Transthoracic endoscopic sympathectomy for palmar and axillary hyperhidrosis in children and adolescents

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Abstract Primary hyperhidrosis (PH) often starts in childhood and adolescence and can be a troublesome condition. In Taiwan, there is a high incidence in childhood (1.6%–2.0%) and adolescence (2.2%–2.6%). There are few reports regarding transthoracic endoscopic sympathectomy (TES) for PH in children and adolescents. From July 1994 to April 1998, a total of 438 patients underwent TES. There were 174 males and 264 females with a mean age of 14.2 years (range 5–17 years). All patients were placed in a semi-sitting position under single-lumen intubation anesthesia. We performed ablation of the T2 ganglion and any Kuntz fibers in 350 patients with palmar hyperhidrosis and a similar procedure on the T2 and T3 ganglia in 88 patients with palmar and axillary hyperhidrosis using either a 6- or 8-mm thoracoscope via one 0.8-cm incision just below each axilla. In the 438 patients, 875 sympathectomies were performed. There was 1 technical failure due to severe pleural adhesions. TES was usually accomplished within 15 min (range 7–20 min). All except 5 patients were discharged within 4 h after operation. The surgical complication rate was minimal: 1 pneumothorax (0.23%) and 2 segmental lung collapses (0.46%). There was no surgical mortality. The mean postoperative follow-up period was 25.2 months (range 4–45 months). The result was highly satisfactory in 408 patients (93.2%), although 377 (86%) developed compensatory sweating of the trunk and lower limbs, the distribution affecting the back (86%), abdomen (48%), lower limbs (78%), and soles (1.4%). The recurrence rate of palmar hyperhidrosis was 0.6% in the 1st, 1.1% in the 2nd, and 1.7% in the 3rd year. TES is thus a safe and effective method for treating palmar and axillary hyperhidrosis in children and adolescents.

Key words Hyperhidrosis · Endoscopic sympathectomy

Introduction

Primary hyperhidrosis (PH) is defined as sweating beyond physiological needs, particularly in response to heat or emotional stimuli. The etiology is still unclear. Epidemiologic studies are scanty, but Adar et al. have reported an incidence of 0.6% to 1% [1]. It usually affects the palms, axillae, and soles [1–3], and occasionally occurs on the face, groin, and legs. PH may cause severe embarrassment, presenting not only psychological and social problems, but also educational and occupational handicaps. The existing nonoperative therapeutic options such as systemic anticholinergic drugs, topical astringents, or absorbing powders, biofeedback, iontophoresis, and percutaneous phenol block seldom give sufficient relief and their effects are usually transient.

Transthoracic endoscopic sympathectomy (TES) is the treatment of choice for palmar and axillary hyperhidrosis: it has a high success rate and minimal morbidity [4–8]. PH often commences in childhood or adolescence [3, 4], but there are few reports of TES for PH in these patients [4]. We present our experience in treating PH in children and adolescents, and discuss the perioperative management and complications.

Materials and methods

From July 1994 to March 1998, 438 patients under 17 years of age underwent a total of 874 TES. There were 174 males and 264 females with a mean age of 14.2 years (range 5–17 years); 350 patients had palmar hyperhidrosis and 88 had both palmar and axillary hyperhidrosis. TES was performed with the patient under general anesthesia with a standard single-lumen endotracheal tube. Throughout the procedure, the patients were ventilated with 100% inspired oxygen and were anesthetized with propofol (Diprivan).
Peripheral arterial oxygen saturation (SaO₂) was monitored with a pulse oximeter to prevent hypoxemia.

All patients were placed in a semi-sitting position with abduction of both arms. An 0.8-cm incision at the 3rd intercostal space was made below the axillae bilaterally just posterior to the pectoralis major muscle (Fig. 1). The endotracheal tube was briefly disconnected to deflate the lung, and then the pleural cavity was entered using mosquito forceps to avoid damaging the lung parenchyma. A 0° thoracoscope, either 6- or 8-mm (Storz, Germany), was introduced into the pleural cavity through an obtuse head trocar. Pneumolysis was sometimes needed for pleural adhesions before identification of the sympathetic trunk, which was easily identified crossing perpendicularly on the ribs. Ablation of the T2 ganglion and any Kuntz fibers was performed at the 2nd and 3rd rib beds with conventional electrocautery in patients with palmar hyperhidrosis (Fig. 2). A similar procedure on the T2 and T3 ganglia was performed at the 2nd, 3rd, and 4th rib beds in patients with both palmar and axillary hyperhidrosis (Fig. 3).

After adequate sympathectomy, the lung was reinflated under visual control. It is important to have the anesthesiologist exert continuous positive pressure for a few seconds when the skin is closed in order to prevent a pneumothorax and incomplete expansion of the lung. No thoracic drains are needed. The surgical wound was closed with subcutaneous sutures for cosmetic considerations. A routine chest radiograph was checked postoperatively to rule out a hemopneumothorax or incomplete lung expansion. Most patients were discharged on the day of operation and returned to their ordinary activities within 1 week.

Results

Among the 438 patients, 875 sympathectomies were performed; 82% of patients had developed PH since the onset of childhood and 18% since adolescence. Almost all patients had plantar hyperhidrosis (92%) as well, and some also had axillary hyperhidrosis (20%). The TES was generally carried out within 15 min (range 7–22 min) unless severe pleural adhesions were encountered. Incidental findings during the operation consisted of pleural adhesions (4 cases, 0.91%) and congenital bullae (2 cases, 0.46%).

Successful bilateral sympathectomies were achieved in all patients except 1 who had severe pleural adhesions.

![Fig. 1 Patient in semi-sitting position under single-lumen intubation anesthesia: 0.8-cm incision below each axilla](image1)

![The 2nd rib](image2)

![Stellate ganglion](image3)

![Fig. 2 Ablation of T2 ganglion at 2nd and 3rd rib beds](image4)

All except 5 were discharged within 4 h after operation. The surgical complication rate was minimal: 1 pneumothorax (0.23%) and 2 segmental lung collapses (0.46%). A thoracostomy tube was placed for 2 days in the patient with a pneumothorax; this was not necessary in the patients with incomplete lung expansion. There was no surgical mortality.

The mean postoperative follow-up period was 25.2 months (range 4–45 months). The immediate postoperative result was excellent in 436 cases (99.3%). One patient complained of some persistent perspiration on his palms and 1 had no improvement of axillary hyperhidrosis. Compensatory sweating of the trunk and lower limbs developed in 377 patients (86%), the distribution being the back (86%), lower chest and abdomen (48%), thigh and leg (78%), and sole (1.4%); 271 (62%) had improvement of plantar perspiration. Twenty-two patients (5%) were more embarrassed by the compensatory sweating than by the original form of PH, and 6 had increased sweating on the soles. Among 88 patients with both palmar and axillary hyperhidrosis, 10 (11.4%) had more severe compensatory hyperhidrosis. Overall, 408 patients (93.2%) had satisfactory results after TES. Neither permanent nor transient Horner’s syndrome occurred in any patient. The recurrence rates

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