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First remarkable findings in comparison of patients in Siirt / Turkey in novel coronavirus (Covid-19) pandemic

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Abstract

In December 2019, a novel coronavirus (Covid-19) associated with human to human transmission and severe human infection has been recently reported from the city of Wuhan in China Hubei Province. The first Covid-19 in Turkey comparative findings of their patients can help spread the infection, early diagnosis, treatment and control. This study in Turkey Siirt State Hospital in Covid-19 diagnosed patients and 12 healthy normal consists of 12 patients. Data from electronic medical records were taken retrospectively and patient and control group data were compared statistically. Statistically decreased lymphocyte (1.23 ± 0.66), WBC (5.00 ± 1.50), neutrophil (3.32 ± 1.77), platelets (175.08 ± 44.18) in Covid-19 patients compared to the control group and increased D-Dimer (595.08 ± 185.87), ferritin (236.31 ± 50.36), CRP (12.43 ± 4.31), lactate (1.37 ± 0.39), CK (189.50 ± 63.66) levels, other clinical findings and CT images were found to be compatible with Covid-19. This study is the first comparative study on pandemic Covid-19 in Siirt/Turkey. These prognostic parameters are important for a specific clinical diagnosis, which may contribute to reflect the evolution of CT findings and the severe course of the disease and the worst clinical picture.

Keywords: Computed tomography, Coronavirus, Covid-19, laboratory tests, pandemic

Introduction

Coronaviruses are enveloped and single strand RNA viruses, meaning their genetic material consists of an RNA strand, and each viral particle is wrapped in a protein envelope. RNA viruses have a different feature. In the RNA replication process, they typically cannot correct errors that occur during replication because they do not have error correction mechanisms that cells use when copying DNA. As the amount of base copied by these pathogens, which are deprived of error correction ability during replication, increases, the probability of making errors increases and each error comes with a new mutation. Some of these mutations can also provide new features to the virus, such as the ability to infect new cell types, even new types. Coronaviruses can be transmitted from person to person through the droplets that infected people throw out when they breathe, cough or sneeze. Covid-19 binds through the human ACE 2 receptor and exerts its effect. In this way, patients infected with Covid-19 without a definitive and effective treatment face severe pneumonia and high mortality. With the binding of Covid-19 to ACE 2 and the depletion of ACE 2, the ACE 2 / Ang / Mas receptor pathway is inhibited. The RAS system is then destabilized and leads to an exacerbation of severe acute pneumonia [1]. No solution has yet been found to prevent and treat the Covid-19 pandemic, with a rapid increase in the number of cases and deaths worldwide. Over 5 million people in the world were infected by Covid-19 till March 31, 2020. The number of deaths from Covid-19 approached to 333.000. 154.000 people in Turkey were infected by Covid-19. The number of deaths from Covid-19 approached to 4.250. Rapid diagnosis of Covid-19 is essential in order to implement therapeutic and infection prevention measures. In this study, biochemical and radiographic findings of Covid-19 pneumonia spreading to different cities in Turkey were examined. Comparative findings on patients can assist in the early diagnosis, treatment and control of the spread of infection.

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Material and Methods

Laboratory Analysis

Siirt University Non-invasive Clinical Research Ethics Committee (No. 2020/03/01, date 08.04.2020) with the decision of Turkey's Siirt Education and Research Hospital in Covid-19 diagnosed 12 patients and nomal healthy 12 data from electronic medical records in this study of patients were retrospectively reviewed. Epidemiological and clinical features of the patients were recorded by keeping their names confidential by taking voluntary forms by the patient or their guardians. Covid-19 was used with reverse transcription polymerase chain reaction (rRT-PCR) performed in infection respiratory samples with proven reliability [2-4]. Serum biochemistry parameters were measured with suitable commercial kits using an autoanalyzer device colorimetrically. D-Dimer was performed in coagulation device and complete blood count using hemogram device.

Clinical Findings

Regarding the complications shown in Table 1, common complications in severe cases and the demographic and clinical findings observed in the normal control group indicate the presence of patients' acute respiratory distress syndrome, and CT images and clinical findings were reviewed. 3 ground glass images showing the relationship between CT images and clinical findings show the acute respiratory distress syndrome of the disease (Figure 1).

a. Covid-19 PCR is positive and asymptomatic patient in terms of respiratory distress syndrome,

b. Covid-19 PCR is positive and symptomatic patient,

c. Covid-19 PCR is positive, symptomatic patient, patient with widespread infiltration areas and bilateral involvement in terms of respiratory distress syndrome,

Table 1. Demonstrating the relationship between the disease and gender/symptoms.

