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SIGNIFICANCE OF SARS-COV-2 PCR POSITIVE AND NEGATIVE RESULTS IN THE CLINICAL COURSE AND LABORATORY PARAMETERS OF COVID-19

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Abstract

Background: The COVID-19 pandemic has posed an unprecedented global public health challenge. Since the beginning of the COVID-19 pandemic, accurate case identification has been essential for patient management, surveillance, and epidemiological control. Although RT-PCR testing remains the gold standard for confirming SARS-CoV-2 infection, false-negative results may occur due to sampling errors, timing of testing, or low viral load. Therefore, clinical judgment and epidemiological context remain critical in diagnosing suspected cases. The WHO recommends the use of the ICD-10 code U07.2 when SARS-CoV-2 is not identified, but a clinical and epidemiological diagnosis of COVID-19 is present. In this study, comparative characteristics of clinical and laboratory parameters in COVID-19 PCR-positive and PCR-negative patients were analyzed.

Methods: The total study population consisted of 266 patients, including 116 men (43.6%) and 150 women (56.4%). Polymerase chain reaction (PCR) examination of nasopharyngeal swabs was carried out to detect SARS-CoV-2 RNA . Clinical and laboratory data (hemoglobin, erythrocytes, leukocytes, platelets, etc.) from 266 hospitalized patients were collected and statistically analyzed using SPSS software .

Results: Out of 266 patients, 154 had positive PCR results, and 112 had negative PCR results. Statistically significant differences were observed only in the frequency of fever and loss of taste between the PCR groups ($p < 0.05$). In the PCR-positive group, women were more likely to complain of dyspnea and nausea. In the PCR-negative group, men were more likely to experience fever ($p < 0.05$) and dyspnea ($p < 0.05$), but women complained of nausea more often ($p < 0.05$). PCR-negative patients were found twice as frequently to have swelling of the lower extremities and dehydration ($p < 0.05$), probably due to a higher incidence of renal and cardiovascular diseases ($p < 0.05$). Impaired vesicular breathing was more frequently observed in PCR-negative patients ($p < 0.05$). The mean platelet count in PCR-positive patients was significantly lower ($p < 0.05$), and the frequency of low lymphocyte counts was significantly higher ($p < 0.05$) compared with PCR-negative patients.

Conclusions: I n COVID-19 PCR-negative patients, complex changes in clinical and laboratory parameters were similar to those observed in PCR-positive patients.

Keywords: *COVID-19; PCR positive patients; PCR negative patients; clinical and laboratory parameters*

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INTRODUCTION

The novel coronavirus named SARS-CoV-2 has been classified as a pandemic pathogen . Consequently, it has become a pressing priority in the fields of healthcare, politics, and economics. According to the WHO, about 780,000,000 people have been infected with COVID-19 worldwide since the beginning of 2020, and more than 7 million people have died from COVID-19–related complications.

COVID-19 is an infectious disease caused by SARS-CoV-2, a single-stranded RNA virus with high virulence and the capability to cause acute respiratory distress. The first cases of the virus were reported in November–December 2019 in the city of Wuhan in Hubei Province, China, where isolated cases of pneumonia of unknown origin among local residents were linked to a local seafood and live animal market [Gabutti G et al. 2020; Zhang Y et al. 2020; Zhu N et al., 2020]. While investigating the aforementioned cases, Chinese scientists identified a novel coronavirus that possessed a genetic sequence that was at least 70% similar to that of SARS-CoV (SARS-CoV-1), the causative agent of severe acute respiratory syndrome (SARS). The genetic sequence was also approximately 50% similar to that of Middle East respiratory syndrome coronavirus (MERS-CoV) [*Hu Y et al. 2020; Li J et al. 2020; Lu R et al. 2020*].

The history of human coronavirus research dates back to the second half of the 1960s [Cui J. et al., 2019]. Coronaviruses are widespread in nature and account for 12–25% of acute respiratory viral illnesses [*Ilchenko L. et al., 2020*]. The virus can be transmitted between humans through direct contact and airborne droplet transmission [*Wu C. et al., 2020*]. SARS-CoV-2 enters the body by utilizing angiotensin-converting enzyme 2 (ACE2) receptors, which are located mainly in the airways. Here, the virus replicates in epithelial cells of the respiratory tract and alveoli, triggering an inflammatory process that may lead to a systemic inflammatory response [*Hojyo S. et al., 2020*].

