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Research Article

Symptoms Clusters Associated with COVID-19 Infection in Community-Based Populations: A Cross-Sectional Analysis of 188 Cases from Kyrgyzstan

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Abstract

Background: The first case of COVID-19 was registered in China in 2019 and speared worldwide, causing considerable challenges in humanity. Since the beginning of the outbreak, COVID-19 is diagnosed by detecting SARS-CoV-2 RNA using real-time reverse-transcriptase polymerase chain reaction (rtRT-PCR). Nowadays, people are traveling with the negative PCR test result. The current study aimed to determine and outline the common clinical symptoms and laboratory features of negative PCR and PCR positive COVID -19 patients test with typical radiological findings.

Methods: This retrospective study was conducted with 188 adult inpatients from Osh City, Kyrgyzstan's regional hospital database. The patients were divided into two subgroups as per their negative and positive RT-PCR report with characteristic radiological signs, and then we compared all characteristic signs among each subgroup. The demographic information, clinical presentations, and laboratory data were collected from the concerned hospitals' electronic medical records. The study excluded admitted patients without radiology confirmed signs of pulmonary infiltrations.

Results: Among the 188 patients, we found 113 negative RT-PCR patients, i.e. about 61.5% of patients, and positive RT-PCR were found among 75 patients (39.8%). Common clinical presentations were different stages of dyspnea, fever, non-productive cough, throat pain, muscle aches, and the same in both groups (Figure 1). The most frequent reported radiological patterns were multifocal bilateral ground-glass patchy opacities recorded size involvement greater than 25% found in almost 174 (92.5%) cases, and unilateral infiltration (particularly right-sided) was found in 14 (7.4%) of cases. The most typical laboratory findings indicate lymphocytopenia, neutrophils, and two-fold and three-fold increased level of fibrinogen A, relatively increased thrombocytes, and prolonged prothrombin time found the same quantities in both groups of patients with COVID -19 with PCR negative and positive cases.

Conclusion: The PCR test is not sensitive for diagnosing and monitoring COVID-19; it would be a better correlation of clinical findings such as new-onset pneumonia-like symptoms and chest radiology patterns with blood coagulogram test. The use of hemostasiogramma can be helpful and relevant for the differential diagnosis between classical-bacterial pneumonia and coronavirus -19 pneumonia.

Keywords: COVID-19; RT-PCR; SARS-CoV-2; Pneumonia; Kyrgyzstan

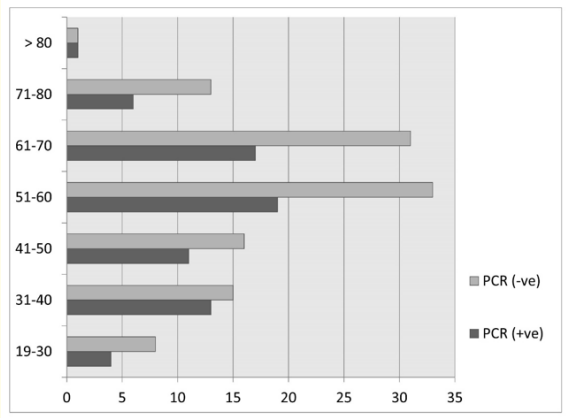

Figure 1: Age allocation.

Introduction

Since December 2019, the COVID-19 has spread worldwide, and the number of associated cases and deaths is still increasing even after one year. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been identified as the causative agent posing phylogenetic similarities to its previous SARS-CoV family member. A public health emergency of international concern was declared by the World Health Organization on January 30, 2020, which makes half of the world population go under home quarantine and temporary lockdown in their respective cities and countries [1,4].

The COVID-19 symptoms varied from region to region among the different age groups. In contrast, the clinical presentation and the initial symptoms of this disease include throat pain, dry cough, fever, anosmia, dyspnea, muscular aches, headache, cough, shivering, arthralgia, vomiting, diarrhea, abdominal pain, dizziness; most of the infected person recovers without any kind of specialized treatment, although the person with a preexisting illness or comorbidities and the old age people are at risk. The average incubation ranges from 2 to 14 days after the infection exposure, and the reproductive number (R0) has been estimated by World Health Organization between 1.4 to 2.5, but few other studies have calculated it as 2.24 - 3.58, which basically shows its varied nature from place to place.

The ongoing gold standard diagnostics test for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) the real-time reverse transcription-polymerase chain reaction (RT-PCR) assay to detect and confirm the infection in nasopharyngeal swab (NPS) samples of high-risk person, healthcare professional, exposed inpatients, and a person willing to travel to other countries. Hence it is very important to understand how these sample predictive values vary with the time from the exposure and symptoms onset to avoid being falsely reassured by negative sample result and also how the accurate testing for SARS-CoV-2 with all preventive measure is quite significant in the healthcare and public premises to prevent both community and nosocomial transmission [3].

