Single stage bilateral uniportal videothoracoscopic sympathicotomy for hyperhidrosis: can it be managed as an outpatient procedure?

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Videosurgery Miniinv 2016; 11 (2): 88–93
DOI: 10.5114/wiitm.2016.60182

Abstract

Introduction: *The videothoracoscopic approach is minimally invasive with benefits that include less postoperative pain and shorter hospital stay. It is also a safe procedure which can be performed on an outpatient basis.*
Aim: *To determine whether videothoracoscopic sympathicotomy can be performed safely in most patients as an outpatient procedure.*
Material and methods: *Between July 2005 and October 2015, a total of 92 patients underwent bilateral and single port thoracoscopic sympathicotomy in our department on an outpatient basis. The level of sympathicotomy was T2 in 2 (2.2%) patients, T2 to T3 in 31 (33%) patients, T2 to T4 in 46 (50%) patients and T3 to T4 in 12 (13%) patients. Demographic data, length of postoperative stay, substitution index (SI), admission rate (AR) and readmission rate (RR), complications and patient satisfaction were reviewed retrospectively.*
Results: *Two (2.2%) patients suffered from chest pain, while 4 (4.3%) patients complained about pain at the port site. Mean discharge time after surgery was 5.1 h (range: 4–6 h), mean duration of hospital stay was 0.15 days (0–3 days) postoperatively and the mean operation time was 43.6 min (15–130 min). In 8 (8.6%) patients, pneumothorax was detected on postoperative chest X-ray, while 5 (5.4%) patients required chest tube drainage. Mild or moderate compensatory sweating developed in 32 (34.7%) patients. No recurrence was observed, and the satisfaction rate was 96.7%. Substitution index and admission rate were 91.3% and 11% respectively, while RR was 0%.*
Conclusions: *Bilateral video-assisted thoracoscopic sympathicotomy can be performed safely in most patients as an outpatient procedure.*

Key words: *video-thoracoscopy, uniportal, sympathicotomy, outpatient.*

Introduction

Video-assisted thoracoscopic sympathectomy (where a chain segment is resected and removed) and sympathicotomy (where the chain is clipped, cut or cauterized at the upper and lower connections and left in place) have been extensively used as surgical therapy for hyperhidrosis. The video-thoracoscopic approach is minimally invasive with benefits that include less postoperative pain and shorter hospital stay. It is also a safe procedure which can be performed on an outpatient basis [1–4].

Aim

The aim of this study is to evaluate the surgical results of thoracic sympathicotomy in hyperhidrosis

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and test the performance and side effects of the procedure as an outpatient intervention.

Material and methods

Between July and October 2015, 92 patients underwent single port bilateral thoracoscopic sympathicotomy on an outpatient basis for the treatment of primary hyperhidrosis. Inclusion criteria consisted of primary hyperhidrosis causing negative effects on the patients' social or professional lives. Exclusion criteria consisted of accompanying vascular symptoms, secondary hyperhidrosis and accompanying disease. Patient satisfaction regarding the operation (discomfort, palmar sweating, sweating of other parts of the body, pain) were questioned by phone calls.

There were 43 (46.7%) male and 49 (53.2%) female patients. All patients experienced disabling palmar hyperhidrosis. The median age of the patients (at the time of surgery) was 25.1 years (range: 9–46 years). A summary of patient demographics is shown in Table I.

Seven (7.6%) patients suffered from axillary hyperhidrosis, while 31 (33%) patients complained about palmar hyperhidrosis. Twenty-one (22.8%) patients suffered from both axillary and palmar hyperhidrosis. In addition, 5 (5.4%) patients had both palmar and plantar hyperhidrosis, while only 1 (1%) patient suffered from axillary-palmar and plantar hyperhidrosis. Only 4 (4.3%) patients had familial history. Sixty-five (70.6%) patients have suffered from hyperhidrosis since their childhood. The median overall follow-up period was 43.6 months (range: 1–125 months) (Table I).