Peiris J. et al. reported that some patients deteriorate in the second week of illness, when the viral load in the body decreases, suggesting that the immune-mediated host response plays an important role in the pathogenesis of the disease [*Peiris J. et al., 2003*].

Clinical manifestations may range from an asymptomatic course all the way to multiple organ failure. The most common clinical signs recorded during multicenter studies were cough (59.6%), fever (46.9%), general weakness (27.8%), and dyspnea (20.2%). The main laboratory changes were as follows: lymphopenia (55.9%), increased C-reactive protein (61.9%) , elevated AST (53.3%), elevated lactate dehydrogenase (40.8%), elevated erythrocyte sedimentation rate (73.0%), elevated ferritin levels (63.0%), increased interleukin-6 (IL-6) levels (52%), prolonged prothrombin time (35.5%), thrombocytopenia (17.3%), eosinopenia (59.0%), decreased hemoglobin levels (29.0%), and decreased albumin levels (38.4%). Chest computed tomography (CT) revealed pathological changes in 93.5% of the subjects, of which 71.1% had bilateral lung involvement , 48.0% showed ground-glass opacities, 78.3% had diffuse pulmonary infiltrates, and 50.7% had lymph node enlargement. Common comorbidities included arterial hypertension, other cardiovascular diseases, diabetes mellitus, obesity, chronic kidney disease, liver disease, and chronic obstructive pulmonary disease. Some less common symptoms include sputum production, headache, hemorrhage, diarrhea, chills, nausea, and vomiting, among others [*Huang C. et al., 2020; Guan W.J. et al., 2020; Wu C. et al., 2020; Israfil S.M.H. et al., 2021*].

After analyzing around 44,000 COVID-19 cases in Hubei province, the WHO reported that 80% of patients experience a mild course of the disease, 14% develop a more severe course such as pneumonia, 5% reach a critical stage, and about 2% eventually die [Feng F. et al., 2020]. Most of the deceased patients initially had concomitant illnesses, and the usual course from the onset of initial symptoms to death lasted an average of 14 days (range 6–41 days) [*Hu Y. et al., 2020; Mirsadraee S. et al., 2020*].

The WHO has published several guidelines for COVID-19 diagnosis. Testing is performed by real-time reverse transcription–polymerase chain reaction (rRT-PCR) using respiratory tract specimens. The results are usually available within a few hours [*WHO Interim Guidance, 2020*]. As mentioned, Chinese scientists isolated the SARS-CoV-2 strain and published its genetic sequence, so that laboratories around the world could indepen-

dently perform polymerase chain reaction (PCR) testing and detect SARS-CoV-2 infection.

The final diagnosis of COVID-19 in the Republic of Armenia is based on a positive result of PCR examination of a nasopharyngeal swab specimen.

Based on available literature data and our own observations, PCR tests can be negative in patients presenting with the aforementioned clinical signs . The WHO has recommended the use of the ICD-10 code U07.2 in cases where the virus is not identified but a clinical, epidemiological, and radiological diagnosis is present [Bhatt et al., 2021; Wander P.L. et al., 2023; Dejenu K.G. et al., 2025]. In such cases, it is important to identify clinical or laboratory markers that suggest the presence of the disease.

The aim of this study was to analyze and compare clinical and laboratory characteristics in COVID-19 PCR-positive and PCR-negative patients.

Materials and Methods

A total of 266 patients with similar clinical symptoms were examined upon their admission to the "Heratsi" No. 1 Hospital Complex (Yerevan, Republic of Armenia) between April and June 2020. Objective patient examinations and clinical data analysis were carried out. Several routine and widely available tests, such as complete blood count, biochemical tests, serological tests, and coagulation tests (coagulogram), were performed, as well as PCR examination of nasopharyngeal swabs to detect SARS-CoV-2 RNA. Out of the 266 patients (overall cohort) , 154 had a positive COVID-19 PCR result (Group I, WHO code: ICD-10 U07.1), and 112 had a negative PCR result (Group II, WHO code: ICD-10 U07.2).

