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Original Research Article

A STUDY OF HAEMATOLOGICAL PREDICTORS IN COVID-19 PATIENTS

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Abstract

Background: The emergence of the novel coronavirus, SARS-CoV-2, leading to the global COVID-19 pandemic, necessitated a thorough examination of haematological parameters to understand disease severity and prognosis. This study focuses on Neutrophil to Lymphocyte Ratio (NLR), Platelet to Lymphocyte Ratio (PLR), and Absolute Lymphocyte Count (ALC) as potential indicators in COVID-19 patients. The aim was to investigate NLR, PLR, and ALC in COVID-19 patients at a tertiary care centre in South-West Bihar. Objectives included profiling these haematological parameters to understand their potential as diagnostic and prognostic markers. Settings and Design is a retrospective study was conducted at Narayan Medical College & Hospital, Sasaram, Bihar. **Materials and Methods:** Haematological parameters were derived from blood samples of 100 confirmed COVID-19 patients admitted between May 1, 2021, and May 31, 2021, and these were analysed with corroboration with age and gender of the patients. Statistical analysis was done by SPSS software. **Result:** Of the 100 patients, 70% were males, and 30% were females, with an age range of 6 months to 90 years. NLR was elevated in all patients, PLR in 75%, and ALC decreased in 36% of cases. The study revealed varying degrees of lymphopenia, neutrophilia, and thrombocytopenia, with specific ratios observed within these parameters. **Conclusion:** The study concludes that COVID-19 patients exhibit notable lymphopenia, neutrophilia, and thrombocytopenia upon admission. Careful consideration of these haematological parameters can aid clinicians in determining appropriate treatment strategies and promptly providing intensive care to those in greater need. NLR and PLR, specifically elevated in severe cases, serve as valuable indicators in assessing disease severity during the ongoing pandemic.

INTRODUCTION

In early December 2019, several cases of pneumonia of unknown aetiology have been reported in Wuhan, Hubei province, China.[1]

Two week later new virus variant called severe acute respiratory coronavirus syndrome 2 (SARS-CoV-2) Caused by CoronaVirus disease 2019(covid-19) was found in an outbreak in Wuhan china and spread to the rest of the world The first case of COVID-19 in India was reported on 30 January 2020 in Kerala.

COVID-19 is a global pandemic through symptomatic and asymptomatic, person to person transmission mainly through respiratory droplets.

The initial presentation of the disease ranged from mild non-specific symptoms of acute respiratory syndrome to severe acute respiratory distress and some cases leading to death.[2-5]

CBC (Complete blood count) are easily performed and inexpensive. included in the CBC are values such as white blood count, neutrophil, lymphocytes, platelet count, (PLT) Mean Platelet volume and certain ratios of these values. These can be used as inflammatory markers.

Neutrophil to lymphocyte ratio (NLR) is an inflammatory mediator used as a predictor of systemic inflammation. NLR is an easily accessible parameter calibrated entirely through CBC, making it a potential diagnostic criterion.[6,7] It gives an idea about the severity of disease. High level determines poor prognosis and high mortality in ICU patients.[8] Elevated levels of NLR indicate prediction of mortality in acute coronary syndrome, polymyositis, dermatomyositis, intracerebral haemorrhage and cancer.[9,10]

The platelet to lymphocyte ratio (PLR) is also an effective inflammatory mediator utilised in predicting the prognosis of many disorder and mortality among patients

Elevated levels of PLR are associated with increased severity and high mortality.[11]

The high count of monocytes and low count of lymphocytes are suggestive of increased incidence of

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mortality and decline of prognosis among patients with severe disease.[12]

The aim of the study was to evaluate and profile Neutrophil to Lymphocyte Ratio (NLR), Platelet to Lymphocyte Ratio (PLR), Absolute Lymphocyte Count (ALC) in Covid-19 Infected Patient in Tertiary Care Centre in South- West Bihar.

MATERIALS AND METHODS

Place of Study: Department of Pathology of Narayan Medical College & Hospital, Jamuhar, Sasaram, Bihar.

Study Design: Retrospective study of haematological parameters of COVID-19 positive patients.

Duration of Study: Period of Data Collection. (01 May 2021 - 31 May 2021).

RESULTS

100 patients with confirmed COVID 19 admitted to NMCH, Sasaram, Bihar from 1 May 2021 to 31 May 2021 were enrolled in this study.

Haematological parameters of COVID-19 infected patients along with age sex and IPD no. were collected. Neutrophil to Lymphocyte ratio(NLR), platelet to lymphocyte ratio (PLR) and absolute lymphocyte count (ALC) were noted down and analysed.

Table 1: Age and sex wise distribution of Covid 19 patients

Age Group	Male	Female	Percentage(%)
0-10	1	1	2
11-20	1	1	2
21-30	4	8	12
31-40	8	2	10
41-50	20	4	24
51-60	12	10	22
61-70	16	4	20
71-80	6	0	6
81-90	2	0	2
Total	**70**	**30**	**100**

Table 2: Distribution of lymphopenia among Covid-19 positive patients

Absolute Lymphocyte Count	Number of Cases	Percentage(%)
<500	6	6
500-1000	30	30
>1000	64	64
Total	**100**	**100**

Table 3: Distribution of Neutrophilia among Covid-19 positive patients

Neutrophil to lymphocyte Ratio	No of cases	Percentage
<3 (Normal)	0	0
3-9 (acute stress)	75	75
>9 (sepsis)	25	25
Total	100	100

Table 4: Distribution of Thrombocytopenia among Covid-19 positive patients

Platelet to Lymphocyte Ratio	No of Cases	Percentage
<50	0	0
50-150	25	25
>150	75	75
total	75	75

Among the 100 patients, there were 70 (70%) males and 30 (30%) females with an age range from 6 months to 90 years with 50 patients above 50 years [Table 1]. There was an increase in NLR in all 100 patients (100%) followed by an increase in PLR 75% cases and decrease in ALC 36% cases.

DISCUSSION

In the presence of rapidly emerging novel coronavirus infection, identification of haematological parameters could help predict disease severity and prognosis thus guiding clinical care. Significant lymphopenia, Neutrophilia & Thrombocytopenia is becoming evident at this point. In the present study lymphopenia was found in 36 patients (36%) with 30 (30%) having moderate absolute lymphopenia and 6 patients (6%) with severe absolute lymphopenia [Table 2]. In the present study Neutrophilia was found in 100 (100%) patients with 75 patients having a ratio between 3-9 (acute stress) and 25 patients having a ratio >9 (sepsis) [Table 3].

In the present study Thrombocytopenia was found in 75 (75%) patients with 75 (75%) patients have ratio >150 and 25 (25%) patients had a ratio between 50-150 [Table 4].

CONCLUSION

COVID-19 patients on admission showed marked lymphopenia, Neutrophilia and thrombocytopenia. Other haematological parameters did not show any significant changes. Careful evaluation of laboratory indices at admission can be helpful to clinicians in formulating a treatment approach and promptly provide intensive care to those who are in greater need.

Haematological parameters are a good guide for predicting the severity and disease outcome.

NLR and PLR were known to be elevated in the current pandemic and also in correlation with disease severity as both of them are more likely to be elevated in severe disease.

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