Original Research Paper

Volume - 11 | Issue - 02 | February - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Medicine

A STUDY ON THE ROLE OF LDH IN COVID-19 IN ASSESSING THE SEVERITY, AND OUTCOME IN A TERTIARY COVID CARE CENTER, GOVERNMENT GENERAL HOSPITAL VIJAYAWADA, ANDHRAPRADESH, INDIA .

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ABSTRACT **Background:** Coronavirus disease in 2019 has affected most of the individuals. For assessing the prognosis and severity we can utilize the biochemical markers as a tool, one of them is Lactate dehydrogenase elevated in hypoxic conditions.

Methodology: It is a retrospective study of 110 covid positive cases collected from the medical records in state covid tertiary care centre, Vijayawada.

Results: In this present study there is statistical significance between levels of LDH and its impact on the severity of disease as 21.5% had the severe stage of infection with 87.5% had elevated LDH .when we see the outcome, out of 21% cases who expired,95.6 % cases have elevated LDH, regarding the level of lung involvement, out of 76.3%of cases with bilateral or unilateral lung involvement, 65.4% of patients have elevated LDH.

Conclusion: There is a significant association between LDH and its impact on assessing the severity, lung involvement, outcome of the patients. Hence LDH could be used as a prognosticator.

KEYWORDS : covid 19, LDH, severity, outcome.

INTRODUCTION:

COVID is due to coronavirus which causes respiratory and other system infections(1), which created a public health emergency announced by WHO in January 2020 and later pandemic situation in the world declared by WHO in march 2020 (2) affecting most of the population and causing deaths. During acute inflammation in lungs, there is a release of inflammatory biomarkers in the alveoli causing poor regulation of the body's immune system (3). Due to uncontrolled viral replication, there is a profuse release of inflammatory markers leading to severe alveolar damage (4). To prevent the deaths and assess the severity in covid-19, we can utilize the biochemical markers, and one such is lactate dehydrogenase.

Coronavirus infection involves the lungs and most of the body's major organs like the heart, liver, and kidneys. More number of studies showed increased LDH in covid. (5)

In the study, we have evaluated the risk of LDH in assessing the risk of severity and outcome of covid-19.

MATERIALS AND METHODS:

It is a retrospective study from the case records of covid-19 patients admitted in a tertiary care state covid hospital, government general hospital, Vijayawada from October 15th 2020, to November 10th, 2020. We compare the levels of LDH with the age, sex, severity of the disease, abnormality of the lung based on chest x-ray and the outcome of these 110 patients.

INCLUSION CRITERIA:

Age >18 years.
Microbiologically swab positive for covid-19.

EXCLUSION CRITERIA:

Children, pregnant women, microbiologically swab negative patients, patients with non-cardiac disease and carcinoma.

Data collection:

Medical records of 110 patients were collected and utilized.
We collected age, sex, laboratory data, chest x-ray, severity and outcome.

Classified Disease severity as mild-moderate and severe according to the Ministry of Health and family welfare India (MOFHW). Age criteria were taken as age>50 and age<50. The outcome may be discharged or succumbed to death.

STATISTICALANALYSIS:

Categorical variables compared using the chi-square test and the variable with a p-value less than 0.05 is considered statistically significant.

RESULTS:

Medical records of all the 110 covid positive patients were collected and tabulated as follows

VARIABLE	LACTATE DEHYDROGENSAE		p - VALUE
	NORMAL	ABNORMAL	
AGE			
< 50YEARS(34%)	19(51%)	18(49%)	>0.05
>50YEARS(66%)	32 (44%)	41(56%)	
GENDER			
MALE (63%)	34 (49%)	35(51%)	>0.05
FEMALE (37%)	18 (44%)	23(56%)	
SEVERITY BASED ON OXYGEN SATURATION			
MILD (40%)	33 (75%)	11(25%)	< 0.05
MODERATE (38%)	15 (36%)	27(64%)	
SEVERE(22%)	03 (12%)	21(88%)	
CHEST-X-RAY			
NORMAL(24%)	21 (81%)	05(19%)	<0.05
ABNORMAL(76%)	31(36%)	53(64%)	
OUTCOME			
DISCHARGE (79%)	50 (57%)	37(43%)	<0.05
DEATH(21%)	01 (4%)	22(96%)	

