

# Thoracoscopic Sympathectomy for Axillary Hyperhidrosis: The Influence of T4

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**Background.** Recent data suggest that severe compensatory sweating after sympathectomy for hyperhidrosis is more common than previously reported. In particular, T2-T4 sympathectomy for axillary hyperhidrosis leads to significantly more disabling sweating compared with T2-T3 sympathectomy for palmar hyperhidrosis. However, it is not known whether this is a result of the additional transection of the T4 segment or if patients with primary axillary hyperhidrosis are more prone to experience disabling compensatory sweating.

**Methods.** A follow-up study by questionnaire was made of 100 consecutive patients who underwent thoracoscopic sympathectomy for axillary hyperhidrosis at two university hospitals. Patients underwent T2-T3 sympathectomy (n = 35) or T2-T4 sympathectomy (n = 65) depending on the surgeon's preference.

**Results.** The questionnaire was returned by 91% of patients after a median of 31 months. Compensatory sweating occurred in 90% of patients and was so severe

in 61% that they often had to change clothes during the day. There were no significant differences in occurrence or severity of compensatory sweating between the two extents of sympathectomy. Surgical outcome, however, was significantly better after T2-T4 sympathectomy.

**Conclusions.** In contrast with previous reports, the incidence of compensatory sweating was not significantly related to the extent of sympathectomy for axillary hyperhidrosis. This result suggests that patients with primary axillary hyperhidrosis are more prone to experience compensatory sweating. Although the majority of patients with axillary hyperhidrosis were satisfied after thoracoscopic sympathectomy, many regret the operation. Patients should undergo surgery only if medical treatments fail; and provided there is an indication, we recommend T2-T4 sympathectomy.

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A recent national survey of 150,000 households concluded that 4 million people in the United States suffer from axillary hyperhidrosis [1]. In one third of these patients, sweating was barely tolerable and frequently interfered with daily activities. Medical management is often frustrating and the response generally transient [2]. Thoracoscopic sympathectomy is a well-established treatment modality for axillary hyperhidrosis in some hospitals, although the primary success rate is lower than in palmar hyperhidrosis [3-5]. Compensatory sweating is a common side effect, and we recently reported that severe sweating was also a frequent problem [6]. In particular, T2-T4 sympathectomy for axillary hyperhidrosis caused significantly more disabling sweating compared with T2-T3 sympathectomy for palmar hyperhidrosis or T2 sympathectomy for facial hyperhidrosis. However, it is not known whether this increase in severe compensatory sweating resulted from the additional transection of the sympathetic chain at the T4 level or if

patients with primary hyperhidrosis in the axilla are more prone to experience disabling compensatory sweating. The aim of this follow-up study was to investigate the influence of T4 in the development of side effects after sympathectomy for axillary hyperhidrosis.

## Patients and Methods

From our databases, we identified two groups of 50 consecutive patients each who were treated for axillary hyperhidrosis by thoracoscopic sympathectomy at the departments of cardiothoracic surgery, Odense University Hospital and Aarhus University Hospital, Denmark, during a 7-year period (January 1997 to January 2003). Objective methods for quantifying sweating before surgery were not applied. The indication for operation was disabling axillary hyperhidrosis as defined by the patient. All patients had symptoms for several years and had failed medical treatment either because of lack of effect or because of local skin reactions. They were subsequently referred to us by their family physician or by a dermatologist. In addition to axillary hyperhidrosis, 49 patients also suffered from palmar hyperhidrosis and 15 complained of facial hyperhidrosis/blushing. A T2-T3 sympathectomy was performed in 35 patients (Odense: n = 30; Aarhus: n = 5), and the remaining 65 patients under-

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Table 1. Effect of Operation for Axillary Hyperhidrosis Versus Extent of Sympathectomy

	Effect of Operation				Total
	Excellent	Satisfactory	Some Effect	No Effect	
Level of sympathectomy					
Th2-3	7 (22)	3 (9)	12 (38)	10 (31)	32 (100)
Th2-4	22 (38)	13 (22)	11 (19)	12 (21)	58 (100)
Total	29 (32)	16 (18)	22 (26)	22 (24)	90 (100)

Data shown as number of patients (with percentages in parenthesis).

went T2-T4 sympathectomy (Odense:  $n = 19$ ; Aarhus:  $n = 46$ ).

