

## Upper Thoracic Sympathetic Block for Palmar Hyperhidrosis: A Case Report

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Received: March 28, 2018; Published: July 05, 2018

### Abstract

We describe a case of childhood onset primary hyperhidrosis of both hands in a young female who found significant relief of symptoms when image guided upper thoracic sympathetic ganglion radio frequency thermo coagulation (RFT) was done by posterior approach as compared to anterior approach.

**Keywords:** Palmar Hyperhidrosis; Upper Thoracic Sympathetic Ganglion Block; Radio Frequency Thermo Coagulation

### Introduction

Primary hyperhidrosis is most likely caused by hyper functioning central sudomotor output. It has predominantly an emotional component and is associated with tonically active sympathetic innervations of vasomotor downstream effectors and more labile innervations of sudomotor effectors. It can be ameliorated by sympathetic denervation [1].

### Case Report

A 25 year old student presented with chief complaints of childhood onset excessive sweating of both palms and sole of feet, causing severe limitations to her dexterity. Cold and clammy extremities were associated with axillary sweating, irrespective of external weather conditions. No familial links or specific aggravating/relieving factors could be isolated. History of thyrotoxicosis, carcinoid syndrome, pheochromocytoma and other autonomic dysfunctions was negative.

General physical and neurological examination was insignificant. With no respite from conservative management, patient was planned for a unilateral image guided stellate ganglion block using percutaneous RFT.

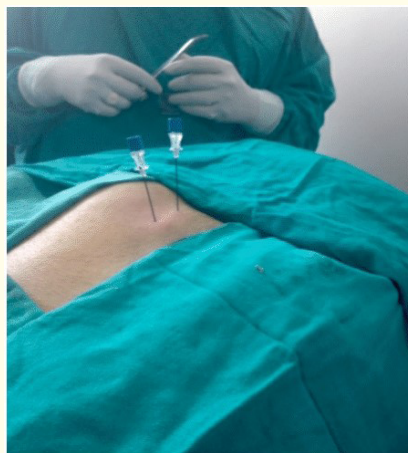
Under strict aseptic precautions and monitoring, right sided stellate ganglion block was performed at C7 level with anterior approach under sedation. After diagnostic confirmation of needle position in antero-posterior and lateral views, in plane and with dye control, 10 ml of 0.125% bupivacaine with 40 mg triamcinolone acetate was injected followed by four cycles of conventional Radio Frequency Thermo coagulation (RFT) at 70 degree Celsius for 90s. A dry and warm hand with transient horner's syndrome was noticed with immediate relief of sweating on the blocked side, at the end of an uneventful procedure and recovery. Patient was discharged the same day on Tab. Pregabalin and Tab. Indomethacin.

In spite of immediate relief in palmar sweating after the block, a follow up week later revealed persistence of same symptoms. Patient was now scheduled for a right sided fluoroscopic guided T2-T3 thoracic ganglion sympathetic block. Using aseptic precautions with monitoring and sedation, a diagnostic and therapeutic block was performed in prone position. This time the plan was changed to blocking the thoracic T2-T3 via posterior approach using 40 mg triamcinolone acetate and 10 ml of 0.125% bupivacaine followed by four cycles of conventional RFT. No complications were noted. Patient was discharged the same day on the same medications as before and reported 90% relief in symptoms in follow up (Figure 1).

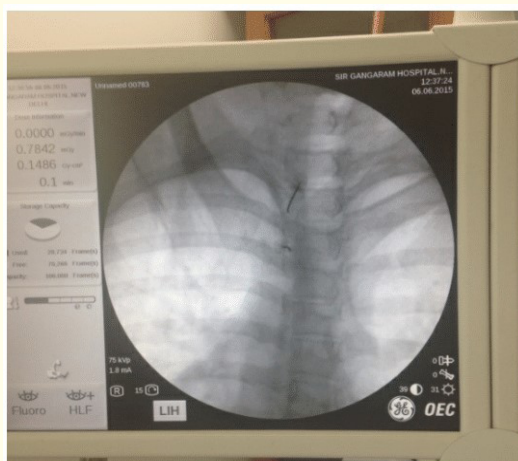


**Figure 1:** Dry right hand after (R) T2-T3 sympathectomy by posterior approach.

The procedure was repeated on the left hand two weeks later. A thoracic left sided T2-T3 sympathectomy using RFT was preferred over stellate ganglion block. Needle position was confirmed under fluoroscopic guidance. (Figure 2-4) Patient reported successful alleviation of her symptoms in both hands after this procedure (Figure 5).