		There is disease (n=12) %	No disease (n=12) %	p-Value
Gender	Male	50	58.3	[a]p>0.05
	Female	50	41.7	
Diabetes	available	16.7	16.7	[b]p>0.05
	not available	83.3	83.3	
Hypertension	available	8.3	8.3	[b]p>0.05
	not available	91.7	91.7	
Chronic Kidney Disease	not available	100	100	-
Cardiovascular	not available	100	100	-
Pulmonary Disease	available	16.7	0	[b]p>0.05
	not available	83.3	100	
Cigarette	available	25	33.3	[b]p>0.05
	not available	75	66.7	
Alcohol	not available	100	100	-
Thorax CT	available	41.7	0	[b]p<0.05
	not available	58.3	100	
Fever	available	41.7	8.3	[b]p>0.05
	not available	58.3	91.7	
Shortness of breath	available	33.3	16.7	[b]p>0.05
	not available	66.7	83.3	
Cough	available	66.7	66.7	[b]p>0.05
	not available	33.3	33.3	
Headache	available	41.7	16.7	[b]p>0.05
	not available	58.3	83.3	
Body Pain	available	50	25	[b]p>0.05
	not available	50	75	
Nausea and Vomiting	available	8.3	0	[b]p>0.05
	not available	91.7	100	

[a] Pearson Chi-Square
[b] Fisher's Exact Test

Statistics

Statistical analyzes were made in computer environment using SPSS Version 22.0. The 2x2 chi-square test was used to demonstrate the relationship between the disease and gender/ symptoms. The Pearson Chi-Square test was used when the expected value was above 5, while the Fisher's Exact Test was used when the expected value was below 5. Independent t-Test was used to determine the significance of differences between disease and biochemical parameters. Data are shown with mean ± standard deviation and median value. When the p value is less than 0.05, the difference between the data is considered statistically significant.

Results

The first major contribution that laboratory data can provide in diagnosing Covid-19 infection is the timely and timely examination of the biochemical findings of the disease. Staging Covid-19 on cases, RT-PCR tests in monitoring its prognosis indicate the course of infection, as well as the possible presence of viremia. This study also includes evaluating disease severity and monitoring the status of acute respiratory distress syndrome (ARDS) by including many other laboratory test findings.

Statistically decreased lymphocyte (1.23 ± 0.66), WBC (5.00 ± 1.50), neutrophil (3.32 ± 1.77), platelets (175.08 ± 44.18) in Covid-19 patients compared to the control group and increased D-Dimer (595.08 ± 185.87), ferritin (236.31 ± 50.36), CRP (12.43 ± 4.31), Lactate (1.37 ± 0.39), CK (189.50 ± 63.66) levels and other clinical findings were found to be compatible. Hemoglobin, hematocrit, ALT, sodium, potassium levels were lower than the control group, urea, keratin, AST, troponin, LDH levels were high, but not statistically significant (Figure1).

Each of these prognostic parameters is important for patient-specific CT findings and a specific clinical diagnosis that can contribute to reflect the severity of the disease and evolution towards more unfavorable clinical pictures (Table 2).

In order to identify CT findings and characteristics, chest CT images of patients were compared in figure 1.

Table 2. The effect of the disease on blood parameters

Parameters	There is disease (n=12)	No disease (n=12)	No disease p-Value
WBC	5.00±1.50	7.28±1.97	p<0.05
LYMPHOCYTE	1.23±0.66	2.01±0.51	p<0.05
HGB	13.49±1.44	14.22±2.35	p>0.05
HTC	43.36±4.06	46.00±7.18	p>0.05
NEUTROPHIL %	3.32±1.77	4.65±1.95	p<0.05
PLT	175.08±44.18	251.08±41.85 (248.50)	p<0.05
CREATINE (mg/dL)	0.97±0.18	0.94±0.29	P>0.05
UREA (mg/dL)	31.19±8.49	29.15±5.98	p>0.05
AST (u/L)	29.17±13.08	26.5±5.30	p>0.05
ALT (u/L)	23.83±18.41	26.83±12.34	p>0.05
SODIUM (mEq/L)	138.50±2.47	139.33±2.10	p>0.05
POTASSIUM(mEq/L)	4.12±0.33	4.21±0.27	p>0.05
CK (u/L)	189.50±63.66	115.42±27.08	p<0.05
CRP (mg/L)	12.43±4.31	8.91±7.21	p<0.05
LACTATE (mmol/L)	1.37±0.39	1.03±0.17	p<0.05
TROPONIN (ng/mL)	5.45±5.79	4.50±3.43	p>0.05
D-DIMER (ng/mL)	595.08±185.87	273.67±103.04	p<0.05
PCT	0.13±0.02	0.12±0.00	p>0.05
LDH (u/L)	210.42±82.22	170.5±22.73	p>0.05
FERRITIN (ng/mL)	236.31±50.36	51.63±39.52	p<0.05

a.

b.

