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Association between thrombocytopenia and mild infection of COVID-19 patients

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Abstract:

Background: Thrombocytopenia is a common manifestation and also an indicator of poor prognosis of SARS, MERS, and COVID-19 according to previous researches, Some studies have found a relationship between thrombocytopenia and the severity of the COVID-19 and related mortality. **Patients and methods:** This study included 504 out hospitalized patients with confirmed COVID-19 infection in Alexandria, Egypt, these study subjects were randomly selected irrespective of the age group and both genders were included, EDTA blood sample was collected for performing complete blood count and platelet count (Diagon D-cell 60 hematology analyzer Europe-Diagon Ltd. Hungary). **Results:** The present study included patients aged from14 years to 75 years mean age was 44.5 ±30.5 who were confirmed to have Covid-19 based on real-time reverse transcription-polymerase chain reaction, the female gender was more frequent (n=280, 55.6%) than Male gender (n=224, 44.4%). This study reveals a normal platelet count in 456 patients (90.5%), and a mild low platelet count of 140-150× 10^9/L in 48 patients(9.5%), with a p-value, is 0.415 which is more than 0.05 not significant. And no patients in this studied group recorded platelet count less than 140× 10^9/L. **Conclusion:** Platelet was not a significant biomarker for COVID-19 diagnosis or prognosis in out-hospitalized patients (Outpatients and patients under home observation).

Keywords: Thrombocytopenia, Platelet, COVID-19, non-hospitalized patients, biomarker

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1. Introduction:

A novel coronavirus disease broke out in 2019 (COVID-19). This disease was found to be a result of infection from the 2019 novel coronavirus (2019-nCoV)[1]. The clinical manifestations in COIVD-19 patients have been extensively reported since the outbreak. Patients with COVID-19 can represent pulmonary symptoms, abdominal symptoms, acute heart injury, acute liver injury, acute kidney injury, and coagulation abnormalities[2,3], and the main changes in complete blood cells are characterized by lymphopenia and thrombocytopenia[4].

Thrombocytopenia is a common manifestation and also an indicator of poor prognosis of SARS, MERS, and COVID-19 according to previous researches[5,6], a national multicentre retrospective study conducted in China revealed that the incidence of thrombocytopenia (< 150 × 10^9/L) on admission in COVID-19 was

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36.2%[7], which is similar to that in SARS (40–45%%) and MERS (36%)[8].

Some studies have found a relationship between thrombocytopenia and the severity of the COVID-19 and related mortality. It has been reported that mortality increases as platelet count decreases[9,10].

This study aimed to evaluate the association between thrombocytopenia and mild infection of COVID-19 patients, this study included outpatients and patients under home observation, while hospitalized patients are not included in this study.

2. Patients and methods

2.1. **Study population Patients**

This study included 504 out hospitalized patients with confirmed COVID-19 infection, these study subjects were randomly selected irrespective of the age group and both genders were included.

It was performed following the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All the studied population was informed about the purpose of sample collection and their consents were obtained. Patients were free to refuse sample collection.

2.2. Data collection

In this cross-sectional study, we obtained data regarding 504 out hospitalized patients with confirmed COVID-19 via real-time reverse transcription-polymerase chain reaction (PCR), they came to Alyameny laboratory in Alexandria, Egypt for biomarkers and complete blood count investigations**,** and reviewed the medical records and compiled data between August 12 and December 30, 2020.

2.3. Collection and processing of blood samples:

EDTA blood sample was collected for performing complete blood count and platelet count (Diagon D-cell 60 hematology analyzer Europe-Diagon Ltd. Hungary) on 504 Positive COVID-19 patients for individuals matching in age and gender.

2.4. Assay procedure as manufactory instructions:

Diagon D-cell 60 hematology analyzer Europe-Diagon Ltd. Hungary was used for platelets count, considered normal platelet count: $150 – 450 \times 10^9$/L.

2.5. Statistical analysis

Data were analyzed using SPSS statistical software, version 20.0(SPSS, Chicago, Illinois, USA). All continuous data are presented as means and standard deviations, while categorical data are presented as numbers and percentages. A chi-square test was used to compare categorical variables. Multivariate regression analysis was performed to analyze relationships between COVID-19 infected patients and platelet count, this model was generated using independent variables achieving a p-value of 0.10 during bivariate analysis. Then, the best-fit model was generated without interaction variables. For all calculations, a p-value of less than 0.05 was considered statistically significant.

