

Life quality after video-assisted thoracoscopic thoracic sympathetic chain clipping for patients with isolated primary palmar hyperhidrosis

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Background

Video-assisted thoracic sympathectomy (VATs) is the most frequently used procedure in the treatment of primary hyperhidrosis. The objective of the present study was to assess the life quality of patients before and after VATs clipping using a specific questionnaire.

Methods

Between February 2009 and September 2012, 45 patients with primary palmar hyperhidrosis admitted to King Abdulaziz University Hospital were administered a disease-specific questionnaire preoperatively and 6 months after VATs clipping of the third and fourth sympathetic chain thoracic segment (T3, 4) under general anesthesia.

Results

The mean age of the patients was 27.8 years (range 19–35). Thirty (66.67%) patients were female, with a mean age of 27 years (range 19–35). Fifteen (33.33%) patients were male, with a mean age of 29.3 years (range 25–34). Six (13.33%) patients were obese and consisted of one (2.22%) male and five (11.11%) female patients. All patients were discharged on the second day, except for one who had pneumothorax (fifth day). There was another patient with pneumothorax (2.22%), two patients with VATs port infection (4.44%), and 17 patients with compensatory hyperhidrosis (37.78%). All domains of the specific questionnaire reported a statistically significant improvement in each domain separately ($P < 0.001$) and in the total test score ($P < 0.001$). Preoperatively, 15 (33.33%) patients were in very poor (VP) health and 30 (66.67%) were in poor (P) health. Postoperatively, the condition of 17 (37.8%) patients improved considerably (of whom 12 were VP and five were P) and that of 28 (62.2%) improved but to a less extent (three were VP and 25 were P).

Conclusion

VATs is a straightforward, effectual, safe, and sound method for relieving the symptoms of primary palmar hyperhidrosis and improving the quality of life.

Keywords:

clipping, life quality, primary palmar hyperhidrosis, sympathectomy

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Introduction

Hyperhidrosis is a condition characterized by excessive physiological perspiration, of unknown etiology, with severe psychological, social, and professional consequences. It shows ephemeral response to medical therapy and good response to surgical treatment. The prevalence of hyperhidrosis is 1–3% (as nearly one-third of patients seek medical advice), with 12.5–56.5% of patients having a positive family history [1]. The exact cause is unknown, but autonomic dysfunction has been observed without a change in the number, distribution, or histopathology of sweat glands [2].

Nonsurgical treatment of primary hyperhidrosis is not commonly helpful and often has a short-lived effect [3]. Surgical treatment has seen success in 94–98% of patients [4]. Thoracic sympathectomy or sympathectomy by means of conventional or video-assisted thoracic

sympathectomy (VATs) using electrocautery, a harmonic scalpel, or clipping at the desired level is the therapy of choice, offering immediate and eternal symptom relief. Clipping has been proved to be effective and is associated with less frequency and severity of compensatory hyperhidrosis, with reversible compensatory hyperhidrosis seen after clip removal [3].

Since the last 10 years, life quality has become an end point of surgical therapy for different diseases, including primary hyperhidrosis [3]. The objective of the study was to assess the life quality of patients before and after VATs clipping using a specific questionnaire.

Patients and methods

This was a prospective, nonrandomized, and uncontrolled study conducted from February 2009 to January 2012

after obtaining approval from the research ethics committee of King Abdulaziz University Hospital.

Forty-five patients were eligible for VATs clipping of T3, 4. All patients were subjected to routine laboratory tests, chest radiograph (to exclude focal pathology), and an ECG before and after the surgery. No quantitative measurement of sweat production was taken. A written consent was taken after the patients had understood the complete details of the procedure and its complications, in addition to an agreement to enroll in the study. Apart from obesity, all patients were healthy and without any clinical or laboratory evidence of comorbidity. Both sides were operated upon sequentially using single lung ventilation under general anesthesia in a dead lateral position.

Patients suffering from primary palmar hyperhidrosis without comorbid conditions (excluding obesity) not improving on nonsurgical treatment who underwent bilateral three-port VATs clipping under general anesthesia using single lung ventilation in dead lateral position and had had at least one follow-up investigation within 6 months of surgery were included in the study.

Exclusion criteria were mixed hyperhidrosis, primary palmar hyperhidrosis improving on nonsurgical treatment, primary palmar hyperhidrosis with comorbid conditions (excluding obesity), recurrent palmar hyperhidrosis, any patient who did not pass through bilateral three-port VATs clipping under general anesthesia using single lung ventilation in dead lateral position, any cause contraindicating VATs, any patient who has not had at least one follow-up investigation within 6 months of surgery, and any patient who cannot understand the test.

