
STUDY ON SOME CLINICAL, LABORATORY CHARACTERISTICS OF 1,168 COVID-19 PATIENTS, TREATED AT INFECTIOUS FIELD HOSPITAL 5D

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ABSTRACT: *Prospective study, cross-sectional description of 1,168 patients with COVID-19, treated at the Infectious Field Hospital 5D, from August to October, 2021. Results: The average age of the patients was 33.85 ± 16.30 years; male (52.5%) more than female (47.5%). The average hospital stay of the patients was 12.72 ± 3.74 days. 11.99% of the patients had been vaccinated for the first dose; 0.86% of the patients had been vaccinated for the second dose; 20.7% of the patients had a history of comorbidities, of which 5.6% with 2 or more comorbid diseases. The common clinical symptoms in patients with COVID-19: cough (45.3%), spit out phlegm (19.4%), fatigue (18.6%), fever (16.4%), dyspnea (12.7%). The laboratory symptoms: there were 27.0% of the patients with leukocytosis, 16.2% of the patients with leukopenia. The percentage of the patients with increased activities of ALT and AST enzyme was 75.4% and 79.6%, respectively. The proportion of the patients with decreased Na^+ , K^+ , Ca^{2+} , PaCO_2 , PaO_2 , HCO_3^- was 97.6%, 85.7%, 95.2%, 83.3%, 57.1% and 47.6% respectively; the proportion of the patients with increased pH, PaO_2 , HCO_3^- was 54.4%, 30.9% and 19.0%, respectively.*

Keywords: Field hospital, infected with COVID-19.

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1. INTRODUCTION.

The new strain (SARS-CoV-2) is a virus caused that severe acute respiratory syndrome (pandemic COVID-19). The novel virus was first identified from an outbreak in the Wuhan city (China) in December 2019, and up to now the disease has spread to most countries around the world. Due to the rapid transmission and danger of the pandemic, WHO (World Health Organization) declared COVID-19 is a global pandemic on 11 March 2020. In Vietnam, by the end of November, 2021, there were over 1,238,000 people infected with SARS-CoV-2 and over 25,000 deaths [4]. The patients infected with SARS-CoV-2 virus with varied clinical and laboratory symptoms, such as fever, dry cough, fatigue, pharyngalgia, headache, myalgia, nasal congestion, rhinorrhea, anosmia and gustatoria, nausea, diarrhea, abdominalgia... Most of the COVID-19 cases were asymptomatic or have mild to moderate clinical symptoms. However, a large proportion of patients have severe clinical symptoms (severe pneumonia, ARDS syndrome, septic shock, multi-organ failure) and death, especially in the elderly, people with chronic diseases, immunodeficiency, or co-infection or superinfection with other pathogens (bacteria, fungus) [5].

Infectious Field Hospital 5D (under the General Department of Logistics), with a scale of 500 beds, was established to strengthen support for Ho Chi Minh City and Binh Duong province in COVID-19 prevention and control. During the period from August to October, 2021, the hospital has received and treated more than 5,500 cases of COVID-19.

We carried out this study to evaluate some clinical and laboratory characteristics of patients with COVID-19, treated at Infectious Field Hospital 5D.

2. SUBJECTS, METHODS OF THE STUDY.

2.1. Subjects of the study:

1,168 patients with a confirmed diagnosis of COVID-19 by RT-PCR technique [1], treated at Infectious Field Hospital 5D, from August to October, 2021.

2.2. Methods of the study:

- Prospective study, cross-sectional description.
- Research indicators:
 - + The patient characteristics: age, sex, BMI, respiratory rate, pulse, body temperature, blood pressure, SpO_2 , type of vaccine.

+ The clinical characteristics: the acquired clinical symptoms and history of other comorbid diseases.

+ The laboratory characteristics: blood count, blood biochemistry, blood gas, lung injury on chest radiography.

