

Journal Pre-proof

Analysis of the results of videotoracoscopic sympathectomy in the treatment of hyperhidrosis in patients 40 years or older

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1 **ANALYSIS OF THE RESULTS OF VIDEOTORACOSCOPIC SYMPATHECTOMY IN THE**
2 **TREATMENT OF HYPERHIDROSIS IN PATIENTS 40 YEARS OR OLDER.**

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26 **Impact Statement:**

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27 Patients aged 40 years or older benefit as much as younger patients from bilateral
28 videotoracoscopic sympatectomy for the treatment of hyperhidrosis.

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29 This is the first article that specifically analyzed in a large casuistry the results of
30 videothoracoscopic sympathectomy in hyperhidrosis patients over 40 years old, and
31 verified the improvement in the quality of life and clinical improvement in more than
32 90% of patients, concluding that patients aged 40 years or older benefit as much as
33 younger patients from this treatment.

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ABSTRACT

50 **OBJECTIVE:** Several factors that could influence the efficacy and satisfaction
51 of patients after bilateral thoracic sympathectomy (VATS) in the treatment of
52 hyperhidrosis (HH) have been studied, but no studies in the literature have specifically
53 analyzed the effectiveness of treatment and variations in the quality of life of patients
54 aged 40 years or older compared to those of young adult patients (19-40 years).

55 **METHODS:** We retrospectively analyzed 2431 hyperhidrosis patients who
56 underwent bilateral VATS and divided the patients into the following groups: a group
57 <40 years old (1760 patients) and a group \geq 40 years (142 patients). Variables included
58 quality of life prior to surgery, improvement in quality of life after surgery, clinical
59 improvement in sweating, presence of severe compensatory hyperhidrosis and general
60 satisfaction at one month after surgery.

61 **RESULTS:** We observed that all surgical patients presented with poor or very
62 poor quality of life before surgery, with similar proportions in both groups. In the
63 postoperative period, we observed improvement in quality of life in more than 90% of
64 the patients, with no significant difference noted between the two groups of patients.
65 More than 90% of the patients in this series had great clinical improvement in the main
66 hyperhidrosis site, with no significant difference between the two groups. Severe
67 compensatory hyperhidrosis occurred in 23.8% of the patients in this series, with no
68 significant difference between the two groups.

69 **CONCLUSIONS:** Patients 40 years of age or older benefit just as much as
70 younger patients from VATS performed to treat primary hyperhidrosis, presenting
71 excellent, significant surgical results.

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INTRODUCTION

74 Primary hyperhidrosis (HH) is sweating that exceeds the physiological need of
75 the body. HH has a major impact on the quality of life of these patients, affecting both
76 their personal and professional relationships.^{1,2} In most cases, HH presents with initial
77 symptoms in childhood and adolescence and persists throughout adulthood, with
78 patients seeking medical care more often during their economically active ages.^{3,4}

79 Treatment with oral anticholinergics, especially oxybutynin, generates clinical
80 improvement in most patients and is also effective in patients over 40 years of age;
81 these agents are the first treatment option for HH and are primarily used in patients over
82 the age of 40 who prefer noninvasive treatment to avoid the risks of surgery.² Most
83 patients are operated on in early adulthood or in their teenage years,^{5,6} because HH is a
84 disease with a significant negative impact on these patients' quality of life, which
85 causes patients seek medical treatment earlier.

86 Several factors that influence efficacy and patient satisfaction after bilateral
87 thoracic sympathectomy include body mass index,² levels of resection,^{7,8} quality of life
88 before surgery, and the number of resected sympathetic ganglion.⁹ To the best of our
89 knowledge, there are no studies in the literature that specifically analyze the results of
90 sympathectomy in patients over 40 years of age and compare surgical outcomes with
91 those of young adult patients (19-40 years).

92 The aim of this study was to analyze the effectiveness of treatment, the variation
93 in quality of life and the general satisfaction one month after surgery in patients 40
94 years of age or older (142 patients) subjected to VATS compared to patients under 40
95 years of age (1760 patients).

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97 METHOD AND CASE STUDY

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100 We retrospectively analyzed 2431 patients from the ambulatory clinic
101 specializing in HH who underwent bilateral VATS from January 2000 until February
102 2017. This study was approved by the Research Ethics Committee of the institution.

103 All patients treated by our service have been routinely evaluated since 2000 with
104 regular completion of a specific medical record that includes the following:
105 demographic data, description of all sites of HH, a specific quality of life questionnaire
106 standardized by Amir et al.¹⁰ translated into Portuguese by Campos et al.^{11 12} and
107 quantification of the degree of improvement at each point after treatment using a
108 specific questionnaire.

