U/L)/(10^3/ML) | 161,91±111,93[a] | 364,59±342,33[b] | 569,88±291,79[c] | **<0,001** |

| | | | | |
|---|---|---|---|---|
| LENF/CRP((10^3/ML)/(mg/l) | 0,29±0,37[a] | 0,11±0,32[b] | 0,11±0,42[b] | **<0,001** |

**Kruskal Wallis test, **One-way ANOVA test*

**Table 5.** The Relationship Between Vaccination Status and Lung Involvement

| | CORADS 1-2 | CORADS 3-4 | CORADS 5-6 | P Values |
|---|---|---|---|---|
| **Status of vaccination** | | | | |
| Sinovac | 13 (18,6) | 17 (24,3) | 40 (57,1) | 0,552 |
| 1-2 dose biontech | 8 (30,8) | 5 (19,2) | 13 (50,0) | |
| 3 dose biontech | 2 (15,4) | 1 (7,7) | 10 (76,9) | |
| Sinovac + biontech | 8 (27,6) | 9 (31,0) | 12 (41,4) | |
| No vaccination & unknown | 18 (20,9) | 23 (26,7) | 45 (52,3) | |

** Chi-square test*

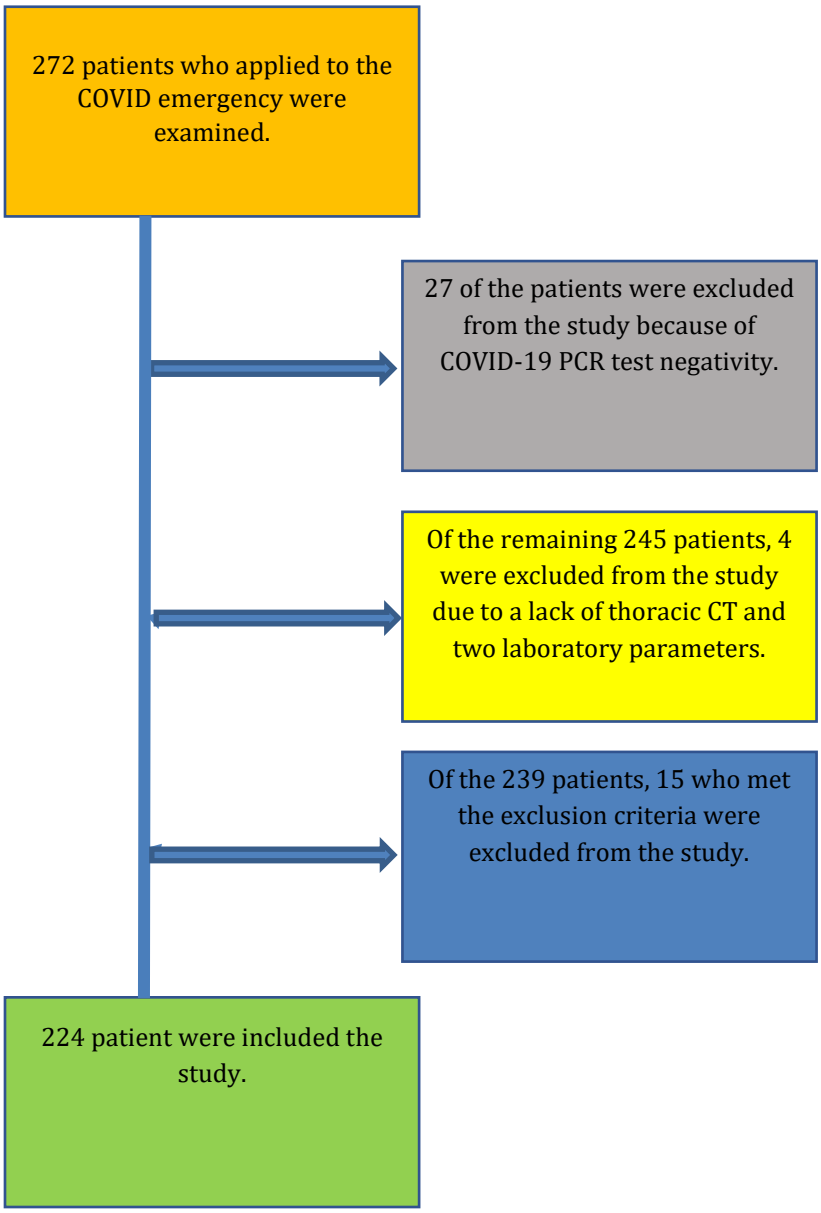


**Figure 1**. Algorithm of Patients Included in the Study

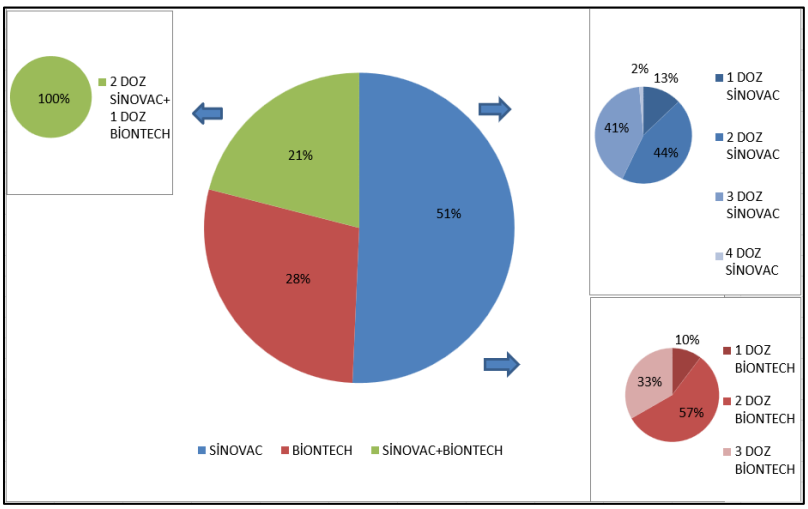


**Figure 2**. Distribution Chart of Vaccine Types and Doses