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Psychosocial functioning of patients after endoscopic thoracic sympathectomy

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Abstract

Objective: Endoscopic thoracic sympathectomy is considered the treatment modality of choice for patients with disabling hyperhidrosis. However, the psychosocial impact of the intervention has not been systematically studied in American samples before and after sympathectomy. It is expected that the reduction of symptoms is associated with improved psychosocial functioning and quality of life. The aim of this study was to examine psychosocial functioning in patients with hyperhidrosis undergoing thoracic sympathectomy. **Methods:** Patients with hyperhidrosis undergoing evaluation for sympathectomy were recruited from Shands Hospital at the University of Florida. Fifty-one patients completed individual psychological assessment batteries prior to undergoing sympathectomy and at 1-month follow-up, measuring the constructs of health-related quality of life, anxiety, and depression. **Results:** Repeated-measures analyses of variance revealed that 1 month after sympathectomy, patients reported significant improvements across the domains of physical quality of life ($p = 0.01$), mental quality of life ($p = 0.005$), trait anxiety ($p < 0.001$), and depression ($p = 0.007$). **Conclusions:** Sympathectomy resulted in increases in health-related quality of life, and decreases in anxiety and depression within 1 month post procedure. Results suggest that sympathectomy exists as an effective treatment choice for both medical and psychosocial outcomes in patients with hyperhidrosis.
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Keywords: Sympathectomy; Hyperhidrosis; Minimally invasive; Psychosocial; Anxiety; Depression

1. Introduction

Primary hyperhidrosis is an idiopathic disorder characterized by excessive sweating beyond physiologic needs. Estimates suggest that hyperhidrosis may affect up to 1% of the population [1]. It is most commonly seen in young adults but may manifest in early childhood and persist throughout adulthood [2,3]. Sweating is typically localized to one or more specific body area, such as the hands, feet, or axillae [4,5]. The symptoms are a benign, functional disorder and can result in restrictions in functioning in virtually every area of daily life [6]. Symptoms of hyperhidrosis have been associated with poor quality of life (QOL), with up to 90% of a pre-surgical sample indicating that they experienced 'poor' or 'very poor' QOL [6].

Standardized measures of QOL have suggested an association between hyperhidrosis and impairments in health-related QOL in Spanish and Japanese samples [7,8], although, to our knowledge, American samples have not been reported. Interestingly, the presentation of anxiety is commonly seen clinically [7], although some researchers have reported that this anxiety is not significantly different from a comparable normative sample [4,9]. Regardless, the general psychosocial impact of hyperhidrosis clearly motivates patients to seek progressive treatment, if symptoms are not reduced. Furthermore, some evidence indicates that a relationship between hyperhidrosis and depression exists [4]. Moreover, results from a Japanese sample indicated that depressive symptoms did not significantly improve following sympathectomy [7].

Hyperhidrosis can be treated with a stepwise approach, beginning with over-the-counter-anti-perspirants, medications, and finally surgery. Endoscopic thoracic sympathectomy (ETS) is a safe and effective treatment modality for patients with debilitating primary hyperhidrosis [7]. Success rates of ETS for palmar hyperhidrosis range from 87% to 98% [1]. Primary side effects include compensatory sweating, which has been estimated to affect up to 50% of patients [1], although this is usually less severe than the excessive sweating in the initial patient presentation. However, besides the obvious therapeutic benefit of the procedure, patients often experience other potential benefits, including minimal pain, short hospital stay, and good cosmesis [7].

The purpose of this study was to examine psychosocial functioning in patients with hyperhidrosis undergoing

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thoracic sympathectomy. It was expected that the reduction of symptoms would be associated with improved psychosocial functioning and QOL.

2. Materials and methods

2.1. Procedure

After approval of the protocol by the institutional review board, 51 patients undergoing evaluation for sympathectomy for primary hyperhidrosis were recruited from Shands Hospital at the University of Florida. Following informed consent, patients completed individual psychological assessment batteries prior to undergoing sympathectomy and at 1-month follow-up, measuring the constructs of health-related QOL, anxiety, and depression. Subsequent follow-up communication with all patients at 6 months or more post procedure was obtained to ensure consistent results.

