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Comparison of Clinical and Laboratory Findings and Computed Tomography Findings of SARS-CoV-2 Infected Patients Followed-up in a Tertiary University Hospital

Üçüncü Basamak Bir Üniversite Hastanesinde Takip Edilen SARS-CoV-2 Enfeksiyonlu Olguların Klinik ve Laboratuvar Bulguları ile Bilgisayarlı Tomografi Bulgularının Karşılaştırılması

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Abstract

Introduction: The severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) infection is a pandemic, a major global health concern. In this study, it was aimed to compare the clinical, laboratory and computed tomography (CT) findings of patients with SARS-CoV-2 infection followed up in our hospital.

Materials and Methods: In this study, reverse transcriptase-polymerase chain reaction (RT-PCR) positive patients hospitalized between 01.03.2020-31.05.2020 were retrospectively analyzed. Computed tomography images of the patients were grouped as typical, indeterminate, atypical, and no pneumonia based on the Radiological Society of North America. After recording patient information on SPSS, clinical and laboratory findings of the patients were analyzed by comparing them to CT findings.

Results: Among 237 RT-PCR positive patients, 104 (43.9%) were female and 133 (56.1%) were male. The mean age of the patients was 50.46±17.26 (18-92) years and the mean symptom onset time of the patients was 3.75±2.72 (median: 3) days. Eighty-seven of the patients (36.7%) had contact stories. Twenty-three (9.7%) patients were healthcare professionals. Of the patients, 49.8% had a comorbid disease. The most common referral complaint was cough with 66.7%. The most common treatment that patients received was hydroxychloroquine (96.2%). Anemia was detected in 61 (25.7%) patients, leukopenia in 104 (43.9%), lymphopenia in 25 (10.5%) and thrombocytopenia in 14 (5.9%). High rates were detected for C-reactive protein (CRP) in 221 (84%) patients, ferritin in 190 (80.2%) patients, D-dimer in 144 (60.8%) patients, fibrinogen in 147 (62%) patients and sedimentation (SED) in 172 (72.6%) patients. Headache was detected higher in patients with typical pneumonia findings in thorax CT (p=0.006). A statistically significant difference wasn't detected between other symptoms and CT findings. Leukocyte and neutrophil counts, SED, CRP, ferritin, D-dimer, fibrinogen, aspartate aminotransferase, and lactate dehydrogenase (p=0.001) levels were observed to be higher in patients with typical pneumonia findings on thorax CT.

Conclusion: Some laboratory parameters, especially acute phase reactants, were found to be higher in patients with typical pneumonia on thorax CT compared to patients without pneumonia. In this viral infection, patients should be evaluated together with clinical, laboratory and CT findings.

