

Treatment of allergic rhinitis with superpulse

CO₂ laser guided by endoscope

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[Abstract]

Objective: To observe the clinical effect in the treatment of allergy rhinitis with CO₂ laser. **Method:** 40 cases of allergy rhinitis were treated with CO₂ laser guided by endoscope. Inverstigators made a global evaluation with symptom scores before treatment and after treatment one week and a year . **Results:** CO₂ laser provided an excellent improvement at the end of the study **Conclusion:** For effect ,accurate , little blood , fewer complication and convenience in use CO₂ laser is a better treatment in allergy rhinitis.

Key words: allergy rhinitis CO₂ laser endoscope

Allergic rhinitis is a kind of chronic hypersensitive inflammatory disease of nasal mucosa, mediated by IgE release following exposure to allergen. In addition to type I hypersensitive reaction, excitation of parasympathetic nerves in the nasal cavity also plays an important role in the pathogenesis of allergic rhinitis. Most patients responded to drug therapy, but a small portion don't. We have treated 40 cases of allergic rhinitis with superpulse CO₂ laser (Multipulse, Asclepion Laser Technologies GmbH, Germany), and have obtained satisfactory results.

1. Materials an methods

1.1 Clinical data:

40 patients (male 21, female 19), aged from 11 to 55, were diagnosed of allergic rhinitis, according to the criteria established in Haikou in 1997. 1 of 40 patients had asthma, 5 had nasal septal deviation, and 4 had nasal polyps. There was no family history in 40 patients.

1.2 Treatment:

Laser system: Superpulse CO₂ laser (Multipulse, Asclepion Laser Technologies GmbH, Germany) was used for treatment.

Procedure: The patient was in recumbent position, the bilateral nasal cavities and middle nasal meatus topically anaesthetized with 1% dyclonine plus some epinephrine for 3 times at 3 minute interval. Operation mode, output power and time were chosen according to the site, severity and range of rhinitis. For the small lesion, low power (1-5W) and pulse or superpulse mode were adopted. As for large ones, high power (5-15W) and continuous mode were chosen. The trigger and sensitive points of allergic rhinitis such as anterior ethmoidal nerve innervated area, nasal cavity, anterior portion of lower turbinate and posterior portion of middle turbinate were irradiated in linear or point-patch mode under the guidance of nasal endoscope.

Pharyngeal and nasopharyngeal areas would be irradiated if necessary.

Erythromycin ethylsuccinate was orally administered for 3-7 days after the operation and saline nose drop was applied 3 times daily. The patient was followed up 1 week after operation, and the pseudomembrane was removed to prevent adhesion. The patient was then followed up 1 year later, pre&post-operative symptoms and signs being recorded to investigate improvement of allergy and postoperative change of nasal cavity. 35 patients underwent 1 treatment and 5 underwent 2.

1.3 Evaluation of clinical response:

Clinical response was evaluated twice according to 1997 Haikou criteria. Excellent means disappearance of symptoms and signs, or disappearance of symptoms with slight edema of turbinate. Effective means significant alleviation of symptoms, or significant decrease of itching and sneezing with slight improvement of nasal obstruction and edema of lower turbinate. Poor means no improvement of symptoms and signs. Short term clinical response was evaluated 1 week after treatment, and long term response 1 year after treatment.

2. Results

1 week after CO₂ laser therapy, 24 cases exhibited excellent result, 13 effective and 3 poor. The total effective rate was 92.5%. Symptoms and signs disappeared in 12 cases. 31 patients (9 dropped out) were followed up 1 year after treatment for evaluation of long term clinical response. Among them, 15 exhibited excellent response, 12 effective and 4 poor. The total effective rate was 87.1%.

As for adverse effect, nasal discharge and obstruction of varied severity were seen in some patients after operation. On examination, there was congestion, edema and increased secretion of nasal mucosa. The above manifestations all disappeared 3-14 days later, and mucosa recovered to normal. There was 1 case of adhesion in nasal cavity, which disappeared after certain treatment. There were no such complications as hemorrhage, infection and perforation of nasal septum.

3. Discussion

Allergic rhinitis is a kind of allergic reaction of nasal mucosa, frequently encountered in

ENT department. The pathogenesis is actually type I hypersensitive reaction of nasal mucosa. Agger nasi is one of the trigger points and sensitive areas of this disease, and anterior ethmoidal nerve is the major nose-innervating parasympathetic nerve, the abnormal excitation of which plays an important role in the pathogenesis. Anterior ethmoidal nerve is distributed at the supra-anterior portion of nasal cavity, where gland density is high. Irradiation of anterior ethmoidal nerve, lateral branch and septal branch in this area will not only damage inflow of parasympathetic nerve, but also decrease acetylcholine released from nasal cavity, thereby alleviating symptoms. Meanwhile, anterior ethmoidal nerve is also a sensory nerve of supra-anterior portion of nasal cavity, the sensory function will be weakened after irradiation.

This will decrease sensitivity of external nose to adverse chemical or physical stimuli.

The effect of superpulse CO2 laser irradiation is as follows:

- 1) The excitability of anterior ethmoidal nerve is decreased, and thereby vascular permeability and nasal secretion are also decreased.
- 2) Some of sensory nerves have been cut, the sensory-parasympathetic nerve reflex is weakened, and at the meantime release of vascular-origin intestinal peptide as well as substance P is also decreased.
- 3) Scar formation of nasal mucosa will prevent hypersensitivity.

Superpulse CO2 laser is of good orientation, flexibility, high focus of energy and minimal injury to the surrounding normal tissue. It will cause coagulation, degeneration and atrophy of protein, and cause damage of varied degree to certain branch of anterior ethmoidal nerve and sphenopalatal nerve. Moreover, laser therapy will destroy glands in this area, decreasing secretion and sensitivity of nasal mucosa to adverse external stimuli, suppressing reflex of sneezing. Thus nasal discharge and obstruction will be lessened and symptoms alleviated. With the aid of nasal endoscope, nasal cavity can be directly observed without influence of abnormal anatomic structure, especially when sphenopalatal ganglion area is irradiated. Superpulse CO2 laser has such advantages as precise targeting, easy manipulation, no bleeding, fewer complications, good response and quick recovery. During the treatment, power output and coagulation time are to be strictly controlled, and surrounding normal tissue is to be well protected in order to ensure both efficacy and safety of treatment.

Bibliography:

1. Gu Zhiyan.
Guidance of treatment of Allergy rhinitis.
Chinese Journal of Otorhinolaryngology Head and Neck Surgery,
2002,37(3):163-164
2. Tian Yongquan, Sun Aihua.
Otorhinolaryngology. Edition 5. 2001,61-62