

Risk factors associated with severity of eosinophilic otitis media



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ABSTRACT

Objective: Eosinophilic otitis media (EOM) is an intractable otitis media associated with bronchial asthma. Clinical characteristics of EOM are apparent, but severe EOM, which is unresponsive to ongoing treatments, can occur. The present study aimed to investigate potential risk factors associated with the severity of EOM.

Methods: We scored the EOM severity of 26 patients according to quantity of middle ear effusion (MEE), thickness of the middle ear mucosa, use of topical and oral corticosteroids, and use of antibiotics, all measured over a 3-month period. The scores for four 3-month periods (1 year) were averaged. We analyzed the prevalence of clinical variables by partial regression: sex, age, body mass index (BMI), duration of bronchial asthma, association of aspirin-intolerant asthma, Lund–Mackay score for sinusitis, mastoid pneumatization, width of the bony Eustachian tube at the tympanic orifice, percentage of eosinophils and immunoglobulin E in peripheral blood, and association of allergic rhinitis. Duration of bronchial asthma was defined as the period from onset of bronchial asthma to the age of first consultation at our hospital. Samples of MEE were taken for bacterial culture.

Results: The average severity score was 6.6 (out of 16). The severity score in the pathogen-positive MEE group was significantly higher than that in the pathogen-negative MEE group ($p < 0.05$). The score was not significantly different between the seasons. Linear multiple regression analysis showed that BMI and the duration of bronchial asthma significantly affected the EOM severity score ($p < 0.05$). The presence of aspirin intolerant asthma tended to be correlated with the severity score. The Lund–Mackay score tended to be negatively correlated with it.

Conclusions: There is a significant association between the severity of EOM and obesity, as well as with the duration of bronchial asthma.

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1. Introduction

Eosinophilic otitis media (EOM) is an intractable otitis media characterized by a highly viscous effusion containing eosinophils, and is associated with bronchial asthma (BA). The clinical characteristics of EOM were clarified [1,2] and diagnostic criteria were proposed in 2011 [3]. The number of patients diagnosed as having EOM has increased in Japan and other countries [4]. EOM is unresponsive to conventional treatments, such as myringotomy or insertion of a tympanostomy tube. Intratympanic instillation of triamcinolone acetonide has been used to treat middle ear effusion

(MEE) and otorrhea [5]. The condition of most patients with EOM remains stable by systemic, topical, or oral administration of corticosteroids. However, some patients experience regular recurrences, despite ongoing treatment. They often have MEE or purulent otorrhea with bacterial infection, and need systemic or topical administration of antibiotics. The present study was carried out to investigate potential risk factor(s) for severe EOM and to investigate new treatment strategies for controlling this intractable disease.

2. Materials and methods

2.1. Subjects

Between October 2011 and September 2012, we studied 26 patients with EOM who had been followed up at Jichi Medical University Saitama Medical Center for more than 1 year. The

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Table 1

Scoring system used to evaluate the severity of eosinophilic otitis media (Iino et al. [6]).

1. Quantity of middle ear effusion (MEE)/otorrhea (without eardrum perforation)
Score 0 No MEE
Score 1 MEE with partial intratympanic aeration
Score 2 Mesotympanum totally filled with MEE
Quantity of MEE/otorrhea (with eardrum perforation)
Score 0 No otorrhea
Score 1 Otorrhea limited to the mesotympanum
Score 2 Otorrhea extrudes to the external auditory canal
2. Condition of the middle ear mucosa
Score 0 Nearly normal or slightly edematous
Score 1 Edematous or thickened
Score 2 Highly thickened or granulated, and extending beyond the eardrum
3. Frequency of intratympanic administration of corticosteroids
Score 0 None
Score 1 Once in the previous 3 months
Score 2 Two or more times in the previous 3 months
4. Frequency of systemic administration of corticosteroids
Score 0 None
Score 1 Seven days or less in the previous 3 months
Score 2 More than 7 days in the previous 3 months
5. Frequency of systemic administration of antibiotics
Score 0 None
Score 1 7 days or less in the previous 3 months
Score 2 More than 7 days in the previous 3 months

patients were 13 male and 13 female patients aged 26–75 years (mean \pm standard deviation, 49.8 ± 13.3 years). All the patients were diagnosed as having BA and EOM on the basis of previously reported diagnostic criteria [3]. They visited our hospital every 1–3 months. Their blood testing was obtained at the initial visit. Intratympanic instillation of triamcinolone acetonide was regularly used at the same time and systemic administration of antibiotics was performed if bacterial infection was present in the middle ear. If acute inflammation became worse, tympanostomy or topical saline irrigation was chosen. Patients also regularly visited the respiratory medicine department for management of BA. All participants used nasal spray for sinusitis and inhaled corticosteroids and five participants also used continuous systemic corticosteroids to control BA. Some of the patients received systemic corticosteroids at the time of exacerbation of BA or EOM. The duration of BA and EOM was defined as the onset of BA and EOM to the age of the first consultation to our hospital.