A time-out was performed to verify the patient's identity, the site specific for surgery, the procedure to be performed, and an appropriate perioperative antibiotic infusion, which, in all patients, was cefazolin. Under a completely aseptic technique, general anesthesia was started using a double lumen endotracheal tube. The dead lateral position was used for the right and left sides. Three ports were used. The third and fourth sympathetic ganglion was clipped at the upper border of the corresponding rib. Then, 2 cm of intercostal space just lateral to the sympathetic chain was electrocauterized to avoid missing any nerve bundles. Successful clipping of the sympathetic chain was confirmed by an increase in palm temperature of 1°C or more. Manual continuous positive pressure ventilation was used before closure of VATs ports. Xylocaine (0.5%) as local infiltration anesthesia and intercostal nerve block were used. VATs ports were closed using a single vicryl 2-0 stitch for subcutaneous and subcuticular monocril 3-0 with steristrips. Immediate postoperative CXR was performed. Intercostal drain was used if the lung did not inflate properly immediately after surgery or if postoperative pneumothorax was documented. A negative suction (−20 mmHg) was used for intercostal drainage, which was removed when the air leak stopped.

All patients underwent an evaluation of life quality before surgery and 6 months after surgery using the same specific questionnaire. The questionnaire consisted of 20 questions divided into four domains, with five levels of response based on tables that allowed only one answer. The effect of treatment is the difference between preoperative and postoperative scores.

Moreover, after 6 months, operative time, hospital stay, pneumothorax, hemothorax, Horner's syndrome, recurrence, compensatory hyperhidrosis, and gustatory sweating were assessed.

The primary end point was life quality after VATs clipping of T3, 4. Data were analyzed using statistical package of social science (SPSS, IBM, Chicago, Illinois, USA). Mean and SD were calculated. Qualitative data were expressed as numbers and percentages. A paired *t*-test was conducted to study the difference in life quality before and after surgery of the studied cases. Significance was considered at *P* value less than 0.05.

Results

Perioperative data are shown in Table 1. The mean age of the patients was 27.8 years (range 19–35). Thirty (66.67%) patients were female, with a mean age of 27 years (range 19–35). Fifteen (33.33%) patients were male, with a mean age of 29.3 years (range 25–34). Six (13.33%) patients [one (16.67%) male and five (83.33%) female] were obese.

There was no mortality or conversion to open surgery. One (2.22%) patient had pneumothorax, two (4.44%) had VATs port infection, and 17 (37.78%) had compensatory hyperhidrosis. There was no recurrence of hyperhidrosis, hemothorax, chylothorax, Horner's syndrome, intractable VATs port pain, or pulmonary atelectasis.

All patients had a smooth postoperative course and were discharged on the second day, except for one patient with pneumothorax who was discharged on the fifth day after pneumothorax had resolved because of the presence of pleural adhesion. The postoperative follow-up period was after 6 months.

All domains of the specific questionnaire reported a statistically significant improvement in each domain separately ($P < 0.001$) and in the total test score

Table 1 Perioperative data of the studied cases

	Range
Number	45
Age	19–35 years (mean: 27.8 years)
Sex (M/F)	15/30 (33.33%)
Obesity (BMI)	6/45 (13.33%)
Follow-up	6 months
Operative time	43–73 min (mean: 56.9 ± 15.71)
Hosp stay	2–5 days (mean: 2.2 ± 1.05)
Pneumothorax	1/45 (2.22%)
Wound sepsis	2/45 (4.44%)
Compensatory sweating	Total 17/45 (37.88%)
Other complications	0

F, female; M, male.

Table 2 Functional and social domain before and after surgery of the studied cases

	Mean $\pm$ SD		Testing significance (<i>P</i>)
	Before surgery	After surgery	
Writing	1.8 $\pm$ 0.81	4.28 $\pm$ 0.69	<0.001
Manual work	1.75 $\pm$ 0.77	4.31 $\pm$ 0.66	<0.001
Leisure	1.44 $\pm$ 0.65	4.35 $\pm$ 0.85	<0.001
Sports	1.62 $\pm$ 0.57	3.97 $\pm$ 0.83	<0.001
Hand shaking	1.87 $\pm$ 0.8	4.26 $\pm$ 0.86	<0.001
Socializing (public places)	1.86 $\pm$ 0.66	4.26 $\pm$ 0.86	<0.001
Grasping objects	1.67 $\pm$ 0.65	4.06 $\pm$ 0.78	<0.001
Social dancing	1.77 $\pm$ 0.65	4.13 $\pm$ 0.78	<0.001
Total	13.78 $\pm$ 2.06	33.66 $\pm$ 4.69	<0.001

