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PREDICTING THE CONDITION OF THE LUNGS AFTER INFECTION WITH THE CORONAVIRUS THROUGH THE VALUE OF LACTIC ACID IN THE BLOOD AT REST

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Abstract

This study, which was conducted on the benign lactic acid cooling index, aimed to diagnose the failure of the lungs to perform their functions after infection with the Coronavirus and the damage resulting from it in the long term. Fifty people who were infected with the Corona virus and it was necessary to provide oxygen for a long period during the period of illness were compared and contrasted with investors. And who invests with them? Natural people have shown an increase in lactic acid in case of cold, smoking cessation and natural remedy companies. This is considered an indicator of the health condition of the lungs and is even considered a good indicator for predicting the recovery of the lungs during the recovery period, but it is a criterion that is not suitable for therapeutic programs for recovery. The elevation of lactic acid in the blood during a cold and its relative transitivity have since been studied and presented as a guide to doctors in Oman regarding the lungs and insufficient supply of oxygen to the blood.

Keywords: lung condition, coronavirus, lactic acid

Introduction

(COVID-19) patients who develop lung fibrosis may suffer from severe lung injury that hinders normal breathing and leads to the blood not supplying the blood and then the body with the necessary oxygen, and this is reflected in their daily vital activities and thus the frequent feeling of fatigue and shortness of breath [1] Coronavirus disease 2019 (COVID-19) is the pandemic new coronavirus disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); CoV-2 is highly pathogenic in humans. The immunopathological event of SARS-CoV-2 is acute respiratory distress syndrome (ARDS). In the majority of individuals, COVID-19 infection is asymptomatic or causes only minor symptoms. Bilateral lung involvement is a common feature on patients' chest CT images [2]. In about 15-20% of patients, COVID-19 infects the respiratory system leading to acute respiratory distress syndrome. In COVID-19 patients, it is important to diagnose it early in the course of the disease. Despite a strong global outbreak in 2020, the spread of coronavirus (COVID-19) continues to rise with the emergence of different variants of coronavirus (CoV-2), posing a serious threat to human life and health. The

reason for the high mortality rate among COVID-19 patients has been linked to the metabolic and endocrine systems. Nearly 50% of people who lost their lives due to COVID-19 had metabolic and vascular diseases such as hypertension and diabetes as well as non-alcoholic fatty liver disease and obesity [3] .

The surge in coronavirus (COVID-19) cases is putting significant pressure on healthcare services around the world. At the current stage, rapid, accurate and early clinical assessment of disease severity is vital. To support decision-making and logistical planning in healthcare systems, this study leverages a database of blood samples from 404 infected patients in the Wuhan region, China to identify critical predictive biomarkers of disease severity. For this purpose, machine learning tools selected three biomarkers that predict patients' survival with more than 90% accuracy: lactic dehydrogenase (LDH), lymphocytes, and high-sensitivity C-reactive protein (hs-CRP). In particular, relatively high levels of LDH alone appear to play a crucial role in distinguishing the vast majority of cases requiring immediate medical attention. This finding is consistent with current medical knowledge that elevated LDH levels are associated with tissue breakdown that occurs in various diseases, including pulmonary disorders such as pneumonia. Overall, this paper proposes a simple and actionable formula to quickly predict which patients are most at risk, allowing them to prioritize and potentially reduce mortality. [4]

As weak ability to circulate oxygen, lower respiratory muscle strength, and abnormalities in lung imaging were discovered in more than half of Covid-19 patients in the early recovery stage. Compared with non-severe cases, severe patients had a higher incidence of impaired pulmonary perfusion and experienced a greater decline in the 6MWD test.[5]

Systematically tracing the steps of SARS-CoV-2 infection and coronavirus (COVID-19) metabolites, he found evidence linking high glucose levels to every major step of the virus life cycle, disease progression, and symptom onset. Specifically, glucose elevations provide ideal conditions for the virus to evade and weaken the first level of the immune defense system in the lungs, reach deep alveolar cells, bind to the ACE2 receptor and enter pneumocytes, and accelerate viral replication. intracellularly, leading to increased cell death and stimulating the pulmonary inflammatory response, which overwhelms the already weakened innate immune system to trigger a torrent of systemic inflammation, inflammation, cell damage, cytokine storm, and coagulation events. We tested the feasibility of the hypothesis by manually reviewing the referenced literature by machine-generated synthesis, atomically reconstructing the virus on the surface of the pulmonary bronchus, and performing quantitative computational modeling of the effects of glucose levels on the infection process. We conclude that elevations in glucose levels can facilitate disease progression through multiple mechanisms and can explain much of the variation in disease severity across populations. The study provides diagnostic considerations, new areas of research and potential treatments, and warnings about treatment strategies and critical care conditions that result in high blood glucose levels. [6]

