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## **ADVANCEMENTS IN DIAGNOSING AND TREATING NASAL VESTIBULITIS: A COMPREHENSIVE REVIEW**

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**Abstract:** *Nasal vestibulitis (NV), a prevalent ailment in otorhinolaryngology, manifests as diffuse inflammation stemming from skin infection in the nasal vestibule. Its clinical presentation comprises redness, swelling, itching, erosion, exudate, or rough chapped skin surrounding the anterior nasal foramen. This condition tends to be recurrent, enduring, and challenging to resolve, exacting a significant toll on the patient's physical and emotional well-being, thereby impairing their quality of life. While the precise incidence and prevalence of NV remain unreported, historical accounts underscore its commonality. The diversity of treatment modalities and varying outcomes have led to inconsistencies in the therapeutic approach, contributing to variable recurrence rates. Extensive research has been conducted globally to dissect the diagnosis and management of NV; however, the findings exhibit heterogeneity and a lack of consensus.*

*This article conducts a comprehensive review encompassing the etiology, pathological mechanisms, clinical manifestations, and diagnostic and therapeutic strategies of NV, bridging the perspectives of both Chinese and Western medicine to provide a holistic overview.*

**Keywords:** Nasal vestibulitis (NV), Inflammation, Diagnosis and treatment, Otorhinolaryngology, Quality of life

### **1. Introduction**

Nasal vestibulitis (NV) is a common clinical disease in otorhinolaryngology. It is a diffuse inflammation caused by nasal vestibular skin infection. The main clinical manifestations are redness, swelling, itching, erosion, exudate or rough chapped skin around the anterior nasal foramen. Its clinical features are recurrent, lingering and difficult to heal, so that the patient's spirit and body are greatly tortured, seriously damaging people's quality of life. The incidence and prevalence of NV have not been reported so far, but previous reports have described NV as a common disease. There are different treatment methods in bed, and there are also great differences in treatment effect and recurrence rate. Scholars at home and abroad have done a lot of research to analyze the diagnosis and treatment of NV, but the results are different and have not been unified. This article reviews the etiology, pathological mechanism, clinical manifestations, diagnosis and treatment of NV in Chinese and Western medicine.

### **2. The etiology and pathogenesis of nasal vestibulitis**

Western medicine believes that NV is related to local minor trauma, such as nose picking, nasal hair removal, excessive blowing of nose and local nasal steroid treatment, which repeatedly stimulates the nasal vestibular skin, mainly caused by *Staphylococcus aureus*. Diffuse inflammation of nasal vestibular epithelium. Tumor necrosis can also be complicated by NV<sup>[1]</sup>. Long-term harmful dust stimulation such as nasal digging or rubbing nasal vestibule is also a common cause. Diabetes and immune diseases can

easily lead to nasal vestibule infections and increase the risk of complications [2]. NV often occurs on the right side, which may be related to the formation of abscesses on the right side. It may also be related to the right hand advantage and the habit of picking nose [3]. Some scholars have reported a patient with NV caused by *Nocardia dasuo* [4]. Some scholars have found that cancer patients receiving targeted therapy often have skin adverse reactions characterized by epidermal destruction and susceptibility to bacterial infection. Because pathogenic microorganisms are transmitted from the nasal cavity, these patients are more likely to develop NV and are more likely to develop secondary skin infections [5]. Studies have found that NV is more common in cancer patients receiving chemotherapy drugs, especially paclitaxel, docetaxel and bevacizumab [6-8]. Nasal secretion stimulation or latex allergy after nasal surgery, combined with tissue ischemia after local compression, can lead to congestion and erosion of nasal vestibule [9].

