



ORIGINAL RESEARCH PAPER

Pulmonary Medicine

A RETROSPECTIVE STUDY TO CORRELATE NEUTROPHIL LYMPHOCYTE RATIO AS A PROGNOSTIC MARKER IN CORONA VIRUS DISEASE (COVID 19) PATIENTS IN A TERTIARY COVID CARE HOSPITAL OF INDORE

KEY WORDS:

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ABSTRACT

INTRODUCTION: Neutrophil to lymphocyte ratio is a new adjunct in management of COVID -19 cases. It acts as a serological marker for physiological stress (infection or inflammation). It is used as an acute serological marker of inflammation.

MATERIALS & METHODS: Case records were taken from MRTB Hospital of COVID 19 patients from March 2020 to February 2021. Data recorded were analysed and correlations were made between NLR with ARDS grading.

RESULTS: In 210 patients 52% cases were not have ARDS, 21.5% cases were MILD ARDS, 18.5% cases were Moderate ARDS and 8.1% cases were Severe ARDS. Total mortality in our study was sixteen out of two hundred ten patients (7.6%). Out of 210 patients, sixty eight patients had NLR more than 5. Among of this sixty eight patients, 16 patients were expired. The risk of in-hospital mortality is higher for increase of NLR at the time of admission and patients with high NLR (> 5) at the time of admission have a higher risk of death than patients with low NLR(<5).

CONCLUSION: This study supports that elevated neutrophil-lymphocyte ratio (NLR) is an independent prognostic biomarker for COVID-19 patients. The neutrophil to lymphocyte ratio (NLR) is an indicator of the systematic inflammatory response. Higher values have been associated with more severe forms of illness and with the worst prognosis. Critically ill COVID-19 patients show higher NLR when compared with non-ICU patients.

INTRODUCTION:

The novel corona virus, named as SARS CoV-2 was first reported in China in December 2019. Rapid outbreak and fast world wide spread has resulted in pandemic of this infectious disease COVID 19.

It may develop serious complications like ARDS , severe pneumonia and multiple organ failure leading to death, with mortality rate being much higher in elder patients with preexisting chronic diseases.

As there are currently no standardized treatments and medications available, so it is crucial to identify factors of severe prognosis for COVID-19 patients.

Neutrophil to lymphocyte ratio is a new adjunct in management of COVID -19 cases. It acts as a serological marker for physiological stress (infection or inflammation).

In the study of Xia et al., reported that approximately 80% of SARS-CoV-2 patients infected with bilateral pulmonary involvement have increased NLR.

A Chinese study aimed at assessing the NLR cut-off value for progression of disease reported that NLR>3.3 is independently associated with more severe COVID-19 and NLR>3.3 was associated with lower survival.

- The NLR, calculated from routine blood tests by dividing absolute neutrophil count by absolute lymphocyte count, it has been reported of great value in indicating a patients overall inflammatory status.
- Prognosis: criteria included in this study are
- Pao2/fio2 levels & ARDS grading at the time of admission.
- Final outcome: discharge/death.

MATERIALS & METHODS:

Aim of this study to correlate neutrophil lymphocyte ratio as a prognostic marker in corona virus disease (covid 19) patients

in a tertiary covid care hospital of indore.

- Study type – Retrospective study.
- Location – MRTB dedicated COVID Hospital, INDORE.
- Study period – from March 2020 to February 2021.
- Sample size - 210 cases.

INCLUSION CRITERIA:

- A diagnosed case of COVID 19 admitted in MRTB hospital proven with RT-PCR for COVID 19, who was under treatment for the same with routine blood workup done and documented of the day of admission.

EXCLUSION CRITERIA:

- Pregnant woman
- Person infected with human immunodeficiency virus (HIV), malignancies (also patients on chemotherapy)
- Case records were taken from MRTB Hospital of COVID 19 patients from March 2020 to February 2021
- Inclusion and exclusion criteria were applied of the patients and cases were selected falling to fulfilling those criteria
- Then following data were taken from the case files
 1. Patients particulars.
 2. Details of COVID -19 sampling and report.
 3. Known co morbidities in patients.
 4. Pao2/fio2 ratio from ABG at the day of admission.
 5. Calculation of NLR from the CBC report.
 6. Final outcome: Discharge/Death.