All hospital records were retrieved and the following data recorded: symptoms, length of hospital stay, postoperative complications, time spent in the operating room, and duration of the surgical procedure.

Questionnaires were mailed to all patients for follow-up except for 3 who had emigrated. All patients were asked to mark their disability, both professionally and socially, from their symptoms before surgery (very much, some, or none at all) and to mark the effect they had achieved from the operation on their axillary symptoms (excellent, satisfactory, some effect, or no effect). Patients were asked to comment on occurrence and location of any compensatory sweating, defined as excessive sweating after the operation that was considered abnormal. In an attempt to assess the severity of compensatory sweating, all patients were asked if they had to change clothes during the day because of this side effect. Further, patients were asked whether they had developed any gustatory sweating defined as facial sweating when eating certain foods. Finally, they were asked if they were satisfied with or regretted the operation.

Statistical analysis included independent-samples  $t$  test, Mann-Whitney  $U$  test, cross-tabulation, and relative risk (RR) estimates with 95% confidence intervals implemented in the SPSS 10.1 statistical software package (SPSS, Chicago, Illinois). All  $p$  values less than 0.05 were considered statistically significant.

#### Surgical Techniques

The surgical techniques were identical at the two hospitals except for the pleural drainage during reinflection of the lungs. All patients were operated on in the supine position with abduction of both arms under single-lumen intubated anesthesia. Two ports were made. The first incision (5 mm) was made anteriorly in the hairline. The endotracheal tube was briefly disconnected by the anesthesiologist to deflate the lung when the pleural cavity was entered to avoid damaging the lung parenchyma. A 5-mm blunt-tip trocar was introduced for the use of a 0-degree or 30-degree videothoracoscope (Olympus Winter & Ibe, Hamburg, Germany). An additional 5-mm trocar was placed posteriorly in the hairline for the introduction of a harmonic scalpel (Ultracision; Ethicon Endo Surgery, Cincinnati, Ohio). The sympathetic chain was identified at the level of the crossing of the second, third, and fourth costal heads. The parietal pleura was

opened, and the sympathetic chain was transected. The incision was extended laterally for approximately 2 cm on the second costa to include any accessory nerve fibers (the nerve of Kuntz). The procedure was performed bilaterally on the second and third costa (T2-T3) or on the second, third, and fourth costa (T2-T4) depending on the surgeon's preference. All procedures were completed by reinflection of the lung while the anesthesiologist ventilated the patient manually, exerting continuous positive pressure for a few seconds to prevent pneumothorax, before a 4-mm chest tube (Aarhus) or the trocar (Odense) was subsequently removed. The surgical wounds were closed with Steri-Strip (3M Health Care, St Paul, Minnesota).

#### Results

One patient was excluded from the analysis because he was misclassified after sympathectomy for palmar hyperhidrosis. For the remaining 99 patients, the two hospitals were comparable with no significant differences in sex (74% were female), age (median, 28 years; range, 14 to 50), hospital stay (median, 2 days; range, 0 to 4), and follow-up time (median, 31 months; range, 1 to 88). The median duration of the surgical procedure was 15 minutes (range, 9 to 105). This was slightly shorter at Odense University Hospital ( $p = 0.02$ ). No conversion to open technique was necessary, and there were no operative deaths. In 1 patient, permanent unilateral Horner's syndrome developed, and 1 patient was treated with a chest tube for postoperative pneumothorax.

A total of 90 patients answered the questionnaires (91%). Six patients did not return the questionnaire despite a reminder, and the remaining 3 patients never received a questionnaire because they had emigrated. All patients answered the question of social disability because of their primary symptoms: very much in 88 cases (98%) and some in 2 cases (2%). The question of professional disability was answered by 88 patients: very much in 86 cases (97%), some in 2 cases (2%), and none in 1 case (1%).