3. Results:

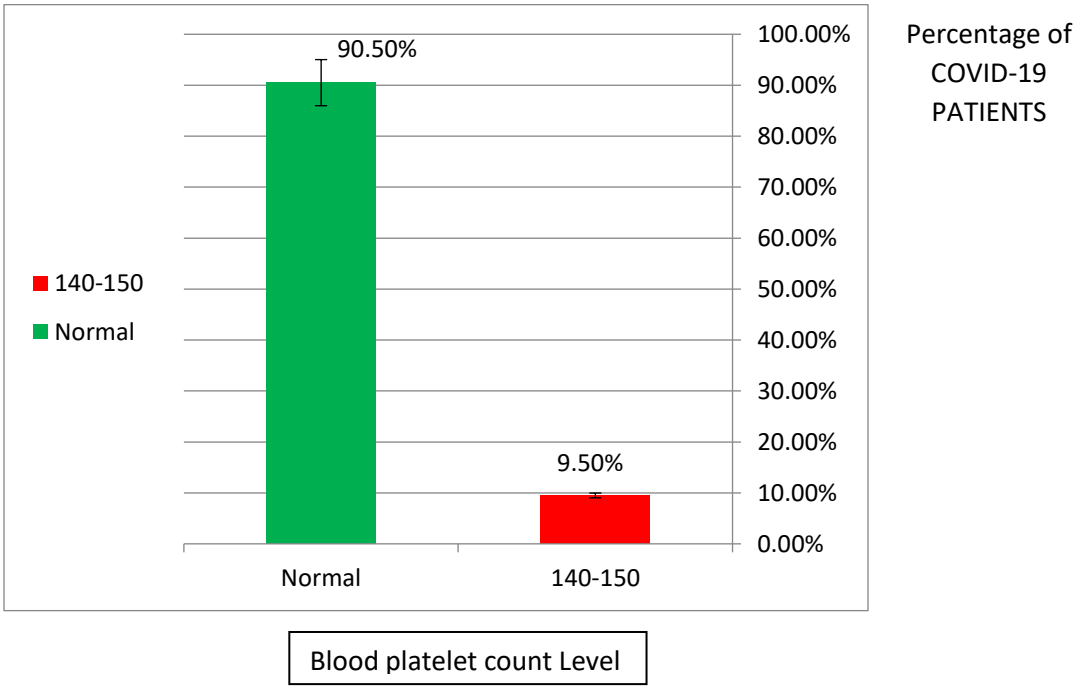
Table (1): shows The percentage of COVID-19 mild infected patients (out hospitalized and home observation Patients) relation to blood platelet count, The present study included patients aged from14 years to 75 years mean age was 44.5 ±30.5 who were confirmed to have Covid-19 based on real-time reverse transcription-polymerase chain reaction, female gender was more frequent (n=280, 55.6%) than Male gender (n=224, 44.4%). This study reveals normal platelet count in 456 patients (90.5%), and mild low platelet count 140-150$\times 10^9$/L in 48 patients(9.5%), which was not a significant biomarker for COVID-19 diagnosis or prognosis in out-hospitalized patients (Outpatients and patients under home observation), with a p-value is 0.415 which more than 0.05 not significant. And no patients in this studied group recorded platelet count less than 140×10^9/L.

Table (1): Association between platelet count and mild infection of COVID-19 Patients

COVID-19 POSITIVE Patients	Blood platelet count				Total	
	*140-150× 10^9/L		**Normal level			
	No.	%	No.	%	No.	%
Male	24	50	200	43.9	224	44.4
Female	24	50	256	56.1	280	55.6
Total	48		456		504	

The chi-square statistic is 0.6632. The *p*-value is 0.415447. Not significant at $p < .05$.
The chi-square statistic with Yates correction is 0.4378. The *p*-value is 0.508192. Not significant at $p < .05$

Figure (1): Blood platelet count level with the percentage of COVID-19 patients



4. Discussion:

It has been reported that 2019-nCoV infection might affect the blood coagulation mechanism resulting in a disorder of blood coagulation[11], Some studies have found a relationship between thrombocytopenia and the severity of the COVID-19 and related mortality. It has been reported that mortality increases as platelet count decreases[12,13].

This study was conducted on 504 mild infected COVID-19 patients (out hospitalized and home observation Patients) who were confirmed to have Covid-19 based on real-time reverse transcription-polymerase chain reaction, This study reveals normal platelet count in 456 patients (90.5%), and mild low platelet count 140-150× 10^9/L in 48 patients(9.5%), which was not a significant biomarker for COVID-19 diagnosis or prognosis in out-hospitalized patients (Outpatients and patients under home observation), with a p-value is 0.415 which more than 0.05 not significant. And no patients in this studied group recorded platelet count less than 140× 10^9/L, this study confirms that mild COVID-19 infection is not associated with significant thrombocytopenia, then platelet count not used as a biomarker for diagnosis or prognosis for mild infection of COVID-19, other markers have a significant value with mild infection as ferritin level which increased in 71.4% (P-value 0.014)[14], LDH has a high level in 67.7% (P-value 0.024)[15], and D-dimer has positive results in 36.4% (P-value 0.00001)[16], Similar to our study Mo et al, reported normal thrombocyte count in 70 cases mild infection and slightly lower in 85 severe cases[17].

Chan et al., 2020 reported decreasing of thrombocyte count level in 2 of 3 a familial cluster, 6 cases more than 60 years[18]

Conflict of interest

There are no conflicts of interest.

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