



CRP Level Associated with The Severity Of COVID-19 Disease

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ABSTRACT

The variables influencing the development of anti-severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) antibodies in patients with coronavirus disease 2019 (COVID-19) are still unknown. The purpose of this study was to find these characteristics among COVID-19 patients who were recovering. Between January 15 and March 30, 2022, patients who were (investigated or examined) at Lalav Hospital were included in this study. 100 SARS-CoV-2-infected patients were all enrolled; 51% (51 cases) of the patients were female and 49% (49 cases) of the patients were male. Between the ages of 22 and 81. Sixty-one percent (61/100) of the patients had elevated CRP. P.Value (0.001). The severity of COVID-19 is positively correlated with serum CRP levels, and greater CRP levels were associated with longer hospital stays. For the first time, it is shown that CRP levels can help distinguish between patients with mild to moderate COVID-19 and those with more severe conditions.

1. Introduction

The family Coronaviridae and Order Nidovirales both include the subfamily Orthocoronavirinae, which is home to the coronavirus. A SARS-CoV was responsible for the severe acute respiratory syndrome outbreak in 2003. Since the SARS-COVID-2

outbreak in China, other cases have also been documented elsewhere in the world, turning the illness into a pandemic. The COVID-19 virus produces mass casualties and presents significant problems to the global healthcare system, even though the majority of patients have moderate symptoms. Early diagnosis and classification of the illness are essential for improving patient prognosis [1]. Additionally, the early detection of patients who will experience severe illness could make it easier to allocate the scarce medical resources to patients who require aggressive treatment for those infected with SARS-CoV-2. Some of the patients did not exhibit respiratory stress or hypoxemia throughout COVID-19, indicating a multifaceted disease of SARSCoV-2 infection. Therefore, a single practical biomarker that can accurately predict the severity of COVID-19 pneumonia is required. C-reactive protein (CRP) has recently been linked to severe dengue infections, and individuals with greater plasma CRP levels during the earliest stages of the disease are more likely to experience plasma leakage [2, 3]. The aim of the present study was to estimate whether the CRP level is able to act as a marker in indicating the severity of COVID-19.

2. Methods

2.1. Study design

At Lalav hospital, the largest comprehensive medical facility in Erbil city and the hospital designated specifically for the treatment of patients with severe COVID-19 in Erbil city, a total of 100 patients with COVID-19 were (investigated or inspected) between January 15 and March 10, 2022. The COVID-19 quick test (bio-medomics) was used to do laboratory confirmation of the COVID-19, and the serum CRP level was measured for all samples. It was determined by Japan's Hitachi (Cobas C111). Several characteristics, including gender and age, were taken into account in this analysis in accordance with the ethics of scientific research.

2.2. Sample collection

Venous blood samples were collected and examined at Lalav Hospital for each patient, vein blood samples were collected in a gel tube for the serological test. Serum was separated after centrifugation at 3000 rpm for 10 min.

2.3. Statistical analysis

Statistical data analysis was performed by using SPSS 25.0 (IBM, U.S.A). Data were presented as continuous and categorical variables, respectively. The categorical variables were compared among the patients by applying One-way analysis of variance (ANOVA) Kruskal-Wallis Chi square test, Fisher exact tests, and continuous variables were compared among the patients by applying Students' T test and ANOVA. Multivariate linear regression model was applied to study the association between plasma CRP concentrations with the severity of COVID-19(IgM and IgG). And receiver operation curve (ROC) was used to analyze the prognostic power of CRP level on the severity of COVID-19.

3. Results

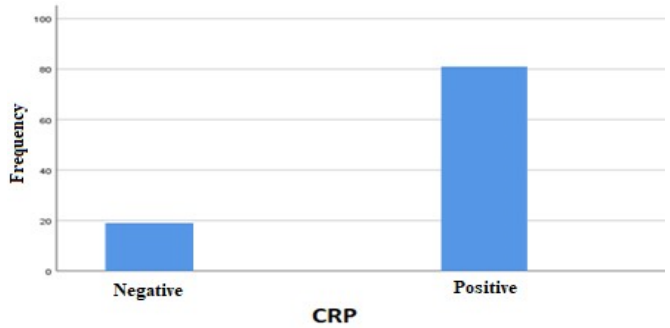
All of the enrolled 100 patients were infected with SARS-CoV-2. 49% (49 cases) of the patients were male and 51% (51 cases) of the patients were female. Ranging the age from 22 to 81 years. CRP elevation was seen in 61% (61/100) of the patients. According to table 1 and 2 results showed a significant difference between gender and age of confirmed COVID- 19 patients and CRP.

Table 1: Study of cases population.

