

“A Study of Hematological and Biochemical Analysis of Covid-19 Patients Admitted in A Tertiary Care Hospital in India”

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Abstract:

Introduction: Covid 19 is caused by SARS CoV 2. The characteristics of lab findings are of great significance for clinical diagnosis and treatment.

Aim: To study the hematological and biochemical analysis of Covid 19 patients admitted in a tertiary care center in Kanpur.

Material and Methods: It is a retrospective study that investigated 170 Real Time-Polymerase Chain Reaction (RT-PCR) confirmed COVID-19 patients from May 2020 to August 2020.

Results: A total of 170 laboratory confirmed adult COVID-19 patients data admitted were included. Hematological findings showed Thrombocytopenia was seen in 5.8% patients, decreased hematocrit in 32.94% patients, neutrophilia in 35.29% patients, lymphocytopenia in 30.58%, monocytopenia in 7.05% patients, increased RBC counts was seen in 70.58% patients, Leukocytosis was seen in 32.94% patients, and leucopenia was seen in 4.7% patients. Biochemical Findings in Covid 19 patients include increased Blood urea (9.41%) and decreased sodium level (14.11%). Fluctuating levels were seen in Uric acid concentration, SGOT and SGPT.

Conclusion: Particular attention should be given to the hematological and biochemical investigation of patients with COVID-19, particularly in older patients with severe symptoms. Increased attention to these investigations will help to better protect and manage COVID-19 patients and to decrease mortality.

Keywords- Hematological, Biochemical, Covid-19

Introduction

Novel Corona virus (2019-nCoV), also known as the Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2), is a newly emerging zoonotic agent causing the Corona virus Disease 2019 (COVID-19) [1]. In symptomatic cases, symptoms of COVID-19 are nonspecific [2] and the clinical presentation is similar to SARS-CoV infection. The most commonly reported symptoms are fever [3], dry cough, dyspnoea and fatigue [2, 4]. Non-respiratory symptoms (e.g. diarrhea, nausea, vomiting, and headache and muscle pain) are usually uncommon. The clinical laboratories play a crucial role in assessing severity of disease, choosing the suitable treatment options and monitoring the response in addition to diagnosis of COVID-19[5] Hematological profile of severe COVID 19 patients showed increased WBC count and neutrophil count, decreased lymphocyte, platelet, eosinophil count, and hemoglobin levels[6]. The biochemical and inflammatory parameters assayed by clinical chemistry laboratories help the clinicians in their decision making and assessing response to their treatment [7]

Material and Methods

This study was conducted in Rama Medical College, Hospital & Research Centre, and Kanpur. It is a retrospective study conducted from May 2020 to August 2020 and a suitable statistical was carried out accordingly

Data collection: The data was collected from Microbiology department as well as Medical Record Department of the hospital.

Results

A total of 170 laboratory confirmed adult COVID-19 patients data admitted were included. The maximum number of patients belonged to the age group of 61-70 years. Men were 114 (67.05%) and women were 56(32.94%) M: F ratio being 2:1.

Hematological Analysis

Thrombocytopenia was seen in 5.8% patients; out of which 60% were male and 40% were female, hematocrit in 32.94% patients in which 39.28% were male and 60.71% were female, neutrophilia in 35.29% patients; out of which 61.66% were male and 38.33% were female, lymphocytopenia in 30.58% ; in which 90.38% were male and 9.61% were female patients, monocytopenia in 7.05% patients and anemia in 21.17% patients out of which 55.55% were male and 44.44% were female, out of which 66.66% were male and 33.33% were female.

Polycythemia vera was seen in 70.58% patients in which 38.23% were male and 32.35% were female.

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Decreased total RBC was seen in 29.41% patients; Out of which 16.17% were male 13.23% were female.

Leukocytosis was seen in 32.94% patients out of which 48.43% were male and 39.06% were female and leucopenia was seen in 4.7% patients; out of whom 4.6% were male and 7.8% were female.