- Data recorded were analysed and correlations were made between NLR with ARDS grading
- NLR with final outcome of the patient
- ARDS grading with final outcome of the patient
- Proportion of raised NLR in COVID 19 patients. ARDS severity classified on the basis of Pao2/fio2 ratio (BERLINS 2012 criteria)
 - No ARDS if ratio is >300.
 - Mild ARDS if ratio is 201-300.

- Moderate ARDS if ratio is 101-200.
- Severe ARDS if ratio is equal or less than 100.
- Normal Neutrophil lymphocyte ratio (NLR) ranges from 0.78–3.2.

RESULTS:

In this study total 210 patients were taken. The patients age range from 8 years to 84 years. Out of 210 patients, 141 patients were male and 69 patients were female.

Fever (87.2%), cough (78.7%), SOB (32%), Hemoptysis (5 patients) & Loose Motion (2%) were the first and most common symptoms of patients before admission. Lymphopenia and neutrophilia were observed in 78.6% and 50.2% of patients respectively.

In cases associated comorbidities followed by hypertension (21%), diabetes (18%), CAD (3.3%), Asthma (2.8%), Liver Cirrhosis (1 patient) and Hypothyroidism (2.3%). The severe case patients showed significantly high frequencies in the occurrence of diabetes, hypertension and coronary artery disease.

In 210 patients 52% cases were not having ARDS, 21.5% cases were MILD ARDS, 18.5% cases were Moderate ARDS and 8.1% cases were Severe ARDS. Total mortality 16/210 (7.6%).

Out of 210 patients, sixty eight patients had NLR more than 5. Among of this sixty eight patients, 16 patients were expired.

Table 1 – Relation of Mortality of covid 19 patients with ARDS and NLR.

NLR	Patients	NO ARDS	Mild ARDS	Moderate ARDS	Severe ARDS	Death (%)
<3.2	113	90	16	7	0	0
3.2 – 4.9	29	9	13	7	0	0
5-9.9	47	10	14	20	3	14.8
>=10	21	0	2	5	14	43

DISCUSSION:

In this study total 210 patients were taken. The patients age range from 8 years to 84 years.

Out of 210 patients, 141 patients were male and 69 patients were female.

Fever (87.2%), SOB (32%), cough (78.7%), Haemoptysis (5 patients) & Loose Motion (2%) were the first and most common symptoms of patients before admission. Lymphopenia and neutrophilia were observed in 78.6% and 50.2% of patients respectively. In cases associated comorbidities followed by hypertension (21%), diabetes (18%), CAD (3.3%), Asthma (2.8%), Liver Cirrhosis (1 patient) and Hypothyroidism (2.3%). The severe case patients showed significantly high frequencies in the occurrence of diabetes, hypertension and CAD.

In this study cases associated comorbidities followed by hypertension (21%), diabetes (18%), CAD (3.3%), Asthma (2.8%), Liver Cirrhosis (1 patient) and Hypothyroidism (2.3%). Previous studies also showed high frequencies in the patients of diabetes, hypertension and coronary artery disease. Qin et al. reported in a cohort study that 36.2% of COVID-19-infected patients had at least one comorbidity, mainly hypertension, diabetes, cardiovascular disease, or chronic obstructive pulmonary disease.

Among 210 patients NLR < 3.2, 113 COVID-19 patients with mild disease were cured and discharged at approximately 7 days. NLR was a very useful indicator and its clinical application was useful as a prognostic marker in corona virus disease (covid 19) patients in covid hospitals.

In 210 patients 52% cases were not having ARDS, 21.5% cases were MILD ARDS, 18.5% cases were Moderate ARDS and 8.1% cases were Severe ARDS. Total mortality 16/210 (7.6%).

Out of 210 patients, sixty eight patients had NLR more than 5. Among of this sixty eight patients, 16 patients were expired.

We found that neutrophil lymphocyte ratio can be used as a prognostic factor for covid-19 in our study. The calculated NLR is recommended as practical tool to assess prognosis and to evaluate the severity of clinical symptoms in COVID-19 patients.

The risk of in-hospital mortality is higher for increase of NLR at the time of admission and patients with high NLR at the time of admission have a higher risk of death than patients with low NLR.

CONCLUSION:

The clinical manifestations of COVID-19 disease can vary in patients; the severity of the condition may be related to the number of immune cells. NLR can be related to the severity of the infection and may also indicate the outcome of the covid-19 disease. This study supports that elevated NLR is an independent prognostic biomarker for COVID-19 patients.

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