The general condition of the patients was assessed as severe in accordance with the COVID-19 management policy of the Ministry of Health of the Republic of Armenia (Appendix 1, Order No. 15-p, dated October 16, 2022), based on blood oxygen saturation levels below 93% (mean value 89%). The mean time from symptom onset to seeking medical care in the overall cohort was 6.84 ± 1.03 days.

The statistical analysis was performed using the statistical package SPSS (SPSS Inc., USA, version 16.0). Parametric and non-parametric statistical methods were applied. Differences in proportions were compared using the Chi-square test or the Fisher's exact test, and differences between means were compared using the Student's t-test. Statistical significance was set at $p < 0.05$ with a confidence level (CL) of 95%.

Results

A total of 266 patients were included (116 males [43.6%] and 150 females [56.4%]). The mean age among men was 62.20 ± 1.43 years, and that of women was 63.03 ± 1.00 years. The mean time from symptom onset to seeking medical attention was 6.84 ± 1.03 days (7.26 ± 2.09 days for males and 6.46 ± 0.62 days for females). Group I patients (PCR-positive) needed a mean of 4.76 ± 0.86 days, whereas those in Group II (PCR-negative) needed 7.46 ± 1.31 days on average.

The frequency of patient complaints among the study participants, in both gender groups and in the overall cohort, is presented in Table 1.

Overall, the most common complaints were general weakness (90.22%) and fever (73.68%).

Table 1.

Frequency of inpatient complaints upon admission in the general group, among males and females.

Complaints	Groups						P-value*
	Male n=116		Female n=150		General n=266		
	N	%	N	%	N	%	
Fever	66	56.90	96	64.00	162	60.90	>0.05
Cough	18	15.52	26	17.33	44	16.54	>0.05
Sneezing, nasal discharge	4	3.45	2	1.33	6	2.26	>0.05
Headache	9	7.76	13	8.67	22	8.27	>0.05
Muscle pain	20	17.24	20	13.33	40	15.04	>0.05
Diarrhea	8	6.90	12	8.00	20	7.52	>0.05
Vomiting	3	2.59	2	1.33	5	1.88	>0.05
Allergic or other rushes	1	0.86	0	0.00	1	0.38	>0.05
General weakness	76	65.52	118	78.67	194	72.93	>0.05
Joint pain	5	4.31	7	4.67	12	4.51	>0.05
Nausea	4	3.45	18	12.00	22	8.27	>0.05
Dispnea	37	31.90	44	29.33	81	30.45	>0.05
Shortness of breath	25	21.55	46	30.67	71	26.69	>0.05
Chest pain	12	10.34	7	4.67	19	7.14	>0.05
Loss of taste and smell	8	6.90	5	3.33	13	4.89	>0.05

Notes: *P-value among 3 groups*

Approximately one-third of patients reported dyspnea (30.45%) and shortness of breath (26.69%), while cough (24.06%) and muscle pain (15.04%) were reported less frequently.

In men, similar to the overall cohort, the most frequent complaint was general weakness (93.1%), followed by fever (81.03%), dyspnea (47.41%), shortness of breath (21.55%), muscle aches (17.24%), and cough (15.52%). It is noteworthy that men, significantly more often than women, complained of fever and dyspnea ($p < 0.05$). Men reported chest pain (10.34%) and loss of taste and smell (6.94%) approximately twice as often as women (4.67% and 3.33%, respectively), although these differences were not statistically significant ($p > 0.05$). Women, significantly more often than men, complained of cough (30.66%, $p < 0.05$).

Analysis of the data presented in Table 1 demonstrated that men significantly more often complained of fever, dyspnea, and chest pain, whereas women significantly more often reported cough.

Next, we calculated the incidence of patient complaints in Groups I and II (Table 2). The analysis aimed to determine whether the PCR result would lead to any differences in presenting complaints at admission. Table 2 shows that the predominant complaints in Groups I and II were general weakness (92.2% and 87.5%), fever (83.1% and 60.7%), dyspnea (28.6% and 33.0%), shortness of breath (24.7% and 29.5%), cough (25.3% and 22.3%), and muscle aches (16.2% and 13.4%). The incidence of other complaints was lower, but Group I patients complained significantly more often of loss of taste (17.5%) than Group II patients (6.25%) ($p < 0.05$). In contrast, Group II patients were approximately twice as likely to complain of chest pain (10.7%) as Group I patients (4.5%), although this difference was not statistically significant ($p > 0.05$).