The outcome of the operation for axillary hyperhidrosis (ie, dry axillae) is shown in Table 1. Outcome was significantly better after T2-T4 sympathectomy compared with T2-T3 sympathectomy ( $p = 0.03$ ). Two patients described mild recurrent symptoms after an otherwise excellent result after T2-T4 sympathectomy for axillary hyperhidrosis. Compensatory sweating occurred in 81 patients (90%) and was located on the back in 65 patients

(80%), the abdomen in 58 patients (72%), the lower extremities in 34 patients (42%), and the chest in 12 patients (15%). Forty-nine patients (61% of the patients who suffered from compensatory sweating) answered that they often had to change clothes during the day because of this side effect. We found no significant difference between the extent of sympathectomy and the occurrence of either compensatory sweating ( $p = 0.19$ ; RR = 0.91, 95% confidence interval 0.77 to 1.07) or severe compensatory sweating ( $p = 0.52$ ; RR = 0.88, 95% confidence interval 0.60 to 1.31). We analyzed data for patients who had isolated axillary hyperhidrosis and those who had additional palmar or craniofacial hyperhidrosis, and there were no significant differences between the two groups and the outcome of the operation ( $p = 0.96$ ) or the risk of compensatory sweating ( $p = 0.94$ , RR = 1.01, 95% confidence interval 0.88 to 1.15). Gustatory sweating occurred in 43 patients (48%), with no significant difference between the two groups. Twenty-five patients (28%) regretted the operation because of side effects ( $n = 12$ ), lack of effect from the operation ( $n = 4$ ), or both ( $n = 9$ ). There was no significant association between the extent of sympathectomy and regretting the operation. At the time of discharge, most patients had moderate pain in the chest that could be relieved by nonsteroidal antiinflammatory drugs, but at follow-up after 2 to 4.5 years, 3 patients reported local pain from the trocar site.

### Comment

Primary hyperhidrosis appears to be much more common than previously reported. A recent national survey concluded that the projected prevalence of hyperhidrosis in the United States is 2.8%, equivalent to 7.8 million people [1]. In more than 1.3 million persons, axillary hyperhidrosis resulted in occupational, emotional, psychological, social, and physical impairment. Our results demonstrate that symptoms of primary axillary hyperhidrosis are disabling both professionally and socially in almost all patients who seek surgical treatment. Our results also demonstrate that thoracoscopic sympathectomy has an effect on axillary hyperhidrosis. In the hands of an experienced thoracic surgeon, the operation is easy to perform; and our results demonstrate that duration of surgery is short (median, 15 minutes). Given the high incidence of axillary hyperhidrosis, we expect an increase in the number of patients who are referred for thoracoscopic sympathectomy, because information on television and advertisements appears frequently and because more patients search the Internet, where "hyperhidrosis" recently resulted in 145,000 links. In addition, the operation was recently reported as an outpatient procedure for the awake patient under local anesthesia [7].

Most reports on thoracoscopic sympathectomy deal with palmar hyperhidrosis, but the extent of sympathectomy varies despite similar clinical presentations. The majority recommend T2-T3 sympathectomy for palmar hyperhidrosis, but some surgeons only perform T2 sympathectomy [8-13] and others routinely include T2-T4 [3-5, 14] or T2-T5 [15-17]. There are fewer reports on

axillary hyperhidrosis, and most recommend T2-T4 sympathectomy [3, 14, 18-21] because it is believed that the T4 segment carries sympathetic fibers to the axilla. Nevertheless, some surgeons only include the T2-T3 segments [12, 22-24], and there is even an effect on axillary hyperhidrosis in some patients after T2 sympathectomy [9]. We have used both T2-T3 and T2-T4 sympathectomy for axillary hyperhidrosis depending on the surgeon's preference, and our study demonstrates that outcome was significantly better when the T4 segment was also included.

Although almost all patients who seek surgical treatment for axillary hyperhidrosis are disabled from their symptoms, it is a benign condition. Consequently, it is extremely important to discuss possible side effects before surgery. In particular, we emphasize that compensatory sweating is a permanent side effect after sympathectomy, although the reported incidence varies considerably. Most authors describe it in 30% to 70% of their patients, and we recently reported that it occurred in 90% of our patients [6]. We also demonstrated that severe sweating was a frequent problem. The present study confirms that compensatory sweating after sympathectomy is very common. It occurred in 90% of patients who were treated for axillary hyperhidrosis, and in 61% it was so severe that they often had to change clothes during the day. We did not specifically ask our patients if their compensatory sweating had improved over time. However, we do not suspect a substantial improvement because of the high prevalence of this side effect after a median follow-up of 31 months from the operation. We found no significant difference in occurrence of either compensatory or severe sweating after T2-T3 or T2-T4 sympathectomy in patients with axillary hyperhidrosis. This result suggests that patients with primary axillary hyperhidrosis are more prone to experience disabling compensatory sweating, and that a more extensive sympathectomy with additional transection of the sympathetic chain at the T4 level is not the reason.

