Japanese Acupuncture - Current Research

Sinusitis – Nasal Congestion/Effect of Acupuncture Stimulation on Nasal Secretion –

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1. Nose disease and treatment with acupuncture

Acupuncture treatment in the field of otorhinolaryngology in Japan started when the news was reported in 1974 that acupuncture anesthesia was used in China for a hearing-impaired individual. Since then, the acupuncture anesthesia has been practiced in Japan based on the Chinese methods. Acupuncture treatment of sinusitis is also based on the one of their methods. The acupuncture of the time was performed not for the purpose of treatment but was handled as acupuncture anesthesia for the surgery of sinusitis. Various books about acupuncture treatment for otorhinolaryngological diseases have been written by a well-known clinical practitioner in Japan, introducing acupuncture treatment for such as hearing loss, buzzing in the ear, dizziness, rhinitis, heaviness of the head, neuralgia, and nerve paralysis. The contents of the books, however, are not based on medical rationales and only provide the general information of diseases and acupuncture points used for the treatment of respective diseases. By contrast, what the university hospital needed was the information of scientifically grounded acupunctured effects. Earlier studies on acupuncture treatment of sinusitis were lack of scientific reasoning and did not serve as useful references.

This report is not written from the standpoint of how to "cure" sinusitis. The purpose is to give an account of nose diseases, especially the connection of nose diseases with the autonomic nervous system on the basis of the relationship between nose symptoms and acupuncture stimulation. Therefore, this report will not be useful for the therapists who expect or seek information about treatment of certain diseases. So I hope this report will be utilized not only for acupuncture treatment of sinusitis but as a guide for supportive or preventive measures of sinusitis treatment with reference to the relationship between autonomic nerve symptoms of the nasal mucous membranes ad acupuncture stimulation.

2. General information of chronic sinusitis

There are few reports published on acupuncture treatment of chronic sinusitis. This may be due to a wide gap between the mechanisms of acupuncture efficacy, causes and pathological conditions. So, firstly a brief explanation of sinusitis will be given.

Chronic sinusitis is caused by individual's constitution, allergies, bacterial and viral infections. If appropriate procedures were not taken in the acute phase, it may lead to chronic problems. The symptoms differ depending on the combination of affected paranasal cavities. However, subjective symptoms commonly seen include rhinorrhea (nasal discharge), nasal congestion, headache/feeling of top heaviness, and decreased mental function. Furthermore, nasal obstruction and inflammation of the nasal mucous membranes may cause anosmia, a reduced sense of smell. The type of nasal discharge in chronic sinusitis is mucous and purulent, which is different from the water soluble thin type in allergic rhinitis. In the case of sinusitis, the nasal discharge more often gives the sensation of dropping downward through the posterior nasal aperture as posterior nasal drop rather than through the anterior nasal aperture. In modern medicine, there are two types of sinusitis treatment – conservative treatment in which antibiotics and/or antiphlogistics are used, and operative treatment[1)2)].

It is difficult to treat sinusitis presenting these

conditions with acupuncture and such sinusitis is often handled as a disease to which acupuncture is not applicable. Even so, it cannot be said that acupuncture treatment is completely helpless. This report is not intended to provide the way of handling chronic sinusitis for a radical cure but is intended to provide the way of thinking about acupuncture treatment based on the relationship between the nasal mucous membranes and autonomic nerves for the people who complain of sinusitis.

3. Typical nasal symptoms

Sneezing, nasal congestion, and nasal discharge are known as three major characteristics of nasal allergy. These symptoms are also typical conditions that are associated with other nasal disorders[1)2)].

Nasal congestion is caused by nasal septum deviations, nasal polyps, nasal tumors, or other structural anomalies of the nose. If there is no structural anomaly, swollen mucus membranes in the nose is often the cause. The swelling of the nasal mucous membrane is due to the structure of abundant blood vessels in the nasal mucous membranes and the degree of the swelling is affected by the activities of cervical sympathetic nerves that innervate the blood vessels in the nasal mucous membrane. If the activities of the cervical sympathetic nerves are enhanced, the blood vessels of the nasal mucous membranes contract and the nasal congestion improve. The connection of the blood vessels of the nasal mucous membranes to cervical sympathetic nerves has been elucidated from the anatomical and physiological viewpoint, and the connection has also been verified from clinical effects of a stellate ganglion block[3)4)], stellate ganglion stimulation, and adrenaline nasal spray[5)6)]. The blood vessels of the nasal mucous membranes are influenced only by sympathetic nerves but parasympathetic nerves have no action on the blood vessels of the nasal mucous membranes.

