ORIGINAL CONTRIBUTION

Rhinology, 47, 450-453, 2009

V.A.S. in the follow-up of turbinectomy*

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SUMMARY

Background: *Nasal airflow resistance, as measured by rhinomanometry, is frequently impaired in allergic rhinitis (AR). However, rhinomanometry is not widely available. Visual analogue scales (VAS) have been proposed to assess symptom severity in AR.*

Aim of the study: *To verify the suitability of the use of the VAS as a surrogate for rhinomanometry in patients with persistent allergic rhinitis and treated with turbinectomy in quantifying nasal obstruction during the follow-up.*

Methods: *Fifty patients (27 males, mean age 23 years, SD 2.24) were studied. VAS for nasal obstruction and rhinomanometry were performed in all patients before turbinectomy and after 6 months.*

Results: *A significant correlation was observed between VAS for nasal obstruction and nasal airflow resistance (Spearman $r = 0.879$, $p < 0.001$) at baseline. Moreover, a significant direct relationship between these two variables was observed ($r = 0.567$, $p < 0.001$) also at the follow-up after surgery.*

Conclusion: *The use of VAS for assessing the nasal obstruction appears as clinically relevant, in that it allows with good reliability to quantify this symptom in the absence of rhinomanometry in the follow-up of patients treated with turbinectomy.*

Key words: *nasal obstruction, turbinectomy, follow-up, persistent allergic rhinitis, pollens, VAS, resistances, rhinomanometry*

INTRODUCTION

Allergic rhinitis (AR) is a common chronic disorder characterized by typical symptoms, the most important being nasal obstruction [1]. Nasal obstruction is also related to allergic inflammation [2]. AR is moreover associated with impairments in quality of life, work and school productivity. Patients may also be bothered by sleep disorders, emotional problems, impairment of activity and social functioning: nasal obstruction largely contributes to affect these aspects.

These reasons explain why, in the ARIA guidelines, the classification of AR is based upon both quality of life and symptoms' severity and duration [3]. In this regard, nasal obstruction constitutes the most bothersome symptom and has been proposed as key symptom in AR [4]. The clinical relevance of nasal obstruction results from the demonstration that the severity of obstruction is significantly correlated with clinical, immunological, and spirometric parameters [4].

Nasal obstruction may be evaluated subjectively by the patient's perception of air passage through the nose, and objectively by measuring nasal airflow resistance using rhinomanometry [5]. Indeed, the objective assessment of nasal obstruction, even though simple to perform, requires the use of rhinomanometry, which is rarely present in the doctor's office. For this reason rhinomanometry is rarely considered in the common clinical practice. Recently, the Visual Analogue Scales (VAS) has been proposed as a useful parameter in assessing allergic rhinitis symptoms [6]. VAS is quantitative measure largely validated in many diseases: in fact, VAS of sensory intensity and affective magnitude was validated as ratio scale measures for both chronic and experimental pain [7]. Moreover, this scale has been proposed to assess the severity of rhinitis as well as the efficacy of therapeutic interventions.

The treatment of nasal obstruction may be based on medical treatment or surgery, when it is indicated or medical therapy is ineffective. Turbinectomy based on electrotherapy by High Frequency (HF) is commonly used: it is safe, effective and determinates a quickly improvement in nasal obstruction symptoms [8]. However, the follow-up of patients treated with turbinectomy is difficult to assess, as there are no easy markers for objectively quantifying the improvement. Therefore, the aim of the present study was to verify the suitability of the use of VAS as a surrogate for rhinomanometry in quantifying nasal

*Received for publication: January 8, 2009; accepted: February 6, 2009

DOI:10.4193/Rhin09.006

obstruction in patients treated with HF turbinectomy and evaluated by a 6-month follow-up.

