

## Early Experience with Thoracoscopic Sympathectomy for Palmar Hyperhidrosis

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Excessive craniofacial, palmar and axillary hyperhidrosis can be very distressing in young people, especially in hot climates. In this study, we are presenting our operative experience and the long-term effect of the technique of thoracoscopic electrocoagulation of the thoracic sympathetic chain in the treatment of this condition. We reviewed the results of 22 thoracoscopies performed on 16 patients at Asir Central Hospital in Abha, Saudi Arabia during the period from January 1999 to December 2002. The patients were 11 males and five females with a mean age of  $26.9 \pm 5$  years (range 19-35 years). Except for one patient who presented with post-traumatic, left upper limb chronic regional pain syndrome (CRPS), the rest presented with craniofacial, palmar and axillary hyperhidrosis. In the first 10 patients, sympathectomy was performed unilaterally and in the following six patients it was performed bilaterally in the same sitting. While pneumothorax occurred in three patients (19%), only one patient (6%) required chest tube insertion. During the mean follow-up period of  $25.6 \pm 14.2$  months (range 4-47 months), only one patient (6%) presented with recurrent left axillary hyperhidrosis. The patient underwent another thoracoscopy which failed due to lung adhesions and required subcutaneous electrocautery of the sweat glands. In conclusion, thoracoscopic sympathectomy is very effective (94%) in the treatment of palmar and axillary hyperhidrosis with no mortality, minimal morbidity and durable long-term effect. (*Ann Thorac Cardiovasc Surg* 2003; 9; 351-4)

**Key words:** palmar and axillary hyperhidrosis, chronic regional pain syndrome, thoracoscopic sympathectomy, electrocoagulation, pneumothorax

### Introduction

Primary palmar hyperhidrosis is a functionally and socially disabling problem of unknown etiology, affecting adolescents and young adults, especially in hot climates.<sup>1)</sup> Ablation of the upper dorsal sympathetic chain has long been accepted as the definitive treatment for this troublesome, excessive sweating of the palms of the hands. The sweating, however, should be severe enough to interfere significantly with the patient's occupation or enjoyment of life.<sup>2)</sup> Endoscopic sympathectomy has been available

for some time as a minimally invasive procedure.<sup>3)</sup> An excellent view of the upper dorsal sympathetic chain can usually be obtained and simple diathermy coagulation of the chain can be achieved. It is currently the treatment of choice for palmar hyperhidrosis.

In this study, we are presenting our experience with this technique for patients with primary palmar and axillary hyperhidrosis. This is the first such report from the Asir region of southern Saudi Arabia.

### Patients and Methods

During the three year period from January 1999 to December 2002, we operated on 16 patients at Asir Central Hospital, Abha, Kingdom of Saudi Arabia. The patients were 11 males and five females with a mean age of  $26.9 \pm 5$  years (range 19-35 years). Fifteen patients presented with troublesome craniofacial and/or palmar and axillary hy-

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**Table 1. Frequency and percent of different patients' occupations**

| Occupation | Frequency | %    |
|------------|-----------|------|
| Student    | 7         | 43.8 |
| Teacher    | 4         | 25.0 |
| Soldier    | 3         | 18.8 |
| Secretary  | 2         | 12.5 |
| Total      | 16        | 100  |

perhidrosis. One patient presented with intractable chronic regional pain syndrome (CRPS) of two years duration following road traffic accident and blunt trauma to the left upper limb. The patients came from different occupational backgrounds (Table 1). All the patients were referred from the dermatology clinic after failure of conservative treatment for the troublesome hyperhidrosis. All patients underwent full physical examination to exclude secondary causes of hyperhidrosis like thyrotoxicosis. The patients also had preoperative chest X-rays to exclude possible pleural and/or pulmonary pathology.

Thoracoscopy was performed under general anesthesia with double-lumen endotracheal incubation. In the first 10 patients, thoracoscopic sympathectomy was performed unilaterally. With subsequent increased experience sympathectomy performed bilaterally (Table 2). Sympathectomy was performed using two ports, a 10 mm axillary one for the thoracoscope and 5 mm anterior one for the electrocautery hook. After occlusion of the ipsilateral lumen of the endotracheal tube (ETT), a Veress needle was inserted in the fourth or fifth intercostal space in the anterior axillary line. About 0.5 L of CO<sub>2</sub> was then insufflated in the pleural cavity with automatic pressure set at 8 mmHg. A 10 mm port was then inserted, through which a 0.8 mm 0° thoracoscope was introduced. Another 5 mm port was introduced under vision in the second or third intercostal space in the mid-clavicular line, through which the diathermy hook was introduced. The dorsal sympathetic trunk was visualized and completely charred on the necks of the second, third and fourth ribs and for about an inch laterally. Gas was then disconnected, the pleural cavity deflated and the anterior port removed under vision. At this stage, the anesthetist was asked to unclamp the ipsilateral lumen of the ETT and to hyperinflate the lung. With complete inflation of the lung, the axillary port was removed and the stab wounds were closed with subcuticular 4/0 synthetic absorbable stitches. A chest tube was not left behind in any of the patients. At the end of the operation, the pupils of the patient were examined by

**Table 2. Side of sympathectomy**

| Side      | Frequency | %    |
|-----------|-----------|------|
| Right     | 4         | 25.0 |
| Left      | 6         | 37.5 |
| Bilateral | 6         | 37.5 |
| Total     | 16        | 100  |

a torch light for light reflex and possible Horner's syndrome. A chest X-ray was done in the recovery room.

Patients' data were individually recorded and the results were analyzed using SPSS® statistical package for Windows, version 7.5.

## Results

Twenty-two thorascopies were performed in 16 patients; one of them was a repeat thoracoscopy. This procedure comprised approximately 2.4% of all the vascular procedures which were performed during the same period (22 out of a total of 900 operations).