- Criteria for evaluation: diagnosis of obesity: based on BMI according to the classification of the Southeast Asian Diabetes Association, 2001. Diagnosis of diabetes according to ADA 2020 [6]. Diagnosis of hypertension according to JNC VI [3]. Evaluate the severity of lung injury on radiography according to the severity scale proposed by Warren et al [7]. Each lung was given 0-4 points, depending on the extent of lung lesions (0 points: no lesions; 1 point: lung lesions \leq 25%; 2 points: lung lesions from 25-50%; 3 points: lung lesions from 50-75%; 4 points: lung lesions \geq 75%).

- Ethics: the study was approved by the Hospital Ethical Committee. The patients have explained the purpose and agreed to participate in the study.

- Data processing: by Excel software 2019 and SPSS.22.0. The continuous variables were represented as mean (\bar{X}), standard deviation (SD), Min-Max value. Compare continuous variables by t-Student test; Compare qualitative variables by χ^2 test, Fisher Exact.

3. RESULTS OF THE STUDY.

3.1. Characteristics of the patients:

Table 1. Characteristics of the patients (n = 1,168).

Characteristics		\pm SD	Min-Max
Age (years)		33.85 \pm 16.30	1-83
Gender	Male	613 (52.5%)	p > 0.05
	Female	555 (47.5%)	
Height (m)		155.51 \pm 18.42	60-185
Weight (kg)		53.65 \pm 13.91	4-100
BMI (kg/m ²)		21.63 \pm 3.32	18.65-35.65
Blood pressure (mmHg)	Systolic	117.44 \pm 9.39	90-190
	Dyastolic	71.38 \pm 6.29	60-110
Body temperature (°C)		36.66 \pm 0.45	36-41
Hospital stay		12.72 \pm 3.74	1-27
Breathing rate (cycle/minute)		17.83 \pm 4.25	14-38
Heart rate (cycle/minute)		82.45 \pm 9.66	60-130
SpO ₂		96.19 \pm 5.72	47-99

For patients from 1 month old to 83 years old, the mean age was 33.85 \pm 16.30 years. Male (52.5%) more than female (47.5%), the difference was not statistically significant with p > 0.05. The patient's hospital stay was from 1-27 days, the mean was 12.72 \pm 3.74 days.

Table 2. The number of vaccination injections of the patients (n = 1.168).

Type of vaccine		Number	Rate %	Average time* (day)
Astra Zeneca	1 st inj.	91	7.79	29.98 (3-111)
	2 nd inj.	8	0.68	
Comirnaty (Pfizer/BioNTech)	1 st inj.	6	0.51	31.18 (15-49)
	2 nd inj.	0	0	
Moderna	1 st inj.	42	3.59	30.06 (9-39)
	2 nd inj.	2	0.17	
Vero Cell (Sino pharm)	1 st inj.	1	0.085	8
	2 nd inj.	0	0	
Total	1 st inj.	140	11.99	29.86 (3-111)
	2 nd inj.	10	0.86	
*from injection to disease detection				

140/1,168 patients (11.99%) received the first dose of vaccine and 10/1,168 patients (0.86%) received the second dose of vaccine. Of which, the first dose of AstraZeneca vaccine accounted for a highest rate (7.79%). The time from the first dose of vaccine to disease detection was from 3 to 111 days, an average of 29.98 days; the second dose of vaccine until the disease detection was from 8 to 64 days, an average of 30.3 days.

- History of comorbid disease (n = 1,168):

+ Having comorbid disease: 241 patients (20.7%), of which 65 patients (5.6%) had 2 or more comorbid diseases.

+ Have no comorbid disease: 927 patients (79.3%).

3.2. The clinical, subclinical symptoms of the patients:

- The clinical symptoms (n = 1,168):

+ Have clinical symptoms: 624 BN (53.4%).

+ Have no clinical symptoms: 544 BN (46.6%).

Table 3. The clinical symptoms (n = 1,168).

