

Clinical Characteristics and Short-Term Outcomes of Patients with Severe COVID-19

Morteza Mousavi-Hasanzadeh¹, Alireza Kamali², Fatemeh Safi³, Hossein Sarmadian⁴, Amir Almasi-Hashiani⁵

¹Researcher, Student Research Committee, Faculty of Medicine, Arak University of Medical Sciences, Arak, Iran, ²Associate Professor, Departments of Anesthesiology and Critical Care, Arak University of Medical Sciences, Arak, Iran, ³Associate Professor, Department of Radiology, School of Medicine, Arak University of Medical Sciences, Arak, IR Iran, ⁴Associate Professor, Department of Infectious Diseases, Faculty of Medicine, Arak University of Medical Sciences, Arak, Iran, ⁵Associate Professor, Department of Epidemiology, School of Health, Arak University of Medical Sciences, Arak, Iran

Abstract

We Report the demographic characteristics, laboratory findings, vital signs and outcomes of 19 laboratory-confirmed COVID-19 patients who admitted to ICU; from 15 Feb to 15 March 2020 in Arak, Markazi Province, Iran. Data showed that the most common laboratory findings on first day of ICU admission, were leukocytosis (52.6%), neutrophilia (73.6%), lymphopenia (100%), anemia (100%), hyperglycemia (78.95), increased levels of INR (100%); AST (66.66%), ALT (50%) and LDH (100%). 36.36% and 45.45% of patients had elevated total and direct bilirubin, respectively but all of patients had normal range of ALK-p (**Table 1**). In term of vital signs (3 first days); SBP, DBP and PR did not have significant changes but O2 saturation increased from 82.9 % to 93 % and the number of mechanical ventilated patients increased from 36.8% to 73.3%

Keywords: COVID-19, Arak, Laboratory findings, Vital signs

Introduction

Corona virus can damage the respiratory system and about 26% of patients with Covid-19 need intensive care unit (ICU) care ⁽¹⁾. At presents, Covid-19 has a substantial morbidity and mortality and is known as a global threat ⁽²⁾. Due to the lack of information, we report the demographic characteristics, laboratory findings, vital signs and outcomes of 19 laboratory-confirmed COVID-19 patients who admitted to ICU; from 15 Feb to 15 March 2020 in Arak, Markazi Province, Iran.

Materials and Method

Our data were obtained from two hospitals affiliated to Arak University of Medical Sciences in the center on Iran. Oropharyngeal samples were collected and

tested by COVID-19 RT-PCR at Arak laboratory for symptomatic cases. RT-PCR was done according to the same protocol described by National Institute for Viral Disease Control and Prevention (China). Data were analyzed using Stata software version 13.

Findings

The mean age was 71.53 (S.D: 10.87, range: 52-92) years that 52.63% of them were male, 78.95% of individuals have past medical history (DM; 56.25%, HTN=IHD= HLP; 15.78%). The most common clinical and computed tomography (CT) manifestations were shortness of breath 76.92%, fever 69.23%, cough 61.54%, myalgia 30.77% and bilateral mixed ground glass opacities with consolidations 57.89%. The most common laboratory findings on first day of ICU admission, were leukocytosis (52.6%), neutrophilia (73.6%), lymphopenia (100%), anemia (100%), hyperglycemia (78.95), increased levels of INR (100%); AST (66.66%), ALT (50%) and LDH (100%). 36.36%

Corresponding author:

Hossein Sarmadian and Amir Almasi-Hashiani,
Emails: alirezakamalimd@gmail.com

and 45.45% of patients had elevated total and direct bilirubin, respectively but all of patients had normal range of ALK-p (**Table 1**). In term of vital signs (3 first days); SBP, DBP and PR did not have significant changes but O2 saturation increased from 82.9 % to 93 % and the number of mechanical ventilated patients increased from 36.8% to 73.3% (**Table 2**).

Table 1. The mean (S.D.) of laboratory tests on first day for COVID-19 patients

Variables	First day	Normal range	Increased	Decreased
WBC	9.42 (3.7)	3.5-9.5*10 ⁹ /L	17(52.6%)	0(0.0%)
PMN	89.27 (5.3)	1.5-6.5*10 ⁹ /L	14 (73.6%)	0(0.0%)
Lymph	5.70 (3.7)	1.1-3.2*10 ⁹ /L	0 (0.0%)	19(100.0%)
Hb	12.55 (1.9)	12-17g/L	0 (0.0%)	19(100.0%)
Plt	194.6 (80.5)	125-350*10 ⁹ /L	2 (10.5%)	6 (31.5%)
Na	136.6 (2.9)	137-140 mmol/L	1 (5.2%)	9 (47.3%)
K	3.94 (0.35)	3.8-4.8 mmol/L	1 (5.2%)	9 (47.3%)
PTT	36.2 (4.7)	31.5-43.5s	2 (10.52%)	4 (21.0%)
PT	15.8 (1.5)	9.4-12.5 s	18 (94.7%)	0(0.0%)
INR	1.43 (0.2)	0.9-1 index	19 (100.0%)	0 (0.0%)
FBS	175.7 (82.2)	100-110 ng/dl	15 (78.9%)	2 (10.5%)
BUN	53.3 (18.6)	17-45mg/l	11 (57.89%)	0 (0.0%)
Cr	1.41 (0.57)	0.8-1.3mg/l	6 (31.5%)	0 (0.0%)
ALT	120.2 (263.7)	7-37 U/L	6 (50%)	0 (0%)
AST	108.5(193.6)	10-40 U/L	8(66.66)	0(0%)
Bili T	13.5 (43.3)	Up to 1.2mmol/L	4 (36.36%)	0 (0.0%)
Bili D	0.40 (0.25)	Up to 0.4 mg/dL	5 (45.45%)	0 (0.0%)
Alb	2.84 (1.10)	28.9-36.0g/L	0 (0.0%)	1 (12.5%)
CPK	235.5 (125.1)	39-308 U/L	2 (33.33%)	0 (0.0%)
LDH	820.4 (309.1)	125-243U/L	8 (100%)	0 (0.0%)

