



SERUM LACTATE DEHYDROGENASE, C-REACTIVE PROTEIN LEVELS AND ITS CORRELATION WITH SEVERITY AND PROGNOSIS IN COVID-19 PATIENTS IN CHENGALPATTU DISTRICT.

General Medicine

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ABSTRACT

Objective: It is important to evaluate Covid-19 patients and prevent its severity. One of the best method is by assessing the biomarkers like Lactate dehydrogenase and C-reactive protein. This study is important for Covid-19 patients in which the severity and prognosis can be judged through lab parameters like CRP and LDH in our population. By conducting this study it is possible to intervene by early interventions which will yield a beneficial outcome or the patients from this deadliest disease.

Methods: Study was done on 234 patients of Sree Balaji medical college and hospital admitted in IP basis with Covid-19. A retrospective evaluation of Serum Lactate dehydrogenase and C-reactive protein levels was done and its results are correlation with severity and prognosis in covid-19 patients. Serum LDH and CRP test was done on patients by random selection method. The severity of covid was selected on the basis of patient requiring oxygen support on the course of hospitalization.

Results: The study was done on 234 patients with 142 males and 92 females, age median was 40. Among this 41 patients were on oxygen support and their LDH level showed no significance with p value of 0.133 but CRP level showed significance with p value of 0.0005. Among these 234 patients 53 were diabetic and on comparing with their LDH level showed no significance with p value of 0.870 but their CRP level showed significance with p value of 0.039. Among these patients 35 patients had systemic hypertension and their LDH level and CRP level showed nil significance on correlation. Patients BMI was calculated, mean was 26.1, median was 24.8 and BMI was correlated with level of LDH showing no significance with mean of 0.835 and CRP level was significant showing mean of 0.0005. The mean age of patients were 43.1, median was 40.0 and on correlation with LDH level showed no significance with p value of 0.607 but CRP showed significance with p value of 0.021.

Conclusions: A simple test of CRP can be used as an effective tool on detecting the severity of covid 19, on early medical intervention with this tool mortality rates can be brought down and can yield good beneficial effect for the patients.

KEYWORDS

Covid-19, CRP and covid-19, LDH and covid-19.

1. INTRODUCTION

The novel Corona virus (Covid-19) is believed to be originated from China, Hubei province and spreaded to rest of the world [1]. As of 15th January India has 1,05,28,896 confirmed cases, of which 8,28,952 confirmed cases are from Tamilnadu with total testing of 1.5 crore [2]. Corona viruses are RNA enveloped virus with spikes like projections resembling like a crown appearance [3].

The clinical presentation of covid-19 includes fever, sore throat, cough, loss of taste, loss of smell, headache, myalgia, conjunctivitis, Respiratory distress, Respiratory failure and death. The severity of the disease is mainly due to cytokine storm IL-2, IL-7, IL-10, TNF- α etc [4].

In Hospital setting it is difficult to diagnose Covid-19 from other mimickers of covid 19 by history taking and clinical examination. The basic work up can provide little clues towards the diagnosis of covid-19, but the covid 19 rt-pcr test plays a key factor in determining covid 19 virus in any setting [5].

The severity of covid-19 can be assessed by inflammatory tools like IL-2, IL-6, IL-7, TNF- α , CRP, LDH, ferritin, d-dimer which can determine the prognosis of patient and escalation of treatment can be done providing beneficial to the patient [6].

2. Patients and Methods

A retrospective evaluation of Serum Lactate dehydrogenase and C-reactive protein levels was done and its results are correlation with severity and prognosis in covid-19 patients. Study was done on 234 patients of Sree Balaji medical college and hospital admitted in IP basis with Covid-19. Serum LDH and CRP test was done on patients by random selection method. The severity of covid was selected on the basis of patient requiring oxygen support on the course of hospitalization.

The mean age of patients was 43.1 with age ranging from 20 years to 80 years. All patients were tested covid -19 positive by covid rt per using oro-pharyngeal swab.

Investigation samples were taken by following the standard protocol. The method for LDH estimation and CRP estimation were done by using UV kinetic method and Latex agglutination method respectively.

To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. The normality of the data was verified with Shapiro Wilk's test for normality the data was skewed, hence to find the significant difference between the bivariate samples in Independent groups the Mann-Whitney U test was used. To assess the relationship between the variables Spearman's rank Correlation was used. In both the above statistical tools the probability value .05 is considered as significant level.

The collected data were analysed with IBM.SPSS statistics software 23.0 Version.

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3. RESULTS

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Among 234 patients used in this study 142 (60.7%) were males and 92 (39.3%) were females. The median age for male was and median age for female was . The median age for both sex groups was 40 years of age.