Keywords: SARS-CoV-2, clinic findings, laboratory parameters, thorax CT

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Öz

Giriş: Şiddetli akut solunum sendromu-koronavirüs-2 (SARS-CoV-2) enfeksiyonu pandemisi büyük bir küresel sağlık sorunudur. Bu çalışmada hastanemizde takip edilen SARS-CoV-2 enfeksiyonlu olguların klinik ve laboratuvar bulguları ile bilgisayarlı tomografi (BT) bulgularının karşılaştırılması amaçlanmıştır.
Gereç ve Yöntem: Bu çalışmada 01.03.2020-31.05.2020 tarihleri arasında serviste takip edilen revers transkriptaz-polimeraz zincir reaksiyonu pozitif hastalar retrospektif olarak incelendi. Hastaların BT görüntüleri Kuzey Amerika Radyoloji Derneği Uzman Fikir Birliği Beyanı sınıflamasına göre tipik, belirsiz, atipik ve "pnömoni yok" şeklinde gruplandırıldı. Hasta bilgileri SPSS'ye kaydedildikten sonra hastaların klinik ve laboratuvar bulguları ile BT bulguları karşılaştırılarak analiz edildi.
Bulgular: Revers transkriptaz-polimeraz zincir reaksiyonu pozitif 237 hastanın 104'ü (%43,9) kadın, 133'ü (%56,1) erkekti. Hastaların yaş ortalaması 50,46±17,26 (18-92) yıl, hastaların semptom başlangıç süresi ortalaması 3,75±2,72 (medyan: 3) gün idi. Hastaların 87'sinde (%36,7) temas öyküsü mevcuttu. Yirmi üç (%9,7) hasta sağlık personeliydi. Hastaların %49,8'inde komorbid hastalık mevcuttu. En sık başvuru şikayeti %66,7 ile öksürüktü. Hastaların en sık aldığı tedavi %96,2 ile hidroksiklorokindi. Anemi 61 (%25,7), lökopeni 104 (%43,9), lenfopeni 25 (%10,5), trombositopeni 14 (%5,9) hastada saptandı. C-reaktif protein (CRP) 221 (%84), ferritin 190 (%80,2), D-dimer 144 (%60,8) fibrinojen 147 (%62), Sedimantasyon (SED) 172 (%72,6) hastada yüksek saptandı. Toraks BT'de tipik pnömoni tutulumu olan hastalarda baş ağrısı daha fazlaydı (p=0,006). Diğer semptomlarla BT bulguları arasında istatistiksel olarak anlamlı fark saptanmadı. Toraks BT'sinde tipik pnömoni tutulumu olan hastalarda lökosit ve nötrofil sayılarının; SED, CRP, ferritin, D-dimer, fibrinojen, aspartat aminotransferaz ve laktat dehidrogenaz düzeylerinin (p=0,001) daha yüksek olduğu görüldü.
Sonuç: Toraks BT'de tipik pnömonisi olan olgularda pnömonisi olmayan olgulara göre başta akut faz reaktanları olmak üzere bazı laboratuvar parametrelerinin daha yüksek olduğu saptandı. Bu viral enfeksiyonda hastalar klinik, laboratuvar ve BT bulgularıyla birlikte değerlendirilmelidir.
Anahtar Kelimeler: SARS-CoV-2, klinik bulgular, laboratuvar parametreler, toraks BT

Introduction

In December 2019, patients with pneumonia of unknown origin were detected in Wuhan city of Hubei province of China, and similar patients spread to other provinces of China and then to the whole world, causing a pandemic[1]. It was determined that the cause of this pandemic was a new coronavirus and it was named Severe Acute Respiratory Syndrome-Coronavirus (SARS-CoV) because of its similarity to SARS-CoV-2[2].

The World Health Organization (WHO) defined the name of the disease as Coronavirus disease-2019 (COVID-19)[3]. On January 30, 2020, WHO declared COVID-19 as a global emergency[4]. Severe Acute Respiratory Syndrome-Coronavirus-2 infection typically presents with fever, dry cough, fatigue and can progress to shortness of breath. The source of infection is people carrying this virus. Even during the incubation period, detection of infection and early diagnosis of the disease are very important to prevent the spread of the virus[5]. Symptoms of COVID-19 infection overlap with other viral infections, making clinical diagnosis difficult[6]. Although the most commonly used method in the diagnosis of COVID-19 is "real-time" reverse transcriptase-polymerase chain reaction (RT-PCR), false negative results may be encountered due to the low sensitivity of the test. For this reason, patients should be evaluated together with clinical, laboratory and thoracic computed tomography (CT) findings[7-10]. Computed tomography is readily available and can be used to quickly screen patients[5].

Clinical and imaging findings are particularly important in the early stage of COVID-19 infection. Confirmation of the diagnosis, determination of the severity of the disease and early initiation of treatment determine the prognosis[11]. The first patient in our country was reported on March 11, 2010. Patients have also been encountered in Konya, and these patients are still being followed up and treated in our hospital[12]. The aim of this study was to compare the clinical, laboratory and CT findings of patients with SARS-CoV-2 followed in our hospital in order to guide the rapid diagnosis, treatment, isolation and prevention of mortality.