Sex	Rate	%	Age	Rate	%	Covid-19	Rate	%
Female	51	51.0	Adult	65	65.0	Neg	19	19.0
Male	49	49.0	Old	35	35.0	Posi	81	81.0
Total	100	100.0	Total	100	100.0	Total	100	100.0

Table 2: The percentages of CRP circumstances

CRP	Rate	%
Negative	19	19.0
Positive	81	81.0
Total	100	100.0



According to Table 3 and Table 4, results showed a significant difference between positive and negative of IgM and IgG COVID-19 patients. On the other hand, our results showed that individuals suffering from COVID-19 are more affected by CRP, as shown in Figures 1 and 2. The current findings have shown that coronavirus infection has triggered a substantial increase in infected people's CRP levels.

Table 3: Percentage between positive and negative of Covid-IgM

COVID-19 IgM	Rate	%
Negative	39	39.0
Positive	61	61.0
Total	100	100.0

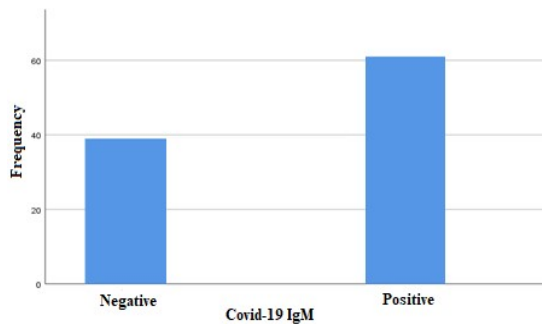


Table 4: Demography study of Covid-IgG infection

COVID-19 IgM	Rate	%
Negative	17	17.0
Positive	83	83.0
Total	100	100.0

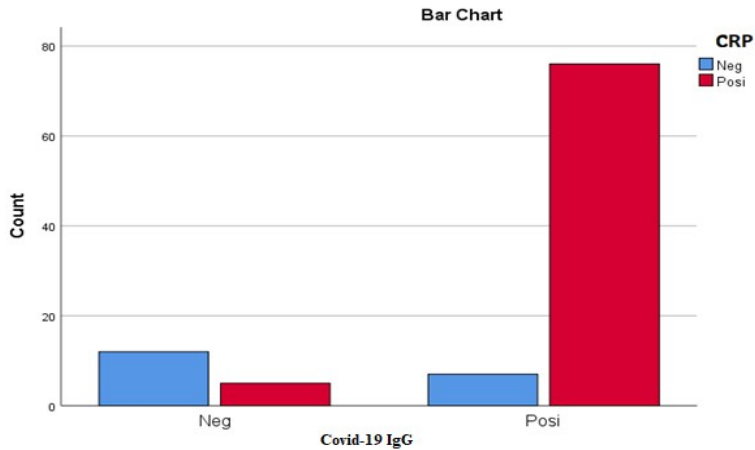
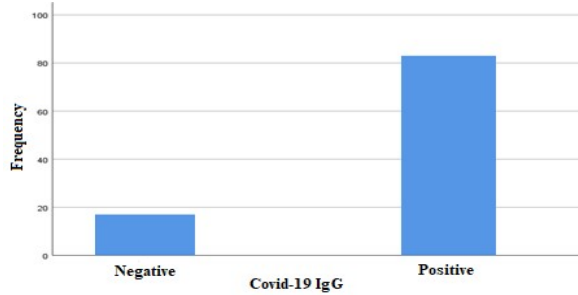


Figure 1: Relationship between positive and negative levels of covid-IgG with CRP levels. P.Value (0.001)

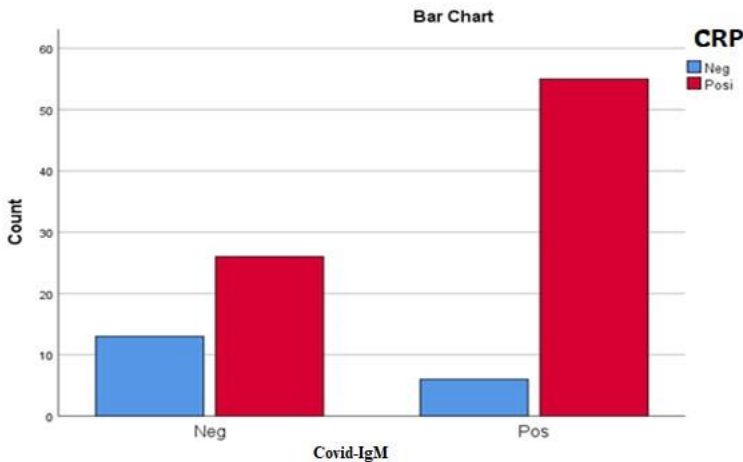


Figure 2: Relationship between positive and negative levels of covid-IgM with CRP levels. P.Value (0.001)