Symptoms	Number of patients	Rate %
Fever	192	16.4
Cough	529	45.3
Spit out phlegm	227	19.4
Fatigue	217	18.6
Pharyngalgia	130	11.1
Myalgia	74	6.3
Nasal congestion, rhinorrhea	29	2.5
Headache	68	5.8
Nausea	4	0.4
Anosmia	8	0.7
Gustatoria	14	1.2
Dyspnea or shortness of breath	148	12.7
Diarrhea	12	1.0
Chill	64	5.5
Chest tightness	33	2.8
Psychosis	2	0.2

The most common symptom was cough (45.3%), followed by symptoms of spit-out phlegm (19.4%), fatigue (18.6%), fever (16.4%), dyspnea (12.7%)... The least common was psychosis symptoms (0.2%).

- The laboratory findings:

Table 4. Characteristics of hematology test:

Hematology test		Number of patients	Rate %
Complete Blood Count (n = 289)	Leukocytosis (> 10 G/L)	78	27.0
	Leukopenia (< 4 G/L)	18	16.2
Blood bio-chemistry (n = 142)	Glucose > 11 mmol/L	25	17.6
	Urea > 7.5 mmol/L	14	9.8
	Creatinine > 133 µmol/L	3	2.1
	ALT (SGPT) > 40 U/L	107	75.4
	AST (SGOT) > 40 U/L	113	79.6

Blood gas (n = 42)	pH < 7.35	3	7.1
	pH > 7.45	22	54.4
	PaCO ₂ < 35 mmHg	35	83.3
	PaO ₂ < 80 mmHg	24	57.1
	PaO ₂ > 100 mmHg	13	30.9
	HCO ₃₋ < 22 mEq/L	20	47.6
	HCO ₃₋ > 26 mEq/L	8	19.0
	SaO ₂ < 80%	7	16.7
Electro-lyte (n = 42)	Na ⁺ < 135 mmol/L	41	97.6
	K ⁺ < 3.5 mmol/L	36	85.7
	Ca ²⁺ < 1.1 mmol/L	40	95.2
	Cl ⁻ < 98 mmol/L	21	50.0
	mOsm < 275 osm/Kg	31	73.8

Among 289 patients who indicated blood count test, 78/298 patients (27.0%) with leukocytosis and 18/298 patients (16.2%) with leukopenia; 142 patients indicated blood biochemical tests, the most common were patients with increased ALT activity > 40 U/L and increased AST activity > 40 U/L, accounted for a high percentage (75.4% and 79.6% respectively), followed by the patients with increased blood glucose (17.6%) and increased blood urea (9.8%), least commonly patients with increased blood creatinine (2.1%); 42 patients indicated blood gas test, the rate of decreased Na⁺, K⁺, Ca²⁺, PaCO₂, PaO₂, HCO₃₋ was 97.6%, 85.7%, 95.2%, 83.3%, 57.1% and 47.6% respectively. The patients with increased pH, PaO₂, HCO₃₋ accounted for 54.4%, 30.9% and 19.0%, respectively.

- The forms of lung lesions on radiography in 1,168 patients, 17 patients were asymptomatic pregnant women and infants, who had no chest X-ray taken. Therefore, the study evaluated the lung lesions on radiography in 1,151 patients with X-ray, the results:

+ Opacified glass: 702 patients (61.0%).

+ Bronchial wall thickening: 352 patients (30.6%).

+ Opaque nodules: 67 patients (5.8%).

+ Coagulation: 58 patients (5.0%).

+ Thickening of the lobular wall: 25 patients (2.2%).

+ Pulmonary fibrosis: 9 patients (0.8%).

+ Pleural effusion: 5 patients (0.4%).

The common form of lung lesions on radiography was opacified glass (61.0%), bronchial wall thickening (30.6%); less common were lung fibrosis (0.8%) and pleural effusion (0.4%).