Materials and Methods

Approval for the study was obtained from the Ministry of Health and the Ethics Committee of the Necmettin Erbakan University Meram Medical Faculty (decision no: 2020/2693). In this prospective cross-sectional study, RT-PCR positive adult patients who were hospitalized and treated in wards reserved for patients with COVID-19 between 01.03.2020 and 31.05.2020 were examined. Patient information was obtained from the hospitalization files of the patients in the archive and the hospital automation system. Demographic characteristics of patients (age, gender), clinical findings (fever, cough, sputum, shortness of breath, etc.), hemogram (Hg), sedimentation (SED) rate, C-reactive protein (CRP), D-dimer, ferritin, aspartate aminotransferase (AST), alanine aminotransferase (ALT), fibrinogen, and procalcitonin (PCT) values were recorded.

Even if the posteroanterior chest X-ray of the patients was normal, if there were no contraindications such as pregnancy, CT images were obtained after the onset of symptoms, and they were evaluated by two radiologists experienced in thoracic radiology. All thorax CT scans were performed with the Somatom Drive (Siemens Healthineers) device. Non-contrast CT images

were acquired for both lungs in all patients, starting from the apex and including the basal area. Scanning parameters were as follows: Tube voltage: 120 Kv, tube current value: 50-100 mAs, pitch: 0.6, matrix: 512x512, section thickness: 3mm, section thickness obtained by reconstruction: 1.5 mm. Images were evaluated in the lung parenchyma window (window width: 1000-1500 HU, window level: 700/ 550 HU) and mediastinal window (window width: 300-350 HU, window level: 30-40 HU) on the Syngo Via workstation.

Computed tomography images were grouped as typical, indeterminate, atypical, and no pneumonia according to the Radiological Society of North America Expert Consensus Statement classification for the reporting of thorax CT findings of COVID-19 infectious disease.

Typical appearance; those with peripheral, bilateral ground-glass opacities (BCO) (alone or with consolidation, or with intralobular lines), multifocal BCO with rounded morphology (alone or with consolidation or with intralobular lines), inverted halo sign, or other signs of organizing pneumonia (late-stage).

Indeterminate appearance; absence of typical findings and the presence of non-peripheral, multifocal, diffuse, round-shaped, perihilar or unilateral BCO or consolidation with no specific distribution and a small number of very small BCOs that were not round and did not show peripheral distribution.

Atypical appearance; absence of typical or vague findings and the presence of isolated lobar or segmental consolidation without BCO, discrete small nodules (centrilobular, budding tree), cavitation, uniform septal thickening, and pleural effusion.

Negative for pneumonia; no CT findings suggestive of pneumonia[13].

Statistical Analysis

All data were statistically analyzed using the Statistical Package for the Social Sciences 22. Shapiro-Wilk test was used to evaluate normal distribution of the groups. Descriptive findings were shown as mean and standard deviation for continuous variables, and as percentages for categorical variables. Chi-square was used in the analysis of categorical variables, and the ANOVA analysis of variance test was used in the comparison of multiple groups with normal distribution. Kruskal-Wallis H analysis of variance test was used to test the significance of the difference between the means of the groups that did not show normal distribution. The Mann-Whitney U test with Bonferroni correction was used to identify the group from which the difference originated. $P<0.05$ was considered statistically significant in all comparisons.

