

# Extended uniportal bilateral sympathectomy

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**Abstract:** Hyperhidrosis affect 3% of the population and, despite benign nature of the disease, the individuals seek medical advice in order to improve their quality of life which can be severely compromised. The interruption of the sympathetic chain (sympathectomy) and of the nerve of Kuntz established its role as the definitive treatment of primary hyperhidrosis. In this manuscript, we present our extended uniportal technique with the aid of the video. Uniportal approach expresses all its benefit when applied for this procedure because there is no specimen to be retrieved and all the surgery is accomplished through a 1–2 cm port access.

**Keywords:** Uniportal surgery; hyperhidrosis; minimally invasive surgery

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## Introduction

Hyperhidrosis is a disorder characterized by excessive sweating, independent of organism's thermoregulation and exacerbated by emotional stimuli or high temperatures. It occurs in about 3% of the world population (1), equally affect men and women but more often young adult. It is classified into primary and secondary forms. The first one is the most common and the trigger cause is not known; secondary hyperhidrosis is the result of systemic neuroendocrine disorders such as hyperthyroidism, diabetes mellitus, peri-menopause or drugs.

Primary hyperhidrosis seems to have a genetic predisposition (2). This condition is determined by an alteration of sympathetic component of the autonomic nervous system (3).

Usually it manifests itself in the palm, axillary, plantar and facial region, causing embarrassment, problems during working and personal life, and therefore it significantly affects the quality of life.

The Society of Thoracic Surgeons has published in 2011 a consensus for the surgical treatment of hyperhidrosis (4) to define the exact level of interruption of the sympathetic chain on the base of localization of the sweating.

## Historic highlights of surgical approach

### *Thoracoscopic approach*

Although the first description of surgical sympathectomy was given by Dr. Hughes in 1942 (5), in 1978, the first thoracoscopic sympathectomy was performed by Kux who performed 124 thoracoscopic sympathectomies in 63 patients (6). Since Kux's paper, several thoracoscopic methods have been described, with different access sites and different operative techniques. Some authors advocate the advantage of the use of awake thoracoscopic sympathectomies (7,8).

### *Uniportal approach*

There is a lot of confusion about the definition of uniportal approach in thoracic surgery (9,10) and this does not spare sympathectomy. In fact, the word uniportal appears in the title of some papers on sympathectomy (11-13). A careful reading of these articles reveals that the operation was carried out using the standard thoracoscope (optic, operative channel and suction were assembled together).

In 1998, our group was the first to initiate performing sympathectomy using the modern definition of uniportal



**Figure 1** Uniportal bilateral sympathectomy in a 46-year-old man affected by palms' hyperhidrosis (19). The video underlines the relevant anatomical structures and their variations to keep in mind when performing the procedure [nerve of Kuntz (INK) is shown clearly on the right side as a parallel nerve beside the first nerve resected]. The dissection is then extended over the rib for 5 or 6 cm. This is essential in order to achieve successful results and prevent compensatory sweating. While the assistant closes the right port, the surgeon starts the procedure on the left side.

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approach (14). The uniportal approach “by definition” utilized a flexible port (trocar) to insert the optic and surgical instruments separately. The advantage of uniportal technique have been extensively described (15,16).

## Results

In the original paper, Kux reported that the side effects of thoracic sympathectomy were compensatory and gustatory sweating that, in four patients, were more embarrassing than the original form of hyperhidrosis. Fifty-five patients were highly satisfied with the result of thoracoscopic sympathectomy (6). Successively, Lai *et al.* (17) reported a success rate of sympathectomy of 93%. All patients except one suffered from compensatory sweating, which was the main cause of patients' dissatisfaction postoperatively. Seventeen percent of the patients (12 of 72 patients) experienced new symptoms of gustatory sweating (facial sweating associated with eating), 21 patients experienced other complications, including pneumothorax, Horner's syndrome, nasal obstruction, and intercostal neuralgia. In a recent experience on 176 patients, the authors reported complications which included unilateral transient Horner's syndrome (n=1), residual pneumothorax (n=4), and segmental pulmonary atelectasis (n=4). Complete

relief of symptoms was observed in all patients at the 6-month follow-up and 45% experienced compensatory hyperhidrosis (18).

## Our operative technique

Uniportal bilateral sympathectomy is generally performed within 30 minutes in the absence of severe pleural adhesion, bullae or bleeding. Surgery is undertaken under general anesthesia and selective, alternate lung ventilation. Patients are usually operated in semi-sitting position, with arms abducted more than 90° and rotating the operating table laterally. One incision of 1.5–2.0 cm is performed in the third intercostal space on the anterior axillary line, and a flexible trocar (Flexipath-Ethicon, 10 or 20 mm) is introduced. A 0 degree 5-mm optic and endoscopic dissector is inserted into the thoracic cavity through the port. The sympathetic chain is identified running down over the neck of the ribs, by opening the parietal pleura. The sympathetic chain is then exposed and T2–T4 tract is identified. Dissection is performed by electrocautery from the 2nd to the 4th ganglia. After sympathectomy, we dissect the pleura lateral to the chain for 5–6 cm including the tissue along the rib, moving sideways to cut the Kuntz fibers and the collateral branches (*Figure 1*). Finally, a chest drain is positioned in the pleural cavity through the same access. While one assistant closes the incision, the surgeon starts the procedure on the contralateral side.

Chest drains are usually removed on the following morning. Some authors suggested to offer this procedure as day surgery case (8), if good lung re-expansion is achieved in the operating room, the chest drains could be removed prior to extubation to anticipate the discharge.

## Discussion

Primary hyperhidrosis is a rare disorder that can significantly affect the quality of life of patients suffering from this condition. The only definitive treatment is the surgical sympathectomy. This is a minimally invasive, quick and immediately resolving procedure whose contraindications are few and complications are rare. The success rate of thoracoscopic sympathectomy range from 55–93% (6,17), and is established by fast recovery, early return to daily activities with immediate and significant improvement of the patient's quality of life. The good success of the surgical procedure can be evaluated immediately after the sympathectomy as the skin of the

palm or axillary region is instantly hot and dry.

General complications, such as bleeding or pain are not frequent. The most important and common video-assisted thoracic surgery (VATS) sympathectomy complication is compensatory sweating which appears in 10% of patients (18). Failure is determined by the incomplete or absent interruption of the sympathetic chain or by the nerve regeneration. Sympathetic chain must be interrupted in its continuity and with it all the connecting branches and the accessory nerve (the nerve of Kuntz) need to be cauterized. This is achieved cauterizing for a few centimeters along the rib.

We have demonstrated in the video that uniportal sympathectomy is certainly an easy, fast and reproducible technique which has an excellent aesthetic result. Of note, in order to avoid recurrence, this technique permits straightforwardly to cut the parietal pleura laterally and extend the operation to include the nerves of Kuntz.

## Conclusions

In our experience, extended uniportal bilateral sympathectomy could be easily done to treat palmar and axillary hyperhidrosis

## Key points

- (I) Uniportal VATS should not be confused with thoracoscopy for sympathectomy;
- (II) The target level of the sympathetic chain interruption is determined by the hyperhidrosis location;
- (III) The pleura lateral to the chain must be dissected for 5–6 cm including the tissue along the rib to cut the Kuntz fibers and the collateral branches;
- (IV) Success rate is above 90% in many large experiences.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Informed Consent:* Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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