



A Study Correlating CT Severity Score Of Covid 19 Positive Patients and LDH Levels among the Patients Attending Tertiary Care Center, Salem

¹Kirubhakaran Kanakaraju^{1*}, ²Moogaambiga SolaiRajaPandiyan, ³Rangabashyam Seetharaman Ranganathan, ⁴Dr. Pillutla Sai Sareen Srivastav

^{1,2}Associate Professor, ³Professor, ⁴Postgraduate Resident

Department of Internal Medicine, Vinayaka Mission Kirupananda Variyar Medical College and Hospital, Salem, India – 636308

***Corresponding Author:**

Dr. Pillutla Sai Sareen Srivastav

Postgraduate Resident, Department of Internal Medicine, Vinayaka Mission Kirupananda Variyar Medical College and Hospital, Salem-636308, Tamilnadu, India

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Abstract

Background: The World Health Organisation declared Coronavirus as a Pandemic and it was considered a global concern. As it affects the lung tissues Chest CT was one of the important tools in diagnosing the brutality of the disease. LDH was considered as one of the prognostic markers in diagnosing the severity of disorders. The aim of the study is to find the correlation between the CT severity score of Covid 19 Positive patients and LDH levels.

Methodology: This study was done in VMKV Medical College and Hospital, Salem, Tamil Nadu in Internal Medicine Department., from the period of August 2020 to November 2020. All the Covid positive patients of all age groups of both sexes with or without comorbidity were included. Patients having Non-Covid Pneumonitis were excluded. After getting ethical committee clearance data was collected using the Patient's information sheet and analysis was completed using SPSS 23. P-value <0.05 is considered significant.

Results: In our study, the mean age was 50 years and males were more compared to females. The level of LDH increased with increased CTSSS scoring and their association was observed to be significant.

Conclusions: Serum LDH is considered as a validated tool in monitoring Covid-19 pneumonia and it helps in recognizing the progression of the disease and thus can be applied for introducing the intervention earliest as possible

Keywords: Computed tomography, Lactate dehydrogenase, COVID-19, and Pandemic

Introduction

In the year 2019, a novel coronavirus originated in the Central region of China, Wuhan, which later spread to multiple continents.^[1] This infection starts with a mild upper respiratory tract infection like cough and cold and progressed to severe diseases like acute respiratory distress syndrome (ARDS) and multiple organ failure. Clinically the COVID 19 disease is classified into mild, moderate, and severe.^[2] Chest CT plays a major role in the early detection and assessing the sternness of the disease.^[3]

Computed tomography is a conventional and non-invasive technique with high speed and accuracy.^[4] Chest computed tomography severity score (CTSS) was used to help assess the severity of lung involvement due to COVID 19 based on the lung opacification as it is equal to the extension of the disease.^[5,6] Lactate dehydrogenase is an intracellular enzyme that helps in the conversion of pyruvate and lactate and it is also present in almost all organs.^[7] It has two subunits A and B. It is presented as five

isoenzymes in Cardiomyocytes (LDH-1), reticuloendothelial system (LDH-2), pneumocytes (LDH-3), kidney and pancreas (LDH-4), and at last in the liver and striated muscle (LDH-5). Cytokine-mediated tissue damage occurs in severe infections which in turn releases LDH and causes it to elevate. As COVID19 infections damage the lungs, the LDH present in the pneumocytes will be released and will be elevated.^[8] There are many laboratory biomarkers associated with COVID19 like C-reactive protein (CRP), Aspartate aminotransferases (AST), and lymphocytes. Lactate dehydrogenase (LDH) is one of the biomarkers which is under study assessing the prognosis of COVID-19. It was found to have higher accuracy and a greater area under the curve in some studies.^[9-11] Many organs like the Liver, Kidney, and heart are also noticed to be damaged in COVID-19.^[12-16] This study was done to find out the association between Serum LDH level and CT Severity Scoring.