Surgical procedure

Surgery was performed under general anesthesia with single-lumen intubation. Patients were placed in the supine position with arms abducted 70° (Photo 1 A). The right side was operated on first. A 2-cm incision was made at the second or third intercostal space in the anterior axillary line and a trocar (10 mm) was inserted into the thoracic cavity (Photo 1 B). Initially, all patients were hyperventilated with 100% O_2, and the apnea period was initiated when the O_2 saturation of hemoglobin was 100%. A 5 or 10 mm thoracoscope was introduced into the pleural cavity and sympathetic chains were identified. The surgical procedure consisted of the identification of the T2–T4 sympathetic chain and ablation by cautery with rami communicantes using a hook cautery. The sympathetic chains between T2 and T3 or T4 were cauterized in accordance with the level of hyperhidrosis (T2–T3 for palmar hyperhidrosis and T3–T4 for axillary hyperhidrosis). No significant bleeding was observed in any of the patients. Peripheral oxygen saturation of hemoglobin was not allowed to drop below 90%. Finally, the thoracoscope was withdrawn following the insertion of a thin aspiration tube catheter into the pleural catheter. Later, a modified underwater seal device was formed using a small cup of saline solution. The proximal end of the catheter was plunged into the saline solution and the lungs were re-expanded by the anesthesiologist to evacuate the intrathoracic air with the help of positive end-expiratory pressure (PEEP). The silicone tube was withdrawn and the skin wound was closed with subcutaneous sutures. The same procedure was also performed on the opposite side.

Patients were observed in the recovery room for 30–45 min and transferred back to the clinic. Discharge criteria included stable vital signs, observation of re-expanded lung on chest X-ray, no or minimal postoperative nausea/vomiting and tolerable pain. Patients were discharged home with oral analgesics (paracetamol and non-steroid anti-inflammatory drugs). No prophylactic antibiotic was

Table I. Patient demographics

Parameter	Result
Age [years]	25.1 (9–46)
Gender (M/F)	43/49
Follow-up period [months]	43.6 (1–125)
Familial history	4 (4.3%)
Region of sweating:	
Axillary hyperhidrosis	7 (7.6%)
Palmar hyperhidrosis	31 (33%)
Axillary and palmar hyperhidrosis	21 (22.8%)
Level of sympathicotomy:	
T2	2 (2.2%)
T2–T3	31 (33%)
T3–T4	12 (13%)
T2–T4	46 (50%)

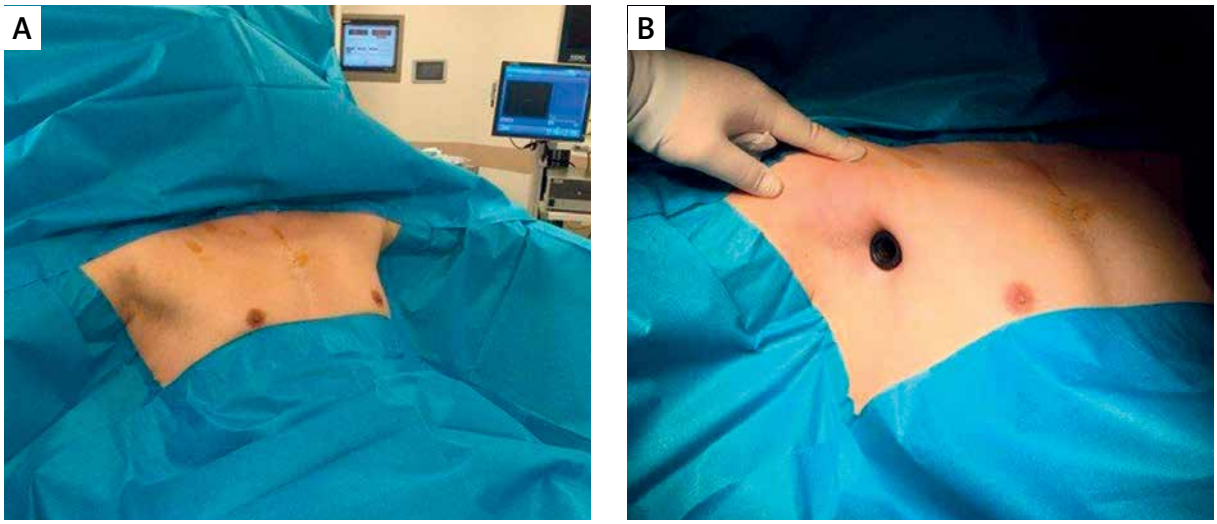

Photo 1. A – Patients were placed in the supine position with arms abducted 70°. **B** – A uniportal approach was performed using a trocar inserted into the thoracic cavity at the second or third intercostal space in the anterior axillary line

used. All patients came for routine follow-up visits after 1 week and one month following the surgery.

