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Thoracoscopic Sympathectomy for Primary Hyperhidrosis : A Two-year Experience at Police General Hospital

Wachirapunyanukul W, MD
Patcharatrakul S, MD
Sukosit P, MD
Hakeem R, MD
Montamara A, MD
Pruksapong C, MD
Poksawat S, MD
Surgical and Anesthesiologic Unit, Police General Hospital, Bangkok 10330, Thailand

Abstract **Thoracoscopic sympathectomy is currently the most acceptable surgical treatment for disabling upper limb hyperhidrosis. The procedure is known and had been performed by a very few surgeons in Thailand. The results were never been reported except from our institute.**

Objective: **To quantitatively evaluate the results of treatment of primary hyperhidrosis with thoracoscopic sympathectomy in our two years experience at Police General Hospital.**

Materials and Methods: **Two hundreds and nine thoracoscopic sympathectomies had been performed for 105 consecutive patients suffered from primary hyperhidrosis during February 1998 to May 2000. To evaluate the results of treatment, side effects, complications, quality of life and satisfaction to the treatment, questionnaires as a form of Linear analogue score was mailed to patients. There were seventy two patients responded to questionaires and were included to this study.**

Statistical Analysis: **Linear analogue score with the Student's t test was used for statistical analysis.**

Results: **Palmar sweating was reduced from a mean score of 9.224 pre-operatively to 0.528 after sympathectomy (P<0.001). For axillae :4.7200 to 3.6900 after T2 sympathectomy(NS) and 8.600 to 3.111 after T2+T3 sympathectomy (P <0.001). Sixty one patients (84.7%) felt their quality of life was markedly improved after the operation, while six (8.3%) felt worsen. Compensatory sweating occurred in more than ninety percents of the patients which was the main cause of dissatisfaction (16.7%) and worsen quality of life (8.3%) in this group. Minor complications occurred in a few patients without major postoperative consequence.**

Conclusions: **Thoracoscopic sympathectomy is safe and effective for the treatment of primary hyperhidrosis especially for the upper limb. However, compensatory sweating does occur in a significant number of patients and is the cause of dissatisfaction to the treatment in some patients. T2+T3 sympathectomy seems promising to treat severe concomitant axillary hyperhidrosis. Patients should be clearly informed of postoperative compensatory sweating before the operation.**

Primary hyperhidrosis is a condition resulting in excessive secretion of sweat without specific underlying disease. It can occur in any part of the body but the most common parts are the hands, feet, and armpits. The condition can cause severe psychological, social, and occupational distress and inconvenience. The exact etiology is not known at present but experimental studies indicated that T2 ganglion played a significant role in this condition.[1]

Currently, thoracoscopic sympathectomy (TS) is proven to be the most acceptable and reliable treatment for this symptom. Ablation of only the T2 sympathetic ganglion is the most accepted treatment by surgeons for upper extremity hyperhidrosis. For excessive sweating of the armpit, the extent of the ganglionic ablation should extend beyond T2, which is varying from T2-T4 or T2-T6. However, the more extensive the ganglionic ablation, the more severe the side effect, especially compensatory sweating[2,3] which is expected to be more severe in the tropical region.

In Thailand, thoracoscopic sympathectomy for primary hyperhidrosis is performed by only few surgeons and patients treated by this method has never been reported elsewhere. Few quantitative results had been reported in the literatures.

We studied the results of treatment with bilateral thoracoscopic T2 sympathectomy (T2S) for excessive sweating at hands and T2+3 sympathectomy (T2+3S) for severe concomitant axillary hyperhidrosis. The severity of sweating before and after treatment, side effects, complications, satisfaction, and also quality of life after the treatment according to the patients, were quantitatively evaluated.

