Rhinology, 39, 147–150, 2001

Histopathological verification of clinical indications to partial inferior turbinectomy*

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SUMMARY

Surgical treatment in cases where disturbances of the nasal patency causes changes in the nasal inferior turbinates is controversial. The authors performed light- and electron microscopy and morphometric examinations of the mucous membrane of the nasal inferior turbinates obtained after partial inferior turbinectomy in patients with vasomotor and perennial allergic rhinitis and compensation hypertrophy of the nasal inferior turbinate accompanied by nasal deviation of the septum.

In specimens obtained from patients with vasomotor rhinitis, a small number of glands and fibrosis of the lamina propria was observed. In specimens obtained from perennial allergic rhinitis patients, plenty of glands and large oedema was observed. In the group with compensatory hypertrophy of the inferior turbinate, normal glands and fibred areas around the vessels were observed.

The largest histopathological changes of degeneration and hypertrophy of the nasal mucosa were observed in vasomotor rhinitis patients. Histopathological examination of nasal mucosa slides confirmed the usefulness of a partial inferior turbinectomy, but only in vasomotor rhinitis patients.

Key words: nasal mucosa, partial inferior turbinectomy, histopathological verification

INTRODUCTION

Surgical treatment of nasal airflow disturbances caused by an enlargement of the nasal turbinates has always been controversial (Kukwa et al., 1988). The surgery has always aimed at a reduction of the volume of the nasal turbinates. However, all surgical techniques have a bigger or smaller influence on the physiological nasal airflow. In our opinion, surgery is only indicated in cases with a hypertrophy of the nasal mucosa of the turbinates, but not in case of oedema.

There are no clear criteria in the literature for the precise (clinical) identification of oedema and a differential diagnosis between oedema and hypertrophy of the nasal mucosa (Grymer et al., 1996). The indications to nasal turbinate surgery are often based only upon a subjective clinical examination by otolaryngologists and therefore, according to our observations, they are often abused (Olszewski et al., 1995).

The aim of our study was a quality and quantity assessment of changes observed in the nasal mucosa of the inferior turbinates. Besides, we analysed the causes of nasal airflow impairment and tried to verify (from a histopathological point of view) clinical criteria for surgery of the turbinates.

MATERIAL AND METHODS

We examined 61 patients ranging in the age from 19 to 73 (mean age 32 ± 0.5). They were divided into three groups:

1. 28 patients with vasomotor rhinitis and aged from 20 to 73 years old (mean age 34 ± 0.5) with an average history of the disease of 10 years (patients had negative allergy tests).
2. 18 patients with perennial allergic rhinitis and aged from 19 to 50 (mean age 27 ± 0.5) with an average history of the disease of 9 years (patients had positive allergy tests).
3. 15 patients with unilateral nasal septum deviation and unilateral compensative hypertrophy of the inferior turbinate, contralateral to deviation, and aged from 19 to 42 (mean age 24 ± 0.5) with an average history of the disease of 9 years.

All these patients underwent partial inferior turbinectomy under local anesthesia and the nose was not decongested before the operation. For such a study, from at least 6 sites of the turbinate biopsies were taken, 3 on the lateral and 3 on the medial surface (anterior, middle, posterior). The criteria for the surgery were based upon the patients' history data, clinical examination, allergic skin prick tests and the active anterior rhinomanometry where the airflow in ml/s has been evaluated.

In the clinical examination, all patients showed hypertrophy of the inferior turbinates.

* Received for publication: July 7, 2000; accepted: May 22, 2001

The nasal mucosa was removed during surgery and was examined under a light microscope. The microscopic specimens were stained with hematoxylin and eosin, mucicarmine stained for mucus detection and Masson's trichrome stain was used to visualize connective tissue.

The average cross area of a single blood vessel and of the blood vessels sum present in one specimen were assessed by the Microscan system picture analysis for Windows by Imal. For comparison purposes, all the results of the morphometrical examinations have been given in square pixels. Since, there was no normal distribution in the obtained results and since there were variable differences, the non-parametric statistical test of Mann-Whitney was used to compare the mean values. Differences are considered statistically significant when $p<0.05$.

RESULTS

In the specimens obtained from the patients with vasomotor rhinitis, a small number of glands with increased secretory activity was observed (Figure 1). Most of these glands showed cystic degeneration. The epithelial layer in this group of patients was visibly smaller than in the other groups. However, in some slides of this group, epithelial mucus secretion was very abundant, and in some slides, features of planocellular metaplasia were observed. This phenomenon was not observed in other groups. It was further observed that the whole lamina propria of the nasal mucosa became fibred.