Thus, PCR-positive patients were more likely to complain of fever (OR = 3.67, 95% CI 1.67–8.04), and more often reported headache, cough, loss of taste and smell, and joint pain. PCR-negative patients more frequently complained of shortness of breath, chest pain, nausea, and vomiting. However, as demonstrated by Table 2, statistically significant differences were observed only in the frequency of fever and loss of taste between the PCR groups ($p < 0.05$).

Afterwards, the incidence of complaints at the time of inpatient admission was analyzed in individual patients with both positive and negative COVID-19 PCR results and classified by gender (Table 3). The data demonstrated that the most common complaints were almost identical, but

TABLE 2.

Frequency of complaints upon admission in COVID-19 PCR positive (group I) and negative (group II) patients.

Complaints	Group I n=154		Group II n=112		P-value
	N	%	N	%	
Fever	107	69.5	55	49.1	>0.05
Cough	29	18.8	15	13.4	>0.05
Sneezing, nasal discharge	5	3.2	1	0.9	>0.05
Headache	17	11.0	5	4.5	>0.05
Muscle pain	25	16.2	15	13.4	>0.05
Diarrhea	10	6.5	10	8.9	>0.05
Vomiting	0	0.0	5	4.5	>0.05
Allergic or other rashes	1	0.6	0	0.0	>0.05
General weakness	112	72.7	82	73.2	>0.05
Joint pain	10	6.5	2	1.8	>0.05
Nausea	10	6.5	12	10.7	>0.05
Dispnea	44	28.6	37	33.0	>0.05
Shortness of breath	38	24.7	33	29.5	>0.05
Chest pain	7	4.5	12	10.7	>0.05
Loss of taste and smell	12	7.8	1	0.9	>0.05

TABLE 3.

Frequency of complaints in COVID-19 PCR positive (group I) and negative (group II) patients in each gender group.

Complaints	Group I					Group II				
	male N=71		Female N=83		P-value	Male N=45		female N=67		P-value
	N	%	n	%		n	%	n	%	
Fever*	49	69.0	58	69.9	>0.05	17	37.8	38	56.7	<0.05
Cough	12	16.9	17	20.5	>0.05	6	13.3	9	13.4	>0.05
Sneezing	3	4.2	2	2.4	>0.05	1	2.2	0	0.0	>0.05
Headache	7	9.9	10	12.0	>0.05	2	4.4	3	4.5	>0.05
Muscle pain	14	19.7	11	13.3	>0.05	6	13.3	9	13.4	>0.05
Diarrhea	4	5.6	6	7.2	>0.05	4	8.9	6	9.0	>0.05
Vomiting	0	0.0	0	0.0	>0.05	3	6.7	2	3.0	>0.05
Rash	1	1.4	0	0.0	>0.05	0	0.0	0	0.0	>0.05
General weakness	47	66.2	65	78.3	>0.05	29	64.4	53	79.1	>0.05
Joint pain	5	7.0	5	6.0	>0.05	0	0.0	2	3.0	>0.05
Nausea	3	4.2	7	8.4	>0.05	1	2.2	11	16.4	<0.05
Dispnea*	17	23.9	27	32.5	>0.05	20	44.4	17	25.4	<0.05

NOTES: *P-value male vs female, (*) There was a statistically significant difference between males in the compared groups.*

some differences were also observed. In particular, in Group II, men complained of fever (84.4%) more often than women (58.2%) ($p < 0.05$). Meanwhile, nausea was more common in women (16.4%) than in men (2.2%) ($p < 0.05$). An additional difference was observed in the frequency of dyspnea. In Group I, women (22.9%) complained more often than men (18.3%), whereas in Group II, the inverse relationship was observed, with a statistically significant difference ($p < 0.05$).

Thus, among PCR-negative COVID-19 patients (Group II), men were more likely to complain of fever and dyspnea. Men in the PCR-negative group (Group II) reported dyspnea more frequently than men in the PCR-positive group (Group I) ($p < 0.05$).

We also calculated the frequency of co-occurrence of complaints at the time of inpatient admission in all patients. The most common presentation involved three concurrent complaints (33.6%), followed by two complaints (21.0%), four complaints (19.6%), one complaint (14.0%), five complaints (7.0%), and six or more complaints (4.8%). The most common complaints were fever and general weakness, which were often accompanied by tachypnea, dyspnea, or shortness of breath.

