

Patient Satisfaction after Thoracoscopic Sympathectomy for Palmar Hyperhidrosis: Do Method and Level Matter?

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ABSTRACT

Context: Although surgery is widely recognized as the best treatment for palmar hyperhidrosis (PH), the decision to perform a sympathicotomy, sympathectomy, or clipping of the thoracic sympathetic chain is based on surgeon preference.

Objective: We investigated the outcomes of patients who underwent surgical intervention for PH with regard to method used and level of sympathetic chain interrupted.

Design: This was a retrospective medical chart review. Patients who underwent thoracoscopic intervention for PH were mailed questionnaires regarding their presenting and postoperative symptoms and satisfaction 6 months to 15 years after their procedure. Analyses were performed to investigate whether the surgical method applied affected these outcomes.

Results: A total of 635 patients underwent bilateral thoracoscopic procedures for PH between April 1995 and February 2010, and 210 (33%) responded to the questionnaires. Sixteen surgeons performed 108 sympathicotomies, 83 sympathectomies, and 19 ligations with titanium clips for PH. Mean follow-up was 5.5 years. Overall palmar success was 85.4% and was not affected by the surgical method. The rate of compensatory hyperhidrosis was significantly lower if the operative level did not include the R2 ganglion (66.7% vs 80.6%, $p = 0.028$). Nevertheless, 76.2% of patients were satisfied with the results, and 85.7% would repeat the procedure if given the option to do it again.

Conclusion: Most patients reported relief of their PH and were satisfied with surgical intervention, regardless of method used. Although postoperative compensatory hyperhidrosis was common, this did not appear to affect overall patient satisfaction. The inclusion of rib level 2 ganglion resulted in a significantly increased incidence of compensatory hyperhidrosis.

INTRODUCTION

Primary hyperhidrosis is characterized by idiopathic sweating in excess of that needed for normal thermoregulation.¹ Although not life-threatening, it is often a cause for anxiety during everyday activities such as holding a pen, shaking hands, playing sports, and driving. Primary hyperhidrosis affects between 1% and 3% of the population and occurs equally in men and women. It can present at any age, although it tends to affect predominantly adolescents and young adults.² Primary hyperhidrosis can involve sweating of the face, palms,

soles, or axillae. Although the pathophysiology remains unclear, it appears to be associated with environmental and emotional triggers. The glands tend to be histologically normal and are innervated by the sympathetic nervous system with acetylcholine as the primary neurotransmitter.²

Surgery is generally reserved for those for whom less invasive interventions have failed. The interruption of the thoracic sympathetic chain is widely accepted as the standard surgical treatment for primary palmar hyperhidrosis (PH), and endoscopic thoracic

sympathectomy has been widely practiced since Kux introduced the procedure in 1978.³ Nevertheless, there is no consensus for the optimal technique (sympathectomy, sympathicotomy, or clipping), and there is no consensus as to the level of sympathetic chain interruption even among patients with PH alone. The objective of this study was to investigate the outcomes of patients who underwent surgical intervention for PH with regard to method used and level of sympathetic chain interrupted, with particular attention to patient satisfaction and compensatory hyperhidrosis.

METHODS

The study was approved by the institutional review board of our institution (protocol number 5887). A retrospective review was conducted to identify all patients who underwent bilateral thoracoscopic procedures for PH between April 1995 and February 2010. All operations were performed by 16 surgeons whose catchment area included 3.6 million patients within a 12-hospital managed care organization, all of whom are linked by a single electronic health care record and central database registry.