Table 1: Gender wise Hematological analysis

S.No.	Features	Increase		Decrease		Total
		Male	Female	Male	Female	
1	PCV	-	-	22	34	56
2	Platelets	-	-	6	4	10
3	Polymorphs	37	33	-	-	60
4	lymphocytes	-	-	47	5	52
5	monocytes	-	-	8	4	12
6	TRBC	26	22	11	9	68
7	Hb	-	-	20	16	36
8	TLC	31	25	3	5	64
9	MCV	15	13	35	29	92
10	MCH	-	-	14	14	28

Biochemical Analysis

Biochemical Findings in Covid 19 patients include increased Blood urea (9.41%) and decreased sodium level (14.11%). However higher levels as well as low level of SGOT, SGPT and Uric acid was observed.

25.88% patient showed higher levels of SGOT whereas 18.82% patients showed low levels of SGOT. In case of SGPT 9.41% showed patients showed increased levels whereas 30.58% patients showed low levels.

Fluctuating levels were also seen in Uric acid concentration i.e. 4.7% patients showed high levels as well as low levels.

Table 2: Gender wise Biochemical Analysis

S. no.	Features	Increase		Decrease		Total
		Male	Female	Male	Female	
1	SGOT	28	16	19	13	76
2	SGPT	11	5	21	31	68
3	Blood Urea	9	7	-	-	16
4	Uric Acid	3	5	6	2	16
5	Na ⁺	-	-	10	14	24

Discussion

Table 3: percentage of leukocytosis

Serial No.	Study	Year	Result
1	Asma Rehman et.al.[8]	2021	Leukocytosis – 3%-24% and leucopenia- 20-40%
2	Chen et. al.[9]	2020	leucopenia- 9%
3	Fan et. Al.[10]	2020	leucopenia- 29.2%
4	Present study	2021	Leukocytosis – 32.94% and leucopenia- 4.7%

In the present study 32.94% patients showed leukocytosis and 4.7% leucopenia. The results were in accordance with Chen ET. Al. and in contrast with Fan ET. Al.

Table 4: percentage of hemoglobin

Serial No.	Study	Year	Result
1	Qian et. Al.[11]	2020	36.3% patient showed decreased hemoglobin level
2	Fan et. Al.[10]	2020	Patient showed decreased hemoglobin level
3	Present study	2021	21.17% patient showed decreased hemoglobin level

In the present study 21.17% patient showed decreased hemoglobin level and the results were in accordance with Qian ET. Al and Fan ET. Al

Table 5: percentage of neutrophilia

Serial No.	Study	Year	Result
1	Chen et. Al.[9]	2020	38% patients showed neutrophilia
2	Xu et. Al.[12]	2020	34.5% patients showed neutrophilia
3	Present study	2021	35.29% patients showed neutrophilia

In the present study 35.29% patients showed neutrophilia, the results were in accordance with Xu et. Al and Chen ET. Al

Table 6: percentage of lymphocytopenia

Serial No.	Study	Year	Result
1	Zhou et. Al. [13]	2020	40% patients showed lymphocytopenia
2	Yang et. Al[14]	2020	85% patients showed lymphocytopenia
3	Present study	2021	30.58% patients showed lymphocytopenia

In the present study 30.58% patients showed lymphocytopenia, the results were in accordance with Zhou et. Al. and was in contrast with Yang et. al

Conclusion

Common hematological abnormalities in COVID-19 are thrombocytopenia, decreased hematocrit, neutrophilia, lymphocytopenia, monocytopenia, increased RBC count, Leukocytosis, Leukopenia whereas common biochemical abnormalities include increased Blood urea, decreased sodium level and fluctuating levels of SGOT, SGPT and Uric acid was observed. These alterations are significantly more common / prominent in patients with severe COVID-19 disease, and thus may serve as a possible biomarker for those needing hospitalization and ICU care.

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