Table 2. The mean of vital signs in the 3 first days of admission (n=19)

Variables	SBP	DBP	PR	RR	Ventilated (%)	O2 sat
First day	108.9 (13.6)	73.6 (12.1)	98 (12.5)	23.9 (6.6)	7 (36.8%)	82.9 (13.9)
2nd day	111.3 (12.6)	74.8 (12.4)	101.6 (15.4)	19.8 (1.1)	9 (52.9%)	93.5 (3.4)
3rd day	110 (9.2)	73.6 (11.1)	100.7 (14.3)	20.5 (0.57)	11 (73.3%)	93 (4.1)

The mean of Hospitalization, ICU stay, time from hospital to ICU admission and intubation period were 8.36 (S.D; 4.70, range; 1-17), 5.73 (S.D; 4.66, range; 1-16), 2.57 (S.D; 3.0, range; 0-10 days) and 4.52 (S.D; 5.48, range; 0-17) respectively. Besides, only one patient extubated from mechanical ventilation (intubation period; 6 days) and discharged from ICU. Among died patients, super infection (e.g. bacterial, fungal and etc) weren't seeing in any patients. Of these patients, 1 patient (5.26%) has been discharged and eight patients (42.1%) are active patients and case fatality rate (CFR) was estimated 52.63% (95%CI: 29.2-74.9%).

Discussion

Most of the COVID-19 patients who admitted to ICU were old and male and had liver injury (hepatic cellular form), and also like available studies on COVID-19 patients⁽³⁻⁵⁾, presented with leukocytosis, neutrophilia, lymphopeni and high level of AST, ALT and bilirubin. Liver injury in sever patients with COVID-19 is higher than mild one⁽⁶⁾ and it seems this virus affected liver and maybe through this way induces sever or lethal condition. That's why, above factors which can consider as prognostic factors in COVID-19 patients. Besides, the most common initial symptoms and CT findings of them were shortness of breath, fever, cough and bilateral mixed GGO with consolidation which confirmed by available studies. CFR in COVID-19 ICU patients was estimated 52.63% and the number of mechanical ventilated patients increased that maybe indicate an exacerbation of pulmonary involvement and can be a cause of high mortality in ICU. In the end, according to past evidences that have showed the SARS-Cov is

naturally neuroinvasive⁽⁷⁻⁹⁾ and induces neuron death in animal model (10), also according to limitation in data about neurological problems in COVID-19 patients, the sudden cardiac arrest of these patients and no responsiveness of them to cardiopulmonary resuscitation (CPR) can because of central nerves system involvement. This our hypothesis needs to future wide investigation in COVID-19 patients.

Conclusion

The mortality rate is too high in ICU admitted patients and the results suggested that past medical history has an important role on COVID-19 mortality rate.

Ethical Clearance: Ethical approval for the study was provided by the Ethical Committee of Arak University of Medical Sciences (IR.ARAKMU.REC.1398.333).

Source of Funding: Vice chancellor of research and technology of the Arak University of Medical Sciences was funded the study. The funder has no role in data collection, analysis, interpretation and manuscript drafting

Conflict of Interest: Nil

References

1. Ronco C, Navalesi P, Vincent JL: Coronavirus epidemic: preparing for extracorporeal organ support in intensive care. *Lancet Respiratory Med* 2020, 8(3):240-241.
2. Baghizadeh Fini M. What dentists need to

- know about COVID-19. *Oral Oncology*. 2020; 105:104741.
3. Cao J, Hu X, Cheng W, Yu L, Tu W-J, Liu Q: Clinical features and short-term outcomes of 18 patients with corona virus disease 2019 in intensive care unit. *Intensive Care Med* 2020:1-3.
 4. Khan ZH, Samadi S, Makarem J, Mireskandari SM. Tests with proven value in diagnosis of COVID-19. *Iran J Microbiol*. 12(3):261-262.
 5. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y: Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *JAMA* 2020.
 6. Huang Y, Zhou H, Yang R, Xu Y, Feng X, Gong P: Clinical characteristics of 36 non-survivors with COVID-19 in Wuhan, China. *medRxiv* 2020.
 7. Morfopoulou S, Brown JR, Davies EG, Anderson G, Virasami A, Qasim W, et al. Human coronavirus OC43 associated with fatal encephalitis. *New England J Med* 2016, 375(5):497-498.
 8. Xu J, Zhong S, Liu J, Li L, Li Y, Wu X, Li Z, Deng P, Zhang J, Zhong N: Detection of severe acute respiratory syndrome coronavirus in the brain: potential role of the chemokine mig in pathogenesis. *Clin Infect Dis* 2005, 41(8):1089-1096.
 9. Turgay C, Emine T, Ozlem K, Muhammet SP, Haydar AT. A rare cause of acute flaccid paralysis: human coronaviruses. *J Ped Neurosciences* 2015, 10(3):280.
 10. Netland J, Meyerholz DK, Moore S, Cassell M, Perlman S: Severe acute respiratory syndrome coronavirus infection causes neuronal death in the absence of encephalitis in mice transgenic for human ACE2. *J Virol* 2008, 82(15):7264-7275.