MATERIALS AND METHODS

Study design

This longitudinal study was performed on 50 consecutive patients (27 males, mean age 23 years, SD 2.24) affected by persistent allergic rhinitis due to pollen allergy and diagnosed according with the ARIA criteria [3]. Exclusion criteria were: the presence of acute upper respiratory infections and the use, during the 4 preceding weeks, of nasal or oral corticosteroids or decongestants, and antileukotrienes and antihistamines during the previous week. A nasal endoscopy was performed in order to rule out anatomic disorders or nasal polyps. The study was approved by the Institutional Review Board and an informed written consent was obtained from every patient.

Treatment

Turbinectomy, under local anesthesia (lidocaine prilocaine cream suctioned from the nose after five minutes of mucosal anaesthetization), was performed by electrotherapy using high frequency alternate current, which caused a decongestion of lower turbinates. The bipolar electrode was elapsed along turbinates from tail to the head and it is not required nasal packing.

VAS

VAS for nasal obstruction and for other symptoms, including itching, sneezing, rhinorrhea, and ocular symptoms, assessment and rhinomanometry were performed in all patients before turbinectomy and after 6 months.

VAS was used to quantify the subjective feeling of nasal obstruction; it ranges from 0 (no obstruction) to 10 (complete obstruction). Patients were asked to position a cross on a line corresponding to their own perception of nasal obstruction.

Rhinomanometry

Nasal airflow resistances were measured by active anterior electronic rhinomanometry (ZAN 100 Rhino Flow Handy II, ZAN, Messgeraete Gmbh, Germany) according to validated criteria [5]. Nasal airflow resistance was considered as the sum of recorded resistances through the right and left nostrils, measured in milliliters per second at a pressure difference of 150 Pa across the nasal passage.

Statistics

The association between Nasal airflow resistance and VAS for Nasal Obstruction was assessed by means of the Spearman's rho coefficient. A linear regression wad used to assess the dependence of the Nasal Airflow Resistance from VAS for Nasal Obstruction. A one-way ANOVA model was used to compare continuous variables between groups, after checking for homoscedasticity using the Levene test. All statistical analyses were performed with the use of SPSS (Version 13.0).

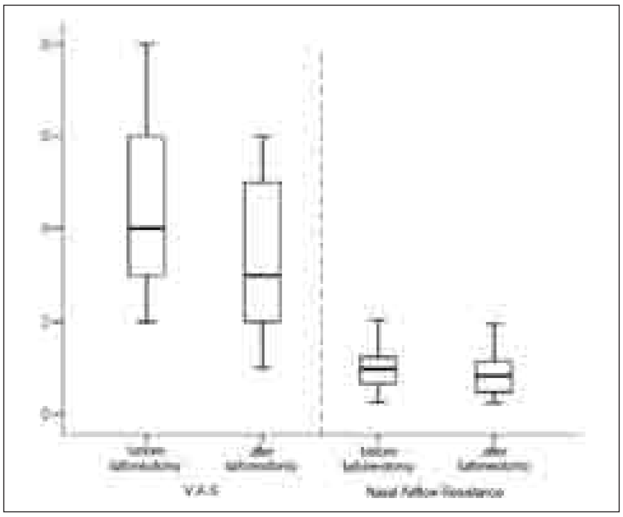

Figure 1. Box-Plot of VAS for Nasal Obstruction and Nasal Airflow Resistance values before and after turbinectomy.

A value of $p < 0.05$ was considered statistically significant.

RESULTS

VAS for Nasal Obstruction and Nasal Airflow Resistance mean ± SD were 4.52 ± 1.64 and 0.99 ± 0.45 respectively at baseline, and 0.86 ± 0.47 and 3.28 ± 1.39 respectively at the follow-up after turbinectomy as reported in Figure 1. In addition, there was a significant difference between pre-surgery and post-surgery for both nasal airflow resistance mean (IC95%): -0.13 (-0.20; -0.05), $p = 0.001$ and VAS mean (IC95%): -1.24 (-1.53; -0.95), $p < 0.001$; it is to note that negative values mean an improvement.