109 In this study, we divided the 2431 patients with primary HH who underwent
110 surgical treatment into the following two groups: a group <40 years (ages between
111 eighteen years and thirty-nine and eleven months- 1760 patients), and a group ≥40 years
112 with patients aged forty years or over (142 patients). All patients less than 18 years of
113 age (529) were excluded.

114 The demographic data, the main site of hyperhidrosis and the level of resection
115 in the VATS of the two groups are shown in Table 1.

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The two groups were similar in terms of sex, with the female sex being more
prevalent, in both. The mean age of the group <40 was 25.82 years; in the group ≥40,
the mean age was 44.78 years, with the maximum age in this group being 70 years old.
The mean body mass index in this series was significantly higher in the group ≥40 years
(21.9 kg/m^2 x 21.9 kg/m^2).

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Regarding the main site of hyperhidrosis, the groups were significantly different;
in the ≥40 years group, there was a higher frequency of axillary (38.7% x 33.9%) and
craniofacial (7.7% x 1.8%) hyperhidrosis. In the analysis of the VATS ablation level,
resection of a single chain at G4 was the most frequent in both groups, and the G2 level
(G2 isolated and G2/G3) was more frequent in the group ≥40 years, but there was no
significant difference in the distribution of techniques between the groups.

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Patients were subjected to clinical and quality of life assessments on two
occasions as follows: once prior to surgery and then at one month after the operation. All
the evaluations were performed by the primary or last investigator. The primary endpoints
in the study were as follows:

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1. The patients' quality of life at the first visit, prior to surgery.
2. After the first postoperative month, we evaluated the improvement of quality
of life after surgery, the clinical improvement of sweating, the presence or
absence of CH and general satisfaction.

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For the measurement of the degree of satisfaction, we used a protocol of quality
of life described by Amir et al.¹⁰ translated to Portuguese by Campos et al.^{11 12} Before
surgical treatment, the patients completed the quality of life assessment without any
physician involvement. This protocol consisted of 20 questions divided into four
domains (functional-social, personal, emotional and special conditions) with five levels
for response described in the tables where only one answer was allowed for each
question. The patients were classified into five different levels of satisfaction calculated
as the summed total score from the protocol, ranging from 20 to 100. When the sum
was greater than 84, the quality of life was considered very poor; from 69 to 83, bad;

145 from 52 to 68, good; from 36 to 51, very good and from 20 to 35, excellent quality of
146 life.

147 The improvement in quality of life after surgery was evaluated using the same protocol
148 and classified the patients into the following different levels of improvement calculated
149 as summed total score from the protocol: greater than 84, we considered the quality of
150 life to be much worse after the surgical treatment; from 69 to 83, a little worse; from 52
151 to 68, equal; from 36 to 51, a little better and from 20 to 35, much better.

152 The clinical improvement of sweating after treatment was defined with a quantification
153 scale ranging from 0 to 10, in which 0 represented no improvement, while 10
154 represented absence of sweat (anhidrosis) for each site of hyperhidrosis, based on the
155 patients' own assessment. The clinical improvement was graded as follows: null (0-4);
156 moderate (5-7); and great (8-10), based on the note regarding the patient's main
157 complaint.

158 The general degree of patient's satisfaction after surgery was quantified using a
159 questionnaire of 4 alternatives for the patients' description of their general satisfaction
160 with the surgical outcomes. The patient's general satisfaction was considered excellent
161 if the patient was 100% satisfied after one month of surgery. The patient's general
162 satisfaction was considered good if the patient was 90% satisfied after one month of
163 surgery. The patient's general satisfaction was considered regular if the patient was 75%
164 satisfied after one month of surgery. The patient's general satisfaction was considered
165 low if the patient was less than 50% satisfied with the surgery outcome one month after
166 surgery.

167 The incidence of compensatory hyperhidrosis (CH) was analyzed using the
168 patient's report, and confirmed by physical examination. The severity of the CH was
169 graded as severe and nonsevere. The CH was considered severe if it was visible,
170 embarrassing and necessitated more than one change of clothes during the day. The CH
171 was considered nonsevere if it was visible and embarrassing but not enough to warrant
172 changing clothes, if it was visible and embarrassing but only occasionally (hot weather
173 and during exercises) or if it was present but did not bother the patient.