A nasal discharge is secreted from the nasal glands in the nasal mucosa. The secretion of nasal discharge occurs when parasympathetic nerves become hyperactive. We have also verified this phenomenon by our clinical study using autonomic drugs and autonomic blocking drugs[5)6)].

Symptoms relating to the nasal mucosa include those caused by the involvement of the autonomic nerves and those developed by the involvement of the sensory nerves innervating the nasal mucosa. Sneezing happens by the involvement of the sensory nerves. Nasal allergic sneezing happened by allergen-induced simulation is triggered by the stimulation of the sensory nerves distributed over the nasal mucosa.

4. Nerve innervations of the nose

The nasal mucous membranes function by the sensory nerves responsible for processing sensory information such as smell and pain and the autonomic nerves innervating the blood vessels of the nasal mucosa and nasal glands. This section presents an overview of autonomic nerve innervations (Figure 1).

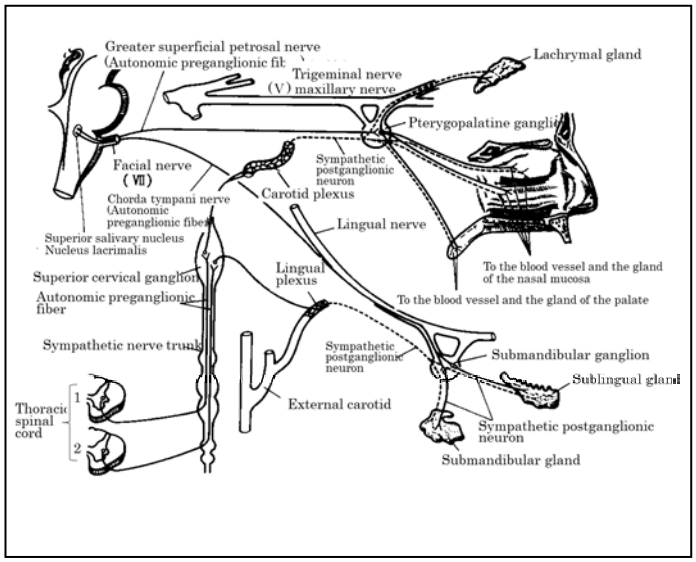

Figure 1

The blood vessels of the nasal mucosa receive control of the cervical sympathetic nerves. As shown in the Figure, preganglionic fibers coming from the upper thoracic spinal cords form synapses, and then pass through the pterygopalatine ganglion to control the blood vessels of the nasal mucous membranes. The control is ipsilateral, and vascular contraction and dilation occur depending on the control activity status. As with other peripheral vessels, this function is not subject to parasympathetic nerve control.

The nasal glands are innervated by the greater petrosal nerve responsible for parasympathetic functions of the facial nerve. After the greater petrosal nerve has formed synapses in the pterygopalatine ganglion, the postganglionic fibers innervate the nasal glands. The control is also ipsilateral. When activities increase, nasal discharge is secreted. Nasal discharge is not affected by sympathetic activities.

The autonomic nerves innervating the nasal mucosa do not have dual and antagonistic control characteristic of autonomic nerves.

5. Methods of applying acupuncture stimulation

The acupuncture points to apply stimulation are hegu and neiguan on one hand. Electric currents are applied to the needles as electrodes inserted in these acupuncture points [7]. The stimulation conditions are for 15 minutes with 1 Hz with the stimulation intensity that causes slight muscle contractions and with which patients do not subjectively feel painful. The stimulation method is similar to that of acupuncture anesthesia except for the points that simulation is given to one hand while sitting and that acupuncture anesthesia needs longer hours of stimulation whereas acupuncture stimulation for nasal symptoms (autonomic nerves in the nasal mucosa) needs 15 minutes. The influence of acupuncture stimulation given in this way on the nasal mucosa is characteristically more effective compared to that in the recumbent position.

6. Relationship between nasal symptoms and acupuncture stimulation

1) Influence on nasal congestion

Nasal congestion improves by electro-acupuncture stimulation to one hand. However, the degrees of the improvement are subjective, so assessing improvements is difficult. Therefore, we used a rhinomanometer to measure the nasal airway resistance to objectively assess the degrees of nasal congestion.

