Optimal examination ways to follow up patients effected by covid-19: case study in Jalawla general hospital in Iraq

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Abstract: The period of survival of the Corona virus in the atmosphere for more than three hours does not reduce its possibility of infection, and in some surfaces such as stainless steel and plastic, the survival period reaches 72 hours. Currently, prevention methods must be followed due to the lack of effective treatment to avoid aggravating the situation, and one of the most important prevention methods is infection prevention and control (IPC), while Infection prevention and control (IPC) has led to a 30% reduction in infection rate in medical clinics and health care centres. The objective is to identify the most successful ways to follow up patients who had corona virus with the best drugs that are effective in a short period of time. To give a few examples of the ailments that fall under the category of chronic diseases: coronary heart disease, diabetes, high blood pressure, cancer, and asthma are just few of the diseases that fall into this category. In many cases, the symptoms of a chronic disease continue to be present for an extended period. During this study endeavour, a sample of patients that is typical of the population was selected, and those patients were afterwards questioned about whether they suffered from a chronic ailment. The researchers have not only documented information on the history of the illness, but they have also documented other information regarding the patients, such as the patients' ages, genders, and current states of health. In addition, the researchers have documented information on the history of the illness.

1. Introduction

Coronavirus can be defined as one of the RNA viruses, and these viruses are very diverse and closed, and they are also single chained [1]. One of the most striking things is the decrease in the annual respiratory infection rate after the outbreak of the pandemic. The SARS virus, which infected 8000 people in the world, caused the death of 800 of them, at a rate of 10%. Also, the MERS virus infected 857 officially registered cases, and caused the death of 334 of those infected, meaning that the death rate was 35% [2, 3]. Covid-19 is the seventh in the family of coronaviruses. Among the main symptoms that appeared on COVID-19 patients are fatigue, fever, and cough, which are common symptoms between SARS, MARS, and Covid-19 [4].

The values of many laboratory markers have a distinctive role in evaluating the disease and knowing the severity of the infection. They predict the progression of the patient's condition towards more serious diseases, for example, the condition in Covid19 infections may develop into acute respiratory distress (SRDS), disseminated intravascular coagulation (DIC) [5].

There are signs by which a non-fatal course of the disease can be described such as hypoalbuminemia, thrombocytopenia, elevated liver enzymes, absolute neutrophils, creatinine, and nonspecific inflammatory markers such as interleukin 6 (IL6). And C-reactive protein (CRP) [6]. With all the previous parameters, hyper (D-dimer), lymphopenia, and hyperlipidemia should not be neglected, and LDH levels should be monitored in the list of markers [7]. To know the mechanism of entry of the Coronavirus into the human cell, it is necessary to identify the receptors that are one of the most

important determinants of infection with the coronavirus, and it is also one of the most important targets of the immune surveillance of the host and the body's defense mechanisms. SARS-Cov-2 RBD has a higher binding affinity for hACE2 compared to SARS-COV. These conclusions have been substantiated by mutagenesis and skeletal analyzes [8].

Disease, lymphatic deterioration, and elevated plasma inflammatory cytokine levels are associated with disease severity and eventual death [9]. Suggesting a pro-inflammatory response or a condition called in the literature, the cytokine cyclone, this may also play a role in disease progression and severity, as shown in SARS and MERS [10]. Therefore, it is important to know the details of what happens when infected. Presence of SARS-CoV-2 viral RNA in the patient's blood, together with acutely elevated plasma interleukin 6 (IL6) levels as well as other biomarkers along with D-related coagulopathy and disseminated intravascular coagulation DIC, have a strong association with medical severity and mortality [11, 12]. Therefore, the objective is to identify the most successful ways to follow up patients who had corona virus with the best drugs that are effective in a short period of time. The remaining parts of this work are organized as described below. The second section presents an illustration of the methods that the article will use to accomplish the goal. The findings that were obtained, together with a discussion of those results, will be presented in Section 3. The conclusion of the article is presented in the fourth part.