174 For statistical analysis, we used the following tests: Chi-square test or likelihood
175 ratio test to compare sex allocation, HH primary site, sympathectomy resection level,
176 quality of life before surgery, improvement of quality of life after surgery and
177 compensatory hyperhidrosis. Additionally, we used Student's t-Test to compare BMI.
178 The level of significance for all tests was $p < 0.05$.

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180 **RESULTS**

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182 The analysis of the quality of life before surgery and the improvement of the
183 quality of life after surgery in patients aged 40 years and over and in patients under 40
184 years of age is presented in Table 2.

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187 We observed that all surgical patients presented with a poor or very poor quality
188 of life before surgery, with similar proportions in both groups.

189 In the postoperative period, we observed an improvement in quality of life in
190 more than 90% of the patients, with no significant difference between the two groups of
191 patients.

192 The analysis of the clinical improvement in the main site of sweating after
193 surgery in the two age groups is presented in Table 3.

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More than 90% of the patients in this series had pronounced clinical improvement in the main hyperhidrosis site, with no significant difference between the two groups.

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The analysis of the prevalence of compensatory hyperhidrosis and its intensity in both groups is presented in Table 4.

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Severe compensatory hyperhidrosis occurred in 23.8% of the patients in this series, with no significant difference between the two groups.

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The analysis of the degree of patient satisfaction after surgery in both age groups is presented in Table 5.

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More than 90% of the patients reported great satisfaction with the surgery. Only 1.5% of the sample reported satisfaction <50%. There was no difference between the two groups in terms of patient satisfaction after surgery.

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DISCUSSION

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HH is a disease that primarily affects young individuals and causes them to seek medical evaluation early. They undergo various treatments to improve their quality of life.¹³ Primary HH, in most cases, presents with initial symptoms in childhood and adolescence, and persists throughout adulthood.^{14,15}

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This study included only patients with primary HH. The prevalence of this disease decreases with increasing age, especially after 40 years, which might be a result of good treatment at a younger age, including having already undergone surgery, a simple adaptation of these individuals to excessive daily sweating or simply an amelioration without physiological explanation. For all patients seeking medical (i.e., noninvasive) treatment for HH, a very popular initial choice is the use of oral oxybutynin,¹⁶ especially for patients older than 40, who frequently have other comorbidities that increase the surgical risk. Many of these patients already use other daily tablets to control those concomitant diseases, and the addition of an oxybutynin tablet to their routine did not generate any of the discomfort mentioned by younger patients, who complained about the daily use of the medication.

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All of the aforementioned factors justify that of our sample of 2431 patients submitted to VATS, only 142 patients were 40 years or older (5.8%).

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Regarding the epidemiological characteristics, the prevalence of HH in the general population is equal between genders,^{15,17} but the demand for medical care is greater among females, as result of aesthetic concerns and interpersonal relationships, among others, that affect the female group more severely.^{17 18} In this sample, the female gender was also more frequent in patients 40 years of age or older, but there was a higher proportion of men, which might be a result of a reduction in aesthetic concern with the advancement of age among these women.¹⁶

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Gallagher et al.,¹⁶ 1996, demonstrated that the percentage of body fat increases with age in both women and men because of a change in the fat deposition process that occurs over the years, justifying a higher BMI in older patients. This difference was observed in this sample, with a significant difference noted in the BMI of the patients, with a mean BMI in the group <40 years (21.9 kg/m²) lower than in the group > 40 years (23.0 kg/m²), following the population trend. These data are representative of our

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249 medical practice since our group operated only on lean patients; the few patients with a
250 BMI greater than 25 were actually individuals with an increased BMI secondary to
251 increased muscle mass, not fat. This finding is supported by the direct influence of the
252 body mass index on the outcome of the surgery and by the increase in the prevalence of
253 severe compensatory hyperhidrosis in the postoperative period of obese patients.¹⁹
254 Thus, we have as procedure of our surgical team, do not to perform surgeries in patients
255 with BMI greater than 25. In these cases, we suggest that the patient lose weight before
256 the surgery.

257 Regarding the distribution of the main sites of hyperhidrosis, the two groups
258 were significantly different. Palmar hyperhidrosis was the most frequent site in both
259 study groups but with a smaller proportion among patients aged 40 years or older. We
260 found that the percentage of patients with a major complaint of axillary and craniofacial
261 hyperhidrosis was significantly higher in patients 40 years of age or older, 33.9% versus
262 38.7% and 1.8% versus 7.7%. Such a finding is compatible with previous studies in our
263 group that demonstrated a higher prevalence of craniofacial hyperhidrosis with
264 increasing age.¹⁶

265 A higher level of VATS ganglion resection, as well as resections of more than
266 one ganglion level in the same surgery, results in a greater incidence of severe
267 compensatory hyperhidrosis.⁷ Thus, in our group, we avoided resection, and we
268 preferred sympathectomies at the G4 or G3 level. Resections at the G2 level were
269 performed around the world in the early 2000s and are performed only in patients with
270 facial hyperhidrosis today, explaining the reason for the prevalence in our series.

