

Original Research Article

## Long-Term Follow-up and Results of Thoracoscopic Sympathectomy for Primary Palmar Hyperhidrosis

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**Abstract:** The goal of this retrospective study was to evaluate the long-term outcomes of bilateral video-assisted thoracoscopic (VATS) sympathectomy for primary hyperhidrosis. Between January 2008 and October 2012, 56 cases underwent VATS sympathectomy for primary palmar hyperhidrosis. All patients' intraoperative and postoperative outcomes were collected. Data of the procedure and complications, midterm and long term outcome were collected by telephone interview. Mean age was 22.5 years (range, 16–38 years), and mean operative time to complete the bilateral procedure was 52 minutes (range, 40–85 minutes). The procedure was successfully completed in all patients without the need to enlarge the incision. The hands of all patients were dry and warm after operation. Postoperatively, there was no mortality and no residual palmar hyperhidrosis. Postoperative stay range was 2 to 4 days. Neurologic complications (radial paralysis, Horner syndrome and dysesthesia of the arm) were not occurred. Compensatory sweating occurred in 12.5% of the patients. Despite this 89.9% of the patients were satisfied or very satisfied. This study confirms that VATS sympathectomy is a suitable choice for severe palmar hyperhidrosis. Long-term follow-up proved that mild compensatory hyperhidrosis is the main side effect associated with this technique.

**Keywords:** Primary palmar hyperhidrosis, Bilateral thoracoscopic sympathectomy, VATS, Follow-up.

### INTRODUCTION:

Primary hyperhidrosis is a disease characterized by excessive sweating occurs in amounts great than physiological needed for thermoregulation. Usually, primary hyperhidrosis commonly affects young people, leading to significant discomfort, both physical and emotional. This discomfort can be seen in many routine activities, leading to significant unease, embarrassment and shame, and severely compromising the affective, professional and social life of those affected. It seems to run in families. The sites most commonly affected are the palms, axillae, or/and the feet. This condition is fairly common and affects up to 4.59% of the population in southern China [1]. Hyperhidrosis may be primary cause. In severe primary cases, surgical procedure, sympathectomy would be recommended when other treatments do not work. In recent years, the procedure has become more acceptable following the introduction of the minimally invasive technique using video-assisted thoracic surgery (VATS) [2]. VATS sympathectomy remains an effective method for treatment of palmar hyperhidrosis refractory to other

conservative forms of management. This procedure is fast, easy, safe, effective and minimally invasive. The most common side effect of this method is compensatory sweating [3]. We report on our experience and long-term results of bilateral VATS sympathectomy at our institute.

### PATIENTS and METHODS

#### Data Collection

This was a retrospective, descriptive observational study. The study population comprised all patients who underwent a VATS sympathectomy for primary palmar hyperhidrosis with or without primary axillary hyperhidrosis in our institution between January 2008 and October 2012. All procedures were carried out by the same surgeon. Criteria for inclusion in the study were severe primary palmar hyperhidrosis that significantly interfered with daily life and work. Criteria for exclusion were the secondary hyperhidrosis; neurotic anxiety; the existence of diseases such as pulmonary infections, heart diseases, pleural or peritoneal diseases that could increase surgical risk; or

patients who were a high risk for general anesthesia. Patient data were collected from the medical records containing information on postoperative visits, and incomplete records were excluded. The study was approved by the Ethics Committee of Guilin Medical Hospital. All patients gave written informed consent for surgery.

The demographic details, surgical time, intraoperative complications, immediate improvement of symptoms, early postoperative complications, and postoperative hospital stay data were collected from the medical records. We analyzed data regarding the resolution of primary palmar hyperhidrosis, compensatory hyperhidrosis (occurrence and quantification), and the degree of patient satisfaction with the surgical outcome in the early postoperative period and in the late postoperative period.

