



To Study of serum lactate dehydrogenase in Chronic Obstructive Pulmonary Disease Patients.

Reena Jain¹, Pankaj Jain², Rachit Saxena³

^{1,3} MD Biochemistry, ² MD Pathology

^{1,2} Senior Demonstrator, ³ Assistant Professor

^{1,3} Government Medical College, Bhilwara.

² JLN medical College, Ajmer

ABSTRACT:

Background- Chronic obstructive pulmonary disease (COPD) is a progressive disease of the lungs characterized by structural changes such as emphysema, airflow limitation, dynamic hyperinflation, air trapping, and peribronchial fibrotic remodeling of the lungs with significant systemic inflammatory components, induced by chronic exposures to smoking and/or occupational or environmental sources. **Methods-** It is a case control study of 60 subjects divided into two groups including 30 healthy controls and 30 cases of COPD. Patients with history of respiratory infection, pneumonia, coronary heart disease heart failure, and neuromuscular disease, renal and hepatic dysfunction were excluded. 30 non-smoker healthy adults were selected as control group.

Results- The statistically significant increased value of serum lactate dehydrogenase in cases as compared to control group with p value < 0.05.

Conclusion- Rise in serum LDH levels, though known to occur in many respiratory conditions, has not been studied in depth. Based on our study results, we have proved that patients with COPD have raised serum LDH levels.

Keywords- COPD, Lactate dehydrogenase, Smoking.

INTRODUCTION:

Chronic obstructive pulmonary disease (COPD) is a progressive disease of the lungs characterized by structural changes such as emphysema, airflow limitation, dynamic hyperinflation, air trapping, and peribronchial fibrotic remodeling of the lungs with significant systemic inflammatory components, induced by chronic exposures to smoking and/or occupational or environmental sources^{1,2}. It is the 5th leading cause of mortality and morbidity globally, and the World Health Organization (WHO) predicts

that by 2030, it will step up to the 4th position with an increase of 160%, in contrast to a predicted decrease in mortality rates due to tuberculosis, malaria, and diarrheal infection⁴.

Lactate dehydrogenase (LDH) is an intracellular cytoplasmic enzyme found in all tissues of the human body. There are five LDH isoenzymes present in blood, which are classified according to their electrophoretic movement. LDH-1 moves faster while LDH-5 is the slowest one. Elevated LDH isoenzymes levels indicate the organ specific origin of disease such as LDH-1, LDH-2 in heart, kidneys, erythrocytes and brain; LDH-3 in lungs,

thyroid, pancreas, adrenals, spleen, thymus, lymph nodes and leukocytes; LDH-4 in skeletal muscles and the LDH-5 in hepatic system.

Normal concentration LDH in the serum is due to normal tissue breakdown which increases significantly after tissue damage. LDH being a cytoplasmic cellular enzyme if increased in serum serve as indicator suggestive of disturbance of cellular integrity induced by pathological conditions.⁵ LDH is raised in number of pathological conditions like hematological disorders acute myocardial infarction, liver diseases and several respiratory conditions. Respiratory conditions include bronchial asthma, bronchopneumonia, pulmonary tuberculosis, chronic obstructive pulmonary disease (COPD). All these conditions have inflammation, cell damage or both as underlying pathological mechanism.⁶

Material and Methods

It is a case control study of 60 subjects divided into two groups including 30 healthy controls and 30 cases of COPD. Patients with history of respiratory infection, pneumonia, coronary heart disease, heart failure, and neuromuscular disease, renal and hepatic dysfunction were excluded. 30 non-smoker healthy adults were selected as control group.

Overnight fasting blood samples were taken by venipuncture in plain vacutainer. Grossly hemolysed and lipemic samples were excluded.

Results

Mean age in COPD patients was 35.20± 11.50 years and control patients was 38.20± 8.74 years and age range was 20-60 years. Both groups were well matched for age and sex distribution.

Table 1: Comparison of biochemical parameters in case and controls.

Parameters	Case (n=30)	Control (n=30)	p-value
Serum LDH(U/L)	352.80± 76.40	290.50± 80.20	<0.05

The statistically significant increased value of serum lactate dehydrogenase in cases as compared to control group with p value<0.05.

Discussion

Pulmonary system related disorders as possible sources of serum LDH abnormalities have been underreported, and isoenzyme patterns are seldom measured. This is the first study of its own kind in India to assess serum LDH level and lipid profile in patients with COPD. We found significant increase in Serum LDH level in the patients with COPD. This elevation is because of a predominant increase in serum LDH 3 isoenzymes which is released from cells of lung and airway origin.⁷ Airway mucosal changes consisting of increased broncho-alveolar mast cells, mononuclear phagocytic cells and epithelial shedding have been observed in chronic cough. In patients with chronic cough, a homogenous rise in cellular markers of inflammation has been observed in the bronchoalveolar lavage fluid⁸.

It is possible that persistent coughing may itself induce a degree of inflammation because of the trauma of the lining epithelium of the respiratory tract as well as that of the lung parenchyma. It is likely that the inflammatory process in patients with chronic cough is the cause of the increase in LDH.

Conclusion

Rise in serum LDH levels, though known to occur in many respiratory conditions, has not been studied in depth. Based on our study results, we have proved that patients with COPD have raised serum LDH levels.

References

1. Mannino DM, Buist AS. Global burden of COPD: risk factors, prevalence, and future trends. *Lancet* 2007;370:765-73.
2. Vestbo J, Hurd SS, Agustí AG, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med* 2013;187:347-65.

3. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006;3:e442.
4. Usher DJ, Shepherd RJ, Deegan T. 1974. Serum lactate dehydrogenase isoenzyme activities in patients with asthma. *Thorax*. 29:685–9.
5. Hagadorn JE, Bloor CM, Yang MS.1971.Elevated plasma activity of lactate dehydrogenase isoenzyme-3 (LDH3) in experimentally-induced immunologic lung injury. *Am J Pathol* 64:575–584.
6. Hagadorn JE, Bloor CM, Yang MS.1971.Elevated plasma activity of lactate dehydrogenase isoenzyme-3 (LDH3) in experimentally-induced immunologic lung injury. *Am J Pathol* 64:575–584.
7. McGarvey LP, Forsythe P, Heaney LG, et al.1993. Bronchoalveolar lavage findings in patients with chronic nonproductive cough. *Eur Respir J*.13:59–65. 8.Jatakanon A, Lalloo UG, Lim S, et al. 1999. Increased neutrophils and cytokines, TNF-alpha and IL-8, in induced sputum of non-asthmatic patients with chronic dry cough. *Thorax*. 54:234–7.