In this study, we retrospectively analyzed the clinical characteristics of patients whose condition developed into inflammation and determined the severity of inflammation or deficiency in the process of supplying oxygen from the lung to the blood by measuring the concentration of lactic

acid in the blood at rest and comparing that with healthy people and smokers for long periods.
Method and tools:
The researchers used the experimental approach by designing three groups with one test, and the research sample consisted of people infected with the Corona virus who had recovered from the virus and who had severe lung infections and were forced to use oxygen supplies throughout the period of infection. Their number was (50) male patients, while the second group was of smokers who had spent a period of no less than 20 years smoking, with no less than 20 cigarettes per day, and their number was (50) male smokers. The third group was for healthy people who had not smoked any type of cigarette or its derivatives during their lives, in addition to (50) men representing... the control group.
The Lactic Pro 2 device was used to take measurements of the level of lactic acid in the blood. The measurement was performed using the index finger after wiping off the first extracted drop and placing it in the device to read the results after 15 seconds. This is how the device works, as the measurement was done in the morning after a 12-hour fasting period. This was confirmed by measuring the morning blood glucose level for each sample [7]. Each sample was measured separately and on a different day using several devices at the same time.

Results:

Table (1) shows the statistical description of the research totals

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
patients	50	3.5420	.15398	.02178	3.4982	3.5858
smokers	50	3.1700	.12495	.01767	3.1345	3.2055
normal people	50	1.3580	.11445	.01619	1.3255	1.3905
Total	150	2.6900	.96619	.07889	2.5341	2.8459

Table (2) shows the value of the F test between the groups in the lactate test at rest

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	136.526	2	68.263	3906.677	.000
Within Groups	2.569	147	.017		
Total	139.095	149			

Significant < 0.05

Table (3) shows the value of the least significant difference between the groups in the lactate test in the resting position

Multiple Comparisons

LSD

(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
patients	smokers	.37200*	.02644	.000	.3198	.4242
	normal people	2.18400*	.02644	.000	2.1318	2.2362
smokers	patients	-.37200*	.02644	.000	-.4242	-.3198
	normal people	1.81200*	.02644	.000	1.7598	1.8642
normal people	patients	-2.18400*	.02644	.000	-2.2362	-2.1318
	smokers	-1.81200*	.02644	.000	-1.8642	-1.7598

*. The mean difference is significant at the 0.05 level.

Table (2) shows that there are statistically significant differences between the groups in the variable lactate at rest, and the score (Sig) was smaller than (0.05). This indicates the significance of the differences between the groups (patients, smokers, and normal people) and when referring to Table (3). We find that the differences between patients and smokers were less than (0.05), which is significant in favor of the patients, while between patients and normal people, they were less than (0.05), which is significant and in favor of the patients, while between smokers and normal people, they were smaller than (0.05), which is significant and in favor of the patients. Normal people: This indicates that the rise in lactic acid at rest was higher for patients and at lower rates for smokers and within the limits of normal rates for normal people. The following figure shows this:

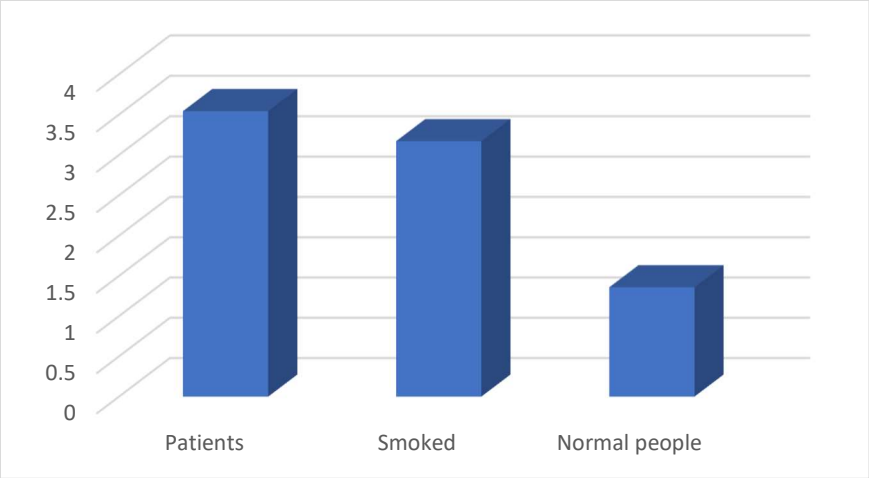

Figure (1) shows the arithmetic means of the research groups in measuring lactic acid at rest

Discussion of results:

When reviewing the results, it becomes clear to us that patients who were infected with the Corona virus and who recovered and did not exercise continued the effects of the disease on them if the lack of oxygen supply to the blood continued and the subsequent infections of the lymph nodes [8] and the rest of the body's systems. Therefore, their recovery may take a longer time and their return to normal life. Normality became a hardship, and thus their lungs were similar to the lungs of smokers for long periods, as they were insufficient in supplying oxygen to the blood and therefore to the body's systems. The body remained in a state of oxygen deficiency after they were afflicted with the disease for long periods. Studies indicate that practicing sports allows them to recover faster and that using regular units of exercise and with a higher pulse. 130 beats per minute and jogging for half an hour daily [29], [30] is enough to return the lungs to their normal or close to normal position and stimulate the pulmonary alveoli to rebuild themselves more quickly. [23], [24]

The accumulation of lactic acid in the blood of patients with the Corona virus occurred through the fibroids that followed the disease and the complications that were associated with it, and these led to a significant deficiency in the supply of oxygen, even during periods of rest [25], [26] and lack of movement, and the use of exercise stimulates the activation of the body and lungs. In particular, it returned to work and opened new channels in the lung structure, thereby compensating for the fibrosis resulting from the disease. This also included the body's lack of resistance to insulin, and thus the cells were able to return to their activity in a better way. [27], [28]

The results of patients approaching those of smokers and their exceeding the normal ratios of lactic acid, which are between (1-2) millimoles at rest, is a reflection of the inefficiency of the lung in gas exchange, and even exceeded that to a high insufficiency in lung function, which was reflected in their results at rest, and this It led to the failure of the rest of the body's systems to work and the constant lethargy and fatigue that accompanied it. Rapid doses of exercise [9] , [10] coupled with drinking water and nutritional supplements helped return the muscles to work and

thus reduced insulin resistance due to the burning cells they represent. It produces significant energy in the body and led to an improvement in the functioning of the joints connected to the muscles.[11] , [12]

The diagnosis of pulmonary fibrosis and lung insufficiency can be read in a simple way using a lactic acid test at rest, which is a preliminary measure of lung function [13]. It cannot be replaced by performing a CT scan of the lung, but it is a preliminary measure from which a simple idea of lung function can be obtained. Related devices [14] and that trying to stimulate the lungs through aerobic exercises, breathing exercises, and yoga would be appropriate during the recovery period from the disease, and that it should be gradual and according to the severity of the injury. [15], [16]

Predicting the condition of the lungs by examining the blood lactate during rest is a good indicator if compared to other tests such as the serum cystatin C test [17] and CT scan, but it is considered the easiest because it is measured directly and quickly and gives a good indication of the lung function by showing the extent of the accumulation of Lactic acid, which in turn indicates that the clomose is not completely burned in the cells or that there is not enough oxygen in the blood.[18],[19]

The recovery period from the disease is very important in diagnosing the return of the lungs to work, and continuous care and observation by the specialist doctor throughout this period is very important in protecting patients from sudden lung failure, which may lead to death. Therefore, the use of diagnosis through lactic acid may give a quick picture. What happens in the lungs throughout the recovery period, which is a good indicator in case of danger, as the continued rise in blood lactate and its failure to decrease during the recovery period indicates the failure of the lungs to recover and the amount of appropriate doses of exercise to achieve good recovery.[20], [21]

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