2. Methodology

Following the acquisition of the patients' consent, a total of one hundred and fifty patients with ages ranging from 25 to 101 years were selected for the research. The severity of these wounds varies from somewhat minor to quite serious to life-threatening.

This study was conducted at Jalawla General Hospital, more specifically in the epidemiological hall for the tests that were available in the hospital, and laboratory work was conducted in the hospital's laboratories in the clinical biochemistry department. Both locations are in Jalawla. After having samples removed from patients, separated, frozen, and then brought in a refrigerated vehicle to a specialist laboratory in Diyala, which is situated in Iraq, the remaining advanced tests were completed there. The laboratory was in Iraq. The study was carried out over the course of one year and one month, commencing on March 1, 2022 and concluding on June 1, 2022 respectively.

The information that was supplied by the pulmonologist was used to diagnose the patients, and that same information was used to determine the of samples that were taken. Each patient had ten milliliters of blood drawn from their veins, which were then deposited in one of many different tubes (Gel tube, EDTE tube, Sodium citrate tube). Blood samples were allowed to coagulate relative to the samples in Gel Tube for fifteen minutes at room temperature on a rack before being centrifuged for ten minutes at 3,500 revolutions per minute. This was done before the blood samples were centrifuged.

Following this step, the serum was isolated from the cells that were still present in the sample. Following the removal of the serum from the tube with a pipette of the proper size, it was transferred to a plain tube before being deposited in the freezer. The following findings emerged from the chemical analyses performed over the course of our research:

The assay known as the fasting blood sugar test is the procedure that determines the amount of glucose present in samples. A chart that provides explanations of blood sugar values using the units mg/dL is called a blood sugar chart. The assay that detects how much sugar is in blood samples is termed the fasting blood sugar test. This test is performed when the patient is not eating or drinking anything.

A full blood count was performed on the patient so that it could be determined not only their levels of hemoglobin (Hb), but also their levels of white blood cells (WBC), red blood cells (RBCs), and blood

count platelets. Within a short amount of time, blood samples were analyzed using a wide range of diagnostic procedures (Mindray BC -2800, USA).

Chronic diseases include things like coronary heart disease, diabetes, high blood pressure, cancer, and asthma, just to name a few instances of the conditions. Chronic illnesses often remain present for a considerable amount of time. During this research project, a representative sample of patients was chosen, and those patients were then questioned on the presence or absence of a chronic condition. The researchers have not only documented information on the history of the sickness, but they have also documented other information regarding the patients, such as the patients' ages, genders, and present states of health.

The body mass index of an adult may be determined by calculating their body fat percentage using their weight in kilograms and their height in millimeters. This may be helpful. To do this, just provide the adult's height in centimeters and their weight in kilos (BMI).

R1 is the diluent, which is a Tris buffer with a concentration of 20 mmol/L; R2 is latex, which is latex particles coated with goat anti-human CRP; and CAL is the calibrator, which is human serum. The CRP test reagent is composed of these three components:

We make use of the interleukin 6 (IL6) determination kit to perform the calculation that determines the IL6 concentration. This is how the computation breaks down: After you have inserted the IC card into the reader on the analyzer machine and waited for it to complete reading the card, you will need to add fifty microliters of sample to the buffer tube and thoroughly mix it. Collect a sample with a volume of 80 liters, add it to the cassette, and then put the cassette into the incubator for 15 minutes. After putting the cassette into the analyzer and selecting the "Test" button on the device, the results will immediately be shown on the screen and will also be printed out of their own accord. After the findings have been shown on the screen, print them off.

The enzyme urea catalyzes the hydrolysis of urea, which results in the production of ammonia and carbon dioxide as byproducts. Ammonia may be converted into glutamate by the process of glutamate dehydrogenase.

The test for cholesterol (LDL) begins with the precipitation of low-density lipoproteins in blood using polyvinyl sulfate, which is then followed by the centrifugation of the precipitate and an evaluation of the residual cholesterol in the VLDL and HDL that are left over after the procedure.

When creatinine is subjected to alkaline conditions, it will react with picrate ions to produce a complex that has a red hue to it. The increase in absorbance that occurs as a direct consequence of complex formation after the passage of a certain length of time is directly proportional to the quantity of creatinine that is found in the sample.