A significant and very strong direct relationship between these two variables was observed (Spearman $r = 0.879$, $p < 0.001$), at baseline as shown in Figure 2A. Likewise at the follow-up after surgery, a significant direct relationship between these two variables was also observed ($r = 0.567$, $p < 0.001$) as shown in Figure 2B.

Moreover, there was a significant relationship between the VAS difference change (post-pre) and nasal airflow resistance difference change (post-pre): $r = 0.385$, $p < 0,05$ as shown in Figure 3.

Finally, the nasal resistance is positively related also with VAS for rhinorrhea ($r = 0.313$, $p = 0.27$) as reported in Figure 4.

DISCUSSION

Nasal obstruction represents the leading symptom in allergic rhinitis [4]. The pathogenesis of nasal obstruction is complex and consists of three main events: inflammatory mucosal oedema, vascular congestion, and mucus hypersecretion [8].

The recommendations for allergic rhinitis and its impact on asthma (ARIA) have proposed a new classification for allergic

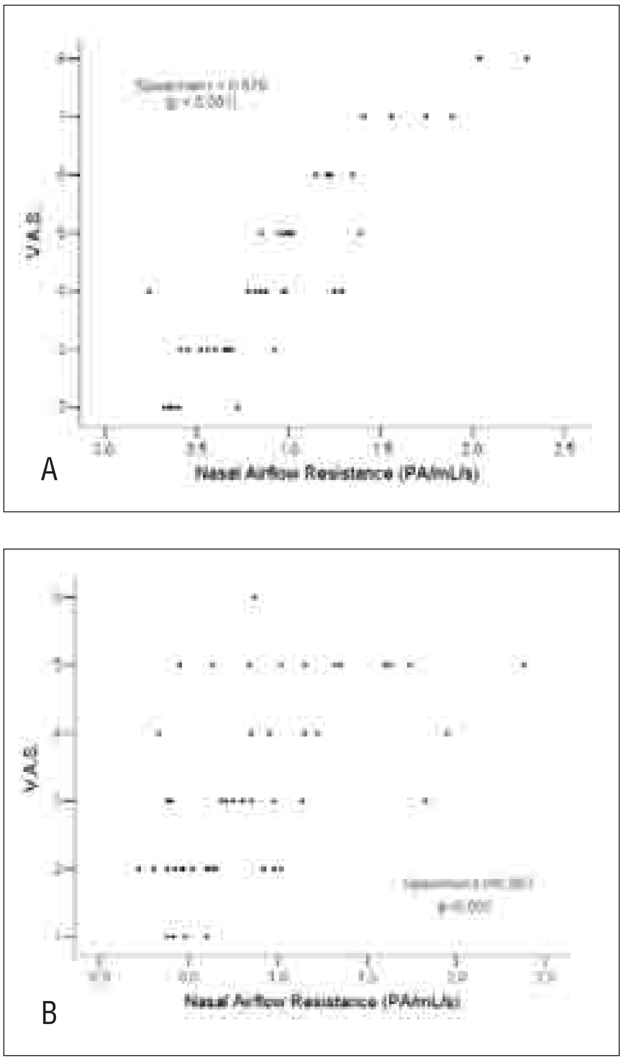

Figure 2. Relationship between VAS for nasal obstruction and nasal airflow resistance before turbinectomy (A) and after turbinectomy (B).