Concomitant diseases in COVID-19 patients are known to aggravate and complicate the course of the disease, and as such have significant prognostic value. Therefore, special attention was given to studying the prevalence of comorbidities among our patients, the results of which are presented in Table 4. Arterial hypertension (34.4%), diabetes mellitus (21.4%), and other cardiovascular diseases (16.9%) were most commonly observed in Group I patients. The sequence in Group II was as follows: arterial hypertension (44.6%), other cardiovascular diseases (38.4%), and diabetes mellitus (18.8%). Other cardiovascular and renal diseases were observed more frequently in patients with negative PCR results than in those with positive results ($p < 0.05$).

At the time of admission for inpatient treatment, all patients answered questionnaires and underwent a physical examination, the data of which are presented in Table 5. The data showed that in both Groups I and II, the disease started gradually in the overwhelming majority of cases (76.3% and 71.2%, respectively). The skin and visible mucous membranes were assessed to have a normal color

Table 4.

The incidence of concomitant diseases among COVID-19 PCR positive (group I) and negative (group II) patients

Concominant diseases	Group I		Group II		P –value
	N	%	N	%	
Absent	13	8.4	16	14.3	>0.05
Arterial hypertension	53	34.4	50	44.6	>0.05
Lung diseases	3	1.9	5	4.5	>0.05
Cardiovascular diseases	26	16.9	43	38.4	<0.05
Diabetes mellitus	33	21.4	21	18.8	>0.05
Renal diseases	5	3.2	12	10.7	<0.05

Table 5.

Physical Examination data for COVID-19 PCR positive (group I) and negative (group II) patients.

Types	Group I		Group II		P – value
	N	%	N	%	
Disease onset					
Acute	36	23.7	29	26.1	>0.05
Gradual	116	76.3	79	71.2	>0.05
Sudden	0	-	3	2.7	>0.05
Skin					
Normal colour	72	48.0	43	41.3	>0.05
Pale	73	48.7	56	53.8	>0.05
Cyanotic	5	3.3	5	4.8	>0.05
Swelling, location					
Absent	144	93.5	98	87.5	>0.05
Face	1	0.64	1	0.89	>0.05
lower extremities	9	5.84	13	11.6	>0.05
Tongue					
Moist	85	55.2	42	37.5	<0.05
Dry	53	34.4	58	51.8	<0.05
coated tongue	16	10.4	12	10.7	>0.05
Type of breathing by auscultation					
Vesicular breathing	31	20.1	10	8.9	<0.05
Decreased breathing sounds	115	74.7	99	88.4	<0.05
Coarse crackles	8	5.2	3	2.7	>0.05
Wheezing					
Absent	76	49.4	51	45.5	>0.05
Wheezes	15	9.7	10	8.9	>0.05
fine crackles	22	14.3	21	18.8	>0.05
Crepitation	41	26.6	30	26.8	>0.05

in approximately half of the patients and were pale in the other half. In both groups, five patients had cyanosis of the skin. Swelling, if present, was localized to the lower extremities in the vast majority of patients. A dry tongue was observed with a statistically significant frequency in Group II patients ($p < 0.05$). Shallow breathing was frequently observed during lung auscultation in both groups, and was statistically more common in Group II ($p < 0.05$). Crepitations were heard in about a quarter of patients in both groups.

In addition, we compared objective screening data, namely blood pressure, heart rate, and blood oxygen saturation. Mean systolic and diastolic blood pressure values were similar between the two groups. Group I values were 130.05 ± 1.55 mmHg and 78.60 ± 0.88 mmHg, respectively. Group II values were 129.87 ± 2.11 mmHg and 78.92 ± 1.19 mmHg, respectively. The mean heart rate in both groups was 89 ± 0.99 beats per minute, and the mean oxygen saturation ranged from 88% to 90%. There were no statistically significant differences in mean hemodynamic parameters between the two groups ($p > 0.05$).

As mentioned above, the most accessible and affordable laboratory tests were performed, namely complete blood count, biochemical tests, and coagulogram. Table 6 shows the overall blood count values for COVID-19 PCR-positive and PCR-negative patients. As shown in the table, in the PCR-negative group, the counts of leukocytes, platelets, and neutrophils at the time of inpatient admission were significantly higher compared to those in the PCR-positive group ($p < 0.05$). Conversely, the mean lymphocyte count was significantly lower in the PCR-negative group, with lymphopenia recorded in 51% of patients, which was significantly higher than in the PCR-positive group (41.6%) ($p < 0.05$).

