

Evaluation of Total Leucocyte and Lymphocyte Count and its Correlation with Severity of Covid Infection

Leucocyte and Lymphocyte and its Co Relation with Co-vid Infection

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ABSTRACT

Objective: This was a new disease occurring in pandemic and nothing was known about it in detail, so main aim of the study was the curiosity about SARS – CoV -2.

Study Design: Descriptive /cross sectional study.

Place and Duration of Study: This study was conducted at the Mardan Medical Complex (M.M.C) from 20 March 2020 to 10 July 2020.

Materials and Methods: Adult male and female patients presenting with short history of fever along with respiratory symptoms and chest ray finding of bilateral pulmonary infiltrates were admitted. Then those whose PCR for corona virus was positive were included in the study.

Results: Majority of patients presented with lymphocytopenias and raised TLC in severe and critical cases. Critically ill patients who survived have average TLC low as compared to those who succumb to infection. Similar was the finding with lymphocytes count as well. While mild cases presented with almost normal TLC but lymphocytes count was slightly reduced.

Conclusion: It was concluded the disease was more aggressive in those patients having a high TLC and low lymphocytes count, high TLC may be due to superadded infections or highly virulent virus as those with mild disease presented with almost normal TLC.

Key Words: Hematological Abnormalities, Corona Virus, SARS – CoV -2

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INTRODUCTION

Corona virus disease 2019 is caused by severe acute respiratory syndrome corona virus 2 (SARS - CoV-2), which started as an epidemic outbreak in Wuhan China¹. The Chinese authorities report this epidemic to W.H.O on December 31st 2019. Unfortunately this epidemic evolves into a pandemic affecting more than 15 million and killing more than six hundred thousand people worldwide till compiling this article on 20th July 2020.

This virus affects the lungs by binding to Angiotensin converting enzyme-2 receptors (ACE-2) and is very much similar to SARS – CoV¹.

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Though it affects mainly the respiratory system but the emerging data of the disease from all over the world confirmed it to be a systemic disease affecting cardiovascular, gastro intestinal tract, central nervous system, hematopoietic and immune system too^{2, 3, 4}. Outbreaks of SARS-CoV and Middle East respiratory syndrome (MERS) in the past were more severe and deadly than SARS-CoV-2⁵ but is more aggressive than common flu. Corona virus disease 2019 is found to be more aggressive and deadly in elderly and people having co morbidity such as chronic liver disease, diabetes, chronic obstructive air way disease, hypertension etc. Unfortunately some of the young and fit people who suffered from covid-19 have presented with more aggressive and lethal complications such as DIC, myocarditis^{6,7}. The novel corona virus was renamed as SARS-CoV-2 (2019) by W.H.O due to more than 79% similarity with SARS-CoV⁸.

The reported clinical manifestation of the disease across the world were mainly from the patients admitted in hospitals but most of the covid-19 patients presented with mild respiratory tract infections which were grouped into simple infection type of W.H.O classification^{9,10,11}. Hematological manifestations of covid-19 varied widely between simple, severe and critical cases. Severe ill covid-19 patients were defined as having respiratory rate of more than or equal to 30

breaths per minute, oxygen saturation of less than or equal to 93% on room air and having fever too¹². Critically ill patients were considered those having sepsis with acute organs failure besides ARDS¹². While simple cases presented with simple flu and lack all above mentioned features¹².

MATERIALS AND METHODS

Patients who presented to us with a short history of fever with severe bodyaches and respiratory symptoms of cough, sore throat, shortness of breath and oxygen saturation less than 96% on room air were admitted. Their respiratory secretions were then send for corona RT-PCR. Those who were found to be positive for corona RT-PCR were included in study or in other words patients with negative corona RT-PCR were excluded from study.

RESULTS

Majority of patients presented with lymphocytopenias and raised TLC in severe and critical cases. Critically ill patients who survived have average TLC low as compared to those who succumb to infection. Similar was the finding with lymphocytes count as well. While mild cases presented with almost normal TLC but lymphocytes count was slightly reduced. Results clearly showed that critically ill patients who survived have a high TLC and lymphopenia which was even much more marked in those who expired.

Table No.1: Recovered

Dis. Severity	Average of TLC	Average of Lympho
Asymptom atic	8,656	10.3%
Critical	11,712	25.3%
Mild	8,633	14.0%
Moderate	10,423	14.7%
Severe	12,255	8.5%

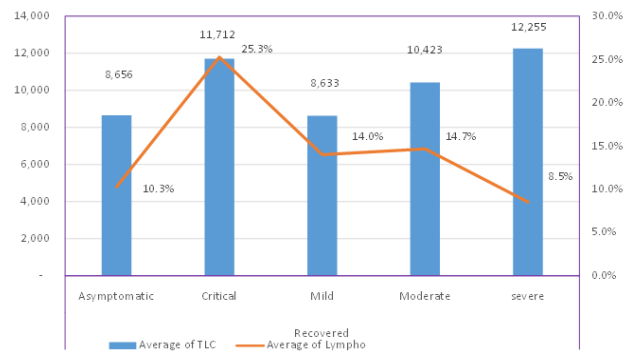


Figure No.1: Average of TLC and Lympho

Table No.2: Expired

Dis. Severity	Average of TLC	Average of Lympho
Critical	15,098	6.3%

DISCUSSION

Patients in our study with mild to moderate symptoms were having normal TLC and their lymphocytes count was only slightly reduced. As SARS-COV-2 have got high affinity for ACE receptors, which are present in lungs, heart, G.I.T. These receptors are also present on cell surface of lymphocytes⁹. As the virus becomes attached to ACE receptors it affects the above mentioned organs and lyses of lymphocytes which accounts for lymphopenia. When cytokine storm occurs cytokines causes lymphocytes apoptosis^{10,12}, and it also damages the lymphoid organs¹³ and thus accounting for marked lymphopenia. In other words more the disease severe marked is the lymphopenia and this is what we concluded in our study too. Co – morbid conditions like malignancy or diabetes can be associated lactic acidosis which blocks the lymphocytes production^{14,15} and causes marked lymphopenia. In our study patients were both critically and severely ill with co morbidity and were having marked lymphopenia too.

Guan et al concluded in his study which was done when the pandemic was originating from china in its very early days¹⁶ that lymphopenia was present in 83.2% and leucopenia in 33.7% of patients. During the same period four other descriptive studies were done on confirmed 41, 99, 138 and 201 co vid patients^{17,18,19} showed similar results. Among them Huang et al¹⁹ and Wang et al¹⁹ showed strong association with aggressiveness of disease and marked lymphopenia. Wu et al²⁰ concluded in his study that ARDS was more common in patients with marked rise in TLC and with extremely low lymphocyte count. Our results matched with above mentioned studies in china.

CONCLUSION

It was concluded in our study that low lymphocytes count occurred in almost cases and as the disease increases its severity the lymphocytes count falls further so that in critically ill patients lymphocytes count was lower than 10%. TLC presented in a different manner initially in mild cases it was normal but it raises as the co-vid infection increases its aggressiveness so that almost all critically patients were having TLC more than 15000. Raised TLC may be due to superadded hospital acquired infection and it may need further work up.

Author's Contribution:

Concept & Design of Study: Shahzeb
 Drafting: Muhammad Abbas, Sajjad Ali Shah
 Data Analysis: Zarka Sarwar, Jamal Nasar, Jehandad Khan
 Revisiting Critically: Shahzeb, Muhammad Abbas
 Final Approval of version: Shahzeb

Conflict of Interest: The study has no conflict of interest to declare by any author.

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