Results

There were 1.870 inpatients with probable COVID-19 who were treated in the wards reserved for patients with COVID-19. Of the 237 RT-PCR positive patients, 104 (43.9%) were female and 133 (56.1%) were male. The mean age of the patients was 50.46±17.26 years (18-92), the mean age of the female patients was 52.5±16.32 years, and the mean age of the male patients was 48.87±17.86 years. The mean duration of symptom onset of the patients was 3.75±2.72 (median: 3) days. There was no difference between the duration of symptom onset and gender ($p=0.19$). One hundred and ten of the patients (46.4%) had no contact history, and 87 (36.7%) had a contact history. Reverse transcriptase-polymerase chain reaction positivity was detected in 40 (16.9%) patients who were isolated in the dormitory after coming from Umrah. Twenty three (9.7%) patients were health personnel (9 nurses, 7 physicians, 3 caregivers, 1 dentist, 1 cleaning personnel, 1 laboratory technician, 1 pharmacist). A comorbid disease was found in 118 (49.8%) of the patients, and more than one comorbid disease [most frequently the combination of diabetes mellitus (DM) and hypertension (HT)] was detected in 46.6%. The comorbid disease distribution of the patients is shown in Table 1. The most common complaint of patients (66.7%) was cough. The distribution of complaints is shown in Table 2, and laboratory parameters are shown in Table 3.

Anemia was found in 61 (25.7%) of the patients, leukopenia in 104 (43.9%), lymphopenia in 25 (10.5%), and thrombocytopenia in 14 (5.9%) patients. C-reactive protein was found to be between 5-10 mg/l in 23 (9.7%) patients, 11-40 mg/l in 39 (16.5%) and >40 mg/l in 33 (13.9%) patients. Ferritin was found to be 151-500 ng/ml in 69 (29.1%) patients and >500 ng/ml in 17 (7.2%) patients. D-dimer was found to be 243-1000 µg/l in 36 (15.2%) of the patients, and >1000 µg/l in 4 (1.7%) patients.

Table 1. Comorbid disease status

	n	%
Multiple diseases	55	46.6
Respiratory disease (asthma, COPD)	17	14.4
Diabetes mellitus	12	10.1
Hypertension	11	9.3
Malignancy	8	6.8
Cardiac problem	7	6
Neurological disorder (Alzheimer's disease, CVA)	5	4.2
Gastrointestinal disease (gastritis, GERD, peptic ulcer)	3	2.6

COPD: Chronic obstructive pulmonary disease, CVA: Cerebrovascular accident, GERD: Gastroesophageal reflux disease

Fibrinogen was high in 43 (18.1%) patients, SED was 20-100 mg/h in 68 (28.7%) patients, and >100 mg/h in 123 (56.1%) patients. Patients most frequently used hydroxychloroquine (96.2%). The treatments used are shown in Table 4.

Thorax CT was performed in 215 of 237 RT-PCR positive patients, and headache was detected more frequently in patients with typical lung involvement on CT suggestive of pneumonia (chi-square: 13.33, p=0.006). Lung involvement was not observed in 45.6% of the patients on thorax CT, and typical in 41.9%, atypical in 9.3%, and indeterminate in 3.2%. A comparison of patient symptoms and CT findings are shown in Table 5.

White blood cell and neutrophil counts, SED, CRP, ferritin, D-dimer, fibrinogen, AST, and lactate dehydrogenase (LDH) values of the patients were found to be statistically significantly higher (p=0.001 in all) as lung involvement became evident on thorax CT. The comparison of laboratory parameters and CT findings of the patients is shown in Table 6.

Table 2. Complaint distribution of patients

Symptom	n	%
Cough	158	66.7
Fever	125	52.7
Shortness of breath	108	45.6
Weakness	99	41.8
Myalgia	95	40.1
Throat ache	59	24.9
Sputum	50	21.1
Headache	41	17.3
Chest pain	31	13.1
Diarrhea	28	11.8
Nausea	27	11.4
Loss of taste	27	11.4
Loss of smell	23	9.7
Vomiting	17	7.2
Abdominal pain	16	6.8

Table 3. Patients' laboratory parameters

Hg	Mean±SD	13.83±1.94 g/dl
WBC		7709.4±3744.5/µl
Neutrophil		5312.3±3491.7/µl
Lymphocyte		1749.6±1008.12/µl
Platelets		234927.6±168531.1/µ
SED		29.14±24.64 mg/h
Fibrinogen		351.1±133.2 mg/dl
LDH		244.5±129.3 u/l
CRP	Median (min-max)	9.3 (0.3-359.4) mg/l
Ferritin		122.6 (3.6-4698) ug/ml
D dimer		138.5 (0.63-3971) µg/l
AST		20.9 (5.7-565) u/l
ALT		17.2 (5-356) u/l
CPK		85 (15-2403) u/l
PCT		0.05 (0.02-340) ug/l

