

## **The Effect of Thoracoscopic Sympathectomy on the Quality of Life and the Functional outcome of the Patients with Primary Palmar Hyperhidrosis**

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### **ABSTRACT**

Hyperhidrosis is a disorder of excessive sweat production. It can profoundly affect the quality of life and the functional outcome of the patients with severe impairment of daily activities, social relationships and occupational activities. The purpose of this study was to evaluate the effect of thoracoscopic sympathectomy at the T2-T4 levels on the quality of life and the functional outcome of the patients with palmar hyperhidrosis. This retrospective study includes 75 patients with palmar hyperhidrosis referred to the Razi Hospital from 2007 to 2011 and underwent thoracoscopic sympathectomy at the T2-T4 levels. The Quality of life of the patients was evaluated using the Dermatology Life Quality index (DLQI) and questionnaire form for functional outcome, while the pain of the patients was evaluated using the visual analogue scale (VAS) before and 6 months after operation. **Results:** The mean age of the patients was 26 years. The number of men was nearly equal to women. After operation, 73 patients (97.3%) had complete remission and 2 patients (2.7%) had partial remission. The Quality of life and the functional outcome of the patients improved significantly after operation ( $P < 0.001$ ). The most common complication was compensatory hyperhidrosis occurred in 41.3% of cases. Thoracoscopic sympathectomy is an effective and safe therapeutic modality for palmar hyperhidrosis. This operation improves the quality of life and the functional outcome of the patients significantly.

**Keywords:** Hyperhidrosis, Thoracoscopy, Sympathectomy, quality of life.

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## INTRODUCTION

Primary hyperhidrosis is a condition characterized hypersecretion of the eccrine sweat glands. The cause of primary hyperhidrosis is unknown. Sweating is emotionally, socially, and professionally distressing and may hinder daily activities. It affects 0.6–1% of the population [1, 2, 3]. Symptoms of hyperhidrosis usually appear in childhood or puberty [4]. Hyperhidrosis is characteristically disproportionate to sweating for thermoregulation and dissipation of body heat [1-6]. It is more common in women [7-9]. About 7.8 million individuals in the United States (2.8% of the population) have primary hyperhidrosis [10]. Common conservative treatments have included antiperspirants, anticholinergics, iontophoresis, botulinum toxin and therapies based on biofeedback [11-15]. In recent years, thoracoscopic sympathectomy has become the standard treatment for severe hyperhidrosis. It is a simple, safe, and effective procedure with a short hospital stay and good cosmesis [16-20]. The most frequent indications for sympathectomy are palmar and axillary hyperhidrosis. The most common side effect and the major reason for patient discontent is excessive sweating in nondenervated areas after a successful operation (compensatory hyperhidrosis). The cause of compensatory hyperhidrosis is obscure [21-28]. This study was designed to evaluate the benefits and complications of thoracoscopic sympathectomy. Besides change of the quality of life and satisfaction, we focused on compensatory hyperhidrosis.