Upon close analysis of Table 7, which shows the average biochemical profile of blood in Groups I and II, there were no statistically significant differences between the groups, and values were mostly similar ($p > 0.05$). However, on average, Ca^{2+} levels were lower than the reference range in both groups, while mean K^+ values were above the normal range. Urea levels in Group I were higher than the physiological norm. In both groups, C-reactive protein (CRP) levels were approximately tenfold higher than the upper limit of normal, and mean glucose levels were also elevated above the reference range. Interestingly, elevated levels of γ-glutamyl transpeptidase (GGT) were observed in patients with negative PCR results (Group II). Although mean alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels were within normal ranges in both groups, ALT values in Group I were elevated in 27.9% of patients, while AST was elevated in 42.2% of pa-

TABLE 6.

General blood test data for COVID-19 PCR positive (group I) and negative (group II) patients

General blood test data		Reference Range	Group I		Group II		P-value
Parameter	Units		Mean	SD	Mean	SD	
Hemoglobin	*g/l*	120-170	137.28	1.47	134.96	1.77	>0.05
Erythrocytes	*x10¹²/l*	4.2-6.2	4.74	0.05	4.64	0.06	>0.05
Platelets	*x10⁹/l*	150-400	205.79	7.09	231.37	9.43	<0.05
Leukocytes	*x10⁹/l*	4.00–10.0	6.89	0.29	17.07	7.57	>0.05
Lymphocytes	%	25-40	16.00	1.06	18.54	1.07	>0.05
Eosinophils	%	0.5–5.0	0.63	0.16	0.75	0.11	>0.05
ESR	*mm/h*	2-15	26.42	2.12	23.32	2.53	>0.05

TABLE 7.

Blood biochemical data from COVID-19 PCR positive (group I) and negative (group II) patients.

Biopchemical data		Reference	Group I		Group II		P-value
Parameter	Units	Range	Mean	SD	Mean	SD	
Ca^{++}	*mmol/l*	2.15–2.55	1.89	0.41	0.41	0.18	>0.05
K^+	*mmol/l*	3.5–5.2	6.30	1.45	1.45	1.77	>0.05
Na^+	*mmol/l*	135–155	137.06	1.40	1.40	0.43	>0.05
Urine	*mmol/l*	2.5–8.3	8.88	0.93	0.93	0.41	>0.05
Glucose	*umol/l*	4.2-6.4	9.18	0.99	0.99	0.33	>0.05
Alanine aminotransferase	*U/l*	<40	37.403	3.142	3.142	2.920	>0.05
Aspartate aminotransferase	*U/l*	<35	35.760	2.074	35.503	3.836	>0.05
C-reactive protein	*g/l*	<5	62.03	6.09	69.97	8.63	>0.05
γ-glutamyl transpeptidase	*U/l*	8-61	59.70	13.15	83.82	20.46	>0.05

Table 8.

Coagulogram data in COVID-19 PCR positive (group I) and negative (group II) patients

Coagulogram data		Reference	Group I		Group II		P-value
Parameter	Units	Range	Mean	SD	Mean	SD	
Protrombin time	sec	12-16	18.0	0.5	17.9	0.7	>0.05
Protrombine index	%	80-105	75.7	1.6	76.7	1.7	>0.05
Fibrinogen	*mg/dl*	2–4	5.52	0.22	5.28	0.18	>0.05
International Normalized Ratio		1.0-1.8	1.42	0.06	1.32	0.04	>0.05
Activated partial tromboplastine time	*sec*	25-35	53.0	2.5	45.8	2.6	>0.05

tients. Meanwhile, in Group II, ALT was elevated in 26.8% of cases, and elevated AST levels were observed in approximately 33.0% of patients.

Data regarding coagulogram tests are summarized in Table 8. According to the table, both groups showed prolongation of prothrombin time (PT) and activated partial thromboplastin time (aPTT), which may be correlated with the fact that the vast majority of patients reported prior use of various anticoagulants before hospital admission. There was also a slight decrease in the prothrombin index values. Both groups demonstrated elevated fibrinogen levels, with 85.7% of patients in Group I and 77.1% in Group II showing increases.

