

Scintigraphic evaluation of nasal mucociliary activity in unilateral chronic otitis media

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Abstract

Mucociliary clearance is a key defence mechanism in human upper and lower airways. Although mucociliary activity is present in both ears of the patients, most cases of chronic otitis media are unilateral.

In this study, we aim to evaluate the difference between nasal mucociliary activity of the affected and non-affected sides in patients with unilateral chronic otitis media. Both nasal transport times of 36 patients with unilateral chronic otitis media were compared statistically with each other and with the control group by independent samples *t*-test. The nasal mucociliary transport times of the nasal cavity at the same side as the affected ear and as the non-affected ear are significantly different, in the same patients.

Our study shows that impaired or decreased nasal mucociliary activity may result in dysfunction of the eustachian tube and middle-ear ciliary activity, which plays an important role in the aetiopathogenesis of chronic otitis media.

Key words: Otitis Media; Mucociliary Clearance; Nasal Cavity; Scintigraphy

Introduction

The aetiology of chronic otitis media has been the subject of numerous investigations and much discussion, reflecting the complex nature of this condition.¹⁻³ The eustachian tube has three major functions: ventilation, clearance and protection of the middle ear. All three functions play an important role in protecting the middle ear from developing chronic otitis media. Abnormal function of the eustachian tube, with an impaired ability to equalize pressure differences, appears to be the most important factor in the pathogenesis of middle-ear diseases.¹⁻⁵ Other probable contributing factors are upper airway infections; recurrent otitis media; infection of the eustachian tube and nasopharynx; and allergy and ciliary dysfunction of the respiratory mucosa, especially in the middle ear.⁴ Besides dysfunction of the musculature of the eustachian tube, inflammatory mediators, including prostaglandins, arachidonic acid metabolites, leukotrienes, and cytokines, have also been postulated in the pathogenesis of middle-ear diseases.⁶

Optimal tubal function depends not only upon equalization of the pressure but also upon a normal mucociliary clearance in the clean middle ear filled

with air.¹ Mucociliary clearance is a key defence mechanism in human upper and lower airways, and its impairment, both acquired and genetically determined, predisposes to chronic infection of the nose, paranasal sinuses and respiratory tree.^{7,8}

An important driving force in mucociliary transport is ciliary beat, so that mucociliary clearance can be decreased due to a decline in ciliary beat frequency (CBF). In type I (Ig E mediated) allergic reactions, such as those seen in patients with allergic rhinitis, several allergic inflammatory mediators are released from the nasal mucosa. These mediators may, in turn, be responsible for the decline in CBF, which then impairs mucociliary clearance.^{6,9}

Morphologically, the ciliated mucosa in the middle ear and eustachian tube is of an identical nature to the nasal mucociliary epithelium.¹ Therefore, these nasal infections and allergic reactions may result in an impairment of mucociliary function in the middle ear as well as the eustachian tube and, thus, in the long term may contribute to otitis media becoming chronic.^{1,4,7,8}

In this study, we aim to evaluate the difference between nasal mucociliary activity of the affected and non-affected sides in patients with unilateral chronic otitis media.