### **3. The etiology and pathogenesis of nasal vestibule inflammation in traditional Chinese medicine**

NV is equivalent to " nasal malnutrition " in traditional Chinese medicine, which belongs to the categories of " nasal sore ", " red nose " and " nasal malnutrition " in ancient medical books of traditional Chinese medicine. The earliest discussion of nasal malnutrition appeared in the " Theory of the Causes and Symptoms of Diseases·Volume 48 ". It recorded : The shape of the insect 's nose, the two red under the nose, and the slight sore and itching at the time of hair, also known as red nose, also known as malnutrition nose. It was not until the Song Dynasty that the name of nasal malnutrition appeared."Taiping Shenghui Fang" book records: "Nasal itching, intense heat, dry coat, skin atrophy, gasping, intermittent dysentery, lesions on the nose and lips, ulcers, and inflammation indicate the presence of nasal malnutrition."Ancient physicians believed that wind, dampness, heat and malnutrition were the pathogenic factors of nasal malnutrition. The treatment of the disease is mainly in the lung, which is related to the spleen and stomach [10]. For example, " Surgical Qixuan·Volume VIII " says : " All nostrils have chancroid sores, that is, there is damp heat in the lungs. " Miscellaneous Diseases Origin Rhinoturbidity·Volume 23 " Yun : " Oral and nasal ulcers and erosions are also the heat of the three meridians of the lung, spleen and stomach. "Through the accumulation of previous experience and years of clinical practice, modern medical scientists have constructed a more perfect theoretical system. Liu Peng suggests that the etiology and pathogenesis of nasal malnutrition can be classified into three types. In the first type, the skin at the nostril is affected by pathogenic heat from within and outside the lungs. The second type involves spleen and stomach damp heat accumulation that results in knotting of the nose orifices with skin corrosion. The third type is associated with yin and blood deficiency that causes dryness and nasal dystrophy. Ding Huirong proposes that postpartum nasal malnutrition results from blood deficiency and dry weathering. There is no need to blindly clear heat. Instead, it is necessary to nourish yin and blood, moisten dryness, and relieve wind. According to Li Hongshu, the pathogenesis of nasal malnutrition stems from the accumulation of heat in the spleen and stomach, which calls for clearing the heart and spleen.

Ding Huirong believes that the etiology and pathogenesis of postpartum nasal malnutrition is blood deficiency and weathering dryness. It is not necessary to blindly clear heat, and it is necessary to nourish yin and blood, moisten dryness and relieve wind. Li Hongshu believes that the pathogenesis of nasal

malnutrition is the accumulation of heat in the spleen and stomach, so it is advisable to clear the heart and spleen [11].

#### **4. Clinical manifestations and differential diagnosis of nasal vestibulitis**

The main symptom of NV is nasal vestibular pain, which can be unilateral or bilateral. The yellow scab on the nasal septum is a typical manifestation, and systemic symptoms and signs are not common. Acute patients had obvious pain, local skin diffuse redness and swelling, or superficial erosion, chapped, and mucopurulent crusts on the nasal hair [1]. Chronic, nasal vestibular fever, dry itching, check the nasal vestibule nasal hair is scarce, or even no nasal hair, local skin thickening, even scab chapped. It may include fever and elevated white blood cell count. NV may be accompanied by facial cellulitis and abscess formation requiring drainage. If not treated in time, NV may develop into severe facial cellulitis and may be accompanied by intracranial complications [3].

According to the clinical manifestations, the diagnosis of NV is not difficult, but it needs to be distinguished from nasal vestibular eczema. The main symptoms of nasal vestibular eczema are local exudation, itching and burning sensation. Pruritus is more severe. Although thickening, infiltration or chapped skin of nasal vestibule can also be seen, most of them have clear boundary and limited lesions [1]. Some scholars have found that the symptoms of nasal skin tuberculosis and nasal squamous cell carcinoma are not specific in clinical practice. The lesion area is often mistaken for local post-traumatic crusting, which is easily confused with NV, but the use of antibiotics is ineffective. Biopsy can be used for differential diagnosis by pathological analysis [12,13].

#### **5. Western medicine treatment of nasal vestibulitis**

NV is a diffuse infection of the nasal vestibule epithelium. The nose is located in the middle of the face. The vascular supply in the middle of the face is characterized by an interconnected and valveless venous system between the facial vein and the angular vein, the superior ophthalmic vein and the cavernous sinus. The facial vein also communicates with the cavernous sinus through the inferior ophthalmic vein and the pterygoid plexus. In these pathways, infection of the midfacial skin ( ' risk area ' ) may result in cavernous sinus thrombosis through intracranial transmission. Therefore, although local treatment may be sufficient for mild cases, systemic antibiotics and local treatment are applicable for more severe infections. Most cases can be treated in the outpatient department ; however, complex cases, including treatment failure or the presence of cellulitis and abscess, require hospitalization.