In spite of the frequent side effects, the majority of our patients accepted compensatory sweating as a side effect because almost three quarters answered that they were satisfied with the operation. However, 28% regretted the operation, and this figure is possibly higher because 6% did not return the questionnaire. The two main reasons for regretting the operation was side effects and lack of effect from the operation. One possible explanation for the lower success rate in axillary compared with palmar hyperhidrosis may be that there are both eccrine and apocrine sweat glands in the axilla. The eccrine sweat glands are distributed over the entire surface of the skin and are innervated by sympathetic fibers, but the apocrine glands respond primarily to epinephrine. They produce a milky sweat that contains fat and cholesterol and may have a strong odor. Because the apocrine glands are not innervated by sympathetic fibers, they continue to function after sympathectomy, and thus may contribute to the lower success rate. Consequently, strict patient selection is important; and if a patient primarily complains of axillary hyperhidrosis with an offensive odor, we

believe that he or she is not likely to benefit from sympathectomy. The other main reason for regretting the operation was compensatory hyperhidrosis. Since the 1960s, this has been considered to be a thermoregulatory mechanism by which the sweat glands attempt to compensate for loss of secretory tissue [25]. However, it is noteworthy that there are no reports on compensatory sweating from patients in whom axillary glands were denervated by botulinum toxin injections or removed surgically.

The mechanism of compensatory hyperhidrosis may be more complex than simple compensation for thermoregulatory purposes. In addition, the reported incidence of compensatory hyperhidrosis varies widely. That could reflect heterogeneous patient populations or different surgical procedures but may also be a consequence of different definitions of compensatory sweating. While some authors count only cases in which massive overperspiration occurs, others consider even a slight increase in perspiration as compensatory sweating [26]. Compensatory sweating may vary with intensity of questioning and thoroughness of follow-up, and it is affected by geographic location, working environment, humidity, temperature, and season [23]. However, our two patient populations were homogenous: all were Caucasian, lived in the same geographical area, and all answered the same questionnaire. Finally, previous studies have only dealt with perception of increased compensatory sweating because quantitation was not done. Whether there is an increased level of compensatory sweating or merely an increase in subjective discomfort has yet to be determined, but we certainly suspect that perception of sweating is important. Thus, someone with mild axillary sweating would probably experience new back sweating more severely than would someone with the same amount of new back sweating after complete relief of severe palmar sweating.

The present study has both advantages and limitations. Firstly, it is favorable that our response rate was 91%. In fact, 3 patients never received the questionnaire because they had emigrated, and the actual response rate may be calculated up to 94%. This figure is higher than most studies and strengthens the credibility of our results. In comparison, even very large series may suffer from reporting bias because the response rate was lower than 50% [8]. Nevertheless, the present study was retrospective, and patients were not randomized for the extent of sympathectomy. Instead, that was the surgeon's preference, and in theory, our results could reflect a difference between the two hospitals. However, surgeons at both institutions performed both extents of sympathectomy, and surgical equipment as well as procedures were exactly the same except for the pleural drainage. Accordingly, we do not suspect this was the reason for a better outcome after T2-T4 sympathectomy, but ultimately a prospective randomized trial may be necessary.

The majority of our patients were satisfied with their operation, and they would even recommend it to others. However, 28% regretted the operation, and it is only reasonable to ask if one should treat axillary hyperhidrosis by thoracoscopic sympathectomy. If so, it is obvious

that patients should undergo a meticulous and critical selection, and they should receive thorough information about the high risk of side effects and a lower success rate compared with palmar hyperhidrosis. The present study has changed our daily practice as we have increased the level of patient information preoperatively. We now recommend that thoracoscopic sympathectomy for axillary hyperhidrosis should only be considered for patients whose symptoms severely interfere with daily life and for whom all medical treatments have failed. We emphasize the information about frequent side effects after this procedure and mention other treatment options, namely, subcutaneous curettage of the axillary sweat glands or botulinum toxin injections. The latter, however, are not available for hyperhidrosis in our country. After receiving this information, approximately 20% of our patients have chosen not to undergo thoracoscopic sympathectomy over the past 12 months, but the majority insist on being operated on. For these patients, we now recommend a T2-T4 sympathectomy at both hospitals because the surgical outcome is better compared with T2-T3 sympathectomy.