Table-1

Age		
	Frequency	Percent
Upto 20 yrs	6	2.6
21 - 30 yrs	50	21.4
31 - 40 yrs	62	26.5
41 - 50 yrs	40	17.1
51 - 60 yrs	40	17.1
61 - 70 yrs	25	10.7
71 - 80 yrs	10	4.3
Above 80 yrs	1	.4
Total	234	100.0

Table-2

Gender		
	Frequency	Percent
Male	142	60.7
Female	92	39.3
Total	234	100.0

The patients was classified with severe covid based on the requirement of oxygen support during the course of hospitalization. Among 234 patients, 41 (17.5%) patients required oxygen therapy.

Table-3

O2 Dependency		
	Frequency	Percent
No	193	82.5
Yes	41	17.5
Total	234	100.0

Among 234 patients 53(22.6%) patients were diabetic and 35(15%) were hypertensive.

Table-4

DM		
	Frequency	Percent
Absent	181	77.4
Present	53	22.6
Total	234	100.0

Table-5

HTN		
	Frequency	Percent
Absent	199	85.0
Present	35	15.0
Total	234	100.0

Statistics was done based on the data collection of Age, BMI, CRP, LDH and the results are tabulated on table 6.

Table-6

Statistics							
	Age	Ht	Wt	LDH	CRP	BMI	Duration of Stay
N	234	234	234	234	234	234	234
Mean	43.1	165.9	71.7	202.9	1.8	26.1	8.2
Median	40.0	165.0	72.5	179.0	0.0	24.8	7.0
SD	15.1	9.7	11.3	71.4	4.2	3.7	3.2
Range	66	56.0	61.0	490.8	32.0	20.41	29
Minimum	15	145.0	47.0	2.2	0.0	17.65	1
Maximum	81	201.0	108.0	493.0	32.0	38.05	30

Test of normality was done based on Kolmogorov-Smirnov and Shapiro-Wilk. LDH, CRP and BMI showed significance of .0005.

Table-7

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LDH	.192	234	.000	.787	234	.0005
CRP	.333	234	.000	.487	234	.0005
BMI	.142	234	.000	.958	234	.0005
p - Value	** Highly Significant at $p < 0.01$					
p - Value	* Significant at $0.01 \leq p \leq 0.050$					
p - Value	# No Significant at $p > 0.050$					

Mann-Whitney test was done. Patients with severe covid-19 i.e., who requires oxygen therapy on correlating with S.LDH, CRP showed CRP (.0005) having high significance and no significance with LDH (.133).

Table-8

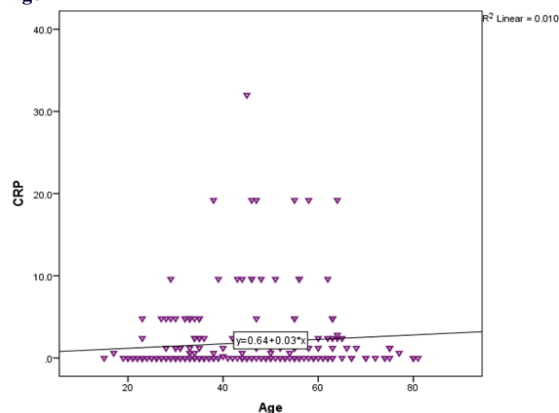
Ranks				
O2 Dependency	N	Mean Rank	Sum of Ranks	
LDH	No	193	114.43	22085.50
	Yes	41	131.94	5409.50
	Total	234		
CRP	No	193	109.46	21125.50
	Yes	41	155.35	6369.50
	Total	234		
Group Statistics				
O2 Dependency	N	Mean	SD	
LDH	Yes	41	237.5	109.2
	No	193	195.6	58.2
CRP	Yes	41	4.5	6.8

	No	193	1.2	3.1
Test Statistics ^a				
	Mann-Whitney U	Z	p-value	
LDH	3364.500	-1.504	.133	
CRP	2404.500	-4.552	.0005	
a. Grouping Variable: O2 Dependency				

Non Parametric correlations using Spearman's rho Using age and S.LDH, CRP showed correlation significance at 0.05 (2-tailed).

