

# Assessment of Role of Adenosine Deaminase in Common Chronic ENT Infection

K Sudhakar<sup>1</sup>, V Harikishan Babu<sup>1</sup>

<sup>1</sup>Assistant Professor, Department of ENT, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India.

Received: November 2020

Accepted: December 2020

## ABSTRACT

**Background:** Chronic otitis media is a chronic inflammation of the middle ear cleft, resulting in permanent perforation and recurrent otorrhoea with reduced hearing. The present study was conducted to assess role of Adenosine Deaminase in common chronic ENT infection. **Methods:** 60 patients of common chronic ENT infection were divided into 3 groups of 20 each. Group I was control group, group II patients were of chronic tonsillitis and group III patients had chronic otitis media. Venous blood samples were collected through venepuncture taking aseptic measures. Serum was separated into clean, dry sterile vials, stored at -100 C and ADA activity was assayed. **Results:** Out of 60 patients, males were 28 and females were 32. The mean ADA level in group I was 20.4, in group II was 65.2 and in group III was 53.6. The difference was significant ( $P < 0.05$ ). **Conclusion:** Serum ADA level can be regarded as one of the necessary diagnostic tool in diagnosing common chronic ENT infections.

**Keywords:** Adenosine Deaminase, chronic otitis media, ENT infections.

## INTRODUCTION

Chronic otitis media is a chronic inflammation of the middle ear cleft, resulting in permanent perforation and recurrent otorrhoea with reduced hearing.<sup>[1]</sup> In developing countries, the incidence is quiet high among low socio-economic groups may be because of overcrowding, poor personal hygiene, inadequate health care and recurrent episodes of upper respiratory tract infection. The common route of spread of infection into the middle ear cavity is through the eustachian tube and the causative infection may be in the adenoids, paranasal sinus, nose or in the oropharynx.<sup>[2]</sup>

This type occurs when middle ear infections are not controlled. A permanent tympanic membrane perforation may result. Cholesteatomas are common in this type. If adhesions are present, the condition is referred to as Adhesive Otitis Media. The hearing loss that is produced by Otitis Media depends on a variety of factors.<sup>[3]</sup> It can result from negative middle ear air pressure, from effusion, from adhesions, from a necrosis which results in a complete disarticulation of the ossicles, and from perforation of the tympanic membrane. Otitis Media is one of the most common causes of conductive hearing loss, if not the most common cause. Fluctuating hearing sensitivity occurs. Perforation of the eardrum may result in ear drainage.

Vertigo and/or Tinnitus may accompany Chronic Otitis Media.<sup>[4]</sup> Adenosine Deaminase (ADA) enzyme plays a key role. If there is obstruction to a normal pathway of enzyme secretion or excretion or if there is a change in the cell permeability, the normal study state of the passage of the enzyme from cells to extracellular fluid will be altered.<sup>[5]</sup> The present study was conducted to assess role of Adenosine Deaminase in common chronic ENT infection.

## MATERIALS AND METHODS

The present study was conducted among 60 patients of common chronic ENT infection of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded on case history proforma. Patients were divided into 3 groups of 20 each. Group I was control group, group II patients were of chronic tonsillitis and group III patients had chronic otitis media. Venous blood samples were collected through venepuncture taking aseptic measures. Serum was separated into clean, dry sterile vials, stored at -100 C and ADA activity was assayed within a week. The concentration of adenosine is directly proportional to the optical density of adenosine solution. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

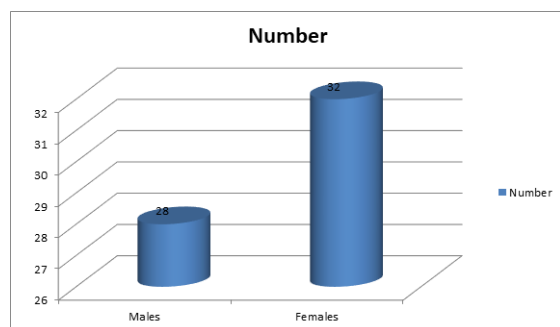
**Table 1: Distribution of patients**

Total- 75		
Gender	Males	Females
Number	28	32

### Name & Address of Corresponding Author

Dr. V. Hari Kishan Babu,  
Assistant Professor,  
Department of ENT,  
Fathima Institute of Medical Sciences,  
Kadapa, Andhra Pradesh, India.