4. Discussions

Figures 1 and 2 from the current retrospective observational analysis show a positive connection between plasma CRP, COVID-IgM, and COVID-IgG levels. Table 2 lists the specifics and sensitivity of serum CRP levels. Numerous investigations linking CRP levels to disease severity elsewhere corroborated our findings. CRP has been proposed to be used as a predictive marker for dengue infection, with greater levels of CRP indicating a higher risk of illness development [4, 5]. It is obvious that SARSCoV-2 and dengue virus are both RNA viruses with comparable infection patterns. Hepatocytes that are activated by inflammation produce CRP quickly. It binds to a wide range of eukaryotic and prokaryotic pathogens, making it easier for the conventional pathway of complement activation to function [6]. Clinically, elevated CRP levels may serve as early warning signs of nosocomial infections in COVID-19 patients who were struggling to recover and may help doctors start empirical antibiotic therapy sooner rather than later to avoid a worsening outcome [7, 8].

5. Conclusions

In conclusion, the severity of COVID-19 is positively correlated with serum CRP levels, and higher levels of CRP were associated with longer hospital stays. For the first time,

it is shown that CRP levels can help distinguish between patients with mild to moderate COVID-19 and those with more severe conditions. This suggests that CRP testing may be helpful as an early warning sign for serious disease and assist doctors in stratifying patients for transfer to intensive care units.

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پوخته

ئەو گۆرپاوانەى كە كارىگەرەىيان هەيه لەسەر گەشەكردنى دژەتەنى دژە توندى نەخۆشى هەناسەدانى قايرۆسى كۆرۆنا-2 (SARS-CoV-2) لە نەخۆشانى تووشبوو بە نەخۆشى كۆرۆنا-2019 (COVID-19)، كە تا ئىستا نەزانراون. ئامانج لەم توپۆزىنەوہىە دۆزىنەوہى ئەم تايبەتمەندىانە بوو لەنيو ئەو نەخۆشانەى كۆفید-19 كە لە بارى چاكبوونەوہ بوون. لە نيوان 10ى كانوونى دووہم بۆ 30ى نازارى 2022، ئەو نەخۆشانەى كە (ليكۆلینەوہ يان پشكینیان بۆ كراوہ) لە نەخۆشخانەى لالاف-هەولپیر لەم توپۆزىنەوہىەدا بەشداربوون. 100 نەخۆشى تووشبوو بە SARS-CoV-2 هەموويان ناويان تۆماركرابوو؛ 51% (51 حالەت) لە نەخۆشەكان لە پەرگەزى مەى بوون و 49% (49 حالەت) لە

نه خوشه كان له رهگهزی نیر بوون. له نیوان ته مه نی ۲۲ بۆ ۸۱ سالد. له سه دا شه ست و به ک (۱۰۰/۶۱) نه خوشه كان CRP یان به رزبوو. به های P (0.001). توندی COVID-19 په یوه نندیبه کی ئه ری نی به ئاستی CRP له سیره مده هیه، و ئاستی زیاتری CRP په یوه ندی به مانه وهی دریزتر له نه خوشه خانه هه بوو. بۆ یه که مجار دهرده که وی ت که ئاستی CRP ده توانیت یارمه تیدهر بی ت له جیا کردنه وهی نیوان ئه و نه خوشه خانه ی که COVID-19 ی سووک یان مامناوه ندیان هه یه له گه ل ئه وانه ی که حاله ته کان یان توندتره.

الملخص

لا تزال المتغيرات التي تؤثر على تطوير الأجسام المضادة و المضادة لفيروس كورونا-2 المضادة للفيروس التاجي الحاد الوخيم في المرضى المصابين بمرض الفيروس كورونا-2019 (COVID-19) غير معروفة. كان الغرض من هذه الدراسة هو العثور على هذه الخصائص بين مرضى COVID-19 الذين كانوا يتعافون. بين 15 يناير الي 30 مارس 2022 ، تم تضمين المرضى الذين تم فحصهم أو فحصهم في مستشفى لالاف-أربيل في هذه الدراسة. تم تسجيل 100 مريض مصاب بالسارس-CoV-2 ؛ 51٪ (51 حالة) من المرضى كانوا من الإناث و 49٪ (49 حالة) من المرضى كانوا من الذكور. بين سن 22 و 81. كان لدى واحد وستون بالمائة (100/61) من المرضى ارتفاع في مستوى CRP القيمة P (0.001). ترتبط شدة COVID-19 ارتباطًا إيجابيًا بمستويات بروتين سي التفاعلي في الدم ، وارتبطت مستويات CRP علاقة الأكبر بإقامة أطول في المستشفى. لأول مرة ، تبين أن مستويات CRP يمكن أن تساعد في التمييز بين المرضى الذين يعانون من COVID-19 الخفيف إلى المتوسط وأولئك الذين يعانون من حالات أكثر خطورة.