Patients who had thoracoscopic procedures performed for PH during this 15-year period were mailed detailed questionnaires regarding their presenting and postoperative symptoms and satisfaction after their procedure. The questionnaire inquired about the location of the patient's hyperhidrosis both preoperatively and postoperatively and asked the patient to subjectively rate from 1 to 5 the

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degree of sweating preoperatively and postoperatively; the quality of life in regard to writing, holding objects, handshaking, playing sports, wearing sandals, driving, worrying, and ability to tolerate hot or enclosed spaces preoperatively and postoperatively; the overall satisfaction with the procedure; and finally, whether the patient would still undergo the procedure knowing the outcomes. This questionnaire has not undergone formal validation. Of those who responded, the outpatient and inpatient electronic medical records were reviewed, and the abstracted data included patient demographic characteristics, comorbidities, and operative details, including technique and level of interruption of the sympathetic chain. Successful therapy was defined as the reported absence of hyperhidrosis after the surgical procedure in patients who had reported the presence of hyperhidrosis in that area preoperatively.

Operative techniques included sympathicotomies (complete division of the sympathetic chain with cautery), sympathectomies (resection of a portion of the sympathetic chain), and ligation with titanium clips. All operations were bilateral procedures performed thoracoscopically under a single session of general anesthesia. The nomenclature used in this study is rib-based, per the recent recommendations of the Society of Thoracic Surgeons,¹ unless otherwise specified.

The results for the variables are reported as frequency distribution percentage. Statistical analysis was performed using the Fisher exact test (www.graphpad.com). A p value < 0.05 was considered to be statistically significant.

RESULTS

Six hundred thirty-five questionnaires were sent out via US Postal Service, and 210 responses were received. Response rate was 33%. Of those who responded, 71% were women and 29% were men. Mean (standard deviation [SD]) age was 34.5 (12.7) years. Mean (SD) body mass index (calculated as weight in kilograms divided by height in meters squared) was 25.4 (4.96),

and 116 (55.2%) identified themselves as white. Only a minority had comorbidities, including hypertension (13 [6.2%]) and diabetes mellitus (5 [2.4%]). Thirty-four respondents (16.2%) had a history of tobacco use. Mean follow-up was 5.5 years.

The operative reports of respondents were reviewed. Sixteen surgeons performed 108 sympathicotomies, 83 sympathectomies, and 19 ligations with titanium clips for primary hyperhidrosis. The operative level(s) interrupted were not standardized and ranged from R1 to R8, and this is listed in Table 1. The diagnosis was documented as subjective reporting by the patients.

Of the 210 patients who responded to the survey, 185 reported the presence of PH. Overall palmar success, defined as the resolution of sweating at the palms after the operation, was 85.4% (158 of 185). This was not affected by the surgical method, with 87.6% success (85 of 97) noted after sympathicotomies, 81.9% (59 of 72) after sympathectomies, and 87.5% (14 of 16) after ligation with surgical clips ($p > 0.05$). Nor was this significantly affected by the level interrupted. Success rates ranged from 50% (1 of 2)

of surgical procedures that included levels R3 to R5 to 100% (17 of 17) of procedures that included R2 to R4. For those who reported axillary (123 [58.6%]) and/or plantar (138 [65.7%]) hyperhidrosis, the overall success rates were 48.0% (59 of 123) and 18.1% (25 of 138), respectively.

Of the 210 who responded, 155 (73.8%) reported some degree of compensatory hyperhidrosis (CH). The degree of CH was not rated. The presence of CH was not affected by method used (72.2% [78 of 108] after sympathicotomies, 77.1% [64 of 83] after sympathectomies, 68.4% [13 of 19] after ligation with clips; $p > 0.05$). However, the rate of CH was significantly lower if the operative level did not include R2 ganglion interruption (80.6% [87 of 108] vs 66.7% [68 of 102], $p < 0.05$). This is summarized in Table 2.

Two patients (1%) reported symptoms of Horner syndrome postoperatively. One was a sympathectomy, and the other was a sympathicotomy. Both involved the interruption of the R2 ganglion only for the treatment of PH.

Nevertheless, 160 (76.2%) of the 210 patients were satisfied with the results of their surgeries, with ratings of 4 to 5 on the questionnaires. This was not affected by method used, with 75.0% (81 of 108) satisfied after sympathicotomies, 74.7% (62 of 83) after sympathectomies, and 89.5% (17 of 19) after ligation with clips ($p > 0.05$). Of the 210 patients, 180 (85.7%) would repeat the procedure if offered to do it again.