Methodology

Study design

A retrospective single hospital-based study was conducted from May to December 2020y. Demographic information, clinical presentations, and laboratory data were collected from the Osh District Hospital database via electronic medical records. Data were entered electronically and recorded using a Microsoft Excel datasheet.

Inclusion criteria

This study enrolled 188 adult inpatients from Kyrgyzstan's Osh District Clinical Hospital database, radiologically confirmed signs of pulmonary consolidation, which had characteristic new-onset respiratory symptoms or pneumonia-like symptoms such as a rise in temperature, cough, and difficulty breathing or close-contact with a COVID-19 patient.

Exclusion criteria

The study excluded admitted patients without radiology confirmed signs of pulmonary infiltrations.

Ethics approval and consent to participate

Ethical approval was taken from the ethical committee of Osh District Clinical Hospital, Kyrgyzstan.

Mechanisms

The patients were divided into two subgroups: patients with laboratory negative and positive RT-PCR test with characteristic radiological signs and compared all characteristic signs among them. Patient including name, age, sex, address, presenting complaints, duration of Covid-19 and symptoms (headache, high temperature, cough, breathlessness, throat pain) and atypical symptoms (ab-

dominal pain, muscle aches, vomiting, diarrhea, and anosmia) and sings of general and chest examinations (SPO_2, respiratory rate, heart rate, blood pressure) were explored. The complete blood test, liver, and kidney function test, blood coagulation test, lipid and chest radiology data were also analyzed. As well as comorbidities with chronic diseases were evaluated.

Results

Among the 188 patients, we found 113 patients with negative RT-PCR (61.5%) patients and RT-PCR positive were tested in 75 patients (39.8%). Among 188 patients, 13 (7.5%) had mild disease, 163 (86.5%) reports severe bilateral pneumonia and 12 (6.3%) were having severe acute respiratory distress syndrome.

Demographic characteristics of cases

The female to male ratio is 1:1, the average age of the patients is 53.7. The average age of males 46.4 and females 55.4 (Table 1).

Clinical manifestations

Common clinical presentations were different stages of dyspnea, fever, non-productive cough, throat pain, muscle aches, and

COVID-19 with pulmonary infiltrations		**PCR- positive n = 75 patients (39.8%)**	**PCR-negative n = 113 patients (61,2%)**
SPO_2	97 - 92%	42 (55,9%)	70 (61,9%)
92 - 88%	24 (31,9%)	29 (25,6)	
< 88%	9 (11,9%)	14(12,3%)	
Fibrinogen A 2000-4000 (m/L)	4000-8000	11 (14,6%)	18 (15,9%)
8000 - 10000	54 (71,8%)	76(67,2%)	
10000 - 12000	10 (22,2%)	19 (16,8%)	
White blood cells	Normal level	57 (75,9%)	92 (81,4,2%)
4,00-10,0 (10^9L)	11 (14,6%)	12 (10,6%)	
Leukocytosis Leucopenia	7(9,3%)	9 (7,9%)	
Lymphocytes 20,0-40,0 (%)	Normal level	38 (50,6%)	58 (51,3%)
	16 (21,3%)	22 (19,4)	
Lymphocytosis Lymphopenia	21 (27,9%)	33 (29,2%)	
Neutrophils 50 - 70%	Normal	31 (41,2%)	41 (36,2%)
	Neutrophilosis	37 (49,3%)	66 (58,4%)
	Neutropenia	7 (9,3%)	6 (5,3%)
Thrombocytes	Normal	56 (81,5%)	92 (81,4%)
180,0 - 300,0 (10^9L)	Thrombocytosis	12 (13,8)	12(10,6%)
	Thrombopenia	7 (4,6)	9 (7,9%)
Erythrocyte sedimentation rate	Normal	19 (25,3%)	24 (21,2%)
2 - 15 mm/h	Increased	56 (74,6%)	89 (78,7%)
Prothrombin time	Normal	46 (63%)	73 (64,6%)
11 - 16s	Prolonged	29 (36,9)	40 (35,4)

Table 1: Oxygen saturation and laboratory distributions.

although less common symptoms were found, diarrhea, vomiting, abdominal pain, and rare symptoms as skin rashes dizziness noted same in both group (Figure 2).

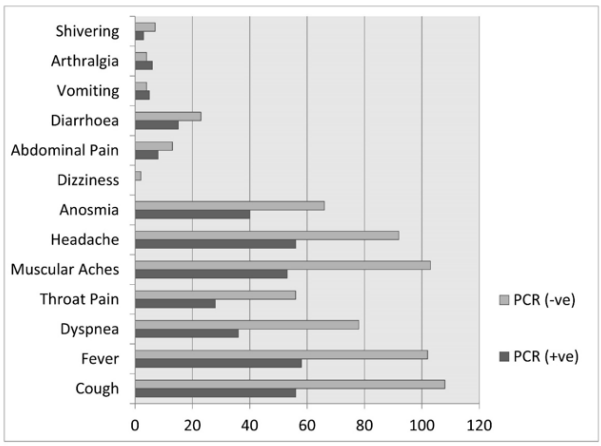

Figure 2: Clinical presentations.