## MATERIALS AND METHODS

Between 2007 and 2011, 73 patients with palmar hyperhidrosis underwent thoracoscopic sympathectomy at the Department of Surgery, Razi Hospital, Rasht. Patients with primary hyperhidrosis were offered thoracoscopic sympathectomy after medical and nonsurgical treatments had been failed or if they had longstanding or severe disease. Diagnosis was based on clinical features. Written informed consent was obtained from all patients. Patients answered questionnaires concerning gender, age, medication, changes in sweating and quality of life (scale: strongly improved, improved, unchanged, worsened), compensatory hyperhidrosis and overall satisfaction with the results of the operation pre and post operation. All procedures were performed by a single surgeon. The patients underwent T2-T4 thoracoscopic sympathectomy in one or two sides according to their symptoms. For operation, the patients were placed in lateral decubitus position. The thoracoscopic sympathectomy technique consisted of three 5-mm ports arranged in a triangular fashion. The lung on the operative side was deflated using general anesthesia with double-lumen endotracheal intubations. After the left lateral chest and axilla were prepped, a 5-mm trocar was placed in the anterior axillary line at the 4<sup>th</sup> to 5<sup>th</sup> intercostal spaces. A 30-degree angle, 5-mm endoscope was placed in order to observe the pleural space and the other ports placements. Then two more trocars, one in the anterior axillary line at the 3<sup>rd</sup> to 4<sup>th</sup> intercostal space and the other in the midaxillary line at the 4<sup>th</sup> or 5<sup>th</sup> intercostal spaces, were inserted. After dissection of sympathetic chain from T2 to T4, it was sharply divided proximally and distally. Then it was sent to pathology in order to obtain permanent histologic section. After the sympathectomy was completed, the lung was reexpanded with a pediatric-sized chest tube in the pleural space. The skin incisions were approximated with subcuticular sutures. The procedure was then repeated on the contralateral side if the patient had simultaneous bilateral sympathectomy. The day after surgery they were examined for Horner's syndrome, pneumothorax or hemothorax and chest tube was removed and patient was discharged if there was no problem. For follow up, patients came to office 1 week, 1 and 6 months later and were examined for wound infection and answered the questions about change in the quality of life, satisfaction and other complications (neuralgia, intercostals pain, compensatory hyperhidrosis,...). The Quality of life was evaluated using DLQI (Dermatology Life Quality index) questionnaire and satisfaction was evaluated using VAS (Visual Analogue scale). In skin disease, the quality of life can be measured using DLQI. This questionnaire is scored from 0 (worst state) to 30 (best state). This index has high validity [26-28]. At last, data was analyzed with SPSS (Ver16) and  $P < 0.05$  was considered significant.

## RESULTS

75 patients participated in this study. The mean age of patients was 26 years (min=19, max=37). The number of men and women were almost equal. The majority of patients (72%) did not have positive family history. 55 of them (73.3%) received drug treatment in pre-operation and since it failed they underwent operation. After operation, 73 patients (97.3%) got complete recovery and 2 of them (2.7%) got partial recovery. The Mean length of hospital stay after operation was  $1.08 \pm 39$  days (min= 1 day, max= 4 days). Before operation, hyperhidrosis interfered with

different aspects of afflicted individuals' lives including educational, occupational and social functions. Dermatology quality of life index of the patients improved noticeably after operation. The comparison of the quality of life before and after recovery also suggests a significant decrease in mean score ( $P < 0.001$ ) (Table 1). Furthermore, patient's satisfaction, according to VAS, shows a significant increase in mean score after operation. Postoperative complications have been presented in table 2. The most common complication after operation was compensatory hyperhidrosis seen in 31 patients (41.3%). The second complication was back pain and chest complication which was observed in 6 patients (8%). Wound infection and rebound hyperhidrosis were not seen in any case. keloid was not also produced in operative location. The most common location of hyperhidrosis was anterior trunk which was detected in 28 patients (37.3%). None of the patients needed operation again. The results of frequency of compensatory hyperhidrosis, based upon gender suggested that compensatory hyperhidrosis frequency in women was significantly more than men (29.7%). In terms of body mass index (BMI), there was no significant relation between BMI and compensatory hyperhidrosis.

**Table1- Mean of quality of life (using DLQI) and satisfaction score (using VAS) of patients before and after operation**

	Before operation (standard deviation)	After operation (standard deviation)	P-value
Quality of life	20.8(5.2)	0.18(0.49)	$P < 0.001$
Satisfaction	1.13(0.66)	9.77(0.66)	$P < 0.001$

**Table2-Post-operative Complications**

Complication	Frequency (%)
Compensatory hyperhidrosis	31(41.3)
Chest and back pain	6(8)
Transient horner	4(5.3)
Pneumothorax	1(1.3)
Intercostal neuralgia	1(1.3)
Keloid	0
Wound infection	0

