International Journal of Research and Review
Vol. 9; Issue: 5; May 2022
Website: www.ijrrjournal.com
Original Research Article *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Comparison of Adenosine Deaminase Activity in COPD with Healthy Subjects

Prangyada Reecha Joshi[1], Prachi Goyal[2], Vishal Garg[3]

[1]Department of Biochemistry, Maharaja Vinayak Global University, Jaipur, Rajasthan
[2]Department of Biotechnology, Maharaja Vinayak Global University, Jaipur, Rajasthan
[3]Faculty of Science, Maharaja Vinayak Global University, Jaipur, Rajasthan

Corresponding Author: Prachi Goyal

DOI: https://doi.org/10.52403/ijrr.20220502

ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a disease condition characterised by non-reversible airflow restriction. Emphysema, which is the damage and inflammation of the lung alveoli, is a component of COPD. It has been demonstrated that adenosine levels rise in COPD leading to reduction in adenosine deaminase (ADA) activity. **Aim**: We determined the activity of ADA in COPD patients.
Methods: Sixty subjects were included in this case-control study who had an acute exacerbation of COPD. The activity of the ADA was measured in 20 COPD, 20 non-smokers, and 20 smokers who served as controls.
Results: Total ADA activity was significantly lower in the COPD and smoking control groups (17.87±6.73, 18.09±8.9, and 21.90±6.4 U/L, respectively) than in the non-smoker group.
Conclusion: Reduction in ADA activity may play an important role in the development of lung damage in COPD patients.

***Keywords*:** Adenosine deaminase (ADA); Chronic Obstructive Pulmonary Disease (COPD), Lung

INTRODUCTION

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) defines chronic obstructive pulmonary disease (COPD) as a disease condition characterised by airflow restriction that is not totally reversible.

COPD symptoms include emphysema, which is the destruction and inflammation of the lung alveoli, chronic bronchitis, which is a persistent cough with phlegm, and small airway abnormalities, which include bronchiole constriction.[1] Excessive cough and sputum production on most days for at least three months during a period of at least two years is clinically characterised as chronic bronchitis.[2]

It has been reported that Adenosine deaminase (ADA) activity is reduced in COPD. The authors investigated if COPD patients have comparatively lower ADA activity compared with healthy subjects.

METHODS

Data was collected from 20 male patients who were brought to the hospital with an acute COPD exacerbation. Patients had COPD and were at least 40 years old.

As a control, blood samples from 40 healthy males were taken. We employed two control groups, 20 smokers and 20 non-smokers, to look into the impact of smoking on the activity of the ADA. The controls did not have any type of lung disease.

Data analysis

Data were shown as mean and standard deviation. Comparison between 3 groups was made using one-way ANOVA. $P<0.05$ was considered significant. SPSS version 21 was used to conduct all statistical analyses (SPSS Inc., Chicago)

RESULTS

General characteristics

Mean age of COPD patients was 50.7±5.1 years with a minimum age of 40 years. Mean age of healthy subjects was 52.06±6.7 years. There were 20 COPD patients, 20 smokers control and 20 non-smokers control.

ADA activity

ADA activity was significantly lower in COPD patients compared with non-smoker control group (P<0.05).

Table 1: Total ADA activity in serum of COPD patients and control groups.

The studied groups	ADAt (U/L)	P value
COPD	17.87±6.73	<0.05
Smoker control	18.09±8.9	
Non-smoker control	21.90±6.4	

DISCUSSION

The foregoing findings show that ADA activity reduced in COPD patients, and that the low overall ADA activity in COPD patients' serum is mostly attributable to low ADA2 activity. Although there have been several papers demonstrating changes in ADA activity in a number of illnesses, including TB, there have been few investigations in COPD. However, there have been instances of greater ADA serum activity in various diseases when compared to a healthy state.[3,4] In COPD patients, we discovered reduced ADA activity. Patients with asthma and COPD have higher amounts of adenosine and adenosine receptors in their lungs.[5] The excessive production of adenosine in the lungs causes profibrotic pathways, which can lead to the development and/or maintenance of pulmonary fibrosis. Low ADA activity in COPD patients' serum may contribute to elevated adenosine levels.

Adenosine levels were shown to be increased in a mouse model of chronic lung inflammation by Fozard et al.[6] The increased blood adenosine level discovered in this study might indicate a high amount of adenosine in COPD patients' lungs.

CONCLUSION

Finally, we conclude that there is decreased ADA activity in COPD patients' serum i

Acknowledgement: None
Conflict of Interest: None
Source of Funding: None

REFERENCES

1. COPD [Internet]. [cited 2022 Apr 11]. Available from: https://www.thoracic.org/statements/copd.php
2. Definition and classification of chronic bronchitis for clinical and epidemiological purposes. A report to the Medical Research Council by their Committee on the Aetiology of Chronic Bronchitis. Lancet Lond Engl. 1965;1: 775–9.
3. Valdés L, San José E, Alvarez D, Sarandeses A, Pose A, Chomón B, et al. Diagnosis of tuberculous pleurisy using the biologic parameters adenosine deaminase, lysozyme, and interferon gamma. Chest. 1993;103:458–65.
4. Valdés L, San José E, Alvarez D, Valle JM. Adenosine deaminase (ADA) isoenzyme analysis in pleural effusions: diagnostic role, and relevance to the origin of increased ADA in tuberculous pleurisy. Eur Respir J. 1996;9:747–51.
5. Adenosine mediates IL-13–induced inflammation and remodeling in the lung and interacts in an IL-13–adenosine amplification pathway - PMC [Internet]. [cited 2022 Apr 11]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC166289/
6. Adenosine receptor ligands: potential as therapeutic agents in asthma and COPD - PubMed [Internet]. [cited 2022 Apr 11]. Available from: https://pubmed.ncbi.nlm.nih.gov/10373392/

How to cite this article: Prangyada Reecha Joshi, Prachi Goyal, Vishal Garg. Comparison of adenosine deaminase activity in COPD with healthy subjects. *International Journal of Research and Review*. 2022; 9(5): 8-9.
DOI: *https://doi.org/10.52403/ijrr.20220502*

******