3. Results and Discussions

The results are shown in Table 1. In which, (group A = 1.0000; group B = 1.5570), age (group A = 57.6400; group B = 64.5369), the patient's condition (group A = 0.9200; group B = 1.8993), and Infection (group A = 45.6692; group B = 2.0000), indicated that there were statistically significant differences, which indicated that it is clinically successful in diagnosing the illness, especially in individuals of this age. Patients of this age are particularly likely to have the disorder.

***Table 1.** The mean of WCM, age, sex and other in patients with COVID-19*

Group Statistics						
Test	Groups	N	Mean	Std. Deviation	Std. Error Mean	P
Chronic Diseases	Group A	50	1.0000	.00000	.00000	0.000
	Group B	149	1.5570	.88059	.07214	0.000
WCM	Group A	50	93.3800	7.49936	1.0605	0.821
	Group B	149	93.6107	5.74069	.47030	0.843
BMI	Group A	50	26.5176	2.81328	.39786	0.586
	Group B	149	26.2281	3.38270	.27712	0.552
age	Group A	50	57.6400	18.57995	2.6276	0.017
	Group B	149	64.5369	17.06527	1.3980	0.023
Sex	Group A	50	1.3200	.47121	.06664	0.235
	Group B	149	1.2349	.42537	.03485	0.261
SPO2	Group A	50	70.0600	14.26629	2.0175	0.273
	Group B	149	67.4564	14.58455	1.1948	.270
The patient´s condition	Group A	50	0.9200	.14515	.02053	.000
	Group B	149	1.8993	.30191	.02473	.000
Infection	Group A	50	45.6692	51.60338	7.2978	.000
	Group B	149	2.0000	.82199	.06734	.000

When performing the statistical analysis at P = 0.05, the averages of IL6, NRL, LYM, and WBC, respectively, were clinically significant and statistically significant, while the results of serum creatinine and urea levels indicated that there were no significant differences with statistical significance and that they could be affected by Covid disease-19, as shown in Figure 1.
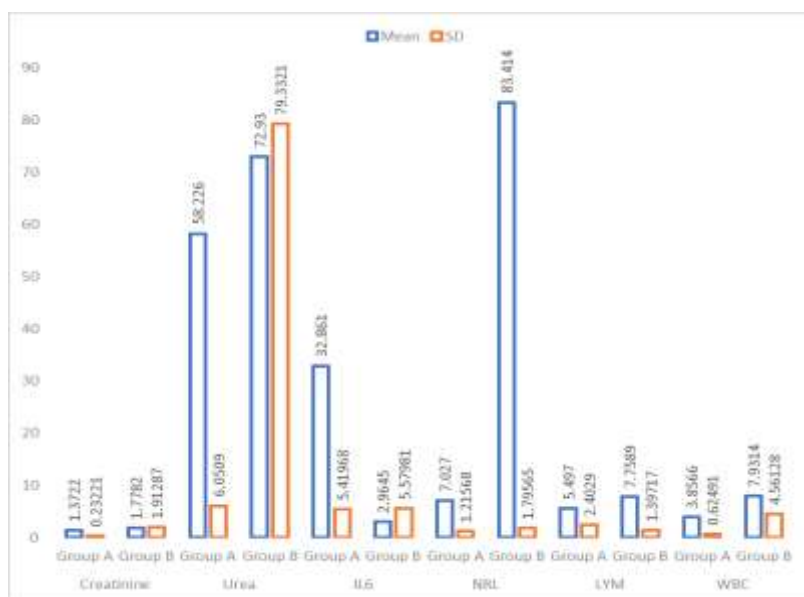

***Figure 1.** The mean of serum creatinine, urea, IL6 and other in patients with Covid-19*

Since liver and blood variables are directly affected in Covid-19 patients, the change in the mean levels of NRL, LYM, and WBC, respectively, is of clinical significance and has statistical power when conducting the data study at P = 0.05, meanwhile the reports revealed that these variables are diagnostic and can be used as markers to monitor the patient's condition during the period of injury and treatment.

