Sympathectomy for palmar hyperhidrosis had been performed by a variety of methods, including open surgery via the posterior, cervical, and transaxillary approaches, as well as by percutaneous radiofrequency coagulation and nonvideo-assisted endoscopic techniques. In recent years, video-assisted endoscopic sympathectomy has emerged as a simple and effective way to treat palmar hyperhidrosis. We report our experience in 82 patients in whom we performed 164 sympathectomies, using equipment available in our hospital for laparoscopic surgery.

Clinical Material and Methods

Patient Population

Between February 1993 and November 1994, we performed bilateral sympathectomies in 82 patients; 63 were males (76.8%), and 19 were female (23.2%). They ranged in age from 15 to 50 years old (mean 29.4 years). Seventy-seven patients were Chinese (94%), three were Malay (3.6%), and two were Eurasian (2.4%). There was a positive family history of palmar hyperhidrosis in 16 (19.5%). Twenty patients (24.4%) had palmar hyperhidrosis only, 41 (50%) had palmar and plantar hyperhidrosis, and 21 (25.6%) had palmar, plantar, and axillary hyperhidrosis. Five patients (6.1%) had palmar hyperhidrosis severe enough to affect their ability to write, seven (8.5%) were severely affected in their ability to shake hands, 40 (48.8%) were affected in their abilities both to write and to shake hands, and 17 (20.7%) were affected in their work.

Forty-two patients had sought other treatments for their condition, without any success: 17 (20.7%) had topical therapy, 16 (19.5%) had undergone iontophoresis, eight (9.8%) had both topical therapy and iontophoresis, and one (1.2%) had previous open surgery.

Surgical Technique

Bilateral procedures were performed in all patients. Palm temperature electrodes were placed. Robert-Shaw or univent endotracheal tubes were placed and anesthesia was induced in a single lung, then patients were turned to the lateral position. A 10-mm trocar was inserted in the fifth intercostal space at the midaxillary line for the videoendoscope; two 5-mm trocars were inserted in the third intercostal space at the anterior axillary line and fourth intercostal space at the posterior axillary line for the endoscopic grasper and coagulating scissors. The lung was collapsed further by suction through the appropriate channel of the endotracheal tube, and if required, further exposure was obtained by gently retracting the lung with the endoscopic grasper to expel the air. No carbon dioxide inflation was used to create the pneumothorax. Any lung or pleural adhesions encountered were dissected and lysed.

Several studies have shown that removal of the second dorsal ganglion is usually enough to obtain complete sympathectomy of the upper limb, thus, we adopted the following procedure to treat palmar hyperhidrosis. The thoracic sympathetic chain was picked up with the grasper and meticulously excised over the second thoracic rib and intercostal space (Fig. 1).

The sympathectomy was extended down to the third rib and intercostal space if there was axillary as well as palmar hyperhidrosis. In one patient with severe palmar, axillary, and truncal hyperhidrosis, we extended the sympathectomy further to the fourth rib and intercostal space. We performed 78 sympathectomies at the T-2 level, 66 at the T-3 level, and 26 at the T-4 level.
the T2–3 level, and one at the T2–4 level. Each procedure included ganglion excision and intraoperative frozen section histology. Histological examination confirmed ganglion nerve bundles in 96 of these specimens and nerve bundles only in 49 of them.

In 19 sympathectomies, it was not possible to excise the ganglion because of severe lung adhesions, pleural adhesions, unfolded aorta, or inadequate lung collapse. In these cases, we found it extremely useful to retract the vital structures and to disrupt the sympathetic chain by means of electrocoagulation through the microscissors.

A thoracostomy tube was inserted through the 10-mm trocar and connected to an underwater seal after the lung was reinflated. The 5-mm trocars were removed, and the incisions closed. The thoracostomy tube was removed at the end of the procedure, and all the patients had a chest x-ray film before returning to the ward. After sympathectomy the palm temperature rose above the preexcision temperature in all patients (range 1.0˚C–8.0˚C; mean 2.8˚C). The time required for the preexcision palm temperature to rise by at least 1.0˚C ranged from 30 seconds to 20 minutes, with a mean of 1 minute. The mean operating time for each sympathectomy was 7 minutes.

**Results**

All the patients experienced dryness of both palms immediately after sympathectomy and 41 (50%) had drier feet as well. Twenty-five patients developed a mild transient palmar hyperhidrosis between the 2nd and 4th postoperative days, which resolved completely. Fifty patients (61%) developed compensatory hyperhidrosis, which improved by 6 months postoperatively. The compensatory hyperhidrosis involved the abdomen in 28 patients, the back in 33, the lower limbs in 36, the chest in eight, and the head and face in two. Sixteen patients (19%) had transient hyperesthesia of the chest wall; six (7.3%) had minor wound infections; three (3.7%) had small pneumothoraces that resolved spontaneously; and one (1.2%) had upper lobe collapse (due to tracheal bleeding from intubation trauma), which improved with physiotherapy. No patient had Horner’s syndrome or required a second operation.

**Discussion**

Endoscopic thoracic sympathectomy is a safe, cost-effective, easy, and quick way to treat palmar hyperhidrosis.6,13,15,17,18,21,22 Some authors6,13,15,17,19,21,27 have reported their experience using only a single trocar and disrupting the connections from the sympathetic chain to the brachial plexus by thermocoagulation or laser coagulation. Although only one incision is necessary in these cases, intraoperative histological confirmation of sympathetic ganglia is not possible. There is some anatomical variability of the upper thoracic sympathetic chain;26,30 thus, this technique may result in a higher rate of failure and recurrence.1,2,8,22 Other disadvantages include the surgeon’s inability to deal with pleural adhesions hampering access to the chain, difficulty controlling hemorrhage from intercostal and azygos vessels near or crossing the chain, and problems dissecting and separating the chain from other structures.  

**Fig. 1.** Intraoperative photograph showing the thoracic sympathetic chain being held by the endoscopic grasper. The chain is carefully dissected and then cut by the endoscopic microscissors. C = thoracic sympathetic chain; EG = endoscopic grasper; ES = endoscopic scissors; L = collapsed lung.
neural structures and vessels. Our technique using three small ports achieved good cosmetic results, and no patient was unhappy with the small scars after the operation. We were able to excise the sympathetic chain and obtain histological confirmation during the operation, or repeat the procedure until a positive histological result was obtained. We were also able to lyse lesions, precisely dissect and lift the chain off adjacent blood vessels, retract underdeflated lung and even unfolded aorta to improve access, and control bleeding effectively and precisely. Although electrophysiological aids have been used to help identify the sympathetic chain, series reported have been relatively small. Our technique enables definitive histological confirmation of the sympathetic chain to be obtained intraoperatively. The only electrophysiological aid used was palm temperature electrodes. We found that a successful outcome could be expected when there was a temperature increase of at least 1°C after the procedure. We recommend waiting for at least 1 minute after the sympathectomy to observe this temperature rise.

Conclusions

Video endoscopic sympathectomy is an effective and safe way to treat palmar hyperhidrosis. Excision of the ganglia enables intraoperative histological confirmation to be obtained; however, a rise in palm temperature of at least 1°C is highly predictive of postoperative success. The three-port technique is extremely useful in dealing with adhesions and intrathoracic structures that impede access to the thoracic sympathetic chain.

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