DISCUSSION

Although it is well documented that surgical treatment of primary PH is generally effective and well-tolerated,¹ and studies exist that compare one method to another,⁴ few studies sought to look at the outcomes comparing all three commonly used methods of sympathicotomy, sympathectomy, or ligation with surgical clips. Our study found no difference in palmar success rates when stratified according to surgical method employed. Furthermore, the surgical method did not affect

Table 1. Operation details from survey responses^a

	No. (%) ^a
Surveys sent	635
Responses received	210
Type of operation	
Sympathicotomy	108 (51.4)
Sympathectomy	83 (39.5)
Ligation with clips	19 (9.0)
Rib Levels (R) of interruption	
R1-R3	2 (1.0)
R2 only	36 (17.1)
R2-R3	28 (13.3)
R2-R4	17 (8.1)
R2-R5	25 (11.9)
R3 only	42 (20.0)
R3-R4	43 (20.5)
R3-R5	2 (1.0)
R3-R8	1 (0.5)
R4 only	14 (6.7)

^a 33% response rate.

Table 2. Compensatory hyperhidrosis rates by method

Variable	No.	Compensatory hyperhidrosis, no. (%)	p value
Sympathicotomy	108	78 (72.2)	NS ^a
Sympathectomy	83	64 (77.1)	
Ligation with clips	19	13 (68.4)	
Include Rib Level 2 ganglion	108	87 (80.6)	0.0237
Does not involve Rib Level 2 ganglion	102	68 (66.7)	

^a Compensatory hyperhidrosis rates between each method were not significant (NS), with significance set at $p < 0.05$.

patient satisfaction rate even after a relatively long mean follow-up period of more than five years.

CH is the most common side effect after surgical intervention for primary hyperhidrosis, with rates ranging from 3% to 98% in the literature.⁵ The most common risk factor cited in the literature for CH appears to be interruption of higher ganglion levels, and in particular R2 ganglion interruption (between R2 and R3).^{1,6-8} This was also noted in our study, where the rate of CH was significantly higher in operations that included the R2 ganglion (81%) compared with those that did not (67%). Interestingly, the level and the number of levels interrupted did not appear to affect this outcome, although few went higher than the R2 ganglion in their dissection. The method of the interruption did not appear to affect the prevalence of CH, either.

Aoki et al⁹ examined the association between the extent of sympathectomy and postoperative CH, PH, and patient satisfaction. In their study of 53 patients, the degree of postoperative PH was not correlated with patient satisfaction. Instead, the severity of CH inversely correlated with the degree of patient satisfaction. It stands to reason that although CH is extremely common and affected almost three-quarters of those who responded to our questionnaires, the severity is likely not severe because most patients (76%) were satisfied with the results of the operation and would repeat the operation if they had to do it all over again (86%).

Our study had some limitations. It was retrospective in design, and therefore randomization was not possible. The response rate was low at 33%. There may be some selection bias although the impact of nonresponse bias has historically been difficult to gauge.¹⁰ All diagnoses were made via patient subjective reporting, thus tending toward recall bias, and it is difficult to quantify and characterize the degree of hyperhidrosis both preoperatively and postoperatively. There was no validated or standardized questionnaire at the time of this study. However, it must be pointed out that since this survey was conducted, there has been the development of the Hyperhidrosis Quality of Life Index (HidroQOL).¹¹ Finally, there was no standardized technique even within the methods subgroups, and both methods and levels interrupted were determined by the variable practice pattern of each surgeon. However, despite these limitations, our study aimed to include all patients who underwent a thoracoscopic procedure for this subjective disease process and captured the variable practices seen in the community.

CONCLUSION

Most patients reported successful relief of their primary PH with surgical intervention, regardless of method used. Although CH was significant, this did not appear to affect overall patient satisfaction. The inclusion of the R2 ganglion resulted in a significantly increased incidence of CH. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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