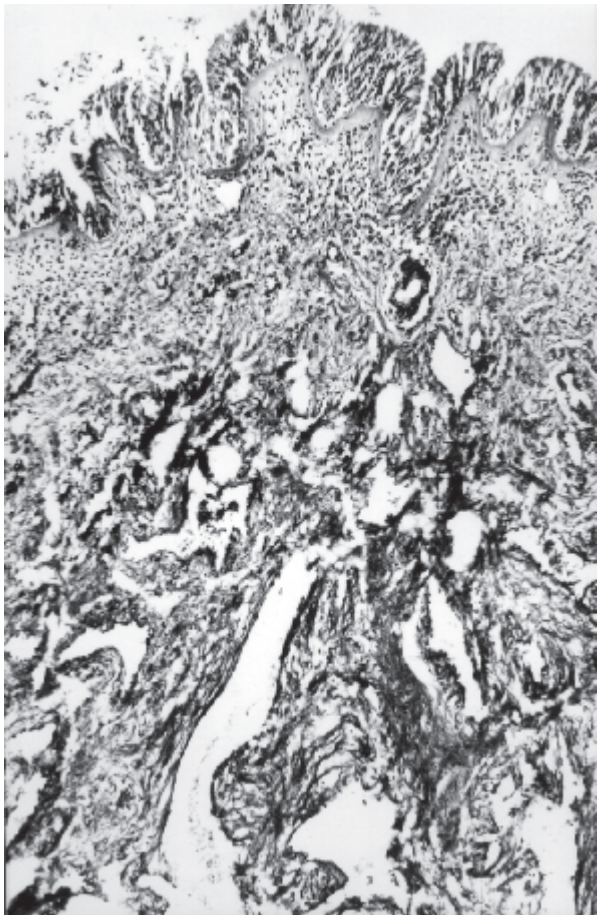

Figure 1. Inferior turbinate mucosa of a patient with vasomotor rhinitis. Visibly plentiful fibroelastasis and festooning of epithelium. Masson stain × 100.

In the specimens obtained from patients with perennial allergic rhinitis, plenty of glands with big secretory activity were observed in the lamina propria (Figure 2). Some of them showed features of cystic degeneration. The epithelium was of normal height with high secretory activity. Large oedema but only a few fibrous areas around the blood vessels were found.

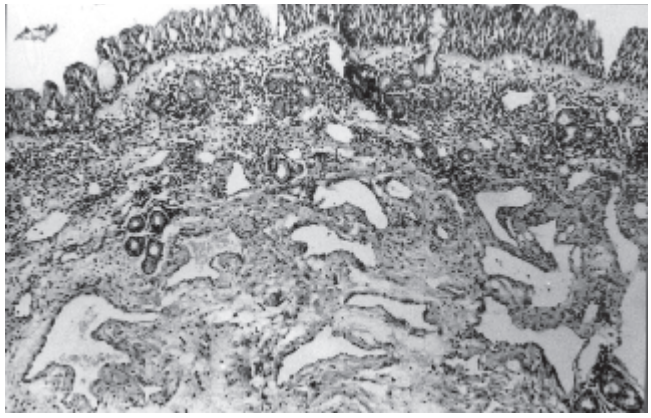

Figure 2. Inferior turbinate mucosa of a patient with perennial allergic rhinitis. Visibly discharge of mucous within the epithelium and glands, and glands with cystic degeneration. Mucicarmine method × 100.

In the specimens of the group with compensatory hypertrophy of the inferior turbinate, a lot of normal glands in the lamina propria and a high epithelium were observed. The glands as well as the epithelium showed a moderate mucus secretion. There were a lot of fibrous areas in the lamina propria, mostly around the vessels (Figure 3).

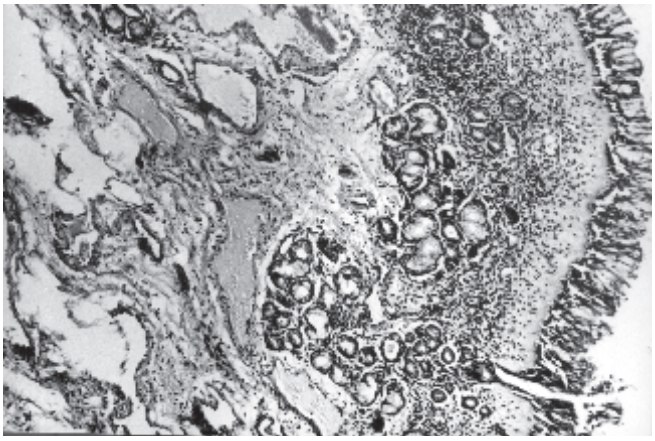

Figure 3. Inferior turbinate mucosa of a patient from the group with compensatory hypertrophy of the inferior turbinate. Visibly numerous glands and widening of cavernous vessels. Hematoxylin and eosin method × 100.