271 In the analysis of the quality of life before surgery, patients less than 40 years
272 old presented with a worse quality of life than did patients 40 years of age or older,
273 showing that the impact of the disease is higher in younger individuals, affecting their
274 interpersonal skills and social acceptance as they begin their professional career.
275 Despite this issue, patients over 40 years of age had a better quality of life since this is a
276 basic condition for surgical indication.

277 The success of surgical treatment in patients 40 years of age or older was
278 comparable to VATS results in the general population, including those patients who
279 failed prior clinical treatment,²⁰ with moderate and large clinical improvement in
280 100% (of patients hyperhidrosis site) of the group ≥ 40 years in this study. Thus, the
281 decision for a late surgical treatment does not influence the positive outcome of surgery
282 in patients 40 years of age or older.

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284 In the postoperative period, we observed improvement in quality of life in
285 more than 90% of patients, with no significant difference between the two groups,
286 demonstrating the important impact of a successful treatment on the quality of life of
287 patients with hyperhidrosis, and regardless of age, there is a clear benefit to operating
288 on these patients.

289 The prevalence of severe compensatory hyperhidrosis of 23.8% in this series is
290 compatible with the findings published in the international literature.²⁰ In addition, the
291 prevalence of 26.5% of severe compensatory hyperhidrosis in patients 40 years of age
292 or older submitted to VATS was not significantly higher than that in the younger
293 individuals despite the higher frequency of the highest resection level in VATS, mainly
294 including G2 (compatible with a higher prevalence of craniofacial hyperhidrosis), which
295 would be associated with a responsible risk factor for compensatory hyperhidrosis.
296 Despite the greater prevalence of severe compensatory hyperhidrosis in the ≥ 40 years
297 group, the general satisfaction level of patients after surgical treatment was similar

298 between the two groups, with more than 90% reporting excellent or good general
299 satisfaction after surgery in this series. This finding is because these data reflect the
300 patient's expectation before surgery and the result obtained after the procedure. Only
301 patients who consented to these risks were operated on. The great clinical
302 improvement in hyperhidrosis after VATS and patient insights into the risk of severe
303 compensatory hyperhidrosis before surgery translates into a high degree of general
304 satisfaction with the surgical treatment even when CH is present.

305 **CONCLUSION**

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308 Patients 40 years of age or older benefit as much as younger patients from
309 VATS because of primary hyperhidrosis, presenting excellent, significant surgical
310 results .

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312 1. Cameron AEP. Selecting the Right Patient for Surgical Treatment of
313 Hyperhidrosis. *Thorac Surg Clin*. 2016 Nov;26(4):403–6.
- 314 2. Wolosker N, de Campos JRM, Kauffman P, de Oliveira LA, Munia MAS,
315 Jatene FB. Evaluation of quality of life over time among 453 patients with
316 hyperhidrosis submitted to endoscopic thoracic sympathectomy. *J Vasc*
317 *Surg*. 2012 Jan;55(1):154–6.
- 318 3. DIAS LIDN, MIRANDA ECM, TORO IFC, MUSSI RK. Relationship
319 between anxiety, depression and quality of life with the intensity of reflex
320 sweating after thoracoscopic sympathectomy for treatment of primary
321 hyperhidrosis. *Rev Col Bras Cir*. 3rd ed. Colégio Brasileiro de Cirurgiões;
322 2016 Oct;43(5):354–9.
- 323 4. Dharmaraj B, Kosai NR, Gendeh H, Ramzisham AR, Das S. A
324 Prospective Cohort Study on Quality of Life after Endoscopic Thoracic
325 Sympathectomy for Primary Hyperhidrosis. *Clin Ter*. 2016
326 May;167(3):67–71.
- 327 5. Wolosker N, Teivelis MP, Krutman M, de Paula RP, Schvartsman C,
328 Kauffman P, et al. Long-Term Efficacy of Oxybutynin for Palmar and
329 Plantar Hyperhidrosis in Children Younger than 14 Years. *Pediatr*
330 *Dermatol*. Wiley/Blackwell (10.1111); 2015 Sep;32(5):663–7.
- 331 6. Buraschi J. [Videothoracoscopic sympathicolysis procedure for primary
332 palmar hyperhidrosis in children and adolescents]. *Arch Argent Pediatr*.
333 2008 Feb;106(1):32–5.
- 334 7. Ong W, Lee A, Tan WB, Lomanto D. Long-term results of a randomized
335 controlled trial of T2 versus T2-T3 ablation in endoscopic thoracic
336 sympathectomy for palmar hyperhidrosis. *Surgical Endoscopy*. 2016
337 Mar;30(3):1219–25.
- 338 8. Teivelis MP, Varella AY, Wolosker N. Expanded level of sympathectomy
339 and incidence or severity of compensatory hyperhidrosis. *J Thorac*