Western medicine believes that the treatment of NV must remove the cause, avoid stimulation, and correct bad nose digging habits. Some scholars recommend the use of clinical severity scale, mild, moderate, severe disease requires different treatment methods. Acute patients can be coated with antibiotic ointment. Local hot and humid compress and local physiotherapy can be considered, and systemic antibiotics can be used as appropriate. Chronic patients can be washed with normal saline, remove scabs, topical application of antibiotic ointment, skin erosion and chapped first with 10 % -20 % silver nitrate burning, and then coated with antibiotic ointment [1]. On this basis, modern scholars have made a lot of play, and Wang Jingli's team [14] applied compound camphor chloramphenicol ointment to treat NV and achieved good clinical efficacy. Applying compound camphor chloramphenicol ointment to the affected area can quickly reduce inflammation and analgesia, reduce exudation, and make the patient feel fresh and comfortable. Kong Dejie [15] treated chronic NV with zinc oxide ointment. Zinc oxide ointment can improve the environment of nasal vestibule and achieve the

effect of improving or curing chronic NV. The zinc oxide ointment in the treatment of chronic NV is effective, economical, simple and convenient, and is worthy of promotion. Song Weiqi 's <sup>[16]</sup> study found that after the recombinant bovine basic fibroblast growth factor external gel was applied to the affected area of NV, the necrotic tissue peeling was faster during wound healing, indicating that it had a repair and regeneration effect on the skin and mucosa of the nose. An Jiangxia <sup>[17]</sup> found that mupirocin ointment is safe and effective in the treatment of NV. Sun Baoqi <sup>[18]</sup> treated NV with Fujin ointment. Local application of Fujin ointment can reduce tissue exudation and secretion stimulation, and promote wound repair. The study of Qu Yarong <sup>[19]</sup> confirmed that the external application of Kangfuxin Liquid can improve local blood circulation and promote the repair of damaged skin or mucosa, which is effective in the treatment of NV. Rose geranium sesame oil nasal spray can improve patients's reported nasal symptoms associated with cancer-oriented therapy. Although this hypothetical study has many limitations, it provides evidence that rose geranium in sesame oil nasal spray may be an effective method for the treatment of nasal diseases <sup>[20]</sup>. Postoperative nasal packing should be observed whether there is congestion at the front end of nasal vestibule. Once erosion occurs, nasal vestibule packing compression should be released in time, and anti-allergy and anti-inflammatory treatment should be strengthened.

#### **6. Chinese medicine treatment of nasal vestibule inflammation**

The treatment of traditional Chinese medicine takes the holistic concept as the guiding ideology, takes the theory of viscera and meridians as the theoretical basis, and emphasizes the combination of disease differentiation and syndrome differentiation, local and overall, internal treatment and external treatment. The syndrome differentiation of traditional Chinese medicine laryngology, the most widely used is the syndrome differentiation of ten principles and the syndrome differentiation of viscera. Liu Peng <sup>[21]</sup> summarized the etiology and pathogenesis of NV into the following three categories, and accordingly divided them into three corresponding symptom types, and treated them with different main prescriptions based on syndrome differentiation. The main points are as follows : for those with heat accumulation in the lung meridian, the method of evacuating wind heat and clearing away lung heat should be used, and Huangqin Decoction should be used ; for patients with spleen and stomach damp heat, the treatment is based on the method of clearing heat and drying dampness, detoxification and harmony, and the prescription is Bixie Shenshi Decoction ; for those with yin deficiency and blood dryness, nourishing yin and moistening dryness, nourishing blood and calming wind should be treated with Siwu Xiaofeng Decoction. On this basis, modern scholars have expanded. Such as Lv Fengrong <sup>[11]</sup> confirmed that the addition and subtraction of Huangqin granule in the treatment of lung meridian heat type of nasal chancre, improve the patient 's nasal itching, burning pain, running water, headache, sputum symptoms on the curative effect. The clinical efficacy of cough and skin erosion was significantly better than that of the control group, and the cure rate was 86.67%. Taking a comprehensive view of the whole prescription, it is a good prescription for the treatment of NV of lung meridian accumulation heat type, which has the function of clearing away lung heat, dispelling wind and dispelling evil, and the compatibility is rigorous. Tian Yueyue <sup>[10]</sup> believes that the acute NV seen clinically, namely NV, is mainly caused by spleen and stomach disorders and dampness and heat accumulation. The treatment should be based on clearing and removing dampness and heat in the spleen and stomach, combined with cooling blood and promoting blood circulation, detoxification and



harmony, supplemented by adding and subtracting Qingwei powder to treat NV of spleen and stomach dampness and heat type. After 7 days of clinical observation and treatment, the symptoms of nasal pain and yellow scab were improved. After 14 days of treatment, the range of nasal pain overflowing fat, yellow scab, skin redness, swelling and erosion was significantly improved, and the systemic symptoms such as abdominal fullness, nausea and anorexia, short and red urine, and loose stool were gradually improved. The treatment rate was 93.33%. Li Zhipeng<sup>[22]</sup> believes that children are prone to disease due to weak spleen and stomach, delicate viscera, easy accumulation of food and heat, heat attack of malnutrition, fumigation and burning of skin. Syndrome differentiation is spleen deficiency and dampness stagnation. The treatment rule should be Jianpi Shenshi Decoction. On the basis of local external application of erythromycin eye ointment, Jianpi Shenshi Decoction was used to treat infantile NV, with a total effective rate of 92.3%.

