

# Sympathectomy with T2-T3 percutaneous radiofrequency thermocoagulation method in upper extremity primary hyperhidrosis cases

## Üst ekstremitte primer hiperhidrosis olgularında T2-T3 perkütan radiofrekans termokoagülasyon yöntemi ile sempatektomi

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### Abstract

Sweating is controlled by the sympathetic nervous system and helps regulate the body's heat and electrolyte balance. Excessive sweating may be observed in about 1% of the population due to a number of reasons. Many methods are used in the treatment of hyperhidrosis, which is important for quality of life. In four patients with primary hyperhidrosis resistant to medical treatment, radiofrequency thermocoagulation of the stellate ganglion with an anterior approach and then the response of radiofrequency thermocoagulation to the T2-T3 sympathetic ganglion were evaluated. We think that it is an advantageous and successful method in terms of being less invasive and cost effective compared to other surgical methods, as the procedure time is short, patient satisfaction, hospitalization time is low. We have seen that stellate and T2-T3 sympathectomy with radiofrequency thermocoagulation method is a useful technique in the treatment of primary hyperhidrosis.

**Keywords:** Primer hyperhidrosis, Radiofrequency thermocoagulations, T2-T3 sympatectomy, Stellat ganglion radiofrequency

### Öz

Terleme sempatik sinir sistemi tarafından kontrol edilir ve vücudun ısı ve elektrolit dengesini düzenlemeye yardımcı olur. Populasyonun %1 kadarında bir takım nedenlerden dolayı aşırı terleme gözlemlenebilir. Yaşam kalitesi açısından önemli olan hiperhidrozisin tedavisinde pek çok yöntem kullanılmaktadır. Medikal tedaviye dirençli primer hiperhidrozisli dört hastada, stellat ganglionun anterior yaklaşımla radiofrekans termokoagülasyonu daha sonra da T2-T3 sempatik gangliona radiofrekans termokoagülasyonunun yanıtı değerlendirildi. İşlem süresinin kısa olması, hasta memnuniyeti, hastanede kalış süresinin az olması ve iş gücü kaybına neden olmaması diğer cerrahi yöntemlere göre hem daha az invaziv olması hem de maliyetinin daha az olması hastanın genel anestezi almaması açısından avantajlı ve başarılı bir yöntem olduğunu düşünüyoruz. Primer hiperhidrozisin tedavisinde radiofrekans termokoagülasyon yöntemi ile stellat ve T2-T3 sempatektominin kesinlikle faydalı bir teknik olduğunu gördük.

**Anahtar kelimeler:** Primer hiperhidrozis, Radiofrekans termokoagülasyon, T2-T3 sempatektomi, Stellat ganglion radiofrekans

### Introduction

Sweating plays a role in maintaining the body's heat balance. It is controlled by the sympathetic nervous system. Excessive sweating can be observed in 1% of the population due to several reasons [1]. It may be generalized or localized (palmar, axillary, plantar, facial), and it is classified according to its etiology as well as where it is observed. The primary type of hyperhidrosis begins in adolescence or before and is uncommon. Rarely, cases of autosomal dominant hyperhidrosis have been reported. Secondary hyperhidrosis can be observed in endocrine diseases such as hyperthyroidism, malignancies, some serious psychiatric diseases, chronic infections, obesity, and menopause. It is common with Reynaud's Disease and Frey's Syndrome. Many methods are used in treatment of hyperhidrosis, including antiperspirants, iontophoresis method, medical treatment, and endoscopic sympathectomy clamping or electrocautery. In addition to these, treatments such as botulinum toxin injection, hypnosis, laser therapy, and radiotherapy are also being tried [2].

In this case report, we aimed to report the results of patients who received radiofrequency thermocoagulation to the stellate ganglion and T2 - T3 sympathetic ganglion.

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## Case presentation

An 18-year-old male patient was admitted to our clinic with complaints of sweating in hands (Case 1). It was learned that his hands and feet sweat excessively since childhood. In physical examination, his hands and feet were red and moist from the ankle, and other system examinations were normal. Reynaud's phenomenon was positive. Different treatments were applied to the patient who visited many clinics with the same complaints. Finally, he had been using pentoxifylline 400 mg three times a day for the last year. The same clinical signs were present in his family, as well. The whole family was admitted to the clinic for examination and treatment. Permission was obtained for the study by the adult patients themselves and the parents of those under the age of 18.

The father (Case 2) was 43 years old and had complaints from childhood. There was no known systemic disease. His hands and feet were also moist from the ankle and he was positive for Reynaud phenomenon. His 17-year-old sister (Case 3) and 14-year-old brother (Case 4) had similar examination results.