SD: Standard deviation, Hg: Hemoglobin, WBC: White blood cell, SED: Sedimentation, CRP: C-reactive protein, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, LDH: Lactate dehydrogenase, CPK: Creatinine phosphokinase, PCT: Procalcitonin, min-max: Minimum-maximum

Discussion

The SARS-CoV-2 pandemic, which affects the whole world and our country, brings economic, social and psychological problems as well as morbidity and mortality. Although vaccination in the fight against the pandemic has started and is continuing rapidly in our country, the spread of mutated strains prevents us from answering the question of when the pandemic will end.

The COVID-19 disease can be seen at any age[14]. In some studies, it was found that the age distribution of adult patients was between 25-89 years and most of these patients were between 35-55 years[15]. In another study, the median age of 41 patients with COVID-19 who were hospitalized and followed up was 49 (age range 41-58) years[16]. In a study involving 44,672 patients in Hubei province, it was found that most of the patients were in the age range of 30-69 (77.8%)[17]. In a study in which 42 patients were examined in Wuhan, the mean age of the patients was found to be 49.5±14.1 (26-75) years[11]. In the study conducted by Sümer et al.[18] in Konya, the mean age of 149 patients with definitive COVID-19 was found to be 49.3±17.6 years. In our study, the mean age of the patients was 50.46±17.26 (18-92) years.

In the study of Li et al.[19] (59%) and in the study of Huang et al.[16] (73%), most of the patients were found to be male. In a study involving 44.672 patients in Hubei province, 51.4% of the patients were found to be male[17]. In a study in which 42 patients were examined in Wuhan, 25 of the patients were male and 17 were female[11]. In the study conducted by Sümer et al.[18] in Konya, 82 (55%) of 149 patients with definitive COVID-19 were female and 67 (45%) were male. In our study, it was found that most of the patients (56.1%) were male.

Table 4. Treatment of patients

	n	%
Hydroxychloroquine	228	96.2
Azithromycin	121	51.1
Oseltamivir	111	46.8
Favipravir	23	9.7
C vitamin	7	3
Low molecular weight heparin	5	2.1
Ceftriaxone	3	1.3

Table 5. Comparison of patients' symptoms and computed tomography findings

	Total	No pneumonia		Atypical		Indeterminate		Typical		p value
	n (100%)	n=98	%	n=20	%	n=7	%	n=90	%	
Cough	150	69	46	11	7.3	4	2.7	66	44	0.368
Fever	117	57	48.7	12	10.3	3	2.6	45	38.5	0.595
Shortness of breath	103	43	41.7	13	12.6	5	4.9	42	40.8	0.205
Weakness	91	39	42.9	11	12.1	3	3.3	38	41.8	0.665
Myalgia	90	37	41.1	8	8.9	2	2.2	43	47.8	0.474
Throat ache	52	31	59.6	4	7.7	2	3.8	15	28.8	0.111
Sputum	46	19	41.3	4	8.7	2	4.3	21	45.7	0.879
Headache	37	13	35.1	0	0	0	0	24	64.9	**0.006**
Chest pain	29	12	41.4	1	3.4	1	3.4	15	51.7	0.542
Diarrhea	25	12	48	1	4	0	0	12	48	0.559
Nausea	25	10	40	3	12	0	0	12	48	0.662
Loss of taste	25	7	28	2	8	0	0	16	64	0.102
Loss of smell	21	5	23.8	2	9.5	0	0	14	66.7	0.086
Vomiting	15	4	26.7	2	13.3	0	0	9	60	0.342
Abdominal pain	14	3	21.4	1	7.1	0	0	10	71.4	0.132