4. DISCUSSION.

4.1. Some characteristics of the patients:

We met patients from 1 month old to 83 years old, the average age was 33.85 ± 16.30 years. Male patients (52.5%) more than female patients (47.5%), the difference was not statistically significant with $p > 0.05$. The hospital stay ranged from 1-27 days, the mean was 12.72 ± 3.74 days. The patient's mean systolic blood pressure was 117.44 ± 9.39 mmHg, mean diastolic blood pressure was 71.38 ± 6.29 mmHg, mean BMI was 21.63 ± 3.32 kg/m², mean body temperature was 36.66 ± 0.45 °C, the average respiratory rate was 17.83 ± 4.25 cycles/min, average SpO₂ was $96.19 \pm 5.72\%$

Our results of the study were different from some other studies, such as the study of Guan et al carried out in 1,099 patients with COVID-19 related to the outbreak in Wuhan, China (patients from 35-58 years old, the average age was 47 years; male patient: 58.1%, female patient: 41.9% [8]), the study of Hoang Van Hung (the average age of patients was 34.74 years, male patient: 42.4%, female patients: 57.6%, the difference was statistically significant with $p < 0.05$ [4]). The average age of patients in this study was lower than the above studies, possibly because the majority of patients receiving treatment at Infectious Field Hospital 5D were of working age, infected in the industrial zones in Ho Chi Minh City and Binh Duong Province.

Among the 1,168 patients, only 150 patients (12.8%) had been vaccinated against COVID-19. In which, 140 patients (93.3%) received the first dose of vaccine and 10 patients (6.7%) received the second dose of vaccine (6 patients were medical staff of the Hospital); with 4 vaccines used: AstraZeneca, Comirnaty (Pfizer/BioN-Tech); Vero Cell (Sinopharm), Moderna. We found that the patients who received the first dose of vaccine were mainly AstraZeneca (91/140 patients, accounted for 65.0%), followed by Moderna (42/140 patients), Comirnaty (6/140 patients), and Vero Cell (1/140 patients); Patients received the second dose of AstraZeneca vaccine (8/10 patients) and the second dose of Moderna vaccine (2/10 patients).

The average time from the first dose of vaccine to disease detection was 29.98 days; from the second dose of vaccine to the disease detection was 30.3 days. During the outbreak in the southern provinces (from April to September 2021), the supply of vaccines under the COVAX mechanism to Vietnam was quite limited, most of the vaccines came from supporting sources of the other countries governments, people were vaccinated in small numbers. Our study found that people who have been vaccinated against COVID-19 were still

the possibility of infection with SARS-CoV-2. This problem needs to be further considered in other in-depth studies.

241 patients (20.7%) had a history of comorbid diseases (such as diabetes, hypertension, cardiovascular disease, chronic pulmonary disease, chronic liver disease, gout, obesity...), of which 65 patients (5.6%) with 2 or more comorbid diseases. This result was similar to Guan's study (23.7% of patients with COVID-19 had the comorbid disease); but lower than Wang's study (46.4% of patients had comorbid disease [9]).

4.2. The clinical symptoms and laboratory findings of the patients:

- The clinical symptoms: Among the 1,168 patients, 624 patients (53.4%) showed clinical symptoms. of which, the most common clinical symptom was cough (45.3%), followed by spit out phlegm (19.4%), fatigue (18.6%), fever (16.4%), Dyspnea (12.7%). This result was different from the study of Guan et al (the clinical symptoms included: fever 88.7%, cough: 67.8%, fatigue: 38.1% and Dyspnea: 18.7%).

This difference may be due to the mutation of SARS-CoV-2 in Binh Duong and Ho Chi Minh City which was a Delta strain (with strong infectious ability), which was different from the original virus strain that was initially transmitted from animals to humans in Wuhan city. On the other hand, the number of asymptomatic patients in this study was more than the number of clinical symptoms, leading to a lower incidence of clinical symptoms in our study sample compared to other studies. Some studies showed that fever was the main symptom, some seriously ill or critically ill patients may have a mild fever or no fever, so it was not advisable to focus too much on the patient's body temperature to assess the condition of the patients in the clinical treatment that ignores other symptoms. The less common clinical symptoms were anosmia (0.7%), anodmia (1.2%), diarrhea (1.0%), vomiting (0.4%) and psychosis. (0.2%). The psychotic patients we encountered in the study were all related to a history of alcohol abuse.