Statistical analysis

Statistical analysis was performed using Pearson's chi-squared (χ^2) test for bivariate analysis. All statistical analyses were performed using IBM SPSS Statistics version 20.0 (IBM Corp., Armonk, NY, USA). *P*-values < 0.05 were considered statistically significant.

Table II. Results of intervention at follow-up

Variable	Result
Postoperative palmar sweating:	
Dry	92 (100%)
Mild	0
No change	0
Compensatory sweating:	
None	60 (65.2%)
Mild	32 (34.7%)
Moderate	0
Severe	0
Satisfaction:	
Satisfied	89 (96.7%)
Partially satisfied	3 (3.2%)
Dissatisfied	0
Recurrence	0
Hospital stay [days]	0.15 (0–3)

Results

All of the patients underwent videothoracoscopic sympathicotomy, and all of the procedures were performed bilaterally except in 3 (3.2%) patients. In 1 patient who had severe pleural adhesions, sympathicotomy was performed with right mini-thoracotomy on one side and with thoracoscopy on the other. The level of sympaticotomy was T2 in 2 (2.2%) patients (facial hyperhidrosis), T2 to T3 in 31 (33%) patients (palmar hyperhidrosis), T2 to T4 in 46 (50%) patients (palmar and axillary hyperhidrosis) and T3 to T4 in 12 (13%) patients (axillary hyperhidrosis) (Table I). There were no surgical mortalities or major morbidities. Two (2.2%) patients suffered from chest pain 1 week after the surgery, while 4 (4.3%) patients complained about pain at the port site.

The mean duration of hospital stay was 0.15 days (range: 0–3 days) postoperatively. The mean operation time was 43.6 min (range: 15–130 min). In 8 (8.6%) patients, pneumothorax was detected on postoperative chest X-ray (bilaterally in 1 patient), while 5 (5.4%) patients required chest tube drainage (Table II).

Compensatory sweating developed in 32 (34.7%) patients – mostly located at the back, chest, and ab-

dominal area. The levels of sympathicotomy did not make a difference in the rate or severity of compensatory sweating. No recurrence was observed, and the post-procedure satisfaction rate was 96.7% (Table II).

We used the substitution index (SI), admission rate (AR) and readmission rate (RR) to evaluate the effectiveness and quality of our outpatient surgery procotol. The SI is the ratio of day-care surgery to the total number of procedures, while AR is the ratio of unplanned admissions to total day care procedures. The ratio of unplanned admissions after discharge to total number of day care procedures is known as the RR. Patients who were eligible to be discharged without the need for an overnight stay were named the "outpatient surgery" group. Patients were operated on early in the morning program and discharged the same afternoon. Mean discharge time after surgery was 5.1 h (range: 4–6 h). Patients who could not be discharged until 4 PM (the limit of the official discharge protocol in our hospital) were not included in the outpatient surgery group and were discharged on the next day or later. In our outpatient thoracoscopic sympathicotomy series, SI and AR were 91.3% and 11% respectively, while the RR was 0%. There were 10 (11%)unplanned admissions. Eight (8%) patients with pneumothorax were hospitalized due to postoperative medical factors, while 2 (2%) patients were hospitalized for afternoon surgery. Regarding these unplanned admissions, AR was found to be 11%. In our series, there was no re-admission after discharge, so the RR was 0%.

Discussion

Primary hyperhidrosis affects 0.6% to 1% of the population and causes excessive sweating – most commonly in the hands [5]. Excessive sweating causes distress and impairment in these patients and may negatively affect their daily activities. Different types of medical and surgical treatment methods have been described [5, 6], but only sympathectomy/sympaticotomy yielded effective and permanent results.