Table 6. Comparison of patients' laboratory parameters and computed tomography findings

	Total n(%)	No pneumonia n=98(%)	Atypcial n=20(%)	Indeterminate n=7(%)	Typical n=90(%)	p value
Hg g/dl	13.9 (6,18)	14 (8,17.9)	12.8 (9.2,17.2)	13.3 (10.1,18)	13.7 (6,17.2)	0.032
WBC/µl	6690 (2350,37180)	7485 (3040,15280)	9110 (4710,21630)	11050 (3340,35390)	5960 (2350,17830)	**0.001**
Neutrophil	4480 (1140,35390)	4800 (1700,13660)	7035 (2630,19300)	6860 (3340,35390)	3790 (1440,15800)	**0.001**
Lymphocyte	1600 (230,5520)	1840 (330,5040)	1275 (230,4440)	1680 (450,4810)	1405 (420,4830)	0.043
Platelets	220000 (26000,256000)	227500 (64000,387000)	2345000 (110000,394000)	242000 (138000,651000)	195000 (83000,256000)	0.013
SED mg/h	22 (2,122)	15 (2,88)	38.5 (4,122)	30 (4,98)	28.5 (3,104)	**0.001**
CRP mg/l	9.3 (0,359)	5.6 (0,359)	33.6 (1.8,214)	54 (1,282.5)	15.7 (0.9,168.9)	**0.001**
Ferritin ng/ml	122.6 (3.6,4698)	82.6 (4,1328)	131.7 (51,892)	307.1 (46.2,692.4)	195.4 (10.3,4698)	**0.001**
D dimer µg/l	138 (0.6,3971)	108 (3,3971)	159.5 (53,1004)	728 (0.6,2486)	172 (23,2997)	**0.001**
Fibrinogen mg/dl	324 (23,1000)	298 (181,1000)	418 (175,812)	382 (266,534)	351 (96,665)	**0.001**
AST u/l	20 (5.7,565)	18.5 (5.7,62.6)	19 (8,36.5)	27.7 (12.7,187.3)	22.7 (8.4,116)	**0.001**
ALT u/l	17.2 (0.1,356)	15.3 (5.3,139)	16.5 (0.1,35)	18.2 (9.2,76.7)	20.8 (5,112)	0.019
LDH u/l	213 (55,1600)	199.5 (136,673)	227 (160-430)	291 (235,555)	234 (55,626)	**0.001**
CPK u/l	85 (15,2403)	90 (33,559)	62 (24,278)	85 (25,680)	83 (21,2403)	0.168
PCT ug/l	0.05 (0.1,340)	0.055 (0,6.9)	0.071 (0.03,85)	0.06 (0.04,340)	0.06 (0.1,1.16)	0.158

All values are given as median (minimum, maximum).

Hg: Hemoglobin, WBC: White blood cell, SED: Sedimentation, CRP: C-reactive protein, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, LDH: Lactate dehydrogenase, CPK: Creatinine phosphokinase, PCT: Procalcitonin

In the latest guidelines in China, health authorities stated that the average incubation period of COVID-19 was 7 days and ranged between 2-14 days[20]. In our study, the mean duration of symptom onset of the patients was found to be 3.75±2.72 (median: 3) days.

The COVID-19 infection is transmitted by large droplets produced during coughing and by sneezing of symptomatic patients. It can be transmitted from asymptomatic people and it can be transmitted from symptomatic patients before the onset of symptoms[14]. In the Chinese centers for disease control and

prevention study, it was found that 31.974 (85.8%) patients had a Wuhan-related contact, 5.295 (14.2%) had no contact, and 7.403 had an unknown contact[17]. In our study, 46.4% of the patients had no contact history and 36.7% of the patients had a contact history. Forty (16.9%) patients were found to be positive after coming from Umrah while they were in isolation in the dormitory.

