DOI: 10.1590/0100-6991e-20202398 Original Article

Bilateral R5-R8 sympathectomy for compensatory hyperhidrosis: complications and patient satisfaction

Simpatectomia bilateral R5-R8 no tratamento de hiperidrose compensatória: análise de complicações e satisfação dos pacientes

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A B S T R A C T

Objective: The purpose of this study was to assess the quality of life of patients who had undergone bilateral thoracic sympathectomy from R5 to R8 as a treatment for severe and debilitating compensatory hyperhidrosis (CH). **Methods:** Twelve patients with severe and debilitating compensatory hyperhidrosis underwent extended sympathectomy (R5-R8) from September 2016 to May 2019 at the Hospital das Clínicas, Federal University of Pernambuco, Brazil. Outcomes such as the level of patient satisfaction with the operation, quality of life scores as well as postoperative complications were assessed. **Results:** There has been a substantial improvement in the quality of life score of 66% of the sample. In all four domains, a statistical significant difference was seen, regarding the relief of compensatory hyperhidrosis symptoms. **Conclusions:** Extended sympathectomy from R5 to R8 was shown to be quite effective in most cases, leading us to believe that this approach could be a therapeutic option for severe compensatory hyperhidrosis.

Headings: Hyperhidrosis. Sympathectomy. Thoracoscopy. Thoracic Surgery.

INTRODUCTION

Palmar and axillary hyperhidrosis can be defined as somatic disorders characterized by excessive sweating in specific anatomic regions, which results from overactivity of the sweat glands, often triggered by an emotional situation[1]. Its pathophysiology is associated with an abnormal sympathetic nervous system stimulus promoting excessive secretion of acetylcholine, which is a chemical mediator responsible for the activity of eccrine sweat glands[2]. The physiological thermoregulation of the body relies upon the sweat glands, especially the eccrine sweat glands, which are diffusely distributed over the cutaneous surface, especially in the palm and plantar regions[1].

The overactivity of these glands can result from several conditions and situations such as while working out, in obese people, and in women in the menopause. It can also be secondary to a clinical disorder such as hyperthyroidism, diabetes mellitus, and pheochromocytoma. [1] Plantar and axillary hyperhidrosis can lead to social, professional, and emotional impairment, which can result in social phobia[1].

The family component of hyperhidrosis shows its genetic inheritance potential[3]. Its clinical symptoms usually appear more intensely in the adolescence, but they can also begin in childhood, with similar distribution among sexes[1,2]. The prevalence, in the general population, is variable, being more frequent in Asia and the Middle East when compared with North America[4].

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One of the potential initial treatment choices is the use of oxybutynin hydrochloride. For patients who do not get better, video-assisted thoracic sympathectomy becomes the most appropriate treatment alternative. Sympathectomy is the sympathetic chain resection; in other words, the denervation of the glands by interruption of the post-ganglion fibers[5]. The surgical technique consists of thermal ablation of T4, or T3, avoiding manipulation of the stellate ganglion, minimizing the occurrence of the Claude-Bernard-Horner syndrome (eyelid ptosis, miosis, and enophthalmia)[6-8].

Compensatory hyperhidrosis (CH) is one of the most common side effects of sympathectomy for hyperhidrosis of the upper members. Although the pathophysiology is still unknown, it affects mainly the trunk, and its prevalence ranges from 30 to 90% [9-13]. Postoperative CH affects the quality of life of patients. Thus, new techniques aiming to minimize such side effects are essential[14,15]. Hsu et al., in 2001, observed different rates of CH when treating axillary hyperhidrosis at different levels of resection. Rates of CH were 70% when the sympathectomy was at the level between T3-T4, 29% at T4, and 29% at T4-T5[11]. In addition, Yazbec et al. reported that resection at the T3 level presented a less intense compensatory response. Severe compensatory hyperhidrosis was observed in 30% of the patients with a resection at T2 and in 10% of those with a resection at T3[16,17]. Having normal weight is another important factor when it comes to treatment efficacy and CH. Wolosker et al. reported that the success rate was higher in patients with a BMI (Body mass index) < 25kg/m² [18-20].

Several techniques of reconstruction of the sympathetic chain have been performed with the intention of treating compensatory hyperhidrosis; however, the results are still in an early phase. Jung et al., performed an autologous transplant of the R5 to R8 chain to reconstruct T3 and T4 in two cases, and found positive results regarding the treatment of cases of severe compensatory hyperhidrosis[21]. Thus, our study aims to assess the outcomes of extended sympathectomy between R5 and R8 in patients with compensatory hyperhidrosis.

