Original Research Article

Journal of College of Medical Sciences-Nepal, Vol-20, No.1, Jan-Mar 2024
ISSN: 2091-0657 (Print); 2091-0673 (Online) Open Access
DOI:10.3126/jcmsn.v20i1.62709

Clinical and Laboratory Characteristics of COVID-19 Patients Admitted in A Tertiary Hospital of Nepal

Naval Kishor Yadav,[1] Rajan Kumar Sah,[2] Navneet Singh[2]

[1]Department of Biochemistry, College of Medical Sciences, Bharatpur, Chitwan, Nepal, [2]Department of Biochemistry, Manipal College of Medical Sciences, Pokhara, Nepal.

ABSTRACT

Background

COVID-19 disease is a respiratory infection. The symptoms range from mild fever and bodyache to multiple organ dysfunction. It was first seen in Wuhan, China and later infected whole world in a very short period of time. The aim of this study was to find the clinical and laboratory Characteristics of COVID-19 patients admitted in tertiary hospital of Nepal.

Methods

This was a cross-sectional hospital based study conducted at Manipal Teaching Hospital, Pokhara, Nepal. The patients with confirmed COVID-19 were included in this study. Questionnaire was used to collect the clinical data and venous blood samples were collected for laboratory parameters. The numerical data were presented in Mean and SD while categorical data were in frequency and percentage.

Results

The Major infected patient were male (67.9%). The major symptoms observed were shortness of breath (78.8%), dry cough (54.5%), chill (60.3%), wet cough (16.7%) and headache (25%). 60.9% COVID-19 patients were in moderate stage followed by severe stage (26.3%). The complication noticed were cardiac, bacterial infection, ARDS, septic shock and GI bleeding. The level of blood urea, creatinine, AST, ALT, serum ferritin and CRP were found high in COVID-19 patients. Similarly, the level of sodium, potassium, d-dimer, total protein, albumin, WBC and platelets were found within normal limits.

Conclusions

The common symptoms in COVID-19 patients were shortness of breath, dry cough, chill and headache. The blood level of AST, ALT, ferritin, CRP, urea and creatinine were high in COVID-19 patients.

Keywords: COVID-19; clinical characterization; laboratory characterization; Pokhara.

INTRODUCTION

COVID-19 disease is a respiratory infection caused by SARS-CoV-2 and SARS-CoV-2 variants and exhibit increased transmissibility as compared to co-circulating variants.[1] It was first seen in Wuhan, China and later infected whole world in a very short period of time. In response to the COVID-19 situation, the World Health Organization (WHO) declared a public health emergency of international concern on January 30, 2020 and then the pandemic on March 11, 2020 to urge all the countries around the world to take urgent and decisive action against the virus.[2] The symptoms ranges from mild fever and bodyache to multiple organ dysfunctions. The incubation period for covid -19 ranges from 2-14, with an average of 5 days. While rate of severity depends upon the location, age group, vaccination status, risk factor an individual poses (Diabetes Mellitus, Hypertension, COPD, CANCER, HIV, immune deficiency syndrome)[3] besides symptomic cases there more percentages of asymptomic

Correspondence: Dr. Naval Kishor Yadav, Department of Biochemistry, College of Medical Sciences, Bharatpur, Chitwan, Nepal. Email: naval.rhythm@gmail.com, Phone: +977-9824193919. **Article received**:2024-01-04. **Article accepted**:2024-03-09.

carriers which are undiagnosed and continue spread the infection. There are various diagnostic technique but RT-PCR (Real time- polymerase chain reaction) is found to have more sensitivity and specificity than any other diagnostic technique. The viral genes targeted so far include the N, E, S, ORF and RdRp genes.[4] Public health and social measures (PHSMs) were being implemented across the globe to suppress SARS-CoV-2 transmission and reduce mortality and morbidity from COVID-19.[1] PHSMs include personal protective measures (e.g. physical distancing, avoiding crowded settings, hand hygiene, respiratory etiquette, mask-wearing); environmental measures (e.g. cleaning, disinfection, ventilation); surveillance and response measures (testing, genetic sequencing, contact tracing, isolation, and quarantine); physical distancing measures (regulating the number and flow of people attending gatherings, maintaining distance in public or workplaces, domestic movement restrictions); and international travel-related measures and later vaccination was started. The aim of this study was to find the clinical and laboratory characteristics of patient with COVID-19 admitted in tertiary hospital of Nepal.

