# Radiofrequency treatment of ethmoidal nerve with allergic rhinitis under nasal endoscopy *

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**Abstract Objective:** To study the effect of radiofrequency treatment of ethmoidal nerve on allergic rhinitis. **Method:** Eighty-eight cases of allergic rhinitis were treated with ethmoidal nerve radiofrequency under nasal endoscopy. **Result:** It showed marked effectiveness in 73 cases (83.0%), improvement in 11 cases (12.5%), and failure in 4 cases (4.5%) in one-year follow-up. The overall effective rate was 95.5%. **Conclusion:** Radiofrequency treatment of ethmoidal nerve with allergic rhinitis under nasal endoscopy has such advantages as significant therapeutic effect, convenient operation, and accurate treatment site, and has good clinical application values.

**Key words** Allergic rhinitis Ethmoidal nerve Nasal endoscopy Electrocoagulation

## Radiofrequency treatment of ethmoidal nerve with allergic rhinitis under nasal endoscopy

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The increased activity of the parasympathetic nervous system in the nasal cavity is an important factor in the onset of allergic rhinitis. From October 1996 to September 1997, we used radiofrequency hyperthermia devices under nasal endoscopy to treat 88 cases of ethmoidal nerve with allergic rhinitis by thermocoagulation. After 1 year of follow-up, the therapeutic effect was significant. Now a report is given as follows.

**1 Data and Methods**

**1.1** Clinical data

All the 88 patients complied with the "Diagnostic Criteria and Efficacy Evaluation Criteria for Allergic Rhinitis" revised at the 1997 Haikou Conference. Among the patients, there were 49 males and 39 females aged at 14-69 years old with an average age of 35.5 years. The course of disease ranged from 1 to 30 years. All the patients were treated with antihistamines and hormone drugs before this treatment, but the efficacy was not significant.

**1.2** Treatment methods

The patient was put in the supine or semi-reclining position and was subjected to nasal mucosal anesthesia using a 2% dicaine epinephrine sponge, focusing on the anterior part of the middle turbinate (nasal ridge) and its corresponding nasal septum. Then, the SHP-I radiofrequency treatment device for facial organs (manufactured by Guangzhou Medical Device Factory) was used, with the negative electrode connected to the lower part of the patient's chin and an intensity of Level 3. Under direct nasal endoscopy, the emitter was used to perform thermal coagulation treatment on the bilateral nasal ridge and the corresponding nasal septum mucosa. The range of thermal coagulation was about 1 cm x 1 cm, with a treatment duration of 5 seconds for the nasal ridge and 3 seconds for the septal side of the nose, preferably to have white spots of local mucosa. After treatment, 1% ephedrine nasal drops was given to reduce reactive swelling of the mucosa and the nasal reactive membrane was promptly cleaned. During the observation period after treatment, antihistamines and hormone drugs were not used, so as to avoid interfering with the efficacy observation. Follow-up examinations were carried out at half a year and one year after treatment, including the improvement of nasal symptoms and findings from nasal examinations. All the patients underwent only one thermal coagulation treatment.

**2 Results**

After treatment, all the patients in the study were followed up for more than 1 year. According to the efficacy evaluation criteria revised at the 1997 Haikou Conference, among the 88 cases, it showed marked effectiveness in 73 cases (83.0%), improvement in 11 cases (12.5%), and failure in 4 cases (4.5%), and the overall effective rate was 95.5%. 3-5 days after treatment, the patients might experience symptoms such as nasal congestion, runny nose, or a small amount of bloody secretions due to nasal reactions, which were gradually improved after 1 week. In the study, 2 patients had recurrence at six months after treatment, and 5 patients developed nasal adhesion which was improved after treatment; No complications such as nasal septum perforation, nasal dryness, or decreased olfactory function occurred.

**3 Discussions**

The onset of allergic rhinitis is not only associated with antigen and antibody reactions, but also with the autonomic nervous system. The internal branch of the ethmoidal nerve is mainly distributed on the nasal ridge and the corresponding nasal septum mucosa. By using a nasal endoscope to observe the nasal structure directly, it is not affected by abnormal nasal anatomy, it is convenient to operate, the disadvantages of ordinary nasal endoscopy can be overcome, the treatment site can be accurately selected, and the therapeutic effect can be improved. The effective rate for the patients in this study reached 95.5%, which was significantly higher than that of our previous use of conventional endoscope for ethmoidal nerve electrocautery (with an effective rate of 84.7%).

For radiofrequency, radiofrequency electromagnetic waves are mainly used to generate strong endogenous heat effects in local cells, causing thermal coagulation of protein, vascular occlusion, tissue degeneration, and atrophy to treat diseases. Radiofrequency treatment can not only cause degeneration and atrophy of the sensitive mucosa on the nasal ridge and corresponding nasal septum, as well as

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damage to the glands, but also can cause varying degrees of damage to the deep ethmoidal nerve, reducing its sensitivity to adverse external physical and chemical stimuli, reducing the secretion of vasoactive peptides, inhibiting sneezing reflex, reducing runny nose, and improving nasal ventilation, thus achieving the goal of treating allergic rhinitis [1, 2].

The intensity selection of radiofrequency treatment has a significant impact on the efficacy and prevention of complications. When the intensity is low and the treatment duration is short, it cannot effectively damage the local mucosal nerves; however, when the intensity is high and the treatment duration is long, it may cause damage to the deep tissues, especially in the treatment of the nasal septum. In our opinion, the intensity should be selected at Level 3, and as the mucosa at the nasal ridge is thick, the duration can be long (5 seconds), and the duration at the nasal septum can be short (3 seconds), and both sides should be staggered as much as possible to avoid perforation of the nasal septum. There were no cases of nasal septum perforation in the patients in this study. The key to preventing nasal adhesion is to timely clean the nasal reaction membrane after treatment, and in this study, 5 patients experienced nasal adhesion at the treatment site, which was improved after treatment.