We had no mortality in this group of patients. There was no significant intraoperative bleeding during any of the procedures or postoperative hemothorax in any of the patients. None of the patients developed Horner's syndrome. Considerable ( $\geq 30\%$  of the pleural cavity) pneumothorax occurred in three male patients at a rate of 19%. In one patient (6%), we opted to insert a chest tube through the axillary port in the early postoperative period. The remaining two patients were treated conservatively by compression dressing and chest physiotherapy without the need for a chest tube.

Over the mean follow-up period of  $25.6 \pm 14.2$  months (range 4-47 months), two patients complained of a degree of rebound (reflex) hyperhidrosis in the lower half of the body after staged, bilateral sympathectomy. This decreased in severity over time and disappeared in 6 to 12 months postoperatively. However, it did not mar the patients' satisfaction with the operation. All the patients had satisfactory dryness of the face, head, palms and axillae except for one patient (6%) who complained of incomplete dryness or residual over-sweating of the left axilla, after staged, bilateral sympathectomy. He underwent repeat thoracoscopy which was abandoned due to dense adhesions and had subcutaneous cauterization of the axillary sweat glands.

## Discussion

In this paper we presented the results of our experience in the main vascular surgery unit in the whole Asir region of southern Saudi Arabia and the only place where thoracoscopic sympathectomy is being performed.

Our patients were predominantly males, with a male to female ratio of about 2:1. This is almost the reverse to most of the reports in the literature. Except for Lardinois and Ris from Switzerland who reported 1:1 ratio, most of the other studies reported 1:1.5 or 1:3.5.<sup>1,4-7)</sup> This may be related to the highly conservative society in Saudi Arabia, which makes women less exposed to society or discouraged from seeking medical treatment for this problem. The mean age of our patient population of 26.9 years compares well with the reported ones of 22.9 to 27.4,<sup>4,8,9)</sup> but much younger than the 39.3 years reported by Lin and Chou.<sup>10)</sup> However, it is older than the 14.1 years reported by Lin et al. who performed the procedure on children and adolescents.<sup>5)</sup>

Although we performed staged procedures for the first 10 patients, we believe it is better to do both sides at the same time. All our patients complained of bilateral palmar and/or axillary hyperhidrosis on the first presentation. Contrary to the view of Al Dohayan, bilateral sympathectomy would therefore save them another admission and another general anesthetic.<sup>1)</sup> We consistently used two ports for all our patients, which is in agreement with most authors. However, Krasna et al. used an average of 2.9 ports for their patients.<sup>11)</sup> Other authors reported the use of a single trans-axillary port with good results and a better cosmesis.<sup>5,10,12,13)</sup>

Traditionally, coagulation should be carried out laterally for an inch or so along the necks of the second and third ribs to deal with the possible presence of a nerve of Kuntz.<sup>14)</sup> However, according to Lin and Wu, Kuntz fiber plays only anatomic and no clinical role in surgical failure of sympathetic surgery, as its incidence is about 60% in clinical studies, while the surgical failure rate is only 1.5% when it is preserved.<sup>15)</sup> Some authors, therefore, practiced clipping or clamping of the sympathetic chain with reportedly good results. Reifeld et al. claimed better satisfaction in patients who had clipping versus electrocautery, at 98% versus 95.1%.<sup>16)</sup> It is also reported to be safe and effective with the advantage of reversal in cases of postoperative compensatory hyperhidrosis.<sup>5,10)</sup>

Although we encountered no serious intraoperative bleeding and our conversion rate was zero, some authors reported an incidence of 0.08%.<sup>17)</sup> Some authors also re-

ported postoperative hemothorax at 0.1%.<sup>4)</sup> Our reported rate of 19% pneumothorax is a bit high compared with the reported ones of 0.5-9.1%.<sup>4,18)</sup> However, we used a postoperative chest tube insertion in only one patient (6%), which in retrospect was not absolutely necessary. Krasna et al. used chest tubes routinely in all patients at the end of the procedure.<sup>11)</sup> None of our patients developed Horner's syndrome, which compares very well with the 3-10% transient and the 0.28% permanent forms reported by different authors.<sup>8,12,17,19)</sup>

Our recurrence rate of 6% for axillary hyperhidrosis compares well with the reported rates of 3-7%.<sup>4,12,16,18)</sup> The two patients (21.5%) who complained of some degree of rebound hyperhidrosis in the trunk and lower limbs had undergone bilateral, staged sympathectomy. Their symptoms improved over six months to one year and they were satisfied with the result. The reported rates of postoperative rebound hyperhidrosis vary widely in the literature. Some authors reported rates as low as 1.2-6%, others reported an intermediate rate of 33% while others reported rates as high as 85-86%.<sup>1,4,5,16,17)</sup> The explanation for this phenomenon also varies widely. According to O'Riordan et al., restricting the extent of sympathectomy to the second dorsal ganglion and the adjoining chain reduces the amount of compensatory, postoperative hyperhidrosis, while effectively improving axillary hyperhidrosis.<sup>20)</sup> On the other hand, Lin and Wu propose that preservation of the sympathetic tone to the head is the main influential factor in avoiding reflex oversweating.<sup>21)</sup> Therefore, they believe that T4 sympathectomy is an ideal procedure that can treat palmar and/or axillary hyperhidrosis without inducing reflex oversweating.

## Conclusion

Thoracoscopic electrocautery of the dorsal sympathetic chain is an effective treatment for primary craniofacial and palmar/axillary hyperhidrosis. It is associated with no mortality, minimal morbidity and a very high rate of durable patient satisfaction. We also recommend bilateral, same-sitting sympathectomy for symptomatic patients.

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