METHODS

A hospital based cross-sectional study was conducted at Manipal Teaching Hospital, Pokhara, Nepal from June 2021 to January, 2022. A total of 159 patients were enrolled in this study. Ethical approval was taken from Institutional review committee (Ref. No: MEMG/455/IRC), Manipal College of Medical Sciences, Pokhara, Nepal. A patient with either positive PCR or RAT for COVID 19, who admitted at Manipal Teaching Hospital were included. Clinical data were collected with help of questionnaire. In this study 5 ml of venous blood were collected from the patients, out of which 2 ml added in EDTA tube and 3 ml in gel tube. The gel tubes were centrifuged at 4000 rpm for 10 minute to obtain the serum. The biochemical tests (urea, creatinine, sodium, potassium, total protein, albumin, AST, ALT and LDH were estimated in Vitros@4600 dry chemistry analyzer and serum ferritin analyzed in Vitros@3600 immunoassay analyzer. The level of CRP and D-dimer were estimated by IFA method. White blood count, hemoglobin and platelet were measured in 5-part hematology analyzer. The data were analyzed using excel and SPSS version 20. The numerical data were presented in Mean and SD while categorical data were in frequency and percentage.

RESULTS

Table 1. The demographic and clinical characteristic of COVID-19 patients.

Clinicodemographic characteristics	Frequency (%)
Sex	
Male	106(67.9)
Female	50(32.1)
Smoking habits	
Smoker	99(63.5)
Non-smoker	57(36.5)
Symptoms	
Shortness of breath	123(78.8)
Dry cough	85(54.5)
Wet cough	26(16.7)
Chill	94(60.3)
Headache	39(25)
Nausea vomiting	7(4.5)
Diarrhea	5(3.2)
COVID staging	
Mild	20(12.8)
Moderate	95(60.9)
Severe	41(26.3)
Pneumoconsolidation	
Pneumonia	28(17.9)
Pneumonia & consolidation	92(59)
Consolidation	14(9)
No	22(14.1)
Complications	
Cardiac	10(6.4)
Septic shock	5(3.2)
Bacterial infection	14(9)
ARDS, bacterial infection	5(3.2)
ADRS, bacterial infection and septic shock	7(4.5)
GI bleeding	1(0.6)
Liver damage	1(0.6)
ARDS, GI bleeding	1(0.6)
Coagulopathy	1(0.6)
ARDS	5(3.2)
No complications	106(67.9)

ARDS (Acute respiratory distress syndrome), GI bleeding (Gastrointestinal bleeding)

A total 159 patients were enrolled in this study, out of which 106 (67.9%) were male and 50 (32.1%) were female. The majority of patients were recovered (65.41%) and 34.59% were died. The mean age of patients was 54.73±21.14 in which the mean of age of males were 56.45±21.20 and female were 51.08±20.75. The majority of patients were smokers (63.5%). The symptoms observed were shortness of breath (78.8%), dry cough (54.5%), chills (60.3%), headache (25%) and wet cough (16.7%). 60.9% COVID patients were in moderate stage of disease and 26.3% were in severe stage and only few of them in mild stage (12.8%). The most of the patients were suffered with pneumoconsolidation (59%) and 17.9% were had only pneumonia. The complication noted in COVID patients were bacterial infection (9%), cardiac complication (6.4%), followed by ADRS, bacterial infection and septic shock (4.5%) (Table 1). The mean serum level of urea, creatinine, AST, ALT, CRP and ferritin were found higher in COVID 19 patients and sodium, potassium, total protein and LDH were normal. The mean levels of serum albumin were slightly low. The mean level of WBC count, hemoglobin and platelets were normal (Table 2).

Table 2. Mean and SD of different laboratory parameters in COVID-19 patients.