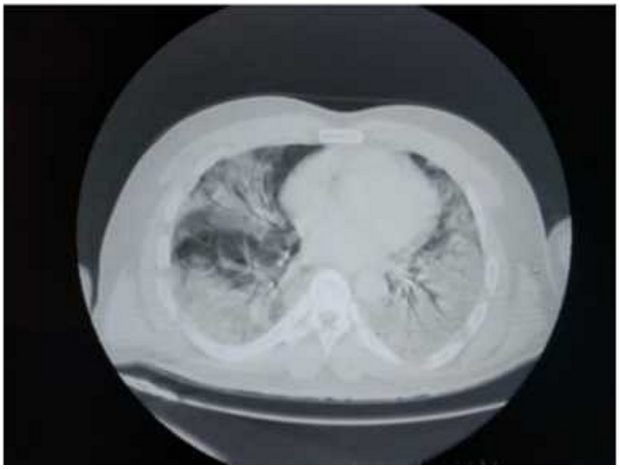

Figure 1. Chest CT on double lung frosted glass opacities in subpleural areas. It shows the marked progression of multiple ground-glass opacities in subpleural areas.

a: Covid-19 PCR is positive and the CT image of the patient who is asymptomatic in terms of respiratory distress syndrome,

b: Covid-19 PCR positive and symptomatic patient,

c: Covid-19 PCR was positive and symptomatic patient, widespread infiltration areas, and bilateral involvement in terms of respiratory distress syndrome, nodular advanced significantly in the subpleural areas of the left and right lung upper lobe.

Discussion

The main clinical symptom of Covid-19 pneumonia patients is characterized by high fever. Dry cough, muscle pain, or chronic fatigue are critical findings that follow. Some cases also complain of headache, hemoptysis and diarrhea. Covid-19 virus has an incubation period similar to other RNA viruses. This period can occur with severe acute respiratory distress syndrome, which lasts about 7-10 days [5]. Covid-19 pneumonia, lung CT, is compatible with certain clinical symptoms similar to common upper respiratory infection [6, 7].

In this study, when CT findings of 3 patients who were positive in Covid-19 PCR in figure 1 were examined in clinical images in CT; Figure 1a in terms of respiratory distress syndrome. No significant ARDS was found in the findings of the asymptomatic patient with Covid-19 PCR positive. In Figure 1b, Covid-19 PCR is positive and symptomatic patient and pneumonia findings are detected. Figure 1c. Covid-19 PCR is positive, with symptomatic findings, widespread infiltration areas and bilateral involvement in terms of respiratory distress syndrome are present in the intensive care unit, with the diagnosis and treatment of infected pneumonia, although it is more severe with the help of intubation than all patients. CT showed subpleural right lower lobe consolidation. Bronchiectasis was observed with reactive thickening of the adjacent pleura. No pleural effusion or mediastinal lymphadenopathy was observed. Increased right lower lobe consolidation was observed after symptomatic 3-day antiviral treatment. Improvements were observed in chest CT repeated 8 days later. Rapid disease progression and in other cases, mechanical ventilation was needed to relieve severe respiratory failure with the help of nasal catheters or masks and to prevent permanent hypoxia. Covid-19 pneumonia has been observed in multiple subpleural areas of the bilateral lung in multiple irregular ground-glass opacity (GGO). The findings accompanied by rapid progression and nodular GGO in chest CT are consistent with previous reports and are important in early detection of severity of Covid-19 pneumonia [8].

