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Subjective and objective nasal obstruction assessment in children with chronic rhinitis

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KEYWORDS
Chronic rhinitis;
Nasal blockage;
Rhinomanometry;
Self-assessment;
Decongestion test

Summary

Objective: The present study was undertaken, to test the hypothesis that schoolchildren on long-term treatment for chronic rhinitis under-report their nasal congestion.
Methods: Ninety-seven children aged 8.3—15.5 years (median 12.7) with non-purulent perennial rhinitis, for 1.4—8.5 years (median 2.8) self-graded their nasal blockage as "severe" (group-A), "moderate" (group-B), "mild" (group-C) or "absent" (group-D). An additional 48 normal children served as controls (group-E). Subsequently active anterior rhinomanometry for total nasal airway resistance (TNAR) measurement and decongestion test (>20% TNAR fall) were employed as objective means of nasal congestion.
Results: Mean pre-decongestion TNAR values did not show any significant difference between the group-A, -B and -C; significant differences were observed between group-A and -D ($p = 0.04$) and between all groups as compared to -E. Positive decongestion test was detected in 57.1%, 53.8%, 48.3%, 32.3% and 10.4% of children in group-A, -B, -C, -D and -E, respectively (group-A, -B, -C versus -E $p < 0.001$, group-D versus -E $p = 0.03$).
Conclusions: Schoolchildren on long-term treatment for perennial rhinitis frequently under-report their symptom of nasal stuffiness.

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1. Introduction

Nasal congestion is one of the most prominent symptoms of chronic rhinitis. In clinical practice, determination of the degree of nasal obstruction is mainly based upon the patient's — adult or child — subjective self assessment [1,2].

The prevalence of physician-diagnosed allergic rhinitis in school-children has been reported to be up to 40% [3]. However, assessment of symptoms' severity, patient's discomfort and treatment effectiveness have also been based upon the children's subjective description. The accuracy and the reliability of such descriptions are questionable.

Over the past 20 years, a number of reports have looked at the relationship between subjective assessment and objective measurement of nasal airway obstruction [4—11]. Most of the studies dealt with adults, focusing on subjects with seasonal allergic rhinitis and even more, after nasal provocation test. Nevertheless, a more marked sensation of nasal congestion would be expected under such conditions, as the change of nasal patency occurs acutely. Consequently, subjective grading of nasal blockage by patients on long-term treatment for persistent rhinitis may well be fundamentally different.

Nasal airflow and resistance measurements represent an objective and quantitative assessment of nasal patency, and active anterior rhinomanometry, is the most reliable and frequently used method to assess these parameters [12,13].

The present study was undertaken, to test the hypothesis that schoolchildren on long-term treatment for chronic rhinitis under-report their nasal congestion.

2. Materials and methods

Children 8—15 years of age with diagnosed non-purulent perennial rhinitis followed at the outpatient clinic of Allergology-Pulmonology Department (KP, AS, MT) were enrolled in the study. All subjects were on long-term treatment with nasal topical corticosteroids continuously for a minimum of four months prior to enrollment. Patients with nasal skeletal deformity, nasal polyps, adenoid hyperplasia, and acute upper respiratory infection within two weeks from enrolment were excluded from the study. All nasal medication was discontinued for 24 h prior to the study visit.

During a routine follow-up visit at the outpatients' Allergy Clinic, after a rest period of 30 min, a simple structured questionnaire was administered in order to estimate the children's subjective nasal blockage assessment. They were asked to blow their nose and then grade their nasal blockage at the level of: ''severe'' (group-A), ''moderate'' (group-B), ''mild'' (group-C) or ''absent'' (group-D). Objective measurements followed.

Active anterior rhinomanometry with mask was performed via a computerized rhinomanometric system (Rhinomanometer PC 200). A minimum of three to five breaths were recorded at a fixed transnasal pressure of 150 Pa during quiet breathing with the mouth closed in the sitting position. The airflow resistance of both nasal cavities was measured and the total nasal airway resistance (TNAR) was calculated (total value for right and left nostrils). Values were expressed as a ratio between transnasal pressure and flow ($Pa/cm^3/s$). Eight minutes after topical application of two puffs of xylometazoline 0.1% nasal spray in each nostril, another measurement was made. The conventional criterion of $>20\%$ fall of TNAR was adopted as a positive decongestion test [14].

Atopic status was estimated by skin prick testing to 20 common environmental inhaled allergens.

Children with no history of chronic nasal or other respiratory symptoms, matched for age, sex and height served as controls (group-E).

Parents of each subject and older children gave written informed consent. The study was approved by the Ethics Committee of the Hospital.

Statistical analysis was performed using the one-way ANOVA-analysis for quantitative variance and Spearman correlation for qualitative data. Chi-square test was also used to compare dependent variance. The statistical analysis was done using the SPSS 11.5.

3. Results

Ninety-seven children (51 males) with diagnosis of non-purulent perennial rhinitis were enrolled in the study. Their age ($\pm$S.D.) was 12.3 ± 1.9 years and their height 149.1 ± 12.8 cm. The duration of a past history of rhinitis ranged from 1.4 to 8.5 years (median 2.8 years). The demographic characteristics of patients and controls are shown in Table 1. There was a Gausian distribution of ages and heights in all five groups and there were no significant differences in age or height among groups.

All patient values of the TNAR for each group before and after decongestion are illustrated in Fig. 1. A significant correlation was detected between baseline TNAR values and the subjective nasal congestion grading of the patients with