[Table 1 & Figure 1] shows that out of 60 patients, males were 28 and females were 32.

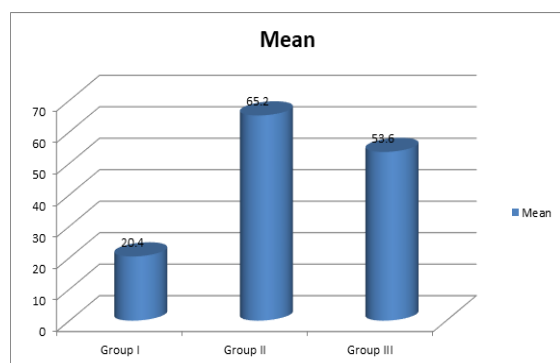


**Figure 1: Distribution of patients**

**Table 2: Assessment of ADA level**

Groups	Mean	P value
Group I	20.4	0.01
Group II	65.2	
Group III	53.6	

[Table 2 & Figure 2] shows that mean ADA level in group I was 20.4, in group II was 65.2 and in group III was 53.6. The difference was significant ( $P < 0.05$ ).



**Figure 2: Assessment of ADA level**

## DISCUSSION

Chronic suppurative otitis media causes recurrent or persistent discharge (otorrhea) through a perforation in the tympanic membrane, and can lead to thickening of the middle ear mucosa and mucosal polyps.<sup>[6]</sup> It usually occurs as a complication of persistent acute otitis media (AOM) with perforation in childhood.<sup>[7]</sup> Chronic suppurative otitis media is a common cause of hearing impairment, disability, and poor scholastic performance. Occasionally it can lead to fatal intracranial infections and acute mastoiditis, especially in developing countries.<sup>[8]</sup> In children with chronic suppurative otitis media, topical antibiotics may improve symptoms compared with antiseptics. The benefits of ear cleansing are unknown, although this treatment is usually recommended for children with ear discharge.<sup>[9]</sup>

Otitis Media with an intact eardrum results in minimal changes in hearing sensitivity,

approximately 30 dB. There may be more of an impact on the lower frequencies, (up to about 1000 Hz), than on the higher frequencies. Ossicular discontinuities are associated with the maximum conductive hearing losses, of approximately 60 dB. Treatment depends on the specific conditions involved. Surgery may be required depending on the reason for the dysfunction. If there is a danger that the drum may rupture spontaneously, an incision in the drum may be made. If healing of a perforation does not occur, surgical repair may be performed. This procedure is one of a class of reconstructive operations called tympanoplasty. The present study was conducted to assess role of Adenosine Deaminase in common chronic ENT infection.

In present study, out of 60 patients, males were 28 and females were 32. Santosh et al,<sup>[10]</sup> conducted a study in which subjects were divided into 4 groups. Group A consisted of 25 normal healthy individuals who served as the controls. Group B consisted of 25 patients, who were clinically diagnosed as chronic tonsillitis. Group C consisted of 25 patients, clinically diagnosed as chronic rhinosinusitis and Group D consisted of 25 patients, clinically diagnosed as chronic otitis media of mucosal type. The serum levels of ADA were estimated in all the subjects. The level of serum ADA was found to be elevated in common chronic ENT infections (Group B, C and D), when compared to control group (Group A).

We observed that mean ADA level in group I was 20.4, in group II was 65.2 and in group III was 53.6. Nagpal R et al,<sup>[11]</sup> in his study found that the level of ADA in acute tonsillitis decreases. It was summarized that in the acute stage, tonsil instead of acting as a protective barrier, appear to become a source for the breakdown of immunological mechanism and neutrophils play a vital role in acute inflammation, and no role for cell mediated immunity. Mishra et al in his study stated that lymphocyte proliferation and differentiation requires adenosine deaminase (ADA). 'T' lymphocytes detects this enzyme. Hence, in chronic inflammatory conditions there might be increased in serum ADA level.

