AĞRI 2013;25(1):36-40
doi: 10.5505/agri.2013.09226

A new target of percutaneus sympathic radiofrequency thermocoagulation for treatment of palmar hyperhidrosis: T4

Palmar hiperhidroz tedavisinde perkütan sempatik radyofrekans termokoagülasyonda yeni hedef: T4

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Summary

Objectives: Hyperhidrosis is thought to result from a functional impairment of the sympathic nervous system. In this study, percutaneous T4 sympathic radiofrequency (RF) thermocoagulation was used to treat palmar hyperhidrosis which does not respond to conservative treatment. The results were evaluated in terms of safety, efficiency and patient satisfaction.

Methods: In this study, 15 patients aged 16-48 years were retrospectively evaluated from prior records. Patient satisfaction scores (very satisfied, satisfied, not satisfied), after treatment of the hand condition (dry, mild dry, no improvement), and whether the most common complication and most patients expressed by the compensatory hyperhidrosis (CH) degree (none, mild, moderate, severe) were analyzed.

Results: No complications were observed except a coughing crisis that lasted for 2 hours in one patient, transient bradycardia in 1 patient and transient injection site pain in all cases. Two patients 1 per week and three patients 1, 2 and 6 months developed recurrence.

Conclusion: Sympathic T4 ablation with RF thermocoagulation was found to have long term (6 months) patient satisfaction (80%). It was also effective in reducing the hand sweating (80% dry or mild dry). The CH rate was 27%. According to our results, sympathic T4 ablation with RF thermocoagulation is a safe and effective treatment with a high degree of patient satisfaction.

Key words: Hyperhidrosis; T4; radiofrequency; sympathectomy.

Özet

Amaç: *Hiperhidrozun sempatik sinir sisteminin fonksiyonel bozukluğu sonucu oluştuğu düşünülmektedir. Bu çalışmada, konservatif tedaviye yanıt vermeyen palmar hiperhidrozun tedavisinde perkütan T4 sempatik radyofrekans (RF) termokoagülasyon, güvenlik, verimlilik ve hasta memnuniyeti açısından değerlendirildi.*

Gereç ve Yöntem: *Bu çalışma, 16-48 yaş arası 15 hastanın düzenli kayıtlarından elde edilen veriler geriye dönük olarak incelenerek yapıldı. Hasta memnuniyeti skoru (memnun değil, memnun, çok memnun), tedavi sonrası elin durumu (kuru, hafif kuru, hiçbir iyileşme yok) ve en sık rastlanan komplikasyon olan kompansatuvar hiperhidroz (KH) derecesi (hiç yok, hafif, orta, şiddetli) incelendi.*

Bulgular: *Bir hastada 2 saat süren öksürük krizi, 1 hasta geçici bradikardi ve tüm vakalarda geçici enjeksiyon yerinde ağrı dışında herhangi bir komplikasyon gözlenmedi. İki hastada 1. haftada, üç hastada da 1., 2. ve 6. aylarda nüks gelişti.*

Sonuç: *Perkütan sempatik T4 RF termokoagülasyon ile ablasyon uzun vadeli (6 ay) hasta memnuniyeti (%80) sağlamıştır. Ayrıca el terlemesinde (kuru veya hafif kuru %80) etkili azaltma gözlendi. KH oranı %27 idi. Bu sonuçlarına göre, perkütan sempatik T4 RF termokoagülasyonun yüksek hasta memnuniyeti ile güvenli ve etkili bir tedavi yöntemi olduğu düşüncesindeyiz.*

Anahtar sözcükler: Hiperhidroz; T4; radyofrekans; sempatektomi.

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Submitted (*Başvuru tarihi)* 20.01.2012 Accepted after revision (*Düzeltme sonrası kabul tarihi)* 13.03.2012

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Introduction

Sweating is a physiological process which increases during physical activities and stress. Excessive sweating in any part of the body is called hyperhidrosis.[1] Hyperhidrosis can be seen in hands, axilla, face, feet, trunk or all over the body and adversely effects the persons daily life and psychosocial status. The incidence of hyperhidrosis is 0.6-2.8%.[2-4] Palmar hyperhidrosis prevents the affected person to use his or her hand properly, reducing quality of life.[1] Etiology of the disease is not known but functional impairment in sympathetic nervous system is thought to be the etiologic factor.[1,2,5]

There are local (ionopheresis, botulinium toxin A), systemic (tricyclic antidepressants, anticholinergics) and surgical (thoracotomy or endoscopic sympathectomy, axillary curettage, and liposuction) treatment alternatives.[1,2,5-10] Despite the various treatment options, uncontrollable hyperhidrosis has a higher cure rate with surgical procedures.[5] The most recommended technique is videoscopic thoracoscopic sympathectomy.[5,11-20] Surgical techniques have some potential complications such as pneumothorax, hemothorax, atelectasia, Horner syndrome, compensatory hyperhidrosis (CH), excessive dryness, bradycardia and cardiac arrest.[1,5,11,12]

The preferred surgical sympathectomy levels in palmar hyperhidrosis are T2, T3, T2-3, T4, T3-4.[1,2,5,11-22] From the first introduction of surgical sympathectomy in the literature, the researches are continuing to find the most effective level with least complications.[1,2,5,13-20] Recent researches have advocated the surgical sympathectomy of T4 sympatheic truncus has lesser adverse effects with better patient satisfaction rates.[1,5,13-15,18-20] However, there is need for additional studies.