Laboratory parameters	Mean ± SD
Urea (15-40 mg/dl)	55.85 ± 56.49
Creatinine (0.5-1.2 mg/dl)	1.48 ± 2.13
Sodium (137-145 mEq/L)	136.94 ± 5.36
Potassium (3.5-5.1 mEq/L)	4.34 ± 0.71
WBC (4,000-11,000 cells/cumm)	9.15 ± 5.13
Hemoglobin (Male: 13.1-16.8 gm/dl, female: 11.5-14.9 gm/dl)	11.89 ± 2.46
Platelet (1.5-4 lakh cells/cumm)	2.38 ± 97.48
Total protein (6-8 gm/dl)	6.31 ± 1.10
Albumin (3.5-5.0 gm/dl)	3.21 ± 0.52
AST (male: 17-59 U/L, Female: 14-36 U/L)	78.09 ± 68.72
ALT (Male: ≤ 49 U/L, Female: ≤ 34 U/L)	64.10 ± 44.78
CRP (<10 mg/L)	53.62±40.60
D-dimer (0-500 ng/mL)	235.67±159.20
LDH (313-618 U/L)	438.75±215.05
Ferritin (Male: 17.9-464 ng/mL, Female: 6.24-264 ng/mL)	470.62±333.59

WBC (White blood cells), AST (Aspartate aminotransferase), ALT (Alanine aminotransferase), CRP (C-Reactive protein), LDH (Lactate dehydrogenase), gm/dl (gram per deciliter), ng/mL (nanogram per milliliter), U/L (Unit per liter), mEq/L (Milliequivalent per liter)

DISCUSSION

COVID-19 was public health emergency worldwide.[2] In our study, the mean age of patients was 54.73±21.14 in which the mean of age of males were 56.45±21.20 and female were 51.08±20.75. The study conducted by Wang et al, reported that the median age was 56 years.[5] This was supported by many studies conducted worldwide.[6-8] Similarly, Abdelmoty et al and Basheer et al. reported severity of diseases increased with increase in age.[9,10] In our study, the most common symptoms observed were shortness of breath, dry cough, chills, headache and wet cough. The most of the patients were suffered with pneumoconsolidation and pneumonia. In present study, shortness of breath was observed in 78.8% of COVID patients. The study conducted by Jain et al in Delhi and many other study reports supports our finding. .[11-13] The Jain et al observed breathlessness in 74.2% of the severe COVID patients and 59.4% of the non-severe COVID patients.[11] Similarly, Gurtoo et al. reported breathlessness in 89% of the severe cases and 14.7% and 45.2% of the mild and moderate cases respectively.[13] In our study, one fourth of the patients (26.3%) were in severe stage of disease. The study conducted in many place of world supports our study. The study conducted by Wu Jain et al reported 29.6%, [14] Xiang Jialin et al reported 28.5%, [15] Xiang Tianxin et al reported 18.3%, [16] Xu et al reported 36.2 %, [17] Yan et al reported 19.0%, [18] Yuan et al reported 13.9%, [19] Young et al reported 33.3%, [20] Zeng et al reported 22.4%, [21] Zhang et al reported 24.8%, [22] and Zhao et al reported 25.9% [23] of severe case of COVID patients in their studies. The laboratory parameters result in our study, the mean serum level of urea, creatinine, AST, ALT, CRP and ferritin were found higher in COVID 19 patients and sodium, potassium, total protein and LDH were normal. The mean levels of serum albumin were slightly low. The mean level of WBC count, hemoglobin and platelets were normal in COVID patients. The study conducted in Brazil by Araujo et al reported higher level of CRP, AST, urea and creatinine in severe

patients.[24] The study conducted by Moutchia et al found that patients with severe or critical COVID-19 had significantly higher biomarkers such as LDH, liver enzymes, kidney function parameters and markers of myocardial function. They also reported significantly higher levels of neutrophils, IL-6, and acute phase reaction markers such as CRP, ESR and serum ferritin, as well as decreased concentrations of albumin and prealbumin. [25] Our results also agree with Qin et al and Abdelmoty et al, they also reported higher level of urea, creatinine, AST, CRP and ferritin in COVID-19 patients.[9, 26]

CONCLUSIONS

The most common symptoms in COVID-19 patients were shortness of breath, dry cough, chill and headache. The blood level of AST, ALT, ferritin, CRP, urea and creatinine were high in COVID-19 patients.