METHODS

This is a case series study, conducted between September 2016 and May 2019, which included twelve patients who underwent extended bilateral sympathectomy between the fifth (R5) and the eighth (R8) ribs for the treatment of severe and debilitating compensatory hyperhidrosis after thoracic sympathectomy between the third (R3) and the fifth (R5) ribs for hyperhidrosis treatment. The study was carried out at the Hospital das Clínicas da Universidade Federal de Pernambuco, in Recife, Brazil. The project was approved by the Ethics Committee under CAAE: 14790619.5.0000.8807.

Inclusion criteria were as follow: 1) diagnosis of severe compensatory hyperhidrosis after R3-R5 thoracic sympathectomy; 2) failure of conservative treatment such as oxybutynin, applications of antiperspirant lotions; 3) patients without any previous comorbidity.

Preoperative and postoperative patients' data were collected from medical records and registered in a specific form. The following domains were assessed through a questionnaire and evaluation:

1) functional/social data regarding functions and activities; 2) personal, actions with partners/spouse; 3) emotional-self, considering themselves and others; 4) under special circumstances.

All patients underwent thoracoscopy positioned in the lateral decubitus, always using the access of the two previous scars and a third in the 7th intercostal space, in the mid-axillary line. The intraoperative period of all patients was carried out without complications, except for the need to cut adhesions, at the site of the previous sympathectomy between R3-R5. After the lysis of the pleuropulmonary adhesions, the sympathectomy was extended to the eighth costal arch (R8). At the end of the denervation, the lung was re-expanded, and a 14F gauge pigtail drain was left in. The average time of the operation was 40 minutes, considering that the procedure for both hemithoraxes was performed in a single approach.

The quality of life questionnaire was based on the short version described by Campos et al. (2003). Quality of life is assessed using a protocol in which everyday situations may be impaired due to hyperhidrosis. The questionnaire consisted of 20 questions divided into four domains (functional/ social, personal, emotional, and under special circumstances), with five levels of responses, although only one answer was admitted. Patients were classified into five levels of satisfaction according to the total addition of the questionnaire scores. The scale ranged from 20 to 100. A score greater than 84 was considered as "very poor" quality of life; between 69 and 84, it was classified as "Bad"; between 52 and 68, it was classified as "Good"; between 36 and 51, "Very good"; and between 20 and 35, "Excellent". Although it is not a specific questionnaire to assess the treatment of CH, it offers an excellent overview of the quality of life of these patients.

Data were analyzed descriptively by absolute frequencies and percentages for categorical variables, and the statistics: mean, standard deviation (mean ± SD) and median were calculated. In the inferential analysis, statistical tests were used to compare the evaluations. A paired student t-test or paired Wilcoxon test was used. The Student t-test was used for numerical variables that showed normal distribution and the Wilcoxon test for those in which normality was rejected or for categorical variables. A 5% level of significance was assumed.

RESULTS

Table 1 shows the classification of the overall preoperative and postoperative quality of life of the 12 patients who underwent bilateral R5-R8 sympathectomy.

On the preoperative assessment, the three major classifications were as follows: "Very bad" (33.3%), "Bad" (33.3%), and "Good" (25,0%). No "excellent" classification was attributed preoperatively. In contrast, in the postoperative assessment, three quarters (75%) of the patients were classified as "Excellent" and no patient were placed on the "Very bad" and "Bad" categories.

Table 2 shows the pre and postoperative results of the individual domains of the overall quality of life. As observed, pre and postoperative assessments were statistically different ($p<0.01$) for all four domains, as well for overall quality of life. In the Emotional domain, the variability was not high since the standard deviation was approximately half of the corresponding mean.

Table 1. *Distribution of patients' self-assessed quality of life.*

Variable	Assessment				P-value
	Preoperative		Postoperative		
	N	%	n	%	
TOTAL	12	100.0	12	100.0	
Self-assessed QoL					$p^{(1)} = 0.004$*
Much better	1	8.3	8	66.7	
Slightly better	-	-	1	8.3	
The same	2	16.7	3	25.0	
Slightly worse	4	33.3	-	-	
Much worse	5	41.7	-	-	

(*) Significant difference at the level of 5.0%; (1) The paired Wilcoxon test.

Table 2. *Quality of life scores in relation to the domains.*

	Assessment			
Domain	Pre	Post	P-value	Absolute difference
	Mean ± SD (Median)	Mean ± SD (Median)		Mean
Functional /Social	31.17 ± 6.60 (33.00)	11.08 ± 3.45 (10.50)	$p^{(1)} = 0.003$*	20.08
Personal	11.08 ± 3.65 (12.00)	3.83 ± 1.34 (3.00)	$p^{(2)} < 0.001$*	7.25
Emotional	5.92 ± 3.00 (6.00)	2.58 ± 1.08 (2.00)	$p^{(2)} = 0.005$*	3.33
Under special circumstances	25.92 ± 6.30 (27.00)	11.58 ± 6.99 (9.00)	$p^{(2)} < 0.001$*	14.33
Total	74.07 ± 14.98 (72,00)	29.07 ± 11.95 (24.00)	$p^{(2)} < 0.001$*	45.00

(*) Significant difference at the level of 5.0%; (1) The paired Student T-Test; (2) The paired Wilcoxon test.