Patients and Methods

Two hundreds and nine TS were performed in 105 consecutive patients with primary hyperhidrosis between February 1998 to May 2000. The procedure was performed with the patient in a lateral position under double lumen intubation. After deflating the lung, the sympathetic ganglion was identified and ablated with electrocautery via a thoracoscope inserted through a small incision made at the armpit. T2S was performed for patients with severe hands involvement, while T2+3S was performed for severe concomitant axillary involvement.

Questionnaires in a form of Linear analogue score were mailed to the patients for evaluation of the treatment results, side effects, complications, quality of life, and satisfaction of the treatment. One hundred and forty four TS were performed in the 72 patients (144 TS, 68.57% of all patients), who responded to the questionnaires formed the data collected in this study.

Of the 72 patients, there were 42 males and 30 females with the age ranging from 17 to 50 years old (mean 31.9 years). Forty five percent of patients had positive family history of hyperhidrosis. Palmar sweating was the presenting sympstom in all 72 patients and was the main complaint of all patients except only two who had severe facial hyperhidrosis where as face, axillae, and feet were affected in 56, 60, and 70 patients respectively. Ten patients had severe concomitant axillary sweating.

To evaluate the amount of sweat changes at various parts of the body before and after operation, the patients were asked to complete a Linear analogue scale which was mailed to them as questionnaires. The scale ranged from 0 to 10, a score of 0 indicated no sweating at rest, and a score of 10 indicated visible sweat droplets at rest. Follow up ranged from 1 to 27 months (mean 9.48 months).

Linear analogue scale and Student's t-test were used for statistical analysis.

Results

The overall results of the treatment are presented by comparing the amount of sweating at particular sites before and after the operation (Table 1 and Figure 1).

Hands Palmar sweating reduced from a mean score of 9.224 to 0.528 after TS in 72 patients ($P<0.001$). The procedure yielded good result in all patients except one with unilateral treatment failure, thus making the effectiveness of TS to reduce palmar sweating up to 99.30 per cent of patients.

Face Facial sweating reduced from a mean score of 5.687 to 1.545 ($P<0.001$) in 56 patients.

Axillae There were 60 patients with concomitant axillary involvement, T2S was performed in 50 patients with clinically mild involvement and T2+3S was performed in 10 patients with severe clinical involvement. For the 10 patients with T2+3S, sweating reduced from a mean score of 8.600 to 3.111 ($P<0.001$), while 50 patients with T2S had their mean scores reduced from

Table 1 Results of treatment

Affected parts	N	Effective No. (%)	Pre-op. Linear score (Ave.)	Post-op. Linear score (Ave.)	P
Hand	72	71 (99.30)	9.224	0.528	<0.001
Face	56	55 (98.21)	5.687	1.545	<0.001
Axilla (T2S)	50	12 (24)	4.720	3.690	NS
Axilla (T2- T3S)	10	10 (100)	8.600	3.111	<0.001
Feet	70	44 (62.85)	8.871	5.115	<0.001

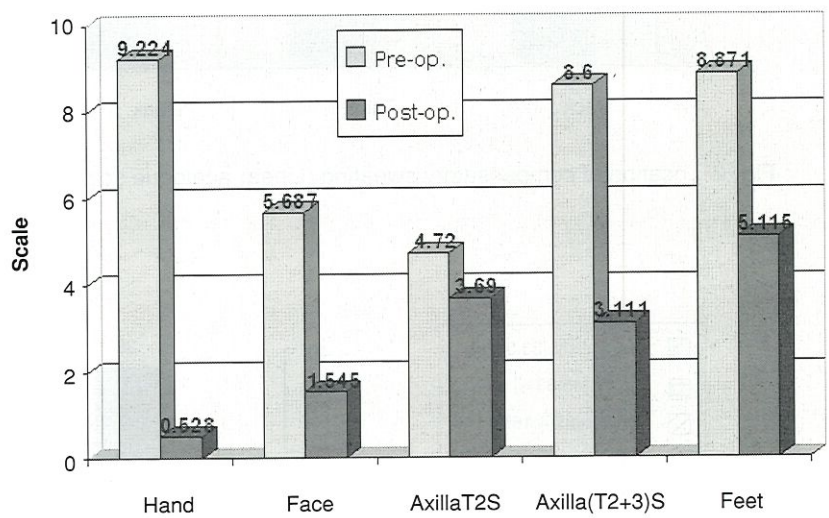


Fig. 1 Location of sweat changed (Linear analogue scale).