Table 2 *The mean of PLT, PT, PTT and other in patients with COVID-19*

Test	Groups	N	Mean	Std. Deviation	Std. Error Mean	P
PLT	Group A	50	30.0640	3.29035	.46533	.000
	Group B	149	168.489	128.236	10.50551	.000
PT	Group A	50	223.540	27.9841	3.95755	.000
	Group B	149	16.7114	5.27525	.43217	.000
PTT	Group A	50	19.4880	4.37277	.61840	.000
	Group B	149	35.4295	5.41925	.44396	.000
LDH	Group A	50	38.2080	13.0743	1.84899	.000
	Group B	149	185.496	55.4670	4.54403	.000
GPT	Group A	50	19.0320	6.56834	.92890	.001
	Group B	149	24.0872	10.1368	.83044	.000
GGT	Group A	50	38.208	11.6348	1.7583	.000
	Group B	149	60.5973	15.9229	1.30446	.000
GOT	Group A	50	19.032	5.74792	0.8593	.720
	Group B	149	20.2282	14.3978	1.17952	.720

The study concluded that clinical laboratories play the most prominent and clear role in the detection of numerous pathogens, including the Covid-19 virus, continuous follow-up and epidemiological monitoring of infected patients, and early infection detection by determining the values of their serological markers.

Age had a major impact on the illness in relation to the infection period. There were no discernible variations or substantial indications of body mass. IL6, NRL, LYM, and WBC were obvious significant differences that might be utilized for early illness diagnosis or to monitor the patient's status by associating them with the other clear significant differences among blood parameters. There were no statistically significant variations in serum creatinine and urea that might aid in the monitoring of Covid 19 disease.

4. Conclusion

The objective was to examine the most successful ways to follow up patients who had corona virus with the best drugs that are effective in a short period of time. An overall meta-analysis with random effects found significantly higher serum levels of IL6 in the severe group compared to the non-severe group, with a mean difference of +23.1 pg/mL (95% CI: 12.42-33.79) and the overall effect of 4.24 (P-value 0.001), respectively. This was determined by a comparison of the two groups' IL6 levels. Additionally, there is a possibility that there are confounding variables that impact the association between IL6 and the severity of Covid-19 but are yet unclear currently [13].

In this research, older participants, and those with age-related comorbidities, such as hypertension, or diabetes, were more likely to have severe manifestations of the condition than participants in earlier literature cohorts. Our cases are older than those that have been described so far, and it was discovered that age has an adverse effect on the clinical course of the illness. Immunosenescence is thus a possibility worthy of consideration as an explanation for the impairment of immune system effectors.

The adaptive immune system would eventually become depleted, and the severity of Covid-19 would be attributed to an innate response that was robust but ineffectual and nearly detrimental in nature. In our study, angiotensin-converting enzyme inhibitors, which are often prescribed to patients with

hypertension, were shown to have a protective effect against the severity of Covid-19. Patients who were using angiotensin II receptor blockers, on the other hand, had signs of a more severe illness [14].

People who are elderly and have a history of chronic illness are more likely to be affected by Covid-19 and have a much higher risk of having a serious or life-threatening infection. To severity grading in Covid-19, the levels of WBC, lymphocytes, neutrophils, CRP, NLR, PLT, troponin-I, creatinine, and BUN are all very essential indications [15].

Author Statements:

•**Ethical approval:** The Research Board of the Center for Education and Human Development has reviewed the project with the number 2113235 titled Optimal Examination Ways to follow up patients effected by COVID-19 case study in Jalawla General Hospital in Iraq" transmitted by Hussein Ali Mohammed to the Research Unit of the Center for Education and Human Development on 10.11.2021, At the end of the review, the board decided that the above research project should be accepted as it meets the standards of the Ministry of Environment and Health and that there is no harm in its implementation in the City Hospital / Child Protection Hospital. Form No.: 03/2021 (Seal) Decision No: 98

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References

[1] Zumla, A., Chan, J. F., Azhar, E. I., Hui, D. S. and Yuen, K. Y. 2016. Coronaviruses drug discovery and therapeutic options. *Nature Reviews Drug Discovery*, 15(5): 327-347.