Our results demonstrate that there was no significant difference in outcome of the operation between patients who had isolated axillary hyperhidrosis and patients who had additional palmar or craniofacial hyperhidrosis. As a consequence hereof, recommendations for thoracoscopic sympathectomy should be the same in the two groups. Traditionally, the sympathetic chain is transected or removed during thoracoscopic sympathectomy, but there are reports of similar or even better outcome after endoscopic clamping [10, 27, 28]. In patients with intolerable compensatory sweating, their side effects could be improved by removing the clamps [10, 27, 28]. We have limited experience with thoracoscopic clamping for primary hyperhidrosis in Denmark, but it may be particularly suitable for patients with axillary hyperhidrosis because they are more prone to have compensatory hyperhidrosis.

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## DISCUSSION

**DR JOSE RIBAS MILANEZ DECAMPOS (São Paulo, Brazil):** Your title is "Side Effects After Thoracoscopic Sympathectomy: The Influence of Th4." In my experience, we have to change the title, because, for me, all of your results are influenced not by the level of Th4; all the consequences and side effects happen because of Th2. If you haven't operated the level Th2, you won't have all these side effects. We have had almost 1,000 operated patients since 1995 until now, and we have never operated the Th2 level for axillary symptoms. I'm completely against your conclusion that compensatory sweating was remarkably frequent after Thoracoscopic Sympathectomy for axillary hyperhidrosis. We don't have these results. We have less than 25% of intense compensatory sweating when we operated below the level of Th2. And I'm completely critical of the conclusion, that the primary location of hyperhidrosis, axillary, is a predictor or factor to enhance or intensify compensatory sweating. At least, it does not reflect our experience. Thank you for the opportunity to comment on your paper.

**DR ROBERT J. CERFOLIO (Birmingham, AL):** Well, is it really the level that the chain is divided—or is it more important if it is divided compared to resection?

**DR MARK J. KRASNA (Baltimore, MD):** Good question. I won't answer that either.

**DR LICHT:** We believe that the North American tradition of resecting the sympathetic chain rather than transecting it may reflect the medicolegal climate rather than best evidence practice. We only do transections, which is correctly named sym-

thectomy rather than sympathectomy. In addition, as Dr Drott from Sweden has pointed out previously, what good is it if you have a histological verification of the sympathetic chain if you cannot prove that you have removed the correct level.

**DR DECAMPOS:** It doesn't matter if you resect, cut, or clamp. It depends on the level that you operated on. That's what I'm trying to say. To reduce the side effects, you never have to touch the Th2 ganglion.

**DR CERFOLIO:** I understand your point quite well—but I fear you are missing mine—I think resection compared to interruption (sympathectomy vs sympathectomy) is the factor that increases compensatory hyperhidrosis.

**DR LICHT:** I am surprised to hear the results from the previous presentation with such a high frequency of severe compensatory sweating following T2 resection. We do a lot of isolated T2 transections in patients with blushing. In fact, that's the majority of patients we have had referred over the last 2 years, and they are very satisfied with the procedure. 75% have excellent or satisfactory results. 80% develop compensatory sweating, but very rarely severe sweating, which is the case with axillary hyperhidrosis.

**DR KRASNA:** Dr Licht, I enjoyed your presentation. I commend Dr Miller for including both talks because they completely contradict each other when they overlap, and I think that's important. It goes to prove that we don't yet know the level, but I think your idea of a randomized controlled trial is in fact a good one.

I have one other specific question for you. I never use the harmonic scalpel when doing sympathetomy. Now, I'm very careful when I divide anything near T2 to only use a hook cautery and I use it at very low current and I cut it and push it apart and cauterize it, and I never cauterize the proximal end. Again, without my own experience in using a harmonic scalpel, is it possible that, just like overusing coagulation current, you can get arcing to the stellate ganglion and elsewhere? Is it possible that something about using the harmonic in this procedure that that happens? I don't know the answer, but I'm curious if you have any data. The only data that I know of where previous comparisons were made was actually Joe LoCicero and Massard, who many years ago looked at Excimer laser, YAG laser, and cutting, and actually there was a slight decrease in side effects with the laser.

Lastly, I just want to comment, as far as I know, this is the highest reported incidence ever of compensatory sweating, almost 90%, and the highest reported incidence of gustatory sweating, almost 50%. So I do agree with you that we need to reassess what your approach is and change it somewhat.