According to data obtained from instrumental examinations (chest X-ray and computerized tomography [CT] scans), bilateral pulmonary infiltrates were the most common finding, present in 94.1% of patients in Group I, while the remaining patients had unilateral lung involvement. In the PCR-negative group (Group II), all patients showed bilateral pulmonary infiltrates, predominantly affecting the posterior segments of the lower lobes on chest X-ray.

We compared the hospitalization period between the two groups.

- Group I: average length of stay 6.06 ± 0.32 days
- Group II: average length of stay 6.36 ± 0.42 days ($p > 0.05$)

No statistically significant difference in length of stay was observed.

Upon completion of inpatient treatment, patient conditions were assessed at discharge.

- It should be noted that the number of patients in the groups decreased by 11.3%, as some patients were transferred to specialized hospitals for further management.
- A statistically significant portion of patients in Group II were discharged with improvement in general condition (91.6%) ($p < 0.05$), whereas this outcome was observed in 74.4% of Group I patients.
- Unchanged general condition (14.0%) and mortality (11.6%) were more common in the PCR-positive group ($p < 0.05$).

Discussion

The findings of this study provide important insights into the clinical and laboratory characteristics of COVID-19 patients with positive and negative PCR results.

Hospital admission patterns showed no significant correlation with PCR status, gender, or average age. The only notable difference was that patients with negative PCR results tended to seek inpatient care more frequently.

Clinical symptoms were largely similar across groups. Overall, the most common complaints were general weakness and fever, while approximately one-third of patients reported dyspnea or shortness of breath, consistent with previous reports [Wu C et al., 2020; Israfil SMH et al., 2021; Huang C et al., 2020; Guan WJ et al., 2020]. One-third of participants presented with three concurrent complaints. Gender-specific differences were observed: women more often reported cough, whereas men more frequently experienced fever and dyspnea. In PCR-negative patients, men were significantly more likely to present with fever and dyspnea than men in the PCR-positive group ($p < 0.05$).

Comorbidities played an important role in disease presentation. Arterial hypertension was the most common concurrent condition in both groups. Among PCR-positive patients, diabetes mellitus was the second most frequent comorbidity, while other cardiovascular diseases predominated in PCR-negative patients. Additionally, renal and other cardiovascular diseases were significantly more prevalent in PCR-negative patients, which may explain the higher incidence of dehydration and lower extremity swelling in this group ($p < 0.05$).

Physical examination revealed a generally gradual onset of disease in most patients. About half of the participants had pale skin, and im-

paired vesicular breathing was more frequently noted in PCR-negative patients ($p < 0.05$). Hemodynamic parameters, including blood pressure, heart rate, and oxygen saturation, were similar between groups.

Laboratory findings demonstrated both similarities and distinctions. PCR-positive patients had significantly lower platelet counts and a higher frequency of lymphopenia compared with PCR-negative patients ($p < 0.05$). An accelerated erythrocyte sedimentation rate was observed in the majority of participants. Blood biochemistry revealed elevated glucose, fibrinogen, and C-reactive protein (CRP) levels in both groups. Mean Ca^{2+} values were below normal, whereas K^{+} levels were elevated. Elevated urea levels were observed predominantly in PCR-positive patients, whereas γ-glutamyl transpeptidase was increased in PCR-negative patients. AST elevation was reported in 42.2% of PCR-positive and 33.0% of PCR-negative patients. Both groups exhibited prolongation of prothrombin time (PT) and activated partial thromboplastin time (aPTT), accompanied by a slight decrease in the prothrombin index.

Hospitalization outcomes showed no significant differences in the length of stay between groups. However, PCR-negative patients were more frequently discharged with conditional improvement ($p < 0.05$), whereas PCR-positive patients were significantly more likely to have an unchanged general condition or death ($p < 0.05$).

CONCLUSION

In summary, COVID-19 patients with negative PCR results demonstrate clinical and laboratory changes largely identical to those observed in PCR-positive patients. These findings suggest that in cases where the primary site of viral infection is the lower respiratory tract, and pneumonia represents a dominant clinical manifestation, nasopharyngeal PCR testing may yield false-negative results during disease progression.

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