The clinical treatment of NV in traditional Chinese medicine is mostly external treatment. Cao Shibin<sup>[23]</sup> used Longzhu ointment to treat ear, nose and throat cavity skin infection. It has the effects of detumescence and pain relief, removing rot and generating muscle, clearing heat and detoxifying, and anti-inflammatory. He Jinhua<sup>[24]</sup> used moist burn ointment to treat NV. Zhang Jinxiu<sup>[25]</sup> treated nasal chancre with hospital preparation nasal ointment, with an effective rate of 97.1%. Ma Baolin<sup>[26]</sup> selfmade lithospermum oil external application in the treatment of chronic nasal chancre. Cheng Qinyu<sup>[27]</sup> used the national folk herbal medicine Duiwei soft capsule to treat chronic nasal chancre. Jiang Zhihui's team<sup>[28]</sup> treated chronic nasal chancre with external application of compound huanglian ointment. Wu Hongjun<sup>[29]</sup> treated NV with Dahuang Zhuzhi ointment.

Acupoint injection therapy is a comprehensive therapy guided by the basic theory of traditional Chinese medicine to stimulate the therapeutic effect of meridians and acupoints, combined with the pharmacological effects and injection methods of modern medicine. This method has a small drug dose, can quickly exert its pharmacological effects, and will not cause damage to the nasal cavity. The patient's pain is very small, the cure rate is very high, and it is easy to operate, so it is worth promoting. Yan Chunli<sup>[30]</sup> treated NV with Yingxiang acupoint blocking. The preparation of blocking solution: dexamethasone 5 mg + gentamicin sulfate 20 000 u + 0.5% lidocaine 2 mL, a total of 4 mL. The effective rate was 100%. Bian Yanfen's team<sup>[31]</sup> used dexamethasone and procaine to block the Yingxiang acupoint on both sides of the patient to treat chronic nasal malnutrition, with a total effective rate of 94.17%. Dexamethasone can anti-inflammatory and anti-allergic; procaine blockade can relieve pain, dilate blood vessels, increase blood flow, enhance local metabolism, and promote inflammation absorption. Removing the cause of disease combined with this method is effective in the treatment of chronic nasal vestibular inflammation. If the chapped is serious, 40% trichloroacetic acid can be used for burning, and the effect is better.

Professor Sun Haibo<sup>[32]</sup> believes that NV should be treated both internally and externally. The external treatment is applied to the local area of the lesion with drugs, which can quickly relieve the pain of patients and has a lasting effect. Combined with oral decoction to regulate the balance of yin and yang of zang-fu organs, both symptoms and root causes can reduce recurrence. Zhang Jie's study found that centipede oil external treatment and Xinyi Qingfei Decoction combined with oral administration for the treatment of nasal malnutrition. Liu Minsheng and other scholars<sup>[33]</sup> used traditional Chinese medicine self-made Qufeng Yangxue Decoction for oral administration, self-made Qingxuan Lotion for

nasal washing, combined with microwave physiotherapy to treat intractable NV has obvious curative effect. Tan Shaoyu 's study <sup>[34]</sup> confirmed that Fuyinjie Lotion combined with MEBO is safe and effective in the treatment of NV. Zhang Weidong <sup>[35]</sup> used vitamin AD drops combined with erythromycin ointment to treat refractory NV. Zhu Honglian <sup>[36]</sup> used Eloson combined with traditional Chinese medicine to treat chronic NV. Eloson has the effects of anti-inflammation, anti-allergy, antipruritic and reducing exudation. Add Qingfeihuo, Lishi, Yangyin Chinese medicine treatment. Therefore, the cure rate is high, and the recurrence rate is significantly reduced.