**DR LICHT:** We started using the harmonic scalpel because we were afraid of thermal damage to the stellate ganglion from electrocautery after we experienced three cases with Horner's syndrome, but we have seen one case of Horner's syndrome after the introduction of the harmonic scalpel.

**DR LAUREANO MOLINS** (Barcelona, Spain): Congratulations on your presentation. I just want to add something about the hospital stay. We have now operated 250 patients, and we came from the three ports to one port, from the lateral position to decubitus, supine position, and now we have performed 60 patients on an outpatient basis, and it works. I would like to know your opinion about that. Of course, everybody here worries about compensatory sweating, and the question would be what you or your dermatologists give to those patients for compensatory sweating.

**DR LICHT:** We don't have any solution for compensatory sweating.

**DR MOLINS:** We have tried Botox injections.

**DR LICHT:** We don't use Botox injections in Denmark.

**DR CERFOLIO:** All you can really do is give them a towel—axillary nerve grafting is a big deal.

**DR MOLINS:** Sure. That's the best thing.

**DR LICHT:** To answer your first question, the hospital stay, this study covers a 7-year period, and hospital stay has decreased over time. In the last 2 years, we admit the patients the day before surgery and they leave the same evening of surgery. I think it may change towards, as the Italians showed at the European meeting last fall, an outpatient procedure being done in the awake patient under local anesthesia and eventually I think we may also change this way.

**DR KRASNA:** Just to comment on the last two questions, I think one of the cautions, and I know someone mentioned earlier about heart rate, there is a lot of data that shows that there is about a 10% reduction in heart rate, and people should recognize that. There is a recommendation that if you have a patient who has a lower than expected heart rate, in the 50's or lower for

an adult, or definitely if you have a young patient with a very low heart rate that they should probably have a tilt test ahead of time to demonstrate that they are in fact not at high risk. I know that there have been all kinds of reports on that.

The other is related to reversing the procedure. The question was what do you do when you have a patient with compensatory sweating. When I recently went and looked at the data on this, there was only one surgeon, who I know and I respect, in Finland, that has a significant experience in reversing these, and, in fact, the reported, that is, published numbers of reversed procedures that were successful is less than two dozen. So I know that every patient knows all the websites out there, but I think patients have to be very, very cautious if they are going to try to get their surgery reversed wherever they go in the world to get it done because it's really not clear-cut that the reversal works.

**DR CERFOLIO:** Well, let's end with a final conclusion so we send people home with our consensus instead of all controversies, I think most of us would agree, and correct me if I'm wrong, that we prefer sympathetomy over sympathetomy and that we prefer not doing 3 levels but 2. But what about T2, do we stay away from T2 or do we cut it? (A show of hands in the audience.)

Who thinks we should cut T2?

(A show of hands.)

**DR JOSEPH B. SHRAGER** (Philadelphia, PA): I have been cutting T2. I've been cutting T2 and T3 for palmar involvement, but both of the papers that have been presented today are consistent with T2 being the problem, so I'm thinking about going home and changing my practice.

**DR CERFOLIO:** I'm not sure it is.

**DR SHRAGER:** Does anybody cut just T3 and does it work in a high percentage of patients for palmar?

**DR CERFOLIO:** Well, cutting T2 and T3 has worked for me in 120 patients with almost no problems.

**DR SHRAGER:** Almost no compensatory sweating?

**DR CERFOLIO:** One severe compensatory. Everybody else is minor.

**DR MILLER:** For facial, that's a whole different beast.

**DR SHRAGER:** Facial, you have to cut T2 if you're going to try to do it.

**DR MILLER:** Yes, but, say, palmar for T2, then that's a whole different story.

**DR SHRAGER:** Does anybody just cut T3, not respect?

**DR MARSHALL:** The one I tried it on failed, so then I went back to T2.

**DR DECAMPOS:** One paper from Dr Leao at al. will be published in 2 or 3 months from now, which compares sympathetomy and sympathetomy. Due to the delayed results with sympathetomy, it's slightly worse than sympathetomy. So the results when we perform sympathetomy after 5, 6, or more than 10 years, are better than when only performing a sympathetomy.

**DR CERFOLIO:** But it may depend on how you divide it. If you divide it and burn each edge, like we do, and there is a good inch gap there, they don't come back at 5 years—I do not have 10 year follow-up.