**Figure 2:** Radiofrequency needle in position for left side posterior approach RFT at T2&T3.



**Figure 3:** Oblique fluoroscopic view of RF needle at T2&T3.



**Figure 4:** Lateral fluoroscopic view of RF needle at T2&T3.



**Figure 5:** Dry left hand after (L) T2-T3 sympathectomy by posterior approach.

### Discussion

Excessive sweating in any body part is called hyperhidrosis which can be a source of great distress to a patient, hindering a person's psychosocial status and quality of life [2]. Exact etiology of the disease is unknown but is considered to be a functional impairment of sympathetic nervous system [2,3].

Management includes both conservative (Anticholinergics/Antiperspirants/Botulinum toxin) and surgical techniques. The preferred surgical sympathectomy levels for palmar hyperhidrosis are T2, T3, T2-3, T4, T3-4 but is associated with complications such as pneumothorax, haemothorax and atelectasis [2,3].

Percutaneous Radiofrequency thermo coagulation (RFT) is an acceptable minimally invasive technique to provide sympathetic denervation [4,5] since 1984. The radiofrequency lesion claims to be one of the most effective and widely implied methods for a localized therapeutic destruction of nerve tissue. Sensory stimulation helps identifying the target zone by eliciting vague sensations or pain. Motor stimulation helps in judging the proximity to the target neural tissue. Closer the radiofrequency electrode to the sympathetic ganglion, higher the chances of successful ablation.

Upper thoracic segments of spinal cord from T2-T6 provide the sympathetic innervations to the upper limbs. The fibers are distributed along the sympathetic trunk and mainly via the stellate ganglion to the brachial plexus and upper limb arteries. Thoracic sympathetic ganglion blockade is a known indication for treatment of hyperhidrosis of upper extremities [6-10]. All the sympathetic nerves that supply the head and neck and most of those that supply the upper extremity traverse through the stellate ganglion. However in significant number of people, the somatic intrathoracic branches of second thoracic spinal nerve join the first thoracic spinal nerve. This intrathoracic branch is joined by the gray rami communicants carrying the sympathetic fibers that arise from the second thoracic sympathetic ganglia and possibly T3 ganglia as well. These fibers join the lower part of brachial plexus without passing through stellate ganglion. This explains the incomplete sympathetic blockade of the upper extremities in a pure stellate ganglion block [11]. Once it was determined that the second thoracic sympathetic ganglion was the largest physiological relay centre to the upper extremity, surgical therapy for hyperhidrosis has included vigilant avoidance of damage to stellate ganglion [12].

A less common variety also exists that branches from T3, and bypasses stellate ganglion. These anomalous pathways, referred to as Kuntz nerves, bypass the stellate ganglion and therefore a pure stellate ganglion block will not produce complete sympathetic denervation of upper extremity as was seen with our patient. Recent studies advocate radiofrequency ablation of T3-T4 (especially T4) sympathetic ganglion to prevent Horner's syndrome and high rates of compensatory hyperhidrosis [2,3,13].

In our patient, performing a unilateral stellate ganglion block at the time of presentation did not provide adequate symptomatic relief, probably suggesting that T2-T3 sympathetic fibers were bypassing the stellate ganglion whereas T2-T3 thoracic sympathetic block done subsequently by posterior approach achieved the desired results in both hands. Through this case report we highlight the fact that when two different sites were chosen for sympathectomy in the same patient for same symptoms, one showed preferential benefit over the other. Thus, choosing the upper thoracic denervation technique over stellate ganglion block at the outset will avoid unnecessary repeat blocks and cost of healthcare.

### Conclusion

Treatment of palmar hyperhidrosis using RFT provided better results in our patient when posterior approach was chosen to perform sympathectomy at T2-T3 thoracic ganglion instead of an anterior approach.

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**Volume 4 Issue 8 August 2018**

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