In a study involving 44.672 patients in Hubei province, 3.8% of the patients and in the study of Sümer et al.[18], 7.4% of the patients with positive SARS-CoV-2 RT-PCR test results were found to be healthcare workers[17]. In our study, it was determined that 9.7% of the patients were healthcare personnel.

In a study conducted in China, there was no sufficient information about comorbidity in 23.690 (53%) of 44.672 patients, 15.536 (74%) had no comorbidity, 2,683 (12.8%) had HT, 1.102 (5.3%) had DM, 873 (4.2%) had cardiovascular disease, 511 (2.4%) had chronic respiratory disease, 107 (0.5%) had malignancy[17]. In another study conducted in China, a comorbid disease was found in 32% of 41 patients with COVID-19 who were hospitalized and followed up, DM in 20%, HT in 15%, and cardiovascular disease in 15%[16]. In the study of Sümer et al.[18], 37 (24.8%) of the patients were found to have HT, 26 (17.4%) DM and 16 (10.7%) cardiovascular disease, and 55 (36.9%) had no underlying disease. HT and DM were found to be the most common underlying diseases. In our study, 49.8% of the patients had comorbidity, and more than one disease (most commonly the combination of DM and HT) was found in 46.6%.

Clinical findings in COVID-19 can range from the asymptomatic form to the form leading to acute respiratory distress syndrome and multi-organ dysfunction. In the study of Chen et al.[21] in 99 patients in China, the most common symptoms at the onset of the disease were fever (83%), cough (82%), shortness of breath (31%), myalgia (11%) and headache (8%). Fever (98%), cough (76%), dyspnea (55%), myalgia or fatigue (44%) were found in 41 COVID-19 patients who were hospitalized and followed up[16]. In a study in which 42 patients were examined in Wuhan, fever was found in 86%, cough in 64%, fatigue in 33%, diarrhea in 26%, and shortness of breath in 19%[11]. In the study of Sümer et al.[18], the most common symptom was cough (46.3%). Fever (29.5%), sore throat (27.5%), weakness (26.8%), myalgia (21.5%), arthralgia (18.8%), headache (16.8%) and shortness of breath (10.7%) were other common symptoms[18]. In our study, cough was the most common in 66.7% of the patients, and fever (52.7%), shortness of breath (45.6%), and fatigue (41.8%) were other symptoms.

In the study of Sümer et al.[18], the most frequently used drug was hydroxychloroquine in 149 (100%) patients. In our study, hydroxychloroquine was used in 96.2% of the patients.

Non-RT-PCR laboratory tests are non-specific in COVID-19. The white blood cell (WBC) count is normal or low. There may be lymphopenia and mild thrombocytopenia. C-reactive protein and SED are usually high. But PCT levels are usually normal. A high PCT level may indicate a bacterial coinfection. Alanine aminotransferase, AST, D-dimer, CPK and LDH may be high. Ferritin is an acute-phase reactant and high serum ferritin level has been associated with organ damage to a greater extent in patients with severe COVID-19[22,23]. Elevated levels of ESR, CRP, and LDH indicate the degree of inflammation and extensive tissue damage, and are frequently seen in viral pneumonia. Leukopenia (25%), lymphopenia (25%), and increased AST (37%) were observed in 41 patients with COVID-19 who were hospitalized and followed up[16]. In a study in which 42 patients were examined in Wuhan, leukocytosis was found in 27%, lymphopenia in 49%, increase in CRP level in 84%, increase in SED level in 46%, and increase in LDH level in 58%[11]. In the study of Sümer et al.[18], 8.1% of the patients had leukopenia, 4.7% leukocytosis, 22.8% lymphopenia, 16.1% thrombocytopenia, and 0.7% thrombocytosis. The D-dimer level was found to be <500 µg/l in 71.1% of the patients, 500-1000 µg/l in 21.5%, and >1000 µg/l in 7.4% of the patients. Lactate dehydrogenase levels were found to be high in 49% of the patients. The CRP level was found to be between 8-40 mg/lt in 27.5% of the patients and >40 mg/lt in 2.7% of the patients. The fibrinogen level was found to be <200 mg/dl in 16.4% of the patients, 200-400 mg/dl in 76.4%, and >400 mg/dl in 7.3%. In our study, anemia was found in 25.7% of the patients, leukopenia in 43.9%, lymphopenia in 10.5%, and thrombocytopenia in 5.9% of the patients. C-reactive protein was found to be 11-40 mg/l in 16.5% of patients and >40 mg/l in 13.9%. D-dimer was found to be 243-1000 µg/l in 15.2% of patients and >1000 µg/l in 1.7%. Fibrinogen was found to be elevated in 18.1% of patients, SED was found to be elevated in 72.6% of patients and ferritin was found to be elevated in 36.3% of patients.