### Operative Technique

During the surgery, monitoring included oxygen saturation, blood pressure and electrocardiogram. The patients received general anesthesia. The patients were positioned in a semi-sitting position with abduction of the upper limbs. Two sub-centimetre incisions were made in the anterior axillary and midaxillary lines in the fourth or third intercostal spaces for the insertion of two 5-mm trocars. Pneumothorax was induced, after which the anatomical landmarks were identified. The costal arches were numbered based on the identification of the insertion of the posterior scalene muscle, on the outer surface of the second rib. The sympathetic chain was visualized running down over the necks of the ribs and was sectioned with scissors at the level of the lower border of the first rib. Diathermy was not used before this time to avoid electrical lesions of the stellae ganglia. After section of the sympathetic chain, the mediastinal pleura were vertically incised by diathermy and the sympathetic chain was dissected and removed from the second to the fourth ganglion. We transected T2-T3 ganglia for palmar hyperhidrosis, T2-T4 ganglia for palmar and axillary hyperhidrosis in patients. Collateral nervous trunks were coagulated. Subsequently, the lung was re-expanded; no chest drain was used until the end of the operation. The same procedure was performed for the right side.

In most cases, the patient was discharged on postoperative day 1. Postoperative analgesia was usually achieved with the use of nonsteroidal anti-inflammatory drugs and mild opioids, such as tramadol.

### Follow-up

All patients were routinely followed up with an office visit at 1 day, 3 days, and 7 days after surgery. Data regarding gender, age and a family history of hyperhidrosis were registered, as were those regarding

the presence and location of hyperhidrosis and the degree of patient satisfaction. The severity of compensatory hyperhidrosis was divided into three categories: mild, moderate and severe. Regarding the degree of patient satisfaction, the following response options were given to the patients: completely dissatisfied; dissatisfied; no opinion; satisfied; and completely satisfied. The long-term data were collected through clinic visits or telephone interviews at 12 months after surgery. Patients were required to answer a simple questionnaire that included relief of symptoms, levels of satisfaction with the procedure, postoperative complications, incidence of symptom recurrence, sweating symptom.

### RESULTS

In our cases, mean age was 22.5 years (range, 16–38 years), and mean operative time to complete the bilateral procedure was 52 minutes (range, 40–85 minutes). The procedure was successfully completed in all patients without the need to enlarge the incision.

The length of postoperative stay was 2–4 days for 56 patients, the mean interval between discharge and return to work was 7 days. There were no intraoperative complications. Postoperative chest radiographs illustrated minor unilateral pneumothorax in 5 patients that required draining in only 2 patients. Only one patient had hemothorax. After treatment, all patients had successfully recovered. No neurologic complications occurred in our patients.

During long-term follow-up, compensatory sweating occurred in 7 (12.5%) of the 56 cases. The severity of compensatory hyperhidrosis was mild (4.9%), moderate (2.7%), severe (4.9%), respectively. This side effect did not change over time. Precipitating factors included heat (45%), emotion or stress (35%), and physical activity (20%). The degree of satisfaction was completely dissatisfied (3.6%), dissatisfied (7.2%), no opinion (7.2%), satisfied (17.6%), completely satisfied (64.4%), respectively. In addition no other side effect was reported.

### DISCUSSION

Primary hyperhidrosis is not a severe, life-threatening disease, but represents an extremely uncomfortable situation causing deep social embarrassment and relationship and psychological disorders in such patients, who frequently becomes socially isolated and acquire habits that attempt to hide the problem. Palmar hyperhidrosis is the most common location. The method of treatment for palmar hyperhidrosis have traditionally been non-operative, including antiperspirants drugs, iontophoresis, botulinum toxin type A and type B injections. These methods only provide some transient effects. Drawbacks to use these agents include local pain or

depigmentation of the skin, necessary of continuous use. VATS sympathectomy is a safe and effective method of managing these patients with significant improvement in quality of life. In the 1990s, VATS allowed thoracic sympathectomy to be indicated and used with significant benefit to patients [4-6].