## DISCUSSION

There are various surgical treatments such as sympathectomy (sympathetic chain resection), sympathicotomy (sympathetic nerve chain is surgically divided), sympathetic Ablation (cauterization of sympathetic chain). Recrudescence of disease happens more in two latest surgical treatments. Despite the above-mentioned surgical treatments, there is a new surgical treatment and that is clipping sympathetic chain which is as successful as other surgical treatments. [6,29]. In current study, the mean age of the patients was 26 years (min= 19, max= 37). In another study, the patients mean age varied from 12 to 60[30]. In present study, there was a positive family history in 28% of patients but in a study by Dr.Toolabi, 78% of patients had positive family history [31]. As we know, T2 ganglion is responsible for palmer hyperhidrosis while in treatment of arm hyperhidrosis, ganglions need to be removed to the level T4. In some studies, limited sympathectomy (T2) has been compared to extensive sympathectomy (T2–T4). Former treatment was accompanied with a reduction in severity of compensatory hyperhidrosis. Limited sympathectomy may lead to returning of the preoperative symptoms. Compensatory hyperhidrosis is a common complication in which sweating increases in other parts of body (mostly anterior trunk) which did not sweat before operation. Compensatory hyperhidrosis (CH) is the most problematic complication which varies from 67% to 89%. It has been said that CH is an adjustable temperature mechanism in which lack of sweating in hands is compensated by other glands in other parts. Therefore, there must be a relation between extension of sympathectomy and compensatory hyperhidrosis [29, 32]. Hsu and colleagues showed that extensive hyperhidrosis reduced severity of compensatory hyperhidrosis [33]. In another study, compensatory hyperhidrosis was observed in all the patients that had undergone limited sympathectomy [34]. It is debated whether or not the extent of a sympathetic resection leads to a higher or lower risk of this complication [29]. In present study, compensatory hyperhidrosis was the most common complication after operation which was observed in 31 patients (41.3%). The most common location of compensatory hyperhidrosis was trunk (37.3%) which was tolerable. Sweating when eating (Gustatory sweating) is a complication after sympathectomy. In one study, the prevalence of gustatory sweating was 32% and it was shown that the extension of sympathectomy was relevant with the

occurrence of this complication but in our study, such matter was not observed. In a study by Shi, gustatory sweating was not observed [29]. In some studies, it has been shown that the increase in severity of hyperhidrosis is affected by BMI increase which did not have relationship with patient's satisfaction [35]. But in our study, there was not relationship between BMI and compensatory hyperhidrosis or patient's satisfaction. In present study, hemothorax, wound infection and rebound hyperhidrosis were not observed in our cases. In one study, rebound hyperhidrosis was observed in 2 patients (5%) [8]. In a study done by Dr. Toolabi et al, the mean of the quality of life was  $18.8 \pm 5.1$  before operation and  $1 \pm 1.64$  after operation [31]. In present study, the mean of the quality of life was  $20 \pm 5.2$  before operation and  $0.18 \pm 0.49$  after operation. In ongoing study, the score of patient's satisfaction according to visual analogue scale (VAS) was  $1.13 \pm 0.66$  before operation and  $9.77 \pm 0.66$  after operation. Almost all patients even those with compensatory hyperhidrosis were satisfied with operation and their quality of life had improved. In this effort, female to male ratio was almost equal to 1 and changes in patient's quality of life had no relation with age and gender. Similar to some other studies there was no relation between age, gender and changes in quality of life [8-11]. In Gossot study also 93.7% of patients were satisfied and 6.3% regretted the operation [36]. In present research, in early cases, 3 trocar (one trocar 10 mm, two trocar 5mm) was used but in the last cases, as the surgeon experience increased, 2 trocar was used. (one trocar 10mm and one trocar 5mm) which led to less trauma, scar and pain. The mean of hospitalization was  $1.08 \pm 0.39$ . In similar studies, the average of hospitalization after surgery was  $1.7 \pm 0.6$  and 1.2 days [37, 38].

### CONCLUSION

Sympathectomy is a reliable and effective treatment for palmar hyperhidrosis accompanied with less complication and more success. After operation, patient's quality of life improved significantly. Even patients with compensatory hyperhidrosis, they had improved quality of life.

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