4.720 to 3.690 (P=NS). The operation produced a good results in all T2+3S patients compared to 24 percent of the T2S patients.

Feet The operation produced good results in 44 of the 70 patients (62.85 %) with mean score of reduction from 8.871 to 5.115(P<0.001).

Side Effects

Compensatory sweating occurred in 68 patients (94.4 %) with mean score at particular parts of the body as the following (Figure 2):

Abdomen from 2.614 to 7.768 after operation (P<0.001).

Back from 2.690 to 8.135 (P<0.001).

Thigh from 2.732 to 6.318(P<0.001).

Gustatory sweating occurred in one patient (1.39%).

Complications

Prophylactic intercostal drainage after operation was necessary in 7 patients (9.72 %), all were removed within 24 hours. There was one patient with vasomotor rhinitis, one wound infection, one chest pain and none had Honor's syndrome.

Satisfaction to the Operation (Figure 3)

Fifty-seven (79.16 %) of the patients were satisfied with the operation while 12(16.66 %) were dissatisfied due to compensatory sweating in 10,vasomotor rhinitis in 1, and chest pain in 1 patient.

Quality of Life (Figure 4)

Sixty-one (84.72 %) of the patients felt their quality of life markedly improved after the operation

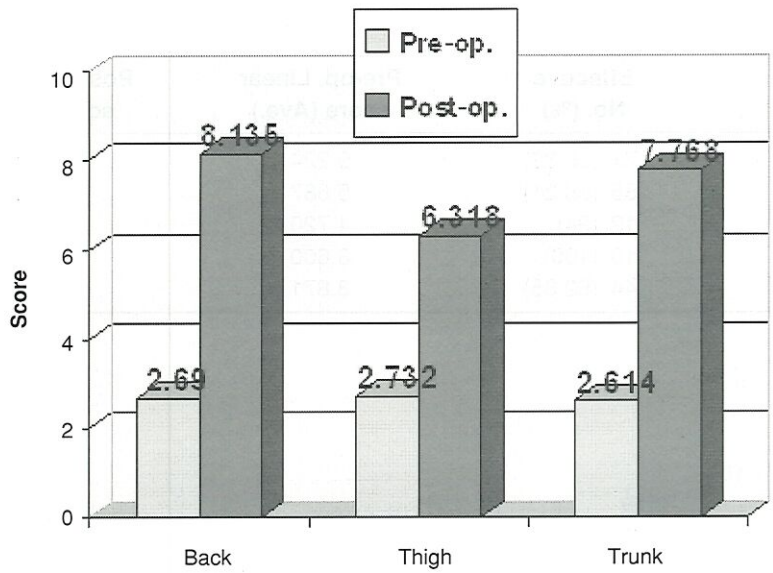


Fig. 2 Location of compensatory sweating (Linear analogue scale).



Fig. 3 Satisfactory of patients operation.

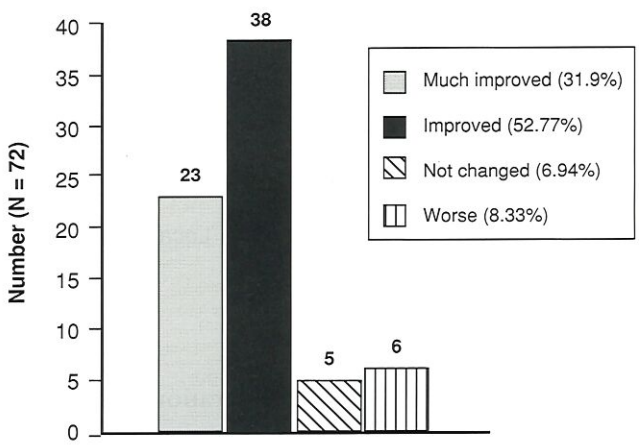


Fig. 4 Post-op. quality of life.

while only 6 (8.33 %) felt worsening due to compensatory sweating.