Thoracal sympathectomy can be performed not only by surgical intervention but also with percutaneous sympathic neurolysis and radiofrequency (RF) thermocoagulation.[2,21,22] RF thermocoagulation for hyperhidrosis treatment is first described by Wilkinson in 1984.[21] T4 sympathic ablation with percutaneous RF thermocoagulation is a minimally invasive technique and as it causes lesser complications than surgical procedures, it can be an alternative option for palmar hyperhidrosis.[2,21,22]

The aim of this study is to evaluate the results of percutaneous T4 sympathic RF thermocoagulation in terms of safety, efficacy and patient satisfaction, in patients who do not respond to conservative treatment.

Patients and Methods

The study is performed at Department of Anesthesiology and Reanimation, between September 2009-February 2010. The patient charts of 15 patients with palmar hyperhidrosis who do not respond to conservative treatment are retrospectively evaluated. The ages of the patients were between 16-48 years. Following patient informed consent, all patients had undergone a T4 sympathic ablation with percutaneous RF thermocoagulation in Pain Management Unit of the department.

Technique: Patients with normal prothrombin time (PT) and platelet counts were included. Following a peripheral i.v. route, the patients were monitorized with EKG, oxygen saturation (SPO_2) and arterial blood pressure and sedated with 0.02 mg/kg i.v. midazolam. The patients were prepped and draped in prone position. The routine RF application procedure in our department is as follows: Following subcutaneous local anesthesic infiltration, Cosman RFG-1A Lesion Generator (Cosman Medical, Inc., Burlington, Massachusetts, USA) is used for RF thermoablation. Under fluoroscopic guidance, 5 mm active cannula of RF device is advanced to T4 sympathetic ganglion. When the probe is reached to the desired point, the level of the cannula is tested with diffusion of the injected radiopaque material over the parietal pleura. After this test, the electrode of RF device is placed in the cannula and the impedance is seen to be between 230-400 ohm. In order to check the position of the cannula neurophysiologically, paresthesia is observed with 50 Hz sensory stimulation and 0.3-0.5V and no motor contraction is observed with 2 Hz motor stimulation and 1.3-1.5 V. After this neurophysiologic test, RF thermocoagulation is applied at 75 °C for 90 seconds. Following thermocoagulation, 2 ml of 2% lidocaine is applied inside the cannula. All patients are followed for potential complications for 2 hours following the procedure.

Table 1. Demographic features of 15 patients with palmar hyperhidrosis

Mean age (range) years	29±9.1 (16-48)
Gender (Female/Male)	7/8
Family History (positive/negative)	5/10
Duration of complaints (range) years	9.5± 3.6 (4-17)

Evaluation is performed with patient satisfaction (very satisfied, satisfied, not satisfied), status of the hand (dry, fairly dry, not dry), observed complications, and the degree of compensatory hyperhidrosis (absent, mild, moderate, severe) which is most frequent complaint. All patients were evaluated at 1. day, 1. week, and 1., 2., and 6. months and the results are recorded. All data are analysed statistically with SPSS v 15.0 program.

Results

The procedure is completed in all patients successfully in all patients. No serious complications such as cardiac arrest, permanent bradicardia, permanent Horner Syndrome, hemothorax, pneumothorax, atelectasia, motor defect and pulmonary edema was observed. Except transient pain in injection site, coughing crisis was observed in one patient and transient bradicardia was observed in one patient. Palmar dryness was obtained and all patients were satisfied with the procedure. The characteristic features of the patients are shown in Table 1. Patient satisfaction scores, post-treatment status of the hand and the degree of compensatory hyperhidrosis recorded at 1. day, 1. week, and 1., 2., and 6. months are shown in Table 2.

All patients stated that they were happy with the procedure. Recurrence was observed in one patient at the end of one week, and in 3 patients at the end of the 6 months. Another RF thermocoagulation procedure is recommended to these patients; however all refused the second procedure as they were seeking for a permanent solution. Thus, these patients are referred to thoracic surgery department for thoracoscopic sympathectomy.

Discussion

This study showed that T4 sympathic ablation with RF is a safe and effective procedure for palmar hyperhidrosis. In the literature, palmar hyperhidrosis has a positive family history in 30-65 % of the patients.[23] Of our patients 33 % had a positive family history which is concordant with the literature.