- 340 Cardiovasc Surg. 2014 Nov;148(5):2443–4.
- 341 9. Lee SS, Lee YU, Lee J-H, Lee JC. Comparison of the Long-Term Results
342 of R3 and R4 Sympathicotomy for Palmar Hyperhidrosis. Korean J
343 Thorac Cardiovasc Surg. The Korean Society for Thoracic and
344 Cardiovascular Surgery; 2017 Jun;50(3):197–201.
- 345 10. Amir M, Arish A, Weinstein Y, Pfeffer M, Levy Y. Impairment in quality of
346 life among patients seeking surgery for hyperhidrosis (excessive
347 sweating): preliminary results. Isr J Psychiatry Relat Sci. 2000;37(1):25–
348 31.
- 349 11. Campos JRM de, Kauffman P, Werebe E de C, Andrade Filho LO,
350 Kuzniek S, Wolosker N, et al. Questionnaire of quality of life in patients
351 with primary hyperhidrosis. Jornal de Pneumologia. Sociedade Brasileira
352 de Pneumologia e Tisiologia; 2003 Aug;29(4):178–81.
- 353 12. de Campos JRM, Kauffman P, Werebe E de C, Andrade Filho LO,
354 Kusniek S, Wolosker N, et al. Quality of life, before and after thoracic
355 sympathectomy: report on 378 operated patients. Ann Thorac Surg. 2003
356 Sep;76(3):886–91.
- 357 13. Estevan FA, Wolosker MB, Wolosker N, Puech-Leão P. Epidemiologic
358 analysis of prevalence of the hyperhidrosis. An Bras Dermatol. Sociedade
359 Brasileira de Dermatologia; 2017 Sep;92(5):630–4.
- 360 14. Lear W, Kessler E, Solish N, Glaser DA. An epidemiological study of
361 hyperhidrosis. Dermatol Surg. Wiley/Blackwell (10.1111); 2007 Jan;33(1
362 Spec No.):S69–75.
- 363 15. Haider A, Solish N. Focal hyperhidrosis: diagnosis and management.
364 CMAJ. CMAJ; 2005 Jan 4;172(1):69–75.
- 365 16. Wolosker N, Krutman M, Teivelis MP, Paula RP de, Kauffman P, Campos
366 JRM de, et al. Analysis of oxybutynin treatment for hyperhidrosis in
367 patients aged over 40 years. Einstein (Sao Paulo). 2014 Mar;12(1):42–7.
- 368 17. Sammons JE, Khachemoune A. Axillary hyperhidrosis: a focused review.
369 J Dermatolog Treat. 2017 Nov;28(7):582–90.
- 370 18. Karimian-Teherani D, Panhofer P, Ringhofer C, Jakesz R, Prager M,
371 Zacherl J, et al. New epidemiological aspects of patients with severe
372 hyperhidrosis presenting for sympathetic surgery. Journal of the
373 European Academy of Dermatology and Venereology. Wiley/Blackwell
374 (10.1111); 2009 Jun;23(6):651–5.
- 375 19. de Campos JRM, Wolosker N, Takeda FR, Kauffman P, Kuzniek S,
376 Jatene FB, et al. The body mass index and level of resection: predictive
377 factors for compensatory sweating after sympathectomy. Clin Auton Res.
378 2005 Apr;15(2):116–20.

- 379 20. Lembrança L, Wolosker N, de Campos JRM, Kauffman P, Teivelis MP,
380 Puech-Leão P. Videothoracoscopic Sympathectomy Results after
381 Oxybutynin Chloride Treatment Failure. Ann Vasc Surg. 2017
382 Aug;43:283–7.

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Journal Pre-proof

Table 1: Demographic and technical data.