Chronic refractory NV has a long history and repeated attacks. Some patients have a chapped depth of 1-2 mm, obvious exudation, and thick blood scabs. After simple anti-inflammatory treatment, some patients with such NV can show symptom relief or temporary cure, but the recurrence rate is high. Therefore, it is necessary to solidify the diseased tissue, promote the regeneration of the basal tissue, enhance the local metabolism, and re-grow the new skin tissue in order to completely cure. Li Guizhi utilizes laser technology to treat persistent nasal vestibulitis (NV). This treatment modality employs its thermogenic coagulation effect to eliminate the localized infected bacteria in the NV, while also coagulating the skin tissue of the nasal vestibule eruption and promoting the regeneration of new epithelial cells. Qian Jinying <sup>[37]</sup> used gentamicin plus dexamethasone wet compress combined with microwave physiotherapy to treat NV. Wang Jing <sup>[38]</sup> used microwave to treat chronic refractory NV. Microwave radiation can convert high-speed friction, rotation and collision between particles into heat energy, resulting in high temperature. Microwave heat energy can promote blood circulation, enhance metabolism, improve local nutrition, improve the body 's regenerative capacity, and promote wound healing and epithelial tissue growth.

#### **7. Thoughts on the treatment of nasal vestibulitis**

Western medicine recognizes that NV is related to infection and stimulation. The most common is Staphylococcus aureus infection, and the stimulating factors are mostly allergen stimulation or improper nose digging. NV is more common on the right side, and the pathological mechanism of NV on the right side needs to be further explored. Although it has been reported that cancer patients treated with taxanes are susceptible to NV, further exploration is needed. Traditional Chinese medicine believes that the incidence of nasal vestibular inflammation is mainly in the lung and nose. According to the clinical manifestations, the diagnosis can be confirmed, but it should be carefully distinguished from skin tuberculosis and nasal squamous cell carcinoma. Such clinical cases are rare, but the doctor is kindhearted and considerate to confirm the diagnosis, which can reduce the misdiagnosis rate, minimize the pain of patients and safeguard the interests of patients.

NV is mainly characterized by redness, itching, erosion and chapped skin around the anterior nasal foramen. The treatment should be based on relieving the pain of patients. Clinically, Western medicine mainly focuses on external treatment, local application of antibiotics, growth factors, etc., aiming at anti-inflammatory analgesia and promoting skin mucosal repair and regeneration. Erythromycin eye ointment is convenient and low cost, but the treatment cycle is long and the patient is not easy to adhere to. Local application of antibiotics is convenient, but it has poor pertinence and slow onset. Long-term use will lead to drug resistance, and it can also change the normal flora environment in the wound, which is not conducive to the recovery of the disease. Antibiotics are easily absorbed through the skin and mucous membranes when used externally, and are metabolized by the liver. Long-term use will

enhance the liver's detoxification and detoxification functions. Growth factor has no obvious side effects, but the price is too high, some patients in the economy is not easy to bear. Zinc oxide ointment does not contain hormones, but it is prone to allergic reactions. Allergic constitution should be used with caution. Children, pregnant and lactating women should be treated under the guidance of doctors. Furacilin is listed in the list of three types of carcinogens published by the International Agency for Research on Cancer of the World Health Organization, so it is not recommended to use furacilin ointment containing its components clinically. Kangfuxin liquid odor, some patients could not accept the smell and refused treatment. The improvement of nasal symptoms related to cancer-oriented therapy by rose geranium sesame oil nasal spray remains to be further studied.

Traditional Chinese medicine treatment can be treated according to syndrome differentiation, individualized treatment for the patient's condition, and addition and subtraction according to the syndrome, but the traditional Chinese medicine decoction tastes bitter, and some patients refuse to accept or cannot adhere to the treatment interruption. The external treatment of traditional Chinese medicine applies traditional Chinese medicine to the affected area, which is low in price and simple in operation. However, primary hospitals are more inclined to use finished drugs for easy storage, and teach primary patients to use and store them. Comprehensive therapy has the advantages of rapid onset, lasting effect and reducing recurrence. The treatment plan can be adjusted according to the patient's condition. Laser irradiation treatment and closed treatment will make patients have unknown fear and resist the treatment, and laser irradiation treatment is easy to burn local tissue.

In summary, there are advantages and disadvantages in the treatment of NV with western medicine or traditional Chinese medicine alone. If the advantages of the two are organically combined, the total effective rate of clinical treatment of NV can be further improved by formulating individualized treatment plans according to the actual situation of patients.

## 8. Conclusion

NV is a common disease in otorhinolaryngology. Because of its easy recurrence and lingering refractory characteristics, patients are troubled. The effect of traditional Chinese medicine or western medicine alone is not good. Therefore, it is of great clinical significance to actively explore NV treatment. On the basis of further clarifying its mechanism in clinical medicine, supplemented by traditional Chinese and Western medicine treatment, the unique treatment of traditional Chinese medicine will provide a new research direction for the treatment of NV in the future. At the same time, the etiology and pathogenesis of NV patients should be further explored, so as to provide more scientific and accurate individualized treatment for NV patients.

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