First, bilateral stellate ganglion block with triamcinolone and bupivacaine (0.125%) was performed in all cases in different sessions. In all cases, 3-5 °C temperature increase occurred in the same extremity within 30 minutes. Transient Horner syndrome lasting approximately four hours was observed in all cases. In all cases, sweating on hands decreased significantly from the previous 4 hours on average.

Since sweating did not respond to the stellate ganglion block adequately, the second step was thermocoagulation of the stellate ganglion with radiofrequency. First, sensory, and then motor responses were checked in each patient using 18-gauge, 5 cm radiofrequency needles in different sessions, and thermal lesions were created at 80 °C for 1 minute. No complications were encountered in any of the cases during the procedure. In patients with thermal probe implantation, an increase of 5-10 °C developed in the extremities of the treated side within 30 minutes and sweating decreased in the same day. However, this decrease was not permanent.

As a third step, we decided to perform bilateral paravertebral sympathetic ganglion block at T2 and T3 levels for all patients. The patients were monitored, and sedation was achieved by intravenous administration of 2 mg midazolam and 50 microgram fentanyl. In each patient in prone positions, at the threshold of fluoroscopy, using an 18-gauge, 10 cm radiofrequency needle, firstly sensory, and then motor responses were controlled, and thermal lesions were created at 80 °C for 1-3 minutes in separate sessions. 5-10 °C increase in temperature was observed by thermal probes on the treated side in patients.

In all cases, sweating and redness on their hands recurred in third month of follow-up after the procedure, although they were less than before. Sweating did not increase in the following months. The cases are still followed up in our clinic.

## Discussion

Although many treatment methods are used to prevent excessive sweating, success rates are not sufficient.

Hyperhidrosis is diagnosed by anamnesis and physical examination [1]. Iodized starch spray is sprayed on the sweating area. If there is a change to black, excessive sweating is diagnosed [3].

Regarding the treatment methods, antiperspirant (20-25% aicl hexahydrate and 70-90% alcohol) preparation is applied to dry skin at night and washed off in the morning. The use of the treatment is limited and requires concentrated solutions (such as 30%), which may cause severe skin irritation. For this reason, it is not recommended for application to the face and sensitive skin. It is not an effective treatment for patients with sweating in these areas.

In the iontophoresis method, the patient's hands are submerged in water with 15-18 mA electric current several times a week. The area of use is limited to hands and feet. It is based on the principle of providing low current electricity in water to the skin surface. This process is applied every day for first week or every day for next month until sweating stops. The water used in the process does not contain electrolytes. Iontophoresis is a time-consuming treatment method with rapid recurrence. It is not recommended for pregnant women, individuals with pacemakers, or epilepsy, and may cause skin irritation.

Sedative and anticholinergic drugs are frequently used as medical treatment. It is used in cases of severe hyperhidrosis and side effects such as dry mouth, and constipation can be tolerated by healthy patients. However, it is recommended that patients be consulted to dermatology and other departments before starting this treatment.

Considering the studies related to botulinum toxin type A injection, the average time without sweating is about 5-6 months. The toxin is applied by making many injections to the area with excessive sweating. Although it is a painful and costly procedure with many side effects, it has recently maintained its popularity. Even hypnosis was applied to patient so that the patient did not feel pain while performing this procedure [4,5].

Considering the surgical methods, thoracic sympathectomy can be performed as an outpatient surgery under general anesthesia. T2, T3 sympathectomy can be performed, and the incision scar is distinctive compared to other surgical methods. Complications may include compensatory hyperhidrosis, Horner's syndrome, pneumothorax, hemothorax, and phrenic nerve damage. Video - assisted thoracoscopic sympathectomy has less mortality and morbidity [6]. The scar is smaller, and the side effects are less.

There are studies investigating the difference between resection and ablation, and it is stated that although resection is more successful, many surgeons prefer ablation for reasons such as easy, short operation time, and the ability to be used in recurrent cases [7].

In addition to the sympathectomy method, there are different opinions and studies about location. Although there are studies supporting the success of T2 sympathectomy alone, there are studies showing that T2-T3 sympathectomy is more successful than T2 alone [8,9]. In these cases, it is thought that the success rate can be increased to 99.9% by reprocessing the relapse cases. On the other hand, there are information and studies suggesting that it is effective in the branches originating from T4 in hyperhidrosis and that T4 ganglion blockage is more

successful instead of T3 [10,11]. There are those who use T4 clamping or cutting only [12,13].

### Conclusions

The total procedure time in our cases was approximately 15 minutes. Although sweating decreased, it partially returned. The patients stated that they were satisfied with the procedure. We think that it is an advantageous and successful method in terms of being less invasive and cost effective compared to other surgical methods, as the procedure time is short, and patient satisfaction, and hospitalization time are low. We have seen that stellate and T2-T3 sympathectomy with radiofrequency thermocoagulation method is a useful technique in the treatment of primary hyperhidrosis.

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