

Eustachian Tube Function in Repeated Upper Respiratory Tract Infections

Ghasem Azimi, Sepideh Amiri, Ashkan Divanbeigi

Department of Internal Medicine, Medical Faculty, Shahed University, Tehran, Iran.
Shefa Neuroscience Research Center, Tehran University of Medical Sciences, Tehran, Iran.

Abstract: In this study we evaluated eustachian tube function (ETF) in patients with repeated upper respiratory tract infections lead to chronic otitis media to determine the percentage of various eustachian tube conditions. ETF test was performed on patients with chronic otitis media, in order to assess passive and active function of the eustachian tube and to determine opening pressure, closing pressure and residual pressure. According to the modified inflation deflation test four patients had normal ETF, patients had poor ETF, and patients had semipatulous eustachian tube. % of our cases have a defect in their ventilatory function, and it is probably due to functional obstruction of eustachian tube.

Key words: Chronic otitis media, Eustachian tube, Upper respiratory tract.

INTRODUCTION

Repeated upper respiratory tract infections can be lead to chronics sinusitis and otitis media. Post nasal discharge in chronic sinusitis may impair the mucosa of the eustachian tube (Hong *et al.*,). The Eustachian tube dysfunction is present in . % of sinusitis patients and in . % of those without sinusitis (Leo *et al.*,). Most episodes of otitis media are associated with an upper respiratory viral infection and are short-lived and self-limiting with or without medical treatment (De Baere *et al.*,). The Eustachian tube dysfunction is one of the most important factors in the etiology of middle ear disease (Celen *et al.*,). Poor eustachian tube function plays a major role in the pathogenesis of chronic otitis media and also it can lead to other physiopathological events that cause disease such as serous otitis media and adhesive otitis media (Tos *et al.*, ; Dominguez *et al.*,). Eustachian tube dysfunction was observed in . % of chronic otitis media group and only seen in . % of tthe normal (Parsad *et al.*,). Otitis media and chronic otitis media are among the most common childhood illnesses and contribute a great deal to health care costs (Yeo *et al.*,). Recent findings from studies of population of children with and without otitis media show that a poor ability to equalize negative pressure is a fundamental deficit of eustachian tube function (De Baere *et al.*,). Such an aerodynamic property of the eustachian tube observed in the group with otitis media with effusion may be due mainly to possible inflammatory condition of the tubal mucosa rather than to abnormal anatomy or to an abnormal physical property of the framework (such as cartilage) of the eustachian tube (Leower *et al.*,). Mucosal disease may be due to allergy and infection or rarely to an abnormality of the mucociliary transport (Borkowski *et al.*,). High pressure tubal passive opening was demonstrated in % of patients with refractory otitis media. In contrast, % of children with routine otitis media with effusion had normal opening (Fujita eta al., ; Hong *et al.*,). The impairment in active opening was thought to be due to functional obstruction of the eustachian tube in . % of otitis media with effusion in children and . % of otitis media with effusion in adultls (Straeteman *et al.*,).

We are going to evaluate the EFT in patients with repeated respiratory tract infections lead to chronic otitis media accurately to determine the percentage of various eustachian tube conditions in this disorder.

MATERIALS AND METHODS

These patients with chronic otitis media due to repeated upper respiratory tract infections such as prolonged acute pharyngitis and chronic sinusitis who referred to Khatam hospital participated in this study during a period of months. After taking otologic history for each case and otoscopy, the ETF test was performed.

Since our patients had a non intact TM (Tympanic membrane), we used the pump manometer system of the electroacoustic impedance brige (AZ) to perform the modified inflatlon-deflatlon ETF test (Leuwer *et al.*, ; Bluestone,) in order to assess passive and active functioning of an eustachian tube and to determine opening pressure (OP) closing pressure (CP) and residual pressure (RP) (Bluestone, ; Doyle,). The time interval between each swallow was approximately seconds and the subjects swallowed dry. The mean

Corresponding Author: Ashkan Divanbeigi, Shefa Neuroscience Research Center, Tehran University of Medical Sciences, Tehran, Iran.

Tel: + ; E-mail: adivanbeigi@farabi.tums.ac.ir

opening pressure for apparently normal subjects with a traumatic TM perforation is mm H O (± 70 mm H O). An extremely high opening pressure (e.g.; greater than to mm H O) may indicate partial obstruction, while a very low opening pressure (e.g., less than mm H O) would indicate a semipatulous eustachian tube. Complete equilibration of applied negative pressure by swallowing is usually associated with normal function, but partial equilibration or even failure to reduce any applied negative pressure may or may not be considered abnormal; due to the fact that all swallowing does not necessarily open the eustachian tube . However we considered it as a poor ETF (Mondain *et al.*, ; Di Martino *et al.*,).

Results:

The percentage of otologic signs including, tinnitus, vertigo, hearing loss, and effusion for all patients are summarized in table .

Tinnitus was founded in , vertigo in , hearing loss in , and effusion in of cases. In those patients whose hearing sensitivities are reminded in normal range, tympanic membrane perforation is in the type of microperforation. According to the modified inflation-deflation test patients had normal ETF, patients had poor ETF with the mean of opening pressure ~ mm H O, closing pressure ~ mm H O, and residual pressure ~ mm H O, and patients had semipatulous eustachian tube.

The percentage of these three conditions in patients with chronic otitis media is shown in figure .

Table 1: The percentage of otologic disorders.

Disorder	Tinnitus	Vertigo	Hearing loss	Effusion
Percent (%)				

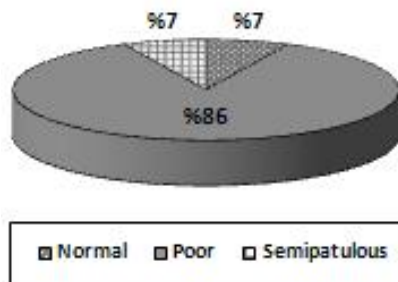


Fig. 1: The percentage of eustachian tube conditions.

Discussion:

Because of its anatomic and functional connections, middle ear disorders frequently occur in sinusitis. Assessment of eustachian tube functions can be helpful in the diagnosis and prevention of middle ear disease as well as in management of patients. The eustachian tube active swallow opening is a rather complex process of a biomechanical action. It is not only closely related to the function of middle ear ventilation but also related to pump-like function and the protective function against refluxing infection from nasopharynx. Modified inflation-deflation test aids in determining the presence or absence of a dysfunction as well as the type of dysfunction (obstruction versus abnormal patency) and its severity when one is present.

No other test procedures may be needed if the patient has either functional obstruction or patent eustachian tube . In this study % of cases have a defect in their ventilatory function that is probably related to the deficit of the upper part of eustachian tube which is involved mainly with ventilation function. - . With respect to the records of opening pressures in the patients (approximately mm H O), it appears that the impairment in active opening is due to functional obstruction because the opening pressures were below than mm H O.

Conclusion:

It is necessary to consider eustachian tube dysfunction and chronic otitis media in prolonged and repeated upper respiratory tract infections as a serious complication.

Consequently ETF test is felt to have a significant role in management of chronic otitis media.

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