The nasal airway resistance decreased within one minute with the application of electro-acupuncture stimulation to one hand, showing an improvement in nasal congestion[8]. Electro-acupuncture stimulation lowered the nasal airway resistance of the ipsilateral nose as well as contralateral nose to the stimulated hand at the same time. This result indicates that acupuncture stimulation to one hand worked on the blood vessels of the nasal mucosa on both sides, resulting in an improvement in the nasal congestion of the opposite side (Figure 2).

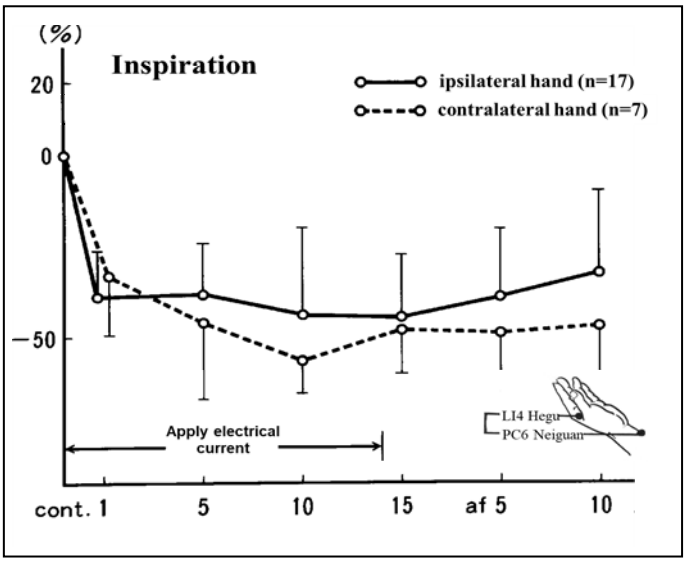

Figure 2

This phenomenon was observed both when air is inhaled and when air is exhaled in nasal breathing.

Electro-acupuncture stimulations, however, did not have effects on congestions occurred in the decubitus position[6] and physiological nasal congestions induced by the pressure on the chest side[9] and nasal congestions occurred due to stellate ganglion blocking [8].

2) Influence on nasal discharge

Electro-acupuncture stimulation applied in the similar manners reduces the secretion volume of nasal discharge. As it is difficult to compare the secretion volumes before and after applying stimulation, an induction test [8] was conducted with patients and healthy volunteers with the use of aerosol sprays of pilocarpine (a parasympathetic nerve stimulant) into the nasal cavities to compare results (Figure 3). The upper graphs of Fig. 3 show the results of healthy volunteers and the lower graphs are for the results of the patients with nasal allergy. The upper and lower graphs on the left side show the results of pilocarpine alone, while those on the right show the results of the simultaneous administration of pilocarpine and electro-acupuncture stimulation.

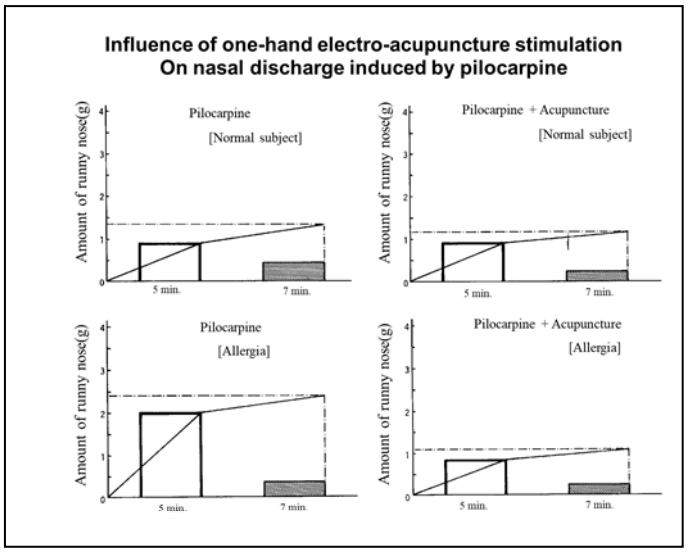

Figure 3

In the group of pilocarpine alone, the patients with nasal allergy had evidently higher secretion volumes of nasal discharge than healthy volunteers. On the other hand, in the combination group of pilocarpine and acupuncture stimulation, the patients with nasal allergy and healthy volunteers had similar levels of secretion volumes to those of healthy volunteers (used as the base) in the group of pilocarpine alone. As the results showed, electro-acupuncture stimulation was unable to block or inhibit the drug efficacy of pilocarpine in either healthy volunteers or the patients with nasal allergy, but the stimulation reduced the secretion volumes of the patients with nasal allergy to the levels of healthy individuals. This phenomenon may have been caused by the sensitivity of nasal mucous membranes or their responsiveness being inhibited by electro-acupuncture stimulation.