ACKNOWLEDGEMENT

We would like to thanks staff nurses of COVID ward, laboratory technician, interns, medical officer, physicians and all the participants of the study, who helped to complete the study.

Funding: None

Conflict of interest: None

REFERENCES

1. World Health Organization. Considerations for implementing and adjusting public health and social measures in the context of COVID-19: interim guidance, 14 June 2021. World Health Organization; 2021.Ryan JM. Timeline of COVID-19. COVID-19: Global Pandemic, Societal Responses, Ideological Solutions. Routledge. 2021 Mar 29.
2. Ryan JM. Timeline of COVID-19. COVID-19: Global Pandemic, Societal Responses, Ideological Solutions. Routledge. 2021 Mar 29.
3. Gold MS, Sehayek D, Gabrielli S, Zhang X, McCusker C, Ben-Shoshan M. COVID-19 and comorbidities: a systematic review and meta-analysis. Postgrad Med. 2020; 132(8):749-55. doi: 10.1080/00325481.2020.1786964.
4. Padhi A, Kumar S, Gupta E, Saxena SK. Laboratory diagnosis of novel coronavirus disease 2019 (COVID-19) infection. Coronavirus Disease 2019 (COVID-19) Epidemiology, Pathogenesis, Diagnosis, and Therapeutics. 2020:95-107. doi: 10.1007/978-981-15-4814-7_9
5. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. jama. 2020 Mar 17; 323(11):1061-9. doi: 10.1001/jama.2020.1585
6. Dosi R, Jain G, Mehta A. Clinical characteristics, comorbidities, and outcome among 365 patients of coronavirus disease 2019 at a Tertiary Care Centre in Central India. The Journal of the Association of Physicians of India. 2020 Sep 1; 68(9):20-3. PMID: 32798340.
7. Lechien JR, Chiesa-Estomba CM, Place S, Van Laethem Y, Cabaraux P, Mat Q, Huet K, Plzak J, Horoi M, Hans S, Rosaria Barillari M. Clinical and epidemiological characteristics of 1420 European patients with mild-to-moderate coronavirus disease 2019. Journal of internal medicine. 2020 Sep; 288(3):335-44. doi: 10.1111/joim.13089.
8. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The lancet. 2020 Feb 15; 395(10223):497-506. doi: 10.1016/S0140-6736(20)30183-5.
9. Abdelmoty AA, Abdeldayem WA, Metwally RH, Elshamy AM. Evaluation of laboratory parameters and their correlation with Covid-19 severity. The Egyptian Journal of Hospital Medicine. 2022 Apr 1; 87(1):1602-7. DOI: 10.21608/EJHM.2022.227005
10. Basheer M, Saad E, Hagai R, Assy N. Clinical predictors of mortality and critical illness in patients with covid-19 pneumonia. Metabolites. 2021 Oct 2; 11(10):679. doi: 10.3390/

metabo11100679.