[2] Gretebeck, L. M. and Subbarao, K. 2015. Animal models for SARS and MERS coronaviruses. Current Opinion in Virology, 13: 123-129.

[3] Drosten, C., Günther, S., Preiser, W., Van Der Werf, S., Brodt, H. R., Becker, S. and Doerr, H. W. 2003. Identification of a novel coronavirus in patients with severe acute respiratory syndrome. *New England Journal of Medicine*, 348(20): 1967-1976.

[4] Liu, J., Zheng, X., Tong, Q., Li, W., Wang, B., Sutter, K. and Yang, D. 2020. Overlapping and discrete aspects of the pathology and pathogenesis of the emerging human pathogenic coronaviruses SARS-CoV, MERS-CoV, and 2019-nCoV. *Journal of Medical Virology*, 92(5): 491-494.

[5] Lippi, G., Plebani, M. and Henry, B. M. 2020. Thrombocytopenia is associated with severe coronavirus disease 2019 (COVID-19) infections: a meta-analysis. *Clinica. Chimica. Acta.*, 506: 145-148.

[6] Ramírez-Truque, M. and Mauricio H. 2021. Rol Del Laboratorio Clínico Ante La Epidemia Del COVID-19: Revisión de Los Métodos Diagnósticos Disponibles y Sus Limitaciones." *Revista Médica de Costa Rica y Centroamérica* 86(629): 73–80.

[7] Letelier, P., Encina, N., Morales, P., Riffo, A., Silva, H., Riquelme, I. and Guzmán, N. 2021. Role of biochemical markers in the monitoring of COVID-19 patients. *Journal of Medical Biochemistry*, 40(2): 115.

[8] Shang, J., Ye, G., Shi, K., Wan, Y., Luo, C., Aihara, H. and Li, F. 2020. Structural basis of receptor recognition by SARS-CoV-2. *Nature*, 581(7807): 221-224.

[9] Qin, C., Zhou, L., Hu, Z., Zhang, S., Yang, S., Tao, Y. and Tian, D. S. 2020. Dysregulation of immune response in patients with coronavirus 2019 (COVID-19) in Wuhan, China. *Clinical Infectious Diseases*, 71(15): 762-768.

[10] Channappanavar, R. and Perlman, S. 2017. Pathogenic human coronavirus infections: causes and consequences of cytokine storm and immunopathology. In Seminars in Immunopathology, 39(5): 529-539.

[11] Chen, R., Sang, L., Jiang, M., Yang, Z., Jia, N., Fu, W. and for COVID, M. T. E. G. 2020. Longitudinal hematologic and immunologic variations associated with the progression of COVID-19 patients in China. *Journal of Allergy and Clinical Immunology*, 146(1): 89-100.

[12] Henry, B. M., De Oliveira, M. H. S., Benoit, S., Plebani, M. and Lippi, G. 2020. Hematologic, biochemical and immune biomarker abnormalities associated with severe illness and mortality in coronavirus disease 2019 (COVID-19): a meta-analysis. *Clinical Chemistry and Laboratory Medicine* (CCLM), 58(7): 1021-1028.

[13] Mojtabavi, H., Saghazadeh, A. and Rezaei, N. 2020. Interleukin-6 and severe COVID-19: a systematic review and meta-analysis. *European Cytokine Network*, 31(2): 44-49.

[14] Jurado, A., Martín, M. C., Abad-Molina, C., Orduña, A., Martínez, A., Ocaña, E. and Molina, J. 2020. COVID-19: age, Interleukin-6, C-reactive protein, and lymphocytes as key clues from a multicentre retrospective study. *Immunity and Ageing*, 17(1): 1-15.

[15] Zhou, Y., Guo, S., He, Y., Zuo, Q., Liu, D., Xiao, M. and Li, X. 2020. COVID-19 is distinct from SARS-CoV-2-negative community-acquired pneumonia. *Frontiers in Cellular and Infection Microbiology*, 10: 322.