However, since it will be inadequate to evaluate Covid-19 pneumonia only in CT findings, epidemiological history and laboratory data are needed to distinguish it from other viral pneumonia and to apply treatment protocols. In this study, when looking at demographic data in positive Covid-19 patients diagnosed with real-time RT-PCR, some cases were observed to follow asymptomatic findings (Table 1). In this study, when the laboratory data were examined, remarkable findings were encountered (Table 2). It is possible to mention statistically decreased lymphocyte, WBC, neutrophil, platelets and increased DDimer, ferritin, CRP, Lactate, CK levels in Covid-19 patients compared to the control group (Figure1). There are studies showing that hemostasis findings, high D-dimer results of 12 patients with Covid-19 are significant predictors of disease severity [9]. In the data obtained in this study, it is necessary to highlight the most important abnormalities observed in patients with Covid-19, lymphopenia, increased C reactive protein (CRP), lactate dehydrogenase (LDH), and D-dimer. We can also mention the presence of a number of hematological parameters that fit serious or critical Covid-19 forms, including leukocytosis, neutrophilia and lymphopenia.

When the literature is examined, it can be seen that many academic

studies are rapidly entering the literature to produce solutions. There are clinical studies as well as theoretical studies on Covid-19. In a study by Ran et al. common symptoms were fever (% 85.71), cough (% 60.71), brachypnea (% 7.14), chest distress (% 7.14), headache (% 7.14), diarrhea (% 7.14), and hemoptysis (% 7.14) among the 28 healthcare workers diagnosed with Covid-19 [10]. In a study by Chung et al., chest CT scans of 21 symptomatic patients from China infected with the 2019-nCoV were reviewed, with emphasis on identifying and characterizing the most common findings [11]. While CT findings have occasional circular morphological and peripheral lung distributions, bilateral pulmonary parenchymal glass locations and consolidative pulmonary opacities are said to be present. It is also mentioned that lung cavitation, discrete pulmonary nodules, pleural effusions and lymphadenopathy are not observed. In a study by Lei et al., a 33-year-old woman applied to the hospital with a 5-day history of fever and cough of unknown cause [6]. It is said that the body temperature is heard at 39.0 ° C and voiced sounds in both lungs and leukopenia is detected in laboratory studies (white blood cell count: 2.91 x 109/L). The white blood cell differential count showed % 70.0 neutrophils and % 0.1 eosinophils. There were elevated blood levels for C-reactive protein (16.16 mg/L; normal range, 0–10 mg/L), erythrocyte sedimentation rate (29 mm/h; normal range, ≤ 20 mm/h) and D-dimer (580 ng/mL; normal range, 500 ng/mL). Chest CT shows multiple peripheral ground glass opacities with subpleural areas in both lungs. Shi et al., laboratory studies showed leukopenia (white blood cell count, 2.88 x 109/L) and lymphocytosis (lymphocyte cell count, 0.90 x 109/L) [12].

In a study by Song F. et al., most patients had a normal white blood cell count (37 of 51, % 73), neutrophil count (44 of 51, % 86), and either normal (17 of 51, 35%) or reduced (33 of 51, % 65) lymphocyte count [13]. CT images showed pure ground-glass opacity (GGO) in 39 of 51 (% 77) patients and GGO with reticular and/ or interlobular septal thickening in 38 of 51 (% 75) patients. GGO with consolidation was present in 30 of 51 (% 59) patients, and pure consolidation was present in 28 of 51 (% 55) patients. Forty-four of 51 (% 86) patients had bilateral lung involvement, while 41 of 51 (% 80) involved the posterior part of the lungs and 44 of 51 (% 86) were peripheral. CT scans at the onset of the disease are said to have consolidated lung lesions in 4 days or less, or for more than 5 days. (431 of 712 lesions vs 129 of 612 lesions; $P \leq 0.001$). While patients with ground glass opacity lesions on CT images are noted with fever and / or cough in the peripheral and posterior lungs, they mention normal or decreased white blood cells with a history of 2019-nCoV pneumonia. In a study by Fang Y. et al., In the first case, laboratory studies showed an increased neutrophil ratio (% 81.2 normal range, % 40.0–75.0), decreased lymphocyte ratio (% 12.8; normal range, % 20.0–50.0), increased erythrocyte sedimentation rate (24 mm/h; normal range, ≤ 20 mm/h), normal D-dimer concentration, and increased lymphokine interleukin 6 (27.47 pg/mL; normal range, 0.1–2.9 pg/mL) [14]. A common interlobular septal thickening and bronchiectasis are mentioned. Unenhanced chest CT showed subpleural right lower lobe consolidation. There was bronchiectasis with reactive thickening of the adjacent pleura. There was no mediastinal lymphadenopathy or pleural effusion. It is said that antiviral and right lower lobe consolidation increases after symptomatic treatment. It is also mentioned that it shows improvement in repeated CT after 8 days and heals without any problem after 10 days.