Table 3 Personal domain before and after surgery

	Mean $\pm$ SD		Testing significance (<i>P</i>)
	Before surgery	After surgery	
Holding hands	1.68 $\pm$ 0.72	4.31 $\pm$ 0.7	<0.001
Intimate touching	1.76 $\pm$ 0.7	4 $\pm$ 0.79	<0.001
Intimate affair	1.70 $\pm$ 0.54	3.95 $\pm$ 0.67	<0.001
Total	5.14 $\pm$ 1.46	12.26 $\pm$ 1.45	<0.001

Table 4 Emotional-self or other before and after surgery

	Mean $\pm$ SD		Testing significance (<i>P</i>)
	Before surgery	After surgery	
I always justified myself	1.51 $\pm$ 0.54	3.95 $\pm$ 0.87	<0.001
People rejected me slightly	1.93 $\pm$ 0.58	4.37 $\pm$ 0.57	<0.001
Total	3.44 $\pm$ 0.89	8.34 $\pm$ 1.21	<0.001

($P < 0.001$), which is shown in Tables 2–6. Grading of the total score of patients preoperatively revealed 15 (33.33%) patients in the very poor (VP) group and 30 (66.67%) in the poor (P) group, which is shown in Table 7. Postoperative grading of the total score disclosed 17 (37.8%) patients in the much better group (of whom 12 were VP and five were P) and 28 patients (62.2%) in the better group (three were VP and 25 were P), which is illustrated in Table 8.

Discussion

Excessive undesirable sweating restricts one's social and professional life and leads to psychological distress [1,3]. The main indication today for thoracic sympathetic surgery is hyperhidrosis (since the procedure was introduced in 1920) the treatment of which through the technique of sympathectomy has seen tremendous progress to provide patients with a better quality of life [3,5].

Hyperhidrosis has a negative impact on life quality, as proved by this study, in which the preoperative ques-

Table 5 Under special circumstances quality of life before and after surgery of the studied cases

	Mean $\pm$ SD		Testing significance (<i>P</i>)
	Before surgery	After surgery	
In a closed or hot environment	1.63 $\pm$ 0.58	4.37 $\pm$ 0.57	<0.001
When tense or worried	1.93 $\pm$ 0.58	4.37 $\pm$ 0.57	<0.001
Thinking about the problem	1.78 $\pm$ 0.54	4.2 $\pm$ 0.81	<0.001
Before an examination, meeting, speaking in public	1.8 $\pm$ 0.61	4.31 $\pm$ 0.76	<0.001
Wearing sandals/walking barefoot	1.73 $\pm$ 0.58	4.11 $\pm$ 0.88	<0.001
Wearing colored clothing	1.83 $\pm$ 0.58	4.2 $\pm$ 0.54	<0.001
Having problems at school/work	1.73 $\pm$ 0.58	3.77 $\pm$ 0.63	<0.001
Total	12.43 $\pm$ 3.58	29.26 $\pm$ 2.88	<0.001

Table 6 Total score for different domains before and after surgery in the studied cases

Domain	Mean $\pm$ SD		Testing significance (<i>P</i>)
	Before surgery	After surgery	
Functional and social (total 40)	13.87 $\pm$ 2.06	33.66 $\pm$ 4.69	<0.001
Personal (total 15)	5.14 $\pm$ 1.46	12.26 $\pm$ 1.45	<0.001
Emotional-self (total 10)	3.44 $\pm$ 1.89	8.34 $\pm$ 1.21	<0.001
Under special circumstances (total 35)	12.43 $\pm$ 3.58	29.26 $\pm$ 2.88	<0.001
Total score	34.88 $\pm$ 2.51	83.52 $\pm$ 3.01	<0.001

Table 7 Grading of the total score before surgery of the studied cases

45 patients	Excellent	Very good	Good	Poor	Very poor
Before surgery	0	0	0	30 (66.67%)	15 (33.33%)

tionnaire revealed the condition of 30/45 patients (66.67%) to be poor and that of 15/45 patients (33.33%) to be VP. Many questionnaires have been used to evaluate the life quality of different pathologies including hyperhidrosis before and after therapy.