Management of hyperhidrosis with thoracal sympathectomy was first described in the 1930s, and the largest series on this issue was reported by Kux in 1954 [3]. Since then, sympathectomy/sympaticotomy has become the standard therapy for hyperhidrosis [5–9]. As the use of videothoracoscopy in thoracic surgery became widespread in the 1990s, sympathectomy/sympaticotomy has begun to be performed with the minimally invasive approach. In comparison to sympathectomy, symphaticotomy (ablation of the sympathetic nerve) is not only equally effective and safe, but also takes a shorter time [1].

The most important side effect of sympathectomy is compensatory sweating [9–12]. Various studies have found controversial results regarding this side effect, which is reported to have developed in 3% to 98% of the cases [12]. In our series, compensatory sweating developed in 32 (34.7%) patients. It was located mostly at the back, chest and abdominal area [9–12]. We did not observe any difference in the results for compensatory sweating with regard to the sympathicotomy level (p = 0.759). In addition, there was no relationship between the area of hyperhidrosis and compensatory sweating (p = 0.293). None of the patients reported restrictions in their daily activities or regretted the surgery. Other potential complications of the procedure include Horner's syndrome, recurrence, hemorrhage and pneumothorax, which can be observed in 3–10% of patients [13–16]. In our series, 8 (8.6%) patients developed pneumothorax postoperatively, which was detected during their routine postoperative chest X-ray (bilaterally in 1 patient), while 5 (5.4%) patients required tube drainage. Two (2.1%) patients suffered from chest pain 1 week after the surgery and 4 (4.3%) patients complained about pain at the port site. None of the patients developed Horner's syndrome. These complications were comparable with those reported in previous studies [13–16]. In our study, the complication rate was significiantly lower in patients with palmar and axillary hyperhidrosis in comparison to the remaining group of patients (p = 0.004). However, there was no relationship between the complication rate and level of sympathicotomy (p = 0.293). The complication rate was higher in females, but the difference was not statistically significiant (p = 0.313). There was also no significiant difference between compensatory sweating and gender of the patients (p = 0.667). On the other hand, all patients were completely free of sweating symptoms postoperatively in our series.

The mean operation times vary from 39 to 124 min in the literature [17–19]. In our series, it was 43.6 min (range: 15 to 130 min). In patients with pleural adhesions, the operation time may extend to 130 min

due to the lysis of pleural adhesions. This situation occurred in 1 of the patients in our own series. Although the rate of recurrence was reported as 0–14% in the literature [19, 20], we did not observe any recurrence in our study.

"Outpatient surgery" (or day care surgery) includes interventions that are performed under general, regional, sedation or local anesthesia and which do not require intensive postoperative care or overnight stay. Patients can be discharged only a few hours after the procedure in this protocol. The SI, AR and RR are known to be efficacious as they are the basic indicators for assessing the management and quality of care in outpatient surgical interventions [21, 22]. In our outpatient thoracoscopic sympathicotomy series, SI and AR were 91.3% and 11% respectively, while RR was 0%. In other words, both our AR and SI turned out to be considerably high. This might be related to the prolonged hospital stay of the patients who were operated on in an afternoon surgical procedure. Only 8 patients with pneumothorax were hospitalized due to postoperative medical factors, while 2 patients were hospitalized for afternoon surgery. In a study by Grabham *et al.* [23], 18 out of 20 thoracoscopic sympathectomies were completed as day-case procedures (AR = 10%). Doolabh *et al.* [24] reported their experience with videothoracoscopic sympathectomy that included 180 patients on an outpatient basis. One hundred and seventy-seven of them were managed as outpatient procedures (SI = 98.3%, AR = 1.7%). Baumgartner and Toh [9] reported 309 consecutive ambulatory sympathectomies with AR = 0.3% and RR = 1.2%.

In our outpatient thoracoscopic sympathicotomy series, 84 out of 92 thoracoscopic sympathicotomies were performed as day care surgery.

Conclusions

Single-port bilateral outpatient thoracoscopic sympathicotomy yields satisfactory results and minimal complications. On the other hand, recently a great potential has emerged for outpatient thoracic surgery. Video-assisted bilateral thoracic sympaticotomy can be performed safely in most patients as an outpatient procedure.

Conflicts of interest

The authors declare no conflict of interest.

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Received: 23.02.2016, **accepted:** 10.05.2016.