In a study by Duan Y and Qin J, laboratory studies showed a normal total white blood cell count of 4.2 x 109/L (normal range, 4.0–10.0 x 109/L), and the differential count % 52.9 neutrophils (normal range, % 40.0–74.0) and % 28.3 lymphocytes (normal range, % 18.0–43.0) [15]. There were elevated blood levels for C-reactive protein (6.4 mg/L; normal range, 0–6 mg/L), erythrocyte sedimentation rate (27 mm/h; normal range, 0–20 mm/h) and D-dimer (566 ng/mL; normal range, 500 ng/mL). It was also mentioned in the CT images that multiple bilateral and peripheral ground glass opacities were observed in the lower lobes of both lungs without subpleural areas in their upper segments.

In a study by Huang P et al., laboratory studies showed a normal white blood cell count (4.6 x 109/L) with a differential count of % 53.1neutrophils [16]. Multiple peripheral ground glass opacities, which are characterized by a higher level of procalcitonin level in the blood and in the upper left lobe in both lungs, and a greater involvement of the lingular segment, are mentioned.

Conclusion

As a result, the rapid spread of the pandemic Covid-19 in Turkey and recognizes the critical importance we believe that the findings have similar characteristics with literature in the world. It was observed that CT findings and biochemical data were dosed in comparison with normal healthy individuals. In this study, Turkey's demographics light emitted by the various provinces of Covid-19 comparisons on biochemical and radiological findings of pneumonia patients, early diagnosis and treatment can help to control the spread of infection and patients.

Conflict of interests
The authors declared they do not have anything to disclose regarding conflict of interest with respect to this manuscript.

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Ethical approval
The study was conducted in Siirt Training and Research Hospital with the approval of the Siirt University Non-invasive Clinical Research Ethics Committee and the approval of the Ministry of Health.

References

1. Sun ML, Yang JM, Sun YP, et al. Inhibitors of RAS Might Be a Good Choice for the Therapy of COVID-19 Pneumonia. Zhonghua Jie He He Hu Xi Za Zhi, 2020;43:219-22.
2. Lippi G, Plebani M. The novel coronavirus (2019-nCoV) outbreak: think the unthinkable and be prepared to face the challenge. Diagnosis. 2020;7:79-81.
3. Pang J, Wang MX, Ang IYH, et al. Potential rapid diagnostics, vaccine, and therapeutics for 2019 novel coronavirus (2019-nCoV): a systematic review. J Clin Med. 2020;9:623.
4. Jin YH, Cai L, Cheng ZS, Cheng H, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). Mil Med Res. 2020;7:4.
5. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. 2020;395:497-506.
6. Lei J, Li J, Li X, et al. CT Imaging of the 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology. 2020;295:18.
7. Pan Y, Guan H, Zhou S, et al. Initial CT findings and temporal changes in patients with the novel coronavirus pneumonia (2019-nCoV): a study of 63 patients in Wuhan, China. J Eur Radiol. 2020;30:3306-9.
8. Zhang X, Song W, Liu X, et al. CT image of novel coronavirus pneumonia:

a case report. Jpn J Radiol. 2020;38:407-8.

9. Han H, Yang L, Liu R, et al. Prominent changes in blood coagulation of patients with SARS-CoV-2 infection. Clin Chem Lab Med. 2020;58:1116-20.

10. Ran L, Chen X, Wang Y, et al. Risk Factors of Healthcare Workers with Corona Virus Disease 2019: A Retrospective Cohort Study in a Designated Hospital of Wuhan in China. Clin Infect Dis. 2020;ciaa287.

11. Chung M, Bernheim A, Mei X, et.al. CT Imaging Features of 2019 Novel Coronavirus (2019-nCoV). Radiology. 2020;295:202–7.

12. Shi H, Han X, Zheng C. Evolution of CT Manifestations in a Patient Recovered from 2019 Novel Coronavirus (2019-nCoV) Pneumonia in Wuhan, China. Radiology. 2020;295:20.

13. Song F, Shi N, Shan F, et al. Emerging 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology. 2020;295:210–7.

14. Fang Y, Zhang H, Xu Y, et al. CT Manifestations of Two Cases of 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology. 2020;295:208–9.

15. Duan Y and Qin J. Pre- and Posttreatment Chest CT Findings: 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology. 2020;295:21.

16. Huang P, Liu T, Huang L, et al. Use of Chest CT in Combination with Negative RT-PCR Assay for the 2019 Novel Coronavirus but High Clinical Suspicion. Radiology. 2020;295:22-3.