DISCUSSION

There was a significant improvement in the quality of life of patients who underwent R5-R8 sympathectomy. 66% of the cases presented a drastic inversion from "a little worse" and "much worse" to "much better". These data are in accordance with Jung et al.[21]. However, these authors assessed the thermography, while in our study, we have assessed the quality of life. Besides, those authors performed sympathectomy of chains 5 to 8 and autologous and epineural anastomosis of chains R3 to R5. We, however, only performed sympathectomy from R5 to R8 without autologous transplantation. Our similar results lead us to believe that in none of the twelve operated cases there were signs of regeneration of the resected nerves. In only one patient there was no clinical change or worsening of symptoms, but the preoperative quality of life was maintained. However, it may be related to other factors such as hormonal and emotional, among other factors.

There was a postoperative statistical difference (table 2) regarding the following domains: social, personal, emotional, and under special circumstances. When assessing the domains, we observed, in the postoperative evaluation, that for the social domain, six out of the seven items were statistically significant.

As for the social (3 items) and emotional (2 items) domains, all items were statistically significant. Regarding the domain under special circumstances, seven out of eight items were statistically significant. It is noteworthy that the items evaluated as "much better" in the social, personal, emotional and under special circumstances were as follow: "after bathing" (83.3%); "tight hugs and intimate touching" (75%); "people rejecting me slightly" (83.3%) and "thinking about the problem" (75%).

Regarding surgical complications, one patient had a left hemothorax after the operation and needed reoperation. Another patient had to remain with a chest tube for 48 hours due to high output. All the remaining patients had their drains removed on the first postoperative day and were discharged home.

When assessing the study by Jung et al. who used the proposed extended sympathectomy technique, there is another aspect that should be taken into account: duration of the operation[21]. In this regard, it is important to highlight that microsurgery requires a longer surgical time and additional equipment while presenting similar results to the technique now proposed[22]. Clinically, we could assume that the predominant factor related to outcomes (compensatory hyperhidrosis) seems to be associated with nerve degeneration. Regarding the quality of life and postoperative outcomes, no treatment previously described in the literature had levels of response in the short and medium-term similar to the R5-R8 sympathectomy.

The minimally invasive approach of the R5-R8 technique allows for shorter surgical time, a reduction in postoperative complications, and, more importantly, an improvement in the quality of life of patients in relation to the surgical method most commonly described in the literature. However, we are aware of the need for further randomized clinical trials to obtain a higher level of scientific evidence.

CONCLUSION

The extended R5-R8 thoracic sympathectomy for compensatory hyperhidrosis seems to be an effective, safe and promising alternative, with encouraging results when compared to the technique currently described. However, to attest the safety and efficacy of this technique for the treatment of severe and debilitating hyperhidrosis, more studies are needed, especially prospective studies and clinical trials, with a larger number of patients and follow-up.

R E S U M O

Objetivo: *Avaliar a qualidade de vida de pacientes submetidos a simpatectomia torácica bilateral de R5 a R8 como forma de tratamento da hiperidrose compensatória (HC) grave e debilitante em pacientes que foram previamente submetidos a simpatectomia torácica bilateral para tratamento da hiperidrose localizada.* ***Métodos:*** *Doze pacientes com hiperidrose compensatória grave e debilitante foram submetidos a simpatectomia estendida no Hospital das Clínicas da Universidade Federal de Pernambuco, Brasil, entre setembro de 2016 e maio de 2019. Os seguintes desfechos foram estudados: nível de satisfação com a operação, escore de qualidade de vida e as possíveis complicações cirúrgicas.* ***Resultados:*** *Houve significativa melhora na qualidade de vida em 66% da amostra. Em todas as esferas de função, foi evidenciada relevância estatística no que se refere ao alívio dos sintomas relacionados à hiperidrose compensatória.* ***Conclusões:*** *A simpatectomia estendida de R5 a R8 mostrou-se efetiva na maioria dos casos operados, caracterizando este procedimento como promissor, podendo, após estudos futuros, ser incluído como uma opção terapêutica para a hiperidrose compensatória.*

Descritores: *Hiperidrose. Simpatectomia. Toracoscopia. Cirurgia Torácica.*

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Received in: 29/10/2019
Accepted for publication: 02/03/2020
Conflict of interest: None
Financing source: None

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