Eustachian Tube Functions in Atrophic Rhinitis-A Tympanometric Study

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Abstract

The present study was carried out on 60 clinically proved cases of primary atrophic rhinitis. Tympanometry was performed to evaluate the Eustachian tube functions. It was observed that in majority of cases, atrophic rhinitis does not effect the Eustachian tube functions. Only a small number of cases revealed hypofunctioning of Eustachian tube.

Introduction

Eustachian tube is an important structure which connects middle ear to nasopharynx, acts as a functionally dynamic organ ultimately related to the physiological integrity of middle ear system (Bluestone and Doyle, 1985). There are three basic functions of Eustachian tube (Bluestone et al, 1972): i) ventilation associated with the equilibration of middle ear and ambient pressure. ii) Protection of middle ear from nasopharyngeal secretions, pathogens, sound and pressure, iii) clearance of accumulated fluid, detritus and foreign substances from middle ear cavity. These functions are interdependent.

It is well known that the diseases of nose and paranasal sinuses invariably effect the Eustachian tube functions leading to pathological changes in middle ear and mastoid (Grote and Kuypers, 1980; Pinkelstein et al 1989). The changes may depend upon severity and dura-

tion of pathological stimulus Magnuson and Falk, 1988). It is presumed that in rhinitis also pathological changes may extend from the nasopharynx and subsequently may involve the Eustachian tube.

Several methods are described to determine the functions of Eustachian tube and middle ear mechanism. Of those, tympanometry is an important and reliable clinical method. The information is derived from various graphic curves relating changes in middle ear impedance with variation of air pressure in the sealed external auditory canal.

Material and Methods

Sixty clinically proved cases of primary atrophic rhinitis were included in the study. All the cases underwent a detailed history and clinical examination of ear, nose and throat. Cases with perforation of tympanic membrane were excluded from the study.

Hearing of the patients was assessed by tuning fork tests and pure tone audiometry. Tympanometry was done for both the ears. An American automatic impedance audiometer model 86-AR was used for this purpose. Various types of curves obtained were classified according to Jerger (1970).

Observations and Results

On examination, 24 cases suffered from unilateral and 36 cases from bilateral atrophic rhinitis. Clinically in 38 patients atrophic changes were confined to the nasal cavity while in 22 cases these changes were found to be involving the nasopharynx also.

Otoscopic examination showed normal tympanic membrane in 94 (78.3%) ears. Ten ears (8.3%) revealed a retracted and sixteen (13.4%) ears had atrophic tympanic membrane. There was no clinical evidence of fluid in middle ear in any of the ears. On Valsalva manoeuvre Eustachian tube was found to be patent in 104(86.4%) ears and blocked in 16(13.4%) ears.

Tympanograms were obtained for both the ears in all patients. Out of 120 ears Type-A tympanogram was obtained in 102 (85%) ears suggestive of normal Eustachian tube function. A small number of ears i.e. 18(15%) revealed abnormal Eustachian tube function. Type-B tympanogram was seen in 10(8.3%) ears and Type-C in 8 (6.7%) ears suggestive of fluid and negative pressure in middle ears respectively. None of the cases showed AS or AD type tympanogram.

Discussion

Tympanometry gives a rapid and simple

method of obtaining objective information using relatively a simple equipment and is superior that obtained by other clinical or radiological investigations (Wolthers, 1970). The changes in the impedance of ear drum are indicative of changes in the middle ear pressure caused by tubal air pressure. In the present study the findings of tympanometry go in favour of normal functioning of Eustachian tube in majority of the cases of atrophic rhinitis. In 85% of ears the middle ear pressure was normal and Type-A tympanogram was obtained. It confirms that the atrophic rhinitis does not affect the Eustachian tube functions in majority of cases.

In a small number of cases Eustachian tube was found to be malfunctioning represented by negative middle ear pressure in 6.7% of ears and presence of fluid ear in 8.3% of ears. These findings however are not coinciding with the clinical findings where none of the ears showed presence of fluid in the middle ear cavity. Malfunctioning of Eustachian tube could be because of blockage of pharyngeal opening of the tube by crusts or thick discharge in the nasopharynx. Direct extension of disease from the nose leading to histological changes in the lumen of Eustachian tube may also cause poor mucociliary clearance and hampering physiological functions of the tube. Another causative factor of poor Eustachian tube function is probably because of crusting present in the nasal cavity responsible for negative pressure resulting into oedema of the lumen of Eustachian tube.

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