Radiological patterns

Common radiological patterns reported multifocal bilateral ground-glass patchy opacities recorded size involvement greater than 25% found almost 174 (92,5%) cases and unilateral infiltration (particularly right-sided) reported in 14 (7,4%) of cases. However, other commonly reported patterns were consolidation, air bronchogram, bronchial wall thickening, pleural thickening, crazy-paving pattern. (Figure 3).

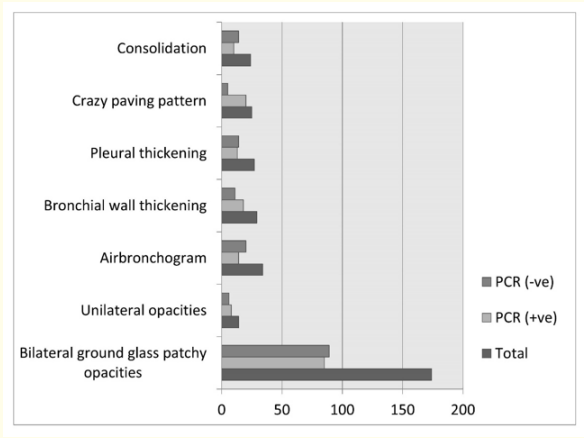

Figure 3: Chest radiology patterns.

Laboratory confirmation

The most typical laboratory findings indicate lymphocytopenia, neutrophils, and two-fold and three-fold increased level of fibrinogen A, relatively increased thrombocytes, and prolonged prothrombin time found the same quantities in both groups of patients with COVID -19 with PCR negative and positive cases (Table 1). The parameters of the renal function test were within normal limits. However, some liver function test abnormalities include increased ALT level and AST in 13 (7,4%) patients.

Comorbidities

Among the studied group, 36 (19,1%) cases report for chronic comorbid conditions as well as hypertension and chronic cardiovascular diseases 24 (12.7%), diabetes 15 (7.9%) and single cases leukemia and neoplasm.

Study limitations

During our study, we could not found instructions and methodology provided PCR analysis in the detection of covid-19. We only get the result data with a positive and negative report.

Discussions

The new coronavirus was rapidly spared in Wuhan, China, and is known as COVID-19. Which belongs to subgenus arbovirus, subfamily Orthocoronavirinae, and differs from both MERS-CoV and SARS-CoV. More than 85% of the genome of nCoV-19 was matched with a bat SARS-like CoV (bat-SL-CoVZC45, MG772933.1) from genus β-CoV- lineage-B [2]. nCoV-19 came from an animal and now transmitting from human to human through respiratory droplets, oro-fecal route, and fomites in the immediate environment around the infected person [3]. Different states of COVID-19 were reported elsewhere, from asymptomatic virus carriers to severe acute respiratory distress syndrome. Common reported symptoms were weakness, rise in temperature, cough and dyspnea, anosmia, muscle aches, and less common symptoms are headache, arthralgia, and gastrointestinal symptoms [4]. Based on chest CT most common findings are multifocal ground-glass opacities, bilateral and unilateral involvement, and consolidation reported in the study by Chung M., *et al.* [6,7]. Our study shows a high incidence of bilateral pulmonary involvement and only 7,4% unilateral upper-middle and lower lob involvement cases. Since the beginning of the outbreak, COVID-19 is diagnosed by detecting SARS-CoV-2 RNA using real-time reverse-transcriptase polymerase chain reaction (rtRT-

PCR). Nowadays, people are traveling with the negative PCR test result. the false-negative explained that low analytic sensitivity, suboptimal specimen collection, low viral load, testing too early in the disease process, inappropriate specimen type, or variability in viral shedding [5]. Almost 2/3 part of severe cases COVID-19 caused cases of pneumonia had negative PCR test and revealed the high sensitive two-fold and three-fold raised fibrinogen A laboratory test from the early stage in either PCR negative and positive and cases raised and the normal value of thrombocytes and prolonged prothrombin time. We determined that no deference of clinical and laboratory findings in PCR-negative and positive patients. Moreover, a high level of fibrinogen A level a predictor of poor patient outcomes. Were patients had fibrinogen level > 10 000 mmol/l, all revealed symptoms of SARS and fatal outcome.

In our study found comorbid such as hypertension, CVD and diabetes. In the study Ejaz H., *et al.* reviewed that the most common coexistence obesity, diabetes, malignancy, COPD and highlighted a high body mass index (BMI) is a risk factor in COVID-19 severity and fatality rate [8].

Conclusion

In summary, the PCR test is not a sensitive test to diagnosis and monitoring of COVID-19; it would be the better correlation of clinical findings such as new-onset pneumonia-like symptoms and chest radiology patterns with blood coagulogram test. The use of hemostasiogramma can help for the differential diagnosis between classical –bacterial pneumonia and coronavirus-19 pneumonia.

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Competing Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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