3) Influence on sneezing

From a separate experiment, it is known that nasal congestion or nasal discharge occurred in the nasal provocation test using allergen extracts could be inhibited by electro-acupuncture stimulation. Sneezes happened by allergens stimulating the nasal mucosa could not be inhibited by electro-acupuncture stimulation. It could be assumed from the above that electro-acupuncture stimulation may not have influence on sensory thresholds of the nasal mucosa[8].

7. Commentary

The subject of this report is effects of acupuncture treatment for sinusitis. As mentioned at the beginning of the report, I consider sinusitis treatment with acupuncture to aim for a cure is difficult. As stated above, I consider that in view of the influence on

acupuncture stimulation on nasal symptoms, acupuncture treatment can yield some practical effect as a symptomatic treatment for sinusitis. For instance, improving nasal congestion has some sort of potential positive influence on ventilation of the paranasal sinuses. Purulent nasal discharge is a symptom resulted from inflammation, and acupuncture stimulation has influence on the secretion volume of nasal discharge through the mediation of the autonomic nerves. Although there are many reports released on immunoreactions in the nasal mucosa, I expect studies will be promoted on autonomic nervous functions of the nasal mucosa as well as anti-inflammatory effects occurring by the stimulation of peripheral nerves.

There are many indications for acupuncture. In the symptoms associated with sinusitis such as headache, top heavy feeling, and deteriorated mental functions, some are apparently susceptible to treat with acupuncture. To provide acupuncture treatment for respective associated symptoms to enhance the QOL of patients is one of important purposes of acupuncture treatment. However, if treatment cannot achieve a radical cure, treating respective symptoms is not beneficial to patients. Therefore, the provision of integrative medicine is required for the benefit of patients.

Lastly, I will mention about the relationship between the Large Intestine Meridian of Arm Yang Brightness (Yangming) [10] and the nose. The acupuncture point of yingxiang (which means meeting flavors) is located at the end of the Large Intestine Meridian of Arm Yang Brightness. It could be assumed that this acupuncture point was named as yingxian (meeting flavors) by ancient people who had observed respiratory anosmia resulted from nasal congestions improved by acupuncture stimulation. Like this, the relationship of the nasal functions with the Large Intestine Meridian of Arm Yang Brightness can be considered from the author's experiences and experiments, that signals induced by stimulation to the acupuncture point of hegu are conveyed to the central nerves system through the afferent pathway, and then mediate the autonomic nerves through the efferent pathway. It means that the acupuncture point stimulation have a functional relation with the nasal mucosa through the pathway of neural reflex. On the transfer point of this pathway, the acupuncture point of dazhui that has a deep connection with cervical sympathetic nerves may be located at the seventh cervical vertebra (Figure 4).

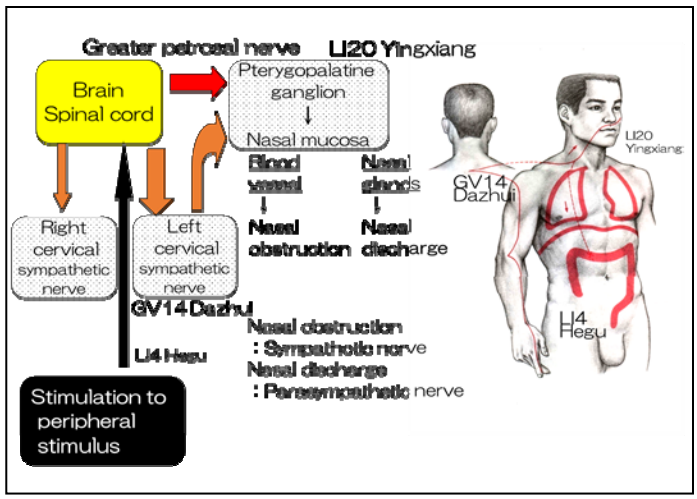

Figure 4

In future acupuncture and moxibustion medicine, the combination of modern medicine, anatomical physiology, and classical concept of meridians and acupuncture points will further deepen the way of thinking toward acupuncture treatment and enhance the clinical significance of acupuncture.

8. References

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