In this study, 2 patients experienced recurrence at half a year after treatment, but the symptoms and signs were still milder than those before this treatment. The two patients had obvious deviation of the nasal septum. It was possible that the deviation of the nasal septum during treatment limited the range of radiofrequency treatment on the protruding side, which affected the therapeutic effect. After undergoing nasal septum correction surgery, the symptoms of allergic rhinitis were significantly relieved; in addition, abnormal distribution of the ethmoidal nerve might also be one of the reasons that affected the treatment efficacy or led to recurrence. According to our experience, this treatment has a clear and intuitive field of vision, has no obvious side effects or serious complications, has significant therapeutic effects, and has good clinical application values.

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## Treatment of infantile nasopharyngeal teratoma with microwave thermocoagulation under nasal endoscopy: Report of one case

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Teratoma occurring in the nasopharynx is extremely rare. One patient was admitted to our department and treated with microwave thermal coagulation under nasal endoscopy, with good results. Now a report is given as follows.

The patient was a 9-year-old female. Two months ago, her mother found that the child snored during nighttime sleep, which was gradually worsened. She often choked and held her breath while breastfed, causing breastfeeding difficulties. The condition was worsened for two days and she was admitted to the hospital on June 29, 1998. Physical examination: The patient had a body weight of 6 kg, with poor nutrition, and with no abnormalities found in the systemic examination. Specialized examination: There was no abnormality of the external nose, and the left nasal cavity was normal. A grayish white mass, approximately 4 cm x 2 cm in size, was found behind the left soft palate, obstructing approximately 4/5 of the oropharynx. The surface of the tumor was smooth, the parenchyma was stiff, active, and not easy to bleed. The pedicle was on the left wall of the nasopharynx. CT showed a 3 cm x 2 cm mass on the left side of the nasopharynx, with the root located behind the occipital part of the eustachian tube and with a basal width of approximately 0.5 cm. No biopsy was carried out before the surgery. Diagnosis: Nasopharyngeal tumor (nature to be determined).

The surgery was performed on July 6, 1998 under general anesthesia and tracheal intubation. One 0° and 70° nasal endoscope (manufactured by Stryker in the United States) and one (D=4 mm) $MTC^{-4}$ multifunctional microwave surgical treatment device (manufactured by Nanjing Qiya Technology Co., Ltd.) were used. The patient was put in the supine position and the mouth was fixed with a mouth opener. The 0° nasal endoscope was put through the left nasal cavity into the nasopharynx to determine the range of the tumor and the relationship between the base and the surrounding area. At the same time, the soft palate was gently pulled through the oral cavity to hold the tumor. Under TV stakeout, it was found that the tumor completely blocked the left posterior nostril, and then it was slightly pulled toward the oral cavity and exposed. The pedicle of the tumor was found as observed via the posterior nostril to be located behind the occipital part of the left eustachian tube, with a base width of approximately 0.5 cm. Firstly, a syringe was used to puncture and aspirate to confirm the absence of liquid, then a saline gauze strip was placed around the opening of the eustachian tube to protect it. A dual pin microwave probe (with a power of 45 W and a time limit of 1-5 s), controlled by a pedal switch, was used. Under the stakeout of nasal endoscope, the microwave probe was placed via the oral cavity between the root of the tumor and the occipital part of the eustachian tube, and microwaves were initiated for coagulation of the tumor base. This process was repeated for 3 times, with each time lasting for 2 seconds, and instantly the base of the tumor turned white (for a total time of 6 seconds), and then the microwave input was stopped. The tumor was gently pulled out from the oral cavity, with about 5 ml of blood oozed from the base. The base of the tumor was coagulated again using microwaves until its surface turned white without active bleeding. The saline gauze around the eustachian tube was removed, without filling the wound, and the surgery was completed. The tumor was 4 cm x 2 cm in size, with fine hairs on the surface. After dissection, the center was composed of adipose tissues, and no fluid or cartilage was found. Pathological report: Benign teratoma of the nasopharynx.

Milk was fed at 6 hours after the surgery. The postoperative local reactions were mild. The wound still had no bleeding, and antibiotic nasal drops were administered four times a day. The patient was discharged at 7 days later.

**Discussion** Teratoma is a congenital tumor, mostly benign and usually present at birth, but it is more common in children, especially newborns and infants. It is usually a painless lump. If the tumor is large or grows in a location that is prone to causing compression or obstruction symptoms, the symptoms occur early. In this patient, it was discovered by swallowing and coughing when it fell from the nasopharynx into the mouth.

For tumors with fine pedicle in the pharynx and nasopharynx top, surgical resection is simpler. However, for tumors located in the deep part of the nasopharynx and with a wide pedicle, surgery with no stakeout is prone to causing residue and recurrence. Under nasal endoscopy, the surgical light is bright, and the various parts of the nasopharynx can be seen clearly, and the operation is simple, safe, and thorough.

In microwave tissue thermocoagulation, when the probe is in contact with the tumor, the boundary of the heated site is clear, the hemostasis is good, and there is no carbonization. Different models and bendable microwave probes can be selected to put into various parts of the nasopharynx, making the surgery more thorough. Even if the microwave probe is wrapped with blood scabs, its sustained thermal coagulation effect is still not affected. It should be noted that saline gauze should be used during the surgery to protect the opening of the eustachian tube.

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