2.2. ETS operative technique

The patients were brought to the operating room, and placed under general endotracheal anesthesia with a double-lumen endotracheal tube. They were positioned in the semi-Fowler position, and prepped and draped in a sterile fashion. A timeout was performed to verify the patient identity, site specific for surgery, procedure to be performed, and appropriate perioperative antibiotic infusion, which, in most patients, was cefazolin. Left-lung ventilation was continued, as the right lung was allowed to recoil naturally. The right chest was entered with a 3-mm port just lateral to the inframammary crease. CO_2 was instilled to a pressure of 8 mmHg, once an intrathoracic location was visually confirmed. Then, under direct vision, a second 3-mm port was placed at the base of the axillary hairline. The first through fourth ribs were identified, with the sympathetic chain visualized crossing the third and fourth. Electrocautery was used to divide the chain at T3 and T4 levels, as well as extending out onto the third rib for 5 cm to identify and divide any accessory nerve of Kuntz. The T2 level was only cauterized in patients with pronounced facial symptoms. The cautery was withdrawn, and a suction catheter placed through the upper port. CO_2 infusion was stopped, and the lung reinflated, while active suction was applied to the suction catheter. Both ports were withdrawn, with the ipsilateral lung held in a fully inflated position. The two small 3-mm incisions were sealed with cyanoacrylate sealant. The left side was then performed in an identical fashion. A chest X-ray was routinely performed at the end of the procedure to ensure no pneumothorax. All patients received a weight-appropriate dose of ketoralac IV, as well as 0.25% Marcaine at each port site. Following a brief stay in the recovery room, the patients were then moved to a day stay area where a final chest X-ray was obtained nearly 2 h after the procedure. Once the final X-ray was interpreted as full lung expansion, the patients were discharged home.

2.3. Measures

The Short-Form 12 Health Survey (SF-12) [10] is a measure of health status used to assess general QOL. Twelve items from the Short-Form 36 Health Survey (SF-36) [11] comprise this measure. The SF-12 can be separated into two components: physical component summary (PCS-12) and mental component summary (MCS-12). Higher scores indicate better QOL. All scores of the SF-12 are comparable and are highly correlated with SF-36 scores (ranging from .63 to .97). Test–retest reliability for the PCS-12 scale in the United States was 0.89, and 0.77 for the MCS-12 scale.

The State-Trait Anxiety Inventory (STAI) [12] is a 40-item, self-report questionnaire designed to measure state and trait anxiety. Trait anxiety is defined as a relatively enduring personality characteristic, or more specifically, as anxiety proneness. The internal reliability of the state and trait anxiety scales has been shown to be uniformly high across samples of adults, ranging from 0.89 to 0.96. Test–retest stability coefficients ranged from 0.73 to 0.86, with test–retest validity for the trait scale being 0.73 for males and 0.77 for females. For this study, the 20-item trait anxiety scale was used, with higher scores indicating higher reported levels of general anxiety.

The Center for Epidemiological Studies-Depression Scale (CES-D) [13] is a 20-item self-report measure that assesses depressive symptomatology. Respondents indicate how frequently they experienced each symptom in the past week. Total scores range from 0 to 60, and reflect the number of depressive symptoms and duration; higher scores indicate higher levels of depression. A standard cut-off of 16 indicates clinically significant symptoms of depression. Previous research has demonstrated that the CES-D is highly sensitive and specific with a high internal reliability coefficient of 0.85.

2.4. Statistical analyses

A series of repeated-measures analyses of variance was employed to examine differences in psychological outcomes of the study. For all analyses, time was the within-subjects factor. To correct for violations of the Box-M test and Levene's test for the assumption of homogeneity of variance, the relatively conservative *Pillai's trace F* was used for the estimation of *F*-statistics in our analyses.

3. Results

3.1. Sample

The mean age of the sample was 24.31 years (standard deviation, SD = 10.72). Of the 51 participants, 34 were female (67%) and 17 were male (33%). Ethnically, 96% of participants were Caucasian and 4% were African-American. Four percent of the sample had a primary diagnosis of palmar hyperhidrosis, 4% facial, 8% axillary, 57% palmar and plantar, and 27% palmar, plantar, and axillary hyperhidrosis.