Chronic suppurative otitis media is usually a complication of persistent AOM, but the risk factors for the condition vary in different settings. Frequent upper respiratory tract infections and poor socioeconomic conditions (e.g., overcrowded housing, poor hygiene and nutrition) are often associated with the development of chronic suppurative otitis media. In developed countries and advantaged populations, previous insertion of tympanostomy tubes is now probably the single most important etiologic factor. Of those children who have tympanostomy tubes in place, a history of recurrent AOM, older siblings, and attendance at a child care center increase the risk of developing chronic suppurative otitis media.<sup>[12]</sup>

## CONCLUSION

Authors found that serum ADA level can be regarded as one of the necessary diagnostic tool in diagnosing common chronic ENT infections.

## REFERENCES

1. Mathur PC, Tiwari KK, Trikha S. Diagnostic value of adenosine deaminase activity in tubercular serositis. *Indian Journal of Tuber.* 2006;53:92-95.
2. Ketavarapu S, Uma Ramani G, Modi P. Study on serum ADA in patients with Typhoid fever and other febrile illness. *Journal of Clinical Diagnosis and Research.* 2013;7(4):613- 17.
3. Ramani NS, Krishnamurthy N, Raghavendra Prasad BN. Role of adenosine deaminase to predict Glycaemic Status in Type 2 Diabetes Mellitus. *Journal Clin Biomed Sci.* 2012;2(3):123-33.
4. Acuin J. Geneva: World Health Organisation;2004. Global burden of disease due to chronic suppurative otitis media: Disease, deafness, deaths and DALYs Chronic Suppurative Otitis Media-Burden of illness and Management Options; pp.9-23.
5. Kumar H, Seth S. Bacterial and fungal study of 100 cases of chronic suppurative otitis media. *J Clin Diagn Res.* 2011;5:1224-27.
6. Ahmadaa, Usman J, Hashim R. Isolates from CSOM, their antimicrobial sensitivity. *Armed Forces Med J.* 1999;49:82-85.
7. Vartianien E. Effect of aerobic bacteriology on clinical presentation and treatment results of CSOM. *J Laryngo-Oto.* 1996;110(4):315-18.
8. Lee JG, Kang DG, Yu JR, Kim YR. Changes in adenosine deaminase activity in patients with type 2 diabetes mellitus and effect of DPP-4 inhibitor treatment on ADA activity. *Diabetes Metab J.* 2011;35:149-58.
9. Jadhav AA, Jain A. Elevated Adenosine Deaminase activity in overweight and obese Indian subjects. *Archives of physiology and Biochemistry.* 2011;45:1-5.
10. Pettersson T, Klockars M, Weber T. Pleural fluid Adenosine deaminase in rheumatoid arthritis and Systemic lupus erythematosus. *Chest.*1984;86:273.
11. Santosh UP, Renukananda GS, Abhilash S. Role of adenosine deaminase in common chronic ENT infections. *Journal of clinical and diagnostic research: JCDR.* 2016 Mar;10(3):MC01.
12. Nagpal R, Rao YN, Dhingra PL, Verma SK. Study of serum adenosine deaminase and ascorbic acid in recurrent tonsillitis. *Indian Journal of Otorhinolaryngol.* 1990;42:1-3.

**Copyright:** © the author(s), 2020. It is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits authors to retain ownership of the copyright for their content, and allow anyone to download, reuse, reprint, modify, distribute and/or copy the content as long as the original authors and source are cited.

**How to cite this article:** Sudhakar K, Babu VHK. Assessment of Role of Adenosine Deaminase in Common Chronic ENT Infection. *Ann. Int. Med. Den. Res.* 2021; 7(1):EN04-EN06.

**Source of Support:** Nil, **Conflict of Interest:** None declared