Stellate ganglion blockade and T2 ganglion blockade for treatment of palmar hyperhidrosis which is refractory to conservative treatment is being aban-

Table 2. The follow-up of 15 patient treated for palmar hyperhidrosis

	Follow-up period (n=15)				
Evaluation	1. day	1. week	1. month	2. months	6. months
Patient satisfaction scale					
Very satisfied	15 (100%)	9 (60%)	8 (53%)	7 (46%)	7 (46%)
Satisfied	–	4 (27%)	4 (27%)	5 (34%)	5 (34%)
Not satisfied	–	2 (13%)	3 (20%)	3 (20%)	3 (20%)
Post-treatment status of the hand					
Dry	15 (100%)	5 (34%)	3 (20%)	3 (20%)	2 (13%)
Fairy dry	–	8 (53%)	9 (60%)	9 (60%)	10 (67%)
Not dry	–	2 (13%)	3 (20%)	3 (20%)	3 (20%)
Compensatory hyperhidrosis					
Absent	–	12 (80%)	9 (60%)	10 (67%)	11 (73%)
Mild	–	2 (13%)	5 (33%)	4 (26%)	3 (20%)
Moderate	–	1 (7%)	1 (7%)	1 (7%)	1 (7%)
Severe	–	–	–	–	–

doned because of permanent Horner syndrome and high rates of compensatory hyperhidrosis.[1,2,5,24] Recent studies are advocating the ablation of T3-4 (especially T4) sympathic ganglion for treatment of palmar hiperhidrosis.[1,2,5,13-20] In accordance with the literature, in our department; patients with palmar hyperhidrosis which is refractory to conservative treatment are being treated with T4 sympathic ganglion ablation.

Our results showed that except compensatory hyperhidrosis, no complications such as cardiac arrest, permanent bradicardia, permanent Horner syndrome, hemothorax, pneumothorax, atelectasia, motor defect and pulmonary edema was observed. These complications can be seen in surgical procedures to various levels of the sympathic chain.[1,2,5,13-20] however according to our results RF ablation of T4 ganglion is a safe procedure.

RF ablation of T4 ganglion is an outpatient procedure which is performed under local anesthesia. The procedure can be performed safely in a short period so it can be an alternative surgical procedures.[2,22,25,26] However, additional studies with larger series are needed in order to determine the rate of compensatory hyperhidrosis, Horner syndrome and the efficacy of the procedure.

Some studies advocate that compensatory hyperhidrosis is not related to procedure but is secondary to reflex reaction at the sweating center of hypothalamus following resection of sympathic chain.[3,12] There are several studies indicating the reduction of compensatory hyperhidrosis frequency following surgical procedures to T4 ganglion.[1,5,13-15,17-20] On the other hand, surgical procedures to T2, T3, T3-4 ganglions have a high compensatory hyperhidrosis frequency ranging between 35-89%.[1,2,5,11,13-20,27,28] Kim et al.[5] reported the results of surgical ablation of T3 and T4 ganglions for treatment of palmar hyperhidrosis. According to their study, compensatory hyperhidrosis frequency for T3 and T4 ganglion ablation was 78% and 17.5%, respectively. In our study, frequency of compensatory hyperhidrosis in the long term (6 months) was 27% and none were severe. All these data show that T4 ganglion ablation is more acceptable for palmar hyperhidrosis treatment.[5,29,30]

Horner syndrome can be seen in 0.5-17% of patients after stellate and T2 ganglion ablation.[1,24,31-33] In our series, we observed no permanent Horner syndrome following T4 ganglion ablation making this procedure reliable in terms of Horner syndrome. The recurrence rate is about 1-27% following surgical approach and the most frequent reasons are inadequate blockade and sympathic regeneration.[1,5,34] Most authors indicate that recurrence rate after T2 blockade is higher than blockade of lower levels.[1,35] In our series, long term recurrence rate was 20 % which shows that RF thermoablation has similar results with surgical approach.

Severe dryness can be thought as an adverse effect so fairy dryness can be accepted as the optimal result for palmar hyperhidrosis treatment. Moreover, mild sweating can be tolerated in stressful conditions and do not adversely affect daily life.[5] According to Kim et al, frequency of fairy dryness after T3 and T4 ablation was 5.4% and 81%, respectively. In our series, fairy dryness in the long term was 67% which is an acceptable result.

Patient satisfaction was 80% which was concordant with the literature and the major reason for dissatisfaction was compensatory hyperhidrosis (CH).[1,2,5,11-22] In some studies, patient dissatisfaction because of CH was reported in 50-97% of patients.[5,28] As there is no solution for CH, the problem becomes more complex.[5] Thus, prevention of CH or selection of a procedure with less frequency of CH will increase the patient satisfaction.

When compared with surgical approach, the major disadvantage of this technique is unsuccessful blockade because of anatomic variations (double sympathic trunk or absence of sympathic truck at normal anatomic position).[2,5,36] In order to overcome this disadvantage, the procedure can be performed in fluoroscopic guidance and the position of the cannula can be tested neurophysiologically.

As a conclusion, percutaneous RF ablation of T4 sympathic ganglion is safe, effective and minimal invasive technique for treatment of palmar hyperhidrosis. This procedure can be an alternative to surgical approach but further studies with larger series are needed.

Conflict-of-interest issues regarding the authorship or article: None declared.

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