		Group	Group	
		<40 years	≥40 years	p
		n= 1760	n=142	
Gender				0,186*
	Female	1192 (67,7%)	89(62,7%)	
	Male	559 (31,8%)	53 (37,3%)	
	Average (SD)	21,9 (2,64)	23,0 (2,90)	<0,001
BMI	(Min-Max)	(13,7-32,3)	(16,41-31,14)	
	Average (SD)	21,7 (2,7)	44,78 (5,24)	<0,001
Age	(Min-Max)	(19-39)	(40-70)	
	Palmar (%)	1110 (63,1%)	75 (52,8%)	<0,001*
Main	Axillary (%)	597 (33,9%)	55 (38,7%)	
Hyperhidrosis	Craniofacial	31(1,8%)	11 (7,7%)	
site	Plantar	22 (1,3%)	1 (0,7%)	
	G2	70 (4%)	12 (8,5%)	0,045*
	G3	592 (33,6%)	39 (27,5)	
	G4	623 (35,4%)	41 (28,9%)	
Techniques	G2/G3	274(15,6%)	29 (20,4%)	
	G3/G4	197 (11,2%)	21 (14,8%)	
	G4/G5	2 (0,1%)	0	
	G2/G3/G4	1 (0,1%)	0	

Table 2: Preoperative and postoperative quality of life relationship with the patients' age group.

	Group	Group	p
	<40 years	≥40 years	
	n= 1513	n=120	
QOL before surgery [n (%)]			0,332*
Excellent	0	0	
Very Good	0	0	
Good	0	0	
Bad	478 (27,2%)	45 (31,7%)	
Very Poor	1162 (66,0%)	91 (64,1%)	
QOL improvement [n (%)]			0,670*
Much Better	1328 (75,5%)	110 (77,5%)	
Better	287 (16,3%)	21 (14,8%)	
Equal	60 (3,4%)	6 (4,2%)	
Little Worse	20 (1,1%)	3 (2,1%)	
Much Worse	11 (0,6%)	0	

QOL= quality of life; Likelihood ratio test

Table 3: Analysis of clinical improvement after surgery at the main site of hyperhidrosis in the groups <40 and \geq 40 years old.

		Group	Group	Total	p
		<40 anos	\geq 40 anos	N=1840	
		n=1703	n=137		
					0,31
Clinical improvement	Great (8-10)	1044 (61,3%)	74 (54,01%)	1118(60,8%)	
	Moderate (5-7)	47 (2,8%)	1 (0,7%)	48 (2,6%)	
	Null (0-4)				
Palmar		11 (0,6%)	0	11 (0,1%)	
[n%]					
					0,31
Clinical improvement	Great (8-10)	519 (86,9%)	49 (35,8%)	561(30,5%)	
	Moderate (5-7)	46 (7,7%)	3 (2,2%)	49 (2,7%)	
	Null (0-4)				
Axillary [n%]		11 (1,8%)	0	11 (0,6%)	
					0,60
Clinical improvement	Great (8-10)	19 (80,6%)	9 (6,6%)	28 (1,5%)	
	Moderate (5-7)	5 (16,1%)	1(0,7%)	6 (0,3%)	
	Null (0-4)				
Craniofacial [n%]		1 (3,2%)	0	1 (0,1%)	

Likelihood ratio test

Table 4: Prevalence of compensatory hyperhidrosis and its intensity in the two groups

	Group	Group	Total	p	
	<40 anos	≥40 anos	n=1852		
	n= 1716	n=136			
	Ausente	163 (9,5%)	9 (6,6%)	145 (7,8%)	0,113*
Compensatory	Non-Severe	1148 (66,9%)	91 (67,0%)	1239(66,9%)	
Hyperhidrosis	Severe	405 (23,6%)	36 (26,5%)	441 (23,8%)	

Chi-square test. Severe= visible, embarrassing and necessitating more than one change of clothes during the day. Non-severe: CH that is not severe.

Table 5: Relation of degree of satisfaction after surgery in each age group

		Group	Group	Total	p
		<40 anos	≥40 anos	n=1827	
		n= 1701	n=126		
					0,37*
	100%	1156 (65,7%)	81 (57,0%)	1237 (67,70%)	
General degree of	90%	395 (22,4%)	35 (24,6%)	430 (23,53%)	
satisfaction [n (%)]	75%	127 (7,2%)	5 (3,5%)	132 (7,22%)	
	<50%	23 (1,3%)	5 (3,5%)	28 (1,53%)	
Chi-square test					