- The laboratory findings:

+ Blood count: we indicated to blood count test in 289 patients, results: 78/289 patients (27.0%) with Leukocytosis > 10 G/L, 18/289 patients (6.2%) with Leukopenia < 4 G/L. This result was different from the study of Guan et al (5.9% of patients with Leukocytosis and 33.7% of patients with Leukopenia).

+ Blood biochemistry: we indicated to blood chemistry test in 142 patients, the results showed that 107/142 patients (75.4%) increased activities of

ALT enzyme (SGPT) and 113/142 patients (79.6%) increased activities of AST enzyme (SGOT); 25/142 patients (17.6%) increased blood glucose, 14/142 patients (9.8%) increased blood urea and 3/142 patients (2.1%) increased blood creatinine. This showed that the SARS-CoV-2 virus, not only causes lesions to the lungs, also damages many other organs, including the liver and kidneys.

+ Blood gas and electrolytes: the hospital carried out the work in the field conditions, only patients with symptoms of Dyspnea, we indicated to arterial blood gas and electrolytes test. The fact showed that, among the patients, only 42 patients had indicated for arterial blood gas and electrolyte test. Results: the rate of reduction of Na^+ , K^+ , and Ca^{2+} in the blood was 97.6%, 85.7% and 95.2%, respectively; reduction rate of PaCO_2 , PaO_2 , HCO_3^- accounted for 83.3%, 57.1% and 47.6% respectively; increase in pH, PaO_2 , HCO_3^- accounted for 54.4%, 30.9% and 19.0%, respectively.

In this study, we did not have data on the indicators to evaluate blood coagulation, the factors reflected inflammation, response inflammation of the body because biochemical testing equipment was not fully equipped at Infectious Field Hospital 5D.

+ Chest X-ray: Among 1,151 patients with chest X-ray, we found that the common lesions were opacified glass (61.0%) and thickened bronchial wall (30.6%); Less common lung lesions were pulmonary fibrosis (0.8%) and pleural effusion (0.4%). This result was different from the study of Hoang Van Hung et al (over 75% of patients did not detect lesions on radiography; the common lesions were opacified glass 14.6%, opaque nodules 8.9%), coagulation 7.5% [2]).

5. CONCLUSION.

Study on the 1,168 patients with COVID-19, treated at Infectious Field Hospital 5D, from August to October 2021, the results showed that:

- The mean age of the patients was 33.85 ± 16.30 years. Male patients (52.5%) were more than female patients (47.5%). The mean hospital stay of the patients was 12.72 ± 3.74 days. 11.99% of patients received the first dose of vaccine; 0.86% of patients received the second dose of vaccine; 20.7% of patients had comorbid diseases (diabetes, hypertension, cardiovascular disease, chronic lung disease, chronic liver disease, gout, obesity...), of which 65 patients (5.6%) suffering from 2 or more comorbid diseases.

- The clinical symptoms: the most common clinical symptoms of patients with COVID-19 were cough (45.3%), spit-out phlegm (19.4%), fatigue (18.6%), fever (16.4%), dyspnea (12.7%).

- The laboratory findings: Among 289 patients indicated to blood count test, 27.0% of patients with Leukocytosis, 16.2% of patients with Leukopenia. Among 142 patients indicated to blood biochemistry test, the rate of increased activities of ALT enzyme and AST enzyme were 75.4% and 79.6% respectively. Among 42 patients indicated to blood gas and electrolytes, the rate of reduction of Na^+ , K^+ , Ca^{2+} , PaCO_2 , PaO_2 , HCO_3^- was 97.6%, 85.7%, 95.2%, 83.3%, 57.1% and 47.6% respectively. The rate of patients with increased pH, PaO_2 , HCO_3^- accounted for 54.4%, 30.9% and 19.0%, respectively.

- Among 1,151 patients indicated to chest X-ray, we found that the common lesions were opacified glass (61.0%) and thickened bronchial wall (30.6%); Less common lung lesions were pulmonary fibrosis (0.8%) and pleural effusion (0.4%).

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