Hematological Alterations in COVID-19 Patients: Insights from a Descriptive Study in Tlemcen, Algeria

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INTRODUCTION & AIM

COVID-19, caused by the zoonotic coronavirus SARS-CoV-2, first emerged in Wuhan, China, in December 2019 and was declared a global pandemic by the World Health Organization. The disease presents with highly variable clinical outcomes, ranging from mild respiratory illness to severe acute respiratory distress syndrome (ARDS).

Recent studies have highlighted the importance of hematological parameters in predicting disease progression and severity. Alterations in complete blood count (CBC) values, such as lymphopenia, thrombocytopenia, and changes in neutrophil-to-lymphocyte ratio (NLR), have been associated with worse outcomes in COVID-19 patients.

This study aims to investigate hematological changes in COVID-19 patients in Tlemcen, Algeria, to better understand potential predictors of disease severity.

METHOD

Study design: Descriptive observational study
Study period: January – March 2024
Setting: Private medical laboratories in Tlemcen, Algeria
Population: Individuals who tested positive for COVID-19
Data collected:
• Age and gender distribution
• Hematological parameters from CBC:
  • White blood cell (WBC) count
  • Neutrophil count
  • Lymphocyte count
  • Hemoglobin levels
  • Platelet count
Analysis:
• Patients were categorized by age and gender
• Correlation tests were used to explore associations between hematological changes and patient characteristics

CONCLUSION

Hematological parameters such as lymphocyte count, neutrophil count, and platelet count can serve as potential indicators of COVID-19 severity and progression.

These simple and accessible tests may assist clinicians in early risk stratification and patient management.

Further research with larger sample sizes is required to validate and strengthen these observations.

FUTURE WORK / REFERENCES

Lemerini W, Zatla I, Triqui C, Tchouar A, Tchouar S, Boublenza L, Bendahmane N. Hematological profile and abnormalities in COVID-19 patients: Evidence from the private sector in Tlemcen. Unpublished manuscript. University of Tlemcen; 2025.

RESULTS & DISCUSSION

Hematological variations were observed among COVID-19 patients.
Lymphopenia (reduced lymphocyte count) was common, especially in older patients.
Elevated NLR (neutrophil-to-lymphocyte ratio) was more frequent in patients with suspected moderate-to-severe disease.
Platelet count changes were noted, with some patients presenting mild thrombocytopenia.
Age and gender influence:
Older individuals showed more pronounced deviations from normal hematological values.
The findings are consistent with international studies showing hematological alterations as markers of COVID-19 severity.
Lymphopenia and high NLR may indicate heightened systemic inflammation and immune dysregulation, both associated with poor prognosis.
Age-related hematological abnormalities suggest that older patients may be at higher risk of severe disease outcomes.
The descriptive approach provides initial insights, but larger cohort studies and clinical follow-up are needed to confirm predictive value.
Our results suggest that hematological parameters can serve as potential indicators for COVID-19 progression and severity. Understanding these changes could contribute to early risk stratification and improved patient management. Further studies with larger sample sizes are needed to validate these findings.

Table 1. Distribution of hematological abnormalities among patients (N = 50)

Parameter	Abnormality	No. of patients	Percentage (%)
WBC (White Blood Cells)	Leucocytosis	8	16
	Leukopenia	5	10
RBC (Red Blood Cells)	Low RBC count	4	8
	Elevated RBC count	3	6
PLT (Platelets)	Thrombocytopenia	3	6
	Thrombocytosis	1	2
LYM% (Lymphocytes)	Lymphopenia	6	12
	Lymphocytosis	6	12
NEU% (Neutrophils)	Neutrophilia	3	6
	Reduced neutrophils	2	4

Table 2. Correlations of hematological parameters

	WBC.P	WBC.R	RBC.P	RBC.R	PLT.P	PLT.R	LYM.P	LYM.R	NEU.P	NEU.R
WBC.P	1	0.582**	0.064	0.037	0.274	0.152	-0.542**	-0.382**	0.533**	0.381**
WBC.R		1	-0.124	0.078	0.206	0.035	-0.292*	-0.603**	0.249	0.492**
RBC.P			1	0.476**	0.117	-0.074	0.015	0.015	0.070	0.022
RBC.R				1	0.204	0.112	0.157	-0.133	-0.087	0.090
PLT.P					1	0.495**	0.020	0.013	0.006	-0.015
PLT.R						1	0.050	0.113	-0.046	-0.009
LYM.P							1	0.478**	-0.968**	-0.472**
LYM.R								1	-0.490**	-0.927**
NEU.P									1	0.510**
NEU.R										1