Pre-post measures of health-related QOL demonstrated significant increases in both physical QOL (*Pillai's trace* $F = 6.456$, $p = 0.01$, $\eta_p^2 = 0.11$) and mental QOL (*Pillai's trace* $F = 8.75$, $p = 0.005$, $\eta_p^2 = 0.15$) among participants. Baseline rates on the STAI bordered clinical significance but did not meet full criteria. However, overall rates of anxiety after sympathectomy decreased significantly (*Pillai's trace*

Table 1. Psychosocial means ± SD of sample pre- and post-sympathectomy.

	Pre	Post
PCS-12‡	51.45 ± 0.99	54.25 ± 0.62
MCS-12‡	49.08 ± 1.48	53.88 ± 1.21
STAI†	36.68 ± 1.79	30.15 ± 1.39
CES-D†	11.93 ± 1.26	7.96 ± 1.18

PCS-12: physical component summary; MCS-12: mental component summary; STAI: State-Trait Anxiety Inventory; and CES-D: Center for Epidemiological Studies-Depression Scale.

† Higher scores = greater levels of distress.

‡ Lower scores = greater levels of distress.

$F = 14.83$, $p < 0.001$, $\eta_p^2 = 0.24$). While rates of self-reported depressive symptoms were not clinically significant at baseline measurement (raw score > 16), overall rates significantly decreased at 1-month follow-up (*Pillai's trace* $F = 7.89$, $p = 0.007$, $\eta_p^2 = 0.14$). Table 1 displays the mean scores and SDs of all psychological outcome variables.

Although a full battery of testing could not be repeated from all subjects at the 6-month time point because of logistical reasons, all 51 patients were queried for resolution of symptoms, complications, and QOL. No patient reported any decrement to QOL or increased anxiety following operation either immediately following operation, or in the subsequent 6 months.

4. Discussion

This study examined the psychosocial impact and QOL outcomes of patients undergoing sympathectomy for the treatment of hyperhidrosis. Results indicated patients perceive significant benefit from the procedure within 1 month, including increases in both physical and mental health-related QOL, and decreases in anxiety and depression.

These results suggest that sympathectomy may provide the relief that patients seek related to the impact of hyperhidrosis on daily life. This study represents the first American investigation of psychosocial functioning of patients with hyperhidrosis, and confirms similar findings from Spanish, Brazilian, and Japanese investigators [6,7,9]. These results should provide further information for patients about the potential benefits of sympathectomy. The primary limitation of this study is the absence of a placebo-controlled group to control for the expectancy effects, self-selection, and dissonance, even though the ethical considerations of that type of trial would be significant.

These results indicate that the debilitating effects of excessive sweating, the resulting behavioral avoidance of personal and professional interactions, and related anxiety and depressive symptoms are reduced by sympathectomy. Sympathectomy is likely sought and only performed on patients, who have failed less invasive interventions. They tend to be a highly motivated relief-seeking population.

Our sample was a predominantly young, female, Caucasian group of patients that experienced excessive sweating in more than one specific body area. While baseline rates of psychosocial functioning did not suggest clinically significant levels of anxiety or depression, rates decreased after ETS on average. Rates of health-related QOL significantly increased, suggesting patients achieved desirable QOL outcomes as a result of the ETS procedure.

4.1. Limitations

The current study has some limitations that include the selection and size of the sample and short follow-up period. Unfortunately, logistical issues prevented us from repeating the testing battery at the 6-month time point, although direct communication confirmed stable improvement from the 1-month to the 6-month time point. No patient reported any decrement to QOL, or increased anxiety following operation. In addition, this study specifically targeted hyperhidrosis patients, who had sought evaluation for treatment. The interpretation of these results is limited by the relatively small sample size. Furthermore, a wait-list control group or an attention placebo control group was not used in this study. As with all self-report measures, acknowledgements that self-report measures may be influenced by patient demand characteristics, such as participant perception of how they should respond or would like themselves to be perceived, are warranted. The measures used in assessing psychosocial functioning in patients were restricted to the use of standardized and validated measures that were chosen for their established reliability and validity in measuring the outcome variables of interest.

4.2. Conclusions

ETS exists as an effective treatment choice for patients with primary hyperhidrosis from both a medical and psychosocial standpoint. Future investigations of this population of patients are warranted to better understand the long-term benefits and possible risk factors of this procedure.

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