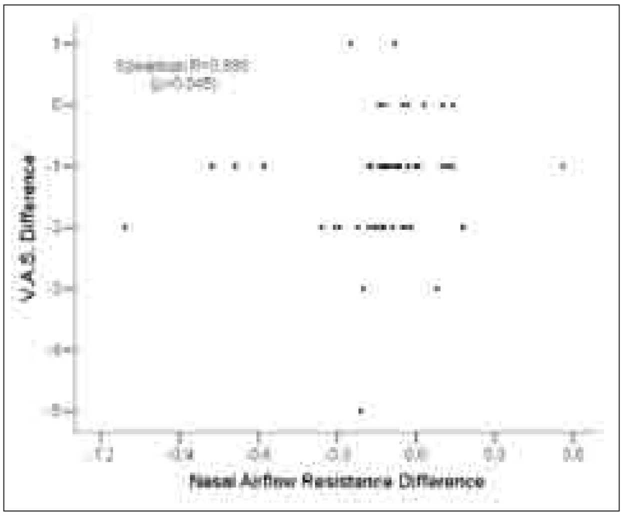

Figure 3. Relationship between relative difference of VAS for nasal obstruction and nasal airflow resistance.

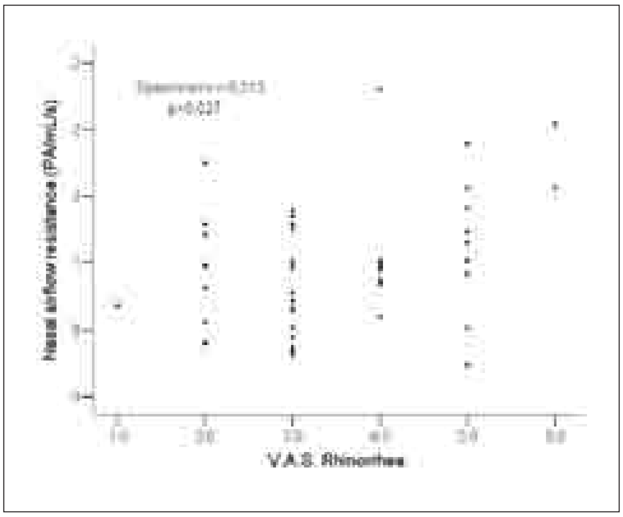

Figure 4. Relationship between VAS for rhinorrhea and nasal airflow resistance.

rhinitis, subdividing it into intermittent and persistent, replacing the old classification of seasonal and perennial rhinitis [3]. Moreover, these guidelines provide a stepwise treatment to for rhinitis, based on duration and severity of the disease [9]. However, the ARIA scoring system employs several questions and cannot be quantified.

Objective assessment of nasal obstruction needs to be performed by rhinomanometry. VAS can be used as a simple and quantitative method for the assessment of rhinitis severity in both intermittent and persistent rhinitis and in untreated or treated patients, as it has been previously demonstrated [6]. Moreover, rhinomanometry and VAS support each other very well in the pathological noses, and they can actually identify intranasal changes very sensitively during an intranasal mucosal pathology [10]. However, rhinomanometry is rarely available, whereas VAS is available everywhere. Therefore, our study aimed at evaluating whether VAS assessment may be performed in clinical setting as surrogate of rhinomanometric evaluation for quantifying nasal obstruction.

This study provides evidence that there is a very strong relationship between rhinomanometry findings and VAS for nasal obstruction at baseline. This relationship is also confirmed by the significant regression between these parameters. In addition, it is to note that also VAS for rhinorrhea is significantly correlated with nasal resistance. In this regard, mucus hyperproduction constitutes a factor contributing to nasal obstruction, as the mucus presence further reduces the space within nasal cavity.

At the follow-up, a statistical significance persists for all these parameters. Therefore, the employment of VAS for assessing nasal obstruction appears as clinically relevant in that it allows, with good reliability, to quantify nasal obstruction in the absence of rhinomanometry.

Consequently, VAS for nasal obstruction may be considered as a reliable predictor for nasal resistance. Therefore, VAS may be used as alternative tool for assessing nasal obstruction intensity in the absence of rhinomanometry. Moreover, the relevance of nasal obstruction assessment has been recently underlined in both allergic rhinitis [11] and chronic rhinosinusitis [12]. Both studies evidenced that there was good relationship between subjective an objective evaluation. These findings further support the present study.

In conclusion, this study provides evidence that assessment of VAS for nasal obstruction may be used in clinical practice to quantify this symptom during the follow-up after surgery.

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