Additionally, the electron microscope examination of specimens obtained from the nasal mucosa of the inferior turbinates from groups 2 and 3 confirmed that the nasal mucosa became fibrous (forming collagen streaks). Mast cells found in the specimens showed degranulation of their secretion granules. This phenomenon was not observed in the other groups of patients.

In the morphometric examination (Table 1), the biggest mean blood vessels cross area was noticed in the nasal mucosa of the vasomotor rhinitis group (group 1) compared to the other two groups. The difference in the mean blood vessels cross area that was found between the first and the third group was statistically significant ($p<0.05$). The biggest cross area of all the blood vessels was observed in the vasomotor rhinitis group, a little bit smaller in the control group and the smallest cross area was found in the perennial allergic rhinitis patients. A statistical significance in the total area of blood vessels was found between the nasal mucosa of the vasomotor and perennial allergic rhinitis patients ($p<0.001$).

Table 1. The results of the morphometric evaluation of vessels of mucosa of the inferior turbinates in different groups of patients.

Group of Patients	Mean blood vessels cross area (square pixels)	Mean area of all the blood vessels (square pixels)
Vasomotor rhinitis	2400 ± 1610	50484 ±29497
Perennial allergic rhinitis	1923± 1114	30255±21092
Compensatory hypertrophy of the inferior turbinate	1740 ± 689	41646 ± 20460

DISCUSSION

In our study we found the biggest destructive changes of hypertrophy and degeneration in the nasal mucosa of vasomotor rhinitis patients. This is indicated by a very small number of glands, planocellular metaplasia and by a fibrous lamina propria. On the contrary, in the group of patients with perennial allergic rhinitis, no degenerative changes were found at all. The dominating feature in this group was huge oedema of the interstitium with a normal epithelium and numerous, secretory active glands.

In the group with compensatory hypertrophy of the inferior turbinate, moderate features of nasal mucosa degeneration were described, mostly in the form of fibrous perivascular areas in the interstitium, but there were still many glands and the epithelium was normal. The blood vessel broadening that was noticed under a light microscope, was also demonstrated in a morphometric assessment. The blood vessel broadening was the biggest in the vasomotor rhinitis and the smallest in the group with compensatory hypertrophy of the inferior turbinate. The statistically significant difference in the total cross area of the blood vessels in the nasal mucosa of the vasomotor rhinitis and allergic rhinitis patients' groups, in comparison to the statistically insignificant difference in the single blood vessel cross area, can indicate an increased number of blood vessels. This phenomenon may be the effect of new vessel formation as a symptom of reparation processes of the nasal mucosa impaired rhinitis (Ash et al., 1956). In our observations, real hypertrophy of the nasal mucosa of the inferior turbinates, according to the morphologic criteria (Ash et al., 1956) was observed in vasomotor rhinitis patients. These changes are irreversible and they are making the nasal mucosa less valuable. These observations seem to support the opinion of Grymer et al. (1996): the assessment of the state of the turbinates and their hypertrophy during the clinical examination of the patient may be controversial in some cases. In the other patient groups, hypertrophy and degeneration were not significant (group 3) or completely absent (group 2).

In our opinion, partial inferior turbinectomy is a simple and effective surgical technique, which allows properly qualified patients with hypertrophy of the nasal mucosa in the turbinates, as is the case with our patients in the vasomotor rhinitis group, to improve nasal breathing. This opinion has been already presented by many authors (Ophir et al., 1985, 1992; Thompson et al., 1989). Although the opponents of partial inferior turbinectomy say it changes the physiological nasal airflow (Moore et al., 1985; Mlynski et al., 1993; Obbura, 1995), in our opinion if the degeneration and hypertrophy of the nasal mucosa already exist, the physiological function of the mucosa is already impaired and the nose is blocked anyway.

CONCLUSIONS

1. In our study, the biggest histopathological changes of degeneration and hypertrophy of the nasal mucosa were observed in the vasomotor rhinitis patients as compared to the group with compensatory hypertrophy of the inferior turbinate.
2. The dominating feature in the perennial allergic rhinitis group was oedema of the interstitium.
3. Disturbances of the nasal patency were caused by hypertrophy of the inferior turbinates in the group with vasomotor rhinitis and with compensatory hypertrophy of the inferior turbinate and mostly by oedema in patients with perennial allergic rhinitis.
4. Histopathological examination of the nasal mucosa confirmed the usefulness of a partial inferior turbinectomy only in vasomotor rhinitis patients.

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