- Out of 110 patients, 69(63%) were males, 41(37%) were females and in these 58(53%) had elevated LDH and 52(47%) had normal LDH with p-value more than 0.05, which was statistically not significant.
- In 37(34%) patients among 110 who were less than 50 years of age 19(51%) having normal LDH, 18(49%) having abnormal LDH, out of 73(66%) patients who belong to more than50 years of age 32(44%) having normal LDH, 41(56%) having abnormal LDH with a p- value more than 0.05 and statistically not significant.
- Based on the MOFHW India, disease severity was mild, moderate and severe based on clinical, laboratory and radiological findings of 110 patients were evaluated.
- Out of 110 patients, 44(40%) belongs to the mild stage of the

disease with 33(75%) having normal LDH, 11(25%) were having abnormal LDH, 42(38%) cases belong to the moderate stage of illness with 15(36%) having normal LDH and 27(64%) having abnormal LDH. 24(22%)patients belonged to the severe stage of the disease with 3(12%) having normal LDH and 21(88%) having abnormal LDH. Based on the severity, the p-value was less than 0.05 and statistically significant.

- Depending on lung involvement by chest x-ray findings, out of 26(24%) patients with a normal chest x-ray, 21(81%) had normal LDH, and 5(19%) had abnormal LDH. Out of 84(76%) patients with abnormal chest x-ray, 31(36%) had normal LDH, 55(64%) had abnormal LDH, with a p-value less than 0.05 thus statistically significant.
- In 87(79%) patients among 110 who were discharged 50(57%) having normal LDH, 37(43%) having abnormal LDH. Out of 23(21%) patients who died, only one(4%) patient had normal LDH, 22(96%) had abnormal LDH. The p-value was statistically significant, which is less than 0.05.

DISCUSSION:

- The present study results showed the statistical significance of LDH in assessing the abnormality of lungs with chest x-ray, the severity of the disease, and patient outcome.
- There is no statistical significance of correlation of LDH among age and gender variables.
- LDH is elevated mostly in the course of decreased oxygen and multi-organ injury.
- Serious infections might cause cytokine-mediated tissue injury causing LDH release (6). As LDH is present in lung tissues, more significant quantities can be released in circulation in severe covid-19 infection advancing to ARDS, a distinctive feature.
- There are multiple studies which show that LDH as a prognostic factor of unfavourable outcomes in patients admitted in hospital(7).
- Covid-19 infection has high rates of rapid spreading from one individual to another with low mortality and has a high potential for respiratory pathogenicity by upregulation of inflammatory mediators and causing mortality.
- Renal failure and myocardial injury can also increase LDH values. (8)
- LDH is an enzyme found in most cells in our body, which catalyzes the pyruvate and lactate with reciprocation of NADH and NAD+ (9).
- LDH has five separate isozymes like LDH-1 in cardiac cells, LDH-2 in RES, LDH-3 in pneumocytes, LDH-4 in kidney and pancreas, LDH-5 in the liver, striated muscle.
- In Middle East Respiratory Syndrome also studies are showing increased LDH levels (10).
- The clinical significance of LDH in infections was investigated for the first time by Zaman et al., in 1988 for immunodeficiency virus-infected patients having p.jirovecii pneumonia (11).
- Ede et al., also described the role of LDH in viral upper respiratory tract infection patients (12).
- Liv et al., proposed that in his study, 58% of patients have elevated LDH at the time of admission with SARS (13).
- a study done by yuan et al., showed a decline in LDH value in patients with Covid 19 mRNA clearance(14).

CONCLUSION:

LDH used for assessing the severity and prognosis caused by covid-19 disease, which was due to SARS COV2 infection. With this small sample, there is a good outcome in patients with average LDH values, the poor outcome in patients with the severe stage of disease having abnormal LDH levels.

We need to have a large sample size for confirming the severity and prognosis. More extensive studies required whether there is any lack of effective antivirals, corticosteroid use contributed to the unsatisfactory outcome in some patients.

ACKNOWLEDGEMENT:

We express our gratitude to Dr P.venkatakrishna professor of general medicine department, Siddhartha medical college, Vijayawada.

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