Table-9

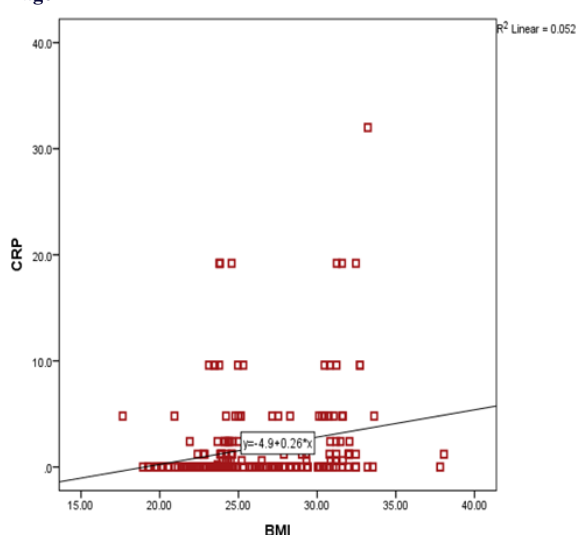
Nonparametric Correlations			
Correlations			
Spearman's Age rho		LDH	CRP
	p-value	.034	.151*
	p-value	.607	.021
	N	234	234
*. Correlation is significant at the 0.05 level (2-tailed).			

Image-1

Non parametric correlations were done using BMI and s.LDH and CRP, showed significant correlation at .01 level.

Table-10

Correlations			
Spearman's BMI rho		LDH	CRP
	p-value	-.014	.306**
	p-value	.835	.0005
	N	234	234
**. Correlation is significant at the 0.01 level (2-tailed).			

Image-2

On correlation patients with Type 2 Diabetes mellitus with S.LDH and CRP, showed significant correlation of CRP with P value of .039 and no significant correlation of S.LDH with P value of 0.870.

Table-11

Ranks				
	DM	N	Mean Rank	Sum of Ranks
LDH	Absent	181	117.11	21196.50
	Present	53	118.84	6298.50
	Total	234		
CRP	Absent	181	113.21	20491.00
	Present	53	132.15	7004.00
	Total	234		
Group Statistics				
	DM	N	Mean	SD
LDH	Present	53	208.5	83.1
	Absent	181	201.3	67.8
CRP	Present	53	3.1	6.3
	Absent	181	1.4	3.3
Test Statistics ^a				
	Mann-Whitney U	Z	p-value	
LDH	4725.500	-.164	.870	
CRP	4020.000	-2.068	.039	

On correlation patients with systemic hypertension with S.LDH and CRP ,showed nocorrelation of CRP with P value of .900 and no correlation of S.LDH with P value of 0.953.

Table-12

Ranks				
	HTN	N	Mean Rank	Sum of Ranks
LDH	Absent	199	117.27	23336.00
	Present	35	118.83	4159.00
	Total	234		
CRP	Absent	199	117.40	23363.50
	Present	35	118.04	4131.50
	Total	234		
Group Statistics				
	HTN	N	Mean	SD
LDH	Present	35	207.9	84.7
	Absent	199	202.1	69.0
CRP	Present	35	2.5	6.8
	Absent	199	1.7	3.5
Test Statistics ^a				
	Mann-Whitney U	Z	p-value	
LDH	3436.000	-.126	.900	
CRP	3463.500	-.059	.953	

4. DISCUSSION

The novel Corona virus (Covid-19) is believed to be originated from China,Hubei province and spreaded to rest of the world[1].As of 15th January India has 1,05,28,896 confirmed cases,of which 8,28,952 confirmed cases are from Tamilnadu with total testing of 1.5 crore[2].Corona viruses are RNA enveloped virus with spikes like projections resembling like a crown appearance[3].

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In Hospital setting it is difficult to diagnose Covid-19 from other mimickers of covid 19 by history taking and clinical examination.The basic work up can provide little clues towards the diagnosis of covid-19,but the covid 19 rt-pcr test plays a key factor in determining covid 19 virus in any setting[5].

The severity of covid-19 can be assessed by inflammatory tools like IL-2,IL-6,IL-7,TNF- alfa,CRP,LDH,ferritin,d-dimer which can determine the prognosis of patient and escalation of treatment can be done providing beneficial to the patient[6].

LDH is an potential prognostic tool in making clinical decision of a disease.The enzyme gets released in an ongoing inflammatory process which causes cell damage and release of LDH[7].Many studies point out that rise on S.LDH had poor prognosis on covid-19 patients[8]

CRP is an inflammatory marker produced by liver hepatocytes.It is an acute inflammatory protein raised in acute inflammation[9].Several

studies shows that CRP levels are raised with Covid-19 patients and were observed in more than 85% patients[10],[11],[12],[13],[14],[15].

CONCLUSIONS

To conclude in our study with 234 patients of 142 males and 92 females with age median was 40 .Among this 41 patients were on oxygen support and their LDH level showed no significance with p value of 0.133 but CRP level showed significance with p value of 0.0005.Among these 234 patients 53 were diabetic and on comparing with their LDH level showed no significance with p value of 0.870 but their CRP level showed significance with p value of 0.039.Hence a simple test of CRP can be used as an effective tool on detecting the severity of covid 19, on early medical intervention with this tool mortality rates can be brought down and can yield good beneficial effect for the patients.

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