In a study examining 42 patients in Wuhan, no correlation was found between fever and fatigue and CT findings[11]. In the study of Sümer et al.[18], the difference between patients with and without pneumonia and the difference between patients with mild pneumonia, patients with moderate pneumonia and patients without pneumonia in terms of the presence of fever were found to be significant in favor of those without pneumonia. The difference between patients with and without pneumonia in terms of arthralgia, myalgia and loss of taste was found to be statistically significant in favor of those without pneumonia. In the study of Ural et al.[24], no difference was found between the presence of headache, myalgia, sore throat, diarrhea, fever, taste disorder, anosmia and thorax CT findings, but a relationship was found with shortness of breath. It was found that dyspnea was milder in patients with mild or no thorax CT findings, and more in those with significant lung involvement. In our study, headache was found to be more common in patients with typical lung involvement suggestive

of pneumonia in Thorax CT (p=0.006), and no difference was found between other symptoms and CT findings (p>0.05).

In the study of Xiong et al.[11], no relationship was found between WBC count and CT parameters. It was found that SED, CRP, and LDH showed a significant positive correlation with severe pneumonia detected in the first CT. In the study of Sümer et al.[18] D-dimer and CRP levels were found to be higher in patients with pneumonia than those without. In the study of Ural et al.[24], while no relationship was found between the presence of lung involvement findings in thoracic CT (ground-glass opacity and/or consolidation) and leukocyte count, neutrophil count, Hg level, platelet count, creatinine, ALT, AST, D-Dimer, PCT, ferritin, lactate and LDH; there was a relationship between the presence of lung involvement findings in thoracic CT and CRP and lymphocyte count. An increase in CRP level and lymphopenia were found to be higher in patients with significant involvement on thorax CT. In our study, leukocyte and neutrophil counts, and the levels of SED, CRP, ferritin, D-dimer, fibrinogen, AST, and LDH were found to be higher (p=0.001) in patients with typical lung involvement in thorax CT suggestive of pneumonia.

Study Limitations

This study was conducted in a single center and includes patient data from March-May 2020, the beginning of the pandemic.

Conclusion

According to the results of our study, the most common (45.6%) finding on Thorax CT was "no pneumonia". In this viral infection, a relationship was found between typical lung involvement on thorax CT and some laboratory parameters, especially acute phase reactants. Thorax CT findings were important in the diagnosis of COVID-19 infection.

Ethics

Ethics Committee Approval: Approval for the study was obtained from the Ministry of Health and the Ethics Committee of the Necmettin Erbakan University Meram Medical Faculty (decision no: 2020/2693).

Informed Consent: Retrospective study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.K.K., B.K., İ.E., H.V., A.Z., Ş.Y., S.D., C.K., P.D.Y., N.P., B.F., M.Ö., Concept: E.K.K., İ.E., Design: E.K.K., İ.E., Data Collection or Processing: E.K.K., T.K., Analysis or Interpretation: M.U., E.K.K., Literature Search: E.K.K., B.K., H.V., Writing: E.K.K., P.D.Y., N.P., İ.E., B.K.

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