METHODOLOGY:

The study was done in VMKV Medical College and Hospital, Salem, Tamil Nadu in the Internal Medicine Department for a period of 3 months from August 2020 to November 2020. All those patients who have given consent for the study and satisfied the inclusion criteria were taken. The minimum sample size would be 100. All those patients who were tested positive for Real-time Polymerase chain reaction through the nasopharyngeal swab. Those with Non-Covid Pneumonitis, patients diagnosed with Cancer, Pregnancy, and Paediatric cases were excluded from the study. Complete Blood Count, Liver Function Test, Renal Parameters, dimer test, Serum Ferritin test, and Serum LDH levels were tested. CT chest and Echocardiogram (ECG) were taken regularly for all patients. The CT scan was taken in the supine position. Two radiologists with more than 5 years of experience give the CT values. The scoring was given out of 25. In case of any mismatch in the CT results, the senior-most will be taken as the result. After obtaining Institutional Ethical Committee Clearance, data was collected like their baseline characteristics like Name, Age, Sex, comorbid status, Saturation, and CT scoring was taken from their patient information sheet. Once the data was collected, it was entered in MS excel Windows 10. Statistical analysis was done by SPSS 23. The continuous variable was expressed in terms of Mean

and Standard deviation. Categorical variables were expressed in terms of numbers (percentages). Association between continuous variables was done by Pearson correlation. p -value <0.05 will be considered as statistically significant.

RESULTS:

In our study, the mean age was 50.660 ± 14.15 with a minimum age of 18 years and maximum age of 81 years. Male preponderance (76%) was noticed in our study. 34% of our study participants have Diabetes Mellitus which is followed by Hypertension 26% which in turn by Hypothyroidism 5%. The most common complaint noticed in our study was fever among 66, followed by Cough and cold in 61% which in turn followed by body pain 33%. The CT severity score in our study ranged from 1 to 22 with a mean of 8.69 ± 4.16 . Serum LDH levels ranged from 11 to 945 with a mean value of 227 ± 129.9 . In our study association was noticed between CT scoring severity and the serum LDH level which is statistically significant. The association between CT severity scoring and Serum LDH was good as it is .72.

DISCUSSION:

Coronavirus disease has a higher fatality rate compared to other respiratory tract viral infections. In recent days many biomarkers have been investigated for their prognostic role in the severity and mortality of COVID-19. Among the patients 76 were male and 24 were female which is more than Meiyang Wu et al^[17] study where 47 were male and 40 were female. In studies of Jin et al and Hiroki et al studies, they noticed that the severe covid disease affects males more than females.^[18,19] In our study the mean age was 50 while in the above study which is 44. In our study, the most frequent comorbidity was Diabetes (34) followed by Hypertension (26) which is vice versa in the Wu et al study where Hypertension (6.9%) is the most frequent comorbidity followed by Diabetes mellitus (5.7%). In our study LDH shown a positive correlation with the CTSSS score which is similar to Yi Han et al study which reflected that LDH elevation related with lung damage and its severity and we also know that is important in the glucose metabolism to catalyze pyruvate and lactate and also released once cytoplasmic membrane damages. In Calderon et al and Huang et al study also stated that they noticed

elevated LDH levels in a lung infection caused by Pneumocystis pneumonia which is due to lung injury.^[20,21] Even in 2009 influenza study done by Lee IK et al in both adults and children showed elevated LDH which is due to lung injury.²² Thus LDH is also used as an indicator in multiorgan injury.^[23] Our study is a single-center study and excluded pregnancy, children, so the generalizability of our study is not possible. Secondly, our study is done to find association of only one promising marker LDH but this enzyme gets elevated even in some non-covid conditions like Liver disease, Heart attack, anemia, muscle trauma, bone fractures, cancers, and infections such as meningitis, encephalitis, and HIV.

CONCLUSIONS:

The study found a positive association between the LDH marker and the computer tomography Severity scoring. But LDH has also elevated in non-Covid indications it has to be ruled out. LDH has been found as a validated marker such that interventions can be introduced as early as possible.

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Table 1: Demographic features of the study participants (N=100)

Demographic characteristics	Number(N)
Age	
<20	2

21-40	21
41-60	54
>60	23
Sex	
Male	76
Female	24
Presentation of Comorbidity	
Diabetes Mellitus	34
Hypertension	26
Hypothyroidism	5
Asthma	2
Cardiovascular disease	4
Signs and Symptoms at the time of admission	
Fever	66
Cough and Cold	61
Throat pain	3
Body pain	33
Breathlessness	28
Loose stools	8
Loss of taste	8
Loss of Smell	14
Headache	1
Loss of appetite	

Table 2: CTSSS and LDH Presentation in the study

	Mean	SD	Median	Minimum	Maximum
CT SSS	8.69	4.160	8	1	22
LDH	227	129.9	199	11	945

Table 3: Correlation between CTSSS and Serum LDH levels

Pearson's correlation		CT severity	Serum LDH level
CT severity	Correlation coefficient	1.000	.720
	Sig (2 tailed)		.000
	N	100	100
Serum LDH level	Correlation coefficient	.720	.000
	Sig (2 tailed)	.000	
	N	100	100