11. Jain P, Sinha N, Prasad MK, Padole V. Clinical and laboratory profile of COVID-19 patients admitted at a tertiary care center in New Delhi and assessment of factors predicting disease severity. Indian J Med Spec. 2021; 12:59-63.
12. Feng Y, Ling Y, Bai T, Xie Y, Huang J, Li J, Xiong W, Yang D, Chen R, Lu F, Lu Y. COVID-19 with different severities: a multicenter study of clinical features. American journal of respiratory and critical care medicine. 2020 Jun 1; 201(11):1380-8. doi: 10.1164/rccm.202002-0445OC.
13. Gurtoo A, Agrawal A, Prakash A, Kaur R, Jais M, Anand R, Sharma S, Shukla S, Singh R. The Syndromic Spectrum of COVID-19 and Correlates of Admission Parameters with Severity-outcome Gradients: A Retrospective Study. J Assoc Physicians India. 2020:43-8. PMID: 33247642
14. Wu J, Li W, Shi X, Chen Z, Jiang B, Liu J, Wang D, Liu C, Meng Y, Cui L, Yu J. Early antiviral treatment contributes to alleviate the severity and improve the prognosis of patients with novel coronavirus disease (COVID-19). Journal of internal medicine. 2020 Jul; 288(1):128-38. doi: 10.1111/joim.13063
15. Xiang J, Wen J, Yuan X, Xiong S, Zhou XU, Liu C, Min X. Potential biochemical markers to identify severe cases among COVID-19 patients. MedRxiv. 2020 Mar 23:2020-03. doi: https://doi.org/10.1101/2020.03.19.20034447
16. Xiang TX, Liu J, Xu F, Cheng N, Liu Y, Qian K. Analysis of clinical characteristics of 49 patients with novel coronavirus pneumonia in Jiangxi province. Chin J Respir Crit Care Med. 2020; 19(2):1-7. doi: 10.1016/j.jinf.2020.03.041
17. Xu Y, Li YR, Zeng Q, Lu ZB, Li YZ, Wu W, Dong SY, Huang G, Wang XH. Clinical characteristics of SARS-CoV-2 pneumonia compared to controls in Chinese Han population. MedRxiv. 2020 Mar 10:2020-03. doi.org/10.1101/2020.03.08.20031658
18. Yan S, Song X, Lin F, Zhu H, Wang X, Li M, Ruan J, Lin C, Liu X, Wu Q, Luo Z. Clinical characteristics of coronavirus disease 2019 in Hainan, China. MedRxiv. 2020 Mar 23:2020-03. doi.org/10.1101/2020.03.19.20038539
19. Yuan J, Sun Y, Zuo Y, Chen T, Cao Q, Yuan G, et al. Clinical characteristics of 223 patients with new coronavirus pneumonia in Chongqing. Journal of Southwest University (Natural Science Edition). 2020:1-7.
20. Young BE, Ong SW, Kalimuddin S, Low JG, Tan SY, Loh J, Ng OT, Marimuthu K, Ang LW, Mak TM, Lau SK. Epidemiologic features and clinical course of patients infected with SARS-CoV-2 in Singapore. Jama. 2020 Apr 21; 323(15):1488-94. DOI: 10.1001/jama.2020.3204
21. Zeng L, Li J, Liao M, Hua R, Huang P, Zhang M, Zhang Y, Shi Q, Xia Z, Ning X, Liu D. Risk assessment of progression to severe conditions for patients with COVID-19 pneumonia: a single-center retrospective study. MedRxiv. 2020 Mar 30:2020-03. doi: https://doi.org/10.1101/2020.03.25.20043166
22. Zhang G, Zhang J, Wang B, Zhu X, Wang Q, Qiu S. Analysis of clinical characteristics and laboratory findings of 95 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a retrospective analysis. Respiratory research. 2020 Dec; 21(1):1-0. doi: 10.1186/s12931-020-01338-8.
23. Zhao W, Yu S, Zha X, Wang N, Pang Q, Li T, et al. Clinical characteristics and durations of hospitalized patients with COVID-19 in Beijing: a retrospective cohort study. doi: https://doi.org/10.1101/2020.03.13.20035436
24. Araújo SL, Feitosa TA, Pereira VC, Andrade CC, Silva AT, Andrade LV, Lopes KE, Sá MV, Souza CD, Armstrong AD, Carmo RF. Clinical characteristics and laboratory parameters associated with the risk of severe COVID-19 in patients from two hospitals in Northeast Brazil. Revista da Sociedade Brasileira de Medicina Tropical. 2022 Sep 26; 55. doi: 10.1590/0037-8682-0119-2022

25. Moutchia J, Pokharel P, Kerri A, McGaw K, Uchai S, Nji M, Goodman M. Clinical laboratory parameters associated with severe or critical novel coronavirus disease 2019 (COVID-19): A systematic review and meta-analysis. PloS one. 2020 Oct 1; 15(10):e0239802. doi: 10.1371/journal.pone.0239802.

26. Qin C, Ziwei MP, Tao SY, Ke PC, Shang MM. Dysregulation of immune response in patients with COVID-19 in Wuhan, China; Clinical Infectious Diseases; Oxford Academic. Clinical Infectious Diseases. 2020; 71 (15): 762-68. doi: 10.1093/cid/ciaa248.

Citation: Yadav NK, Sah RK, Singh N. Clinical and Laboratory Characteristics of COVID-19 Patients Admitted in A Tertiary Hospital of Nepal. JCMS Nepal. 2024; 20(1): 78-83.