Discussion

Hyperhidrosis, though not a life threatening condition, can cause severe psychological, social, and occupational distress and inconvenience. The prevalence rate is about 1.0 per cent of the population[4] with positive family history in 30-50 per cent of cases.

Although many conservative therapeutic measures, such as topical agent with aluminium chloride, tap water, iontophoresis[5,6] or botulinum toxin[7] are widely available, all give only temporary control with still certain degrees of inconvenience to the patients. Upper thoracic sympathectomy is accepted as the only effective treatment for the severe cases. The success rates of the procedure have ranged from 94 per cent to 98 per cent.[8,9] More recently, with the development of minimal invasive surgery and video-assisted thoracic surgery, TS has become the treatment of choice for primary hyperhidrosis.

The first thoracic sympathectomy for hyperhidrosis was performed in 1920 by removal of the

inferior cervical ganglion and upper two dorsal ganglions. In 1942, Hyndman OR, et al concluded that only the removal of second dorsal ganglion was necessary for complete upper limb sympathectomy.[10] Since then, dorsal T2 sympathectomy had become the standard surgical approach for palmar hyperhidrosis. The effectiveness of T2S to treat palmar hyperhidrosis in this study was 99.30 per cent, which is comparable to most results in the literatures.

More extensive ablation of sympathetic ganglion is necessary for treatment of severe axillary hyperhidrosis which ranged fromT2-T4 or T2-T6 sympathectomy.[11] However, more extensive ganglionic ablation will cause worsening of compensatory sweating[2,3] which would expect to affect more frequently in Thailand as a tropical country. In order to reduce sweating in patients with severe concomitant axillary hyperhidrosis while keeping the accepted compensatory sweating, T2+3S has been performed instead of T2-T6 sympathectomy in our institute. With T2+3S, the amount of sweat at axilla was significantly reduced in all 10 patients in this study. However, the number of patient is still quite limited and further study is required. In order to avoid compensatory sweating, excision of axillary sweat gland was performed instead of TS in patient with isolated axillary hyperhidrosis in our institute.

It is known that TS can also reduce sweating in pedal hyperhidrosis in some patients ranged from 41.30 per cent to 64.25 per cent by unknown mechanism which is also confirmed by this study. Pseudomotor function of the cerebral cortex that controls the perspiration of hands and feet had been proposed to be the cause of decreasing plantar sweating after transection of the T2 sympathetic chain.[12]

Compensatory sweating is the most common side effect for TS ranging from 48 per cent to 81 percent[5,13] and is expected to be more prevalent in tropical country. Following T2+3S about 40 per cent of the body's sweat function is lost and truncal hyperhidrosis is a compensatory mechanism of thermoregulator.[2] Compensatory sweating tends to increase in response to temperatures. Hsu et al[5] and Kao[14] reported the incidence of 81 per cent and 66 per cent respectively. Varying degree of compensatory sweating occurred in most of the patients in this study and was the major cause of dissatisfaction and worsens quality of life in 16.66 per cent and 8.33 per cent, respectively. However, it is noted that even though the patients who felt dissatisfied to compensatory sweating, half of them felt their quality of life had improved after the operation.

Conclusion

Thoracoscopic sympathectomy is safe and effective for the treatment of upper limb hyperhidrosis. T2+T3 sympathectomies are promising alternative in treating severe concomitant axillary hyperhidrosis. Further study with larger number of patients is necessary. Compensatory sweating does occur in a significant number of patients in this country and is the cause of dissatisfaction to the treatment in some patients. Explanation concerning this side effect before operation should be sought for.

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