This study was approved by the Ethics Committee of Jichi Medical University Saitama Medical Center (study number: RIN 13-49).

2.2. Evaluation of severity of EOM

The degree of severity of EOM was evaluated according to five items: (1) quantity of MEE or otorrhea; (2) condition of the middle ear mucosa; (3) frequency of intratympanic injection of triamcinolone acetonide; (4) frequency of administration of systemic corticosteroids; and (5) frequency of administration of antibiotics. These items were scored on a scale from 0 to 2 (Table 1 [6]). Patients were evaluated every 3 months. The scores for four 3-month periods (1 year) were averaged to resolve seasonal differences in clinical symptoms. Three of the items (1, 2, and 3) were evaluated separately for each ear. Two of the items (3 and 5) in each participant were also evaluated, including medications prescribed by physicians other than the otolaryngologist. The 3-month assessment periods were assigned to correspond with Japanese seasons (from October to March: cold season; from April to September: warm season).

2.3. Bacterial and fungal cultures in MEE or otorrhea

MEE or otorrhea was obtained from each patient for bacterial and fungal cultures. Detection of bacteria and fungi was performed

by routine laboratory analysis at the clinical microorganism division of our University Hospital.

2.4. Width of the bony portion of the Eustachian tube at the tympanic orifice

We measured the width of the bony portion of the Eustachian tube at the tympanic orifice from an anatomical perspective [7]. Measurements were obtained from 0.5-mm sliced axial and coronal sections of a computed tomography (CT) scan of the temporal bone (Fig. 1).

2.5. Lund–Mackay score

The extent of sinus disease identified by CT scan was evaluated by using the Lund–Mackay scoring system [8]. To evaluate sinus contents, the five major right and left sinuses (frontal, maxillary, anterior and posterior ethmoid, and sphenoid), and the ostiomeatal complex were scored on a 2-point scale as follows: 0, clear; 1, partial opacification; and 2, total opacification. This score applied to not only pre-operative condition but also post-operative condition after endoscopic sinus surgery (ESS).

2.6. Mastoid pneumatization

Mastoid pneumatization was evaluated according to the extent of pneumatization. Pneumatization was classified as follows: 1, poorly pneumatized (cells were not well developed); 2, moderately pneumatized (cells were developed within the sigmoid sinus); and 3, well pneumatized (cells were developed beyond the sigmoid sinus). We used the mean score of both sides.

2.7. Statistical analysis

Associations between variables for some characteristics and the severity score were assessed by the partial correlation coefficient. The variables were used as independent variables in multiple linear regression analysis, which was performed to identify risk

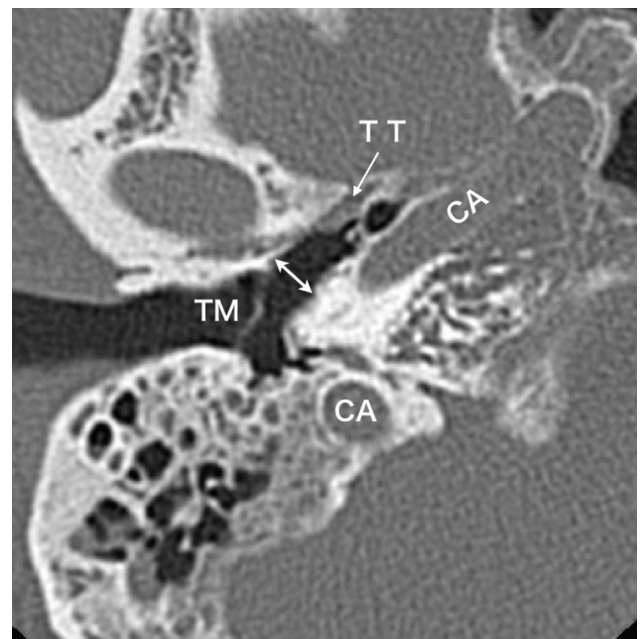


Fig. 1. Width of the bony portion of the Eustachian tube at the tympanic orifice (measured from 0.5-mm sliced axial and coronal sections of a temporal bone CT scan). TT, tensor tympani muscle; TM, tympanic membrane; CA, carotid artery.

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