Other reports supporting the poor preoperative life quality include the study by Swartling *et al.* [6] comparing quality of life (QOL) in different skin diseases using the Dermatology Life Quality Index in which hyperhidrosis, eczema, and psoriasis had the greatest negative impact on QOL. In the study by Naumann *et al.* [7] using the Hyperhidrosis Impact Questionnaire and the Short Form-12 (SF-12) Health Survey before nonsurgical treatment for hyperhidrosis 71% of patients were reported to be less confident, 49% were unhappy or depressed, 45% had to change leisure activities, 25% missed social events, 32% felt limitation in sexual activities and 81% were uninterested in meeting new people.

Table 8 Grading of the total score after surgery of the studied cases

	Much better	Better	The same	Slightly worse	Much worse
After surgery (n=45)	17 (37.8%) 12 VP 5 P	28 (62.2%) 3 VP 25 P	0	0	0

P₁, poor; VP, very poor.
 χ^2 with linear trend $P < 0.001$.

Postoperatively, a significant improvement in life quality in all domains of the questionnaire ($P < 0.001$) after VATs T3, 4 was noted. In the VP group, 12 patients showed significant improvement and three patients showed improvement, whereas in the poor group five patients showed significant improvement and 25 patients showed improvement, although 17/45 patients (37.78%) who experienced compensatory sweating did not demand a changes of clothes. Some reported better improvement in QOL (100%) in the palmar group than in the axillary one (67%) [8].

Several reports support the evidence of improved life quality after surgical intervention. Vazquez *et al.* [9] reported a statistically significant improvement in the physical ($P < 0.01$) and mental ($P < 0.005$) quality of life and decreases in anxiety ($P < 0.001$) and depression ($P < 0.007$) within 1 month after the procedure after they had studied health-related quality of life, anxiety, and depression in 51 patients before VTAs electrocautery of T3–4 and lateral 5 cm and 1 month after surgery using the SF-12 Health Survey, The State-Trait Anxiety Inventory (STAI), and The Center for Epidemiological Studies-Depression Scale. Kumagai *et al.* [10] reported significant improvement in health-related quality of life and decreases in anxiety and depression within 1, 3, and 6 months even in the presence of compensatory sweating after VATs T2, 3 electrocautery in 42 patients (26 female and 16 male) using study SF-36 to assess life quality, the Spielberger STAI to assess anxiety, and the Zung Self-Rating Depression Scale to assess depression. Ramos *et al.* [11] reported significant improvement in palpitation, anxiety level, and consequent life quality after 12 months of VATs T2, 3, 4 electrocautery (according to the site of hyperhidrosis) in 112 patients using Spielberger STAI to assess anxiety. Rodríguez *et al.* [12] found higher satisfaction (which reduced with time because of recurrence) and better life quality after electrocautery of T2–4 (according to the site of hyperhidrosis) in 406 patients (241 female patients) from January 1999 to November 2006.

Even with nonsurgical treatment, QOL showed an improvement after 2 weeks to 4 months of follow-up botulinum toxin type A therapy on the Hyperhidrosis Impact Questionnaire ($P < 0.01$) and the SF-12 Health Survey ($P \leq 0.019$) [10] or Dermatology Life Quality Index ($P < 0.0001$ [9] and $P < 0.001$ [13]).

This study used clipping because of its comparable results with other techniques in addition to the probable lower incidence and reversibility of compensatory sweating (CS) [8,14]. Yanagihara *et al.* [15] reported that

clipping is as effective as cutting in terms of effectiveness, compensatory sweating, recurrence, satisfaction, and life quality after they had compared cutting (55%) and clipping (45%) of VATs of T3 in cases of palmar hyperhidrosis in 152 patients.

In this study, the incidence of compensatory sweating was seen in 37.78% of patients. All of them did not reach the point of social embarrassment or occupational disability, and hence there was no indication (CS causing social embarrassment or occupational disability) to unclip. Other papers reported different incidence rates (30–87%) because of lack of clear-cut definitions, the extent of resection and the technique used, the timing of assessment, climate changes, and BMI [3,14]. The low incidence of CS might be attributed to the use of clipping in which the incidence and severity were reported to be lower [8,14].

Other unusual complications were not reported in this study, such as chylothorax, subclavian artery injury, large hemothorax, cerebral edema, neurologic sequelae, Horner's syndrome, damage to the brachial plexus, recurrence, sinus bradycardia, and cardiac arrest.

Study limitations were small sample number, short follow-up period, self-selection, absence of a placebo-controlled group, the fact that the assessment did not involve all the seasons, and lack of quantitative assessment of hyperhidrosis.

Nowadays, the disease-specific life quality questionnaire is the scale used in management evaluation of the quality of life in order to optimize it. This specific questionnaire proved highly effective, was easily understood and applied, and helped to evaluate the change in life quality comparing the periods before and after the surgical procedure.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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