With the advent of VATS, Horner's syndrome has become a rare complication. It has been reported to occur at a rate between 0.7% and 3% after operation [2]. Its occurrence is limited to cases of indirect injury by cautery, traction, or surrounding inflammation can occur owing to improper localization of the second rib. We believe that resecting ganglia that are more distant from T1 should reduce the incidence of this severe complication further [7, 8]. In our cases, no one case of Horner's syndrome occurred.

Compensatory sweating is the most common complication reported after VATS sympathectomy in many cases [9-12]. Its physiopathology is unknown, but it is suspected that this phenomenon is caused by a temperature-regulating compensatory mechanism in the body [13, 14], and corroborated by our study, are the abdomen, back, feet, and gluteal region. In our series compensatory sweating occurred in 12.5% of the patients. According to results of the questionnaires 89.9% of the patients were satisfied and experienced improved quality of life. It seems to be the level of severe compensatory sweating that is more important. However the definition of severe compensatory sweating has not been clearly established and the evaluation of quality of life by the patient is a suitable way of estimating the results. Compensatory sweating is the consequence experienced for dry hands. In our study compensatory sweating was most often moderate and well tolerated. However it is very important to inform patients of this side effect provides the same rate of success and the same rate of compensatory sweating but with the potential for reversal in those patients who are dissatisfied because of severe compensatory sweating. In our cases, it is tolerable and does not lead to social disturbances or occupational disability. Patients are only inconvenienced when their symptoms are severe or when they do not receive adequate information before the operation. Patients must always be warned about this possible complication before the surgery because of the irreversibility of the method. When severe, compensatory sweating can significantly affect quality of life. At present, there is no consensus for the classification of compensatory sweating.

Our initial technical choices were motivated by the use of the same procedure as other types of VATS sympathectomy (two endoscopic ports, double lumen endotracheal tube, 8 mm thoracoscope, etc). For instance, the reduction of postoperative pain is a challenge [15]. This complication is rarely mentioned in

our cases possibly because it was transient. We used a 5 mm 0° thoracoscope instead of 8 mm to decrease intercostal trauma. We tried a 2 mm thoracoscope but the visibility was limited and it was too fragile. It seems to us that decreasing local electro cauterization decreases the intensity of postoperative upper back pain.

This study confirms our choice and preference to operate for severe and dominant palmar hyperhidrosis. Though the risks of this type of surgery are rather minimal, we do not operate for minor forms of palmar hyperhidrosis. For isolated palmar forms we restrict the height of resection of the sympathetic trunk to only the T2–T3 ganglions [16, 17]. We also restrict coagulation as much as possible and will change the port (5 mm instead of 8 mm) that seems to be the origin of postoperative pain. Permanent bradycardia, recurrent hyperhidrosis are other potential side effects after surgery for hyperhidrosis as well [15, 18, 19]. In our cases, these similar complications didn't appear. The lack of recurrence observed in the study is due to the absence of technical failure among our patients operated.

This study has its limitations. This is single-center experience included only a small number of patients. Further study and more patients are required.

## CONCLUSIONS

Despite the main drawback of postoperative compensatory sweating, surgical sympathectomy remains a favorable treatment for severe and dominant palmar hyperhidrosis because it manifestly improved the quality of life for patients in our cases. Despite the presence of compensatory hyperhidrosis, an improvement in quality of life was found for our entire series. Our task is to select suitable cases carefully and to provide informative and thorough information to patients.

## CONFLICT OF INTERESTS

None declared.

## AUTHOR'S CONTRIBUTION

Haiyong Wang and Jianfei Song wrote the paper. Xingxing Peng, Lifei Zhang, Angui Li, Tianci Qian, Fugui Ruan, Jianbin Sun, Zhenzong Du and Xiaolin Sun supervised the composition of the paper. All authors read and approved the final paper.

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