Clipping versus Transection in Endoscopic Thoracic Sympathectomy (ETS) as Regards Postoperative Compensatory Sweating (CS)

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ABSTRACT

Introduction: *Endoscopic thoracic sympathectomy has been accepted as the most effective treatment for palmar hyperhidrosis (PH). The present study was done to compare the results achieved by electrocautery transection and clipping with special attention to compensatory sweating.* ***Methods:*** *This prospective randomized study was conducted in Ain Shams University Hospitals from September 2014 to February 2017 and included 16 patients with primary palmar hyperhidrosis. They were randomized into 2 groups; each of 8 patients. In group A; the sympathetic chains with T2 and T3 ganglia were clipped on both sides and in group B, the sympathetic chains and ganglia were ablated bilaterally using electro-coagulation diathermy hook.* ***Results:*** *Highly significant rate of CS in group A versus group B (62% VS 37%) with P value 0.004.* ***Conclusion:*** *Both clipping and cauterization are highly effective for the treatment of PH but clipping had the higher incidence of CS which mostly mild to moderate and theoretically can be reversed.*
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INTRODUCTION

Despite unquestionable and spectacular success of sympathectomy, there is still a group of patients that developed postoperatively intensive sweating of the trunk, known as compensatory or reflex sweating. Though the theories behind the origin of this phenomenon are still unclear. [1] The existence of this side effect of sympathectomy is considered one of the most important limitations of the surgical treatment of primary hyperhidrosis and facial blushing, and it does not seem to diminish with time [2].

Endoscopic transthoracic sympathectomy is a popular surgical technique to treat severe refractory essential hyperhidrosis because it is a safe, effective, and minimally invasive method. However, this is sometimes offset by the development of disturbing side effects, especially compensatory sweating [3].

The term 'compensatory' is largely misleading, as it indicates that there is a compensatory mechanism that takes effect after sympathectomy, in which the body 'redirects' the sweating from the palms or face to other areas of the body. The exact mechanism of the phenomenon is poorly understood.

According to Shelley and Florence [4], postsympathectomy CS serves a thermoregulatory function. Although they did not show it, they suggested that the magnitude of CS reflects the extent of denervation. Based on this theory, several investigators have advocated the use of limited or selective sympathectomy and have reported their midterm results with mixed conclusions. On the other hand, Wilkinson[5] suggested that patients were more likely to have severe CS if their preexisting hyperhidrosis included more widespread pathologic sweating.

Other factors that may account for a high incidence rate of severe CS include hot and humid climate, bilateral versus unilateral sympathectomy[6] and a positive family history[7].

Aim of work:

The aim of this study was to determine is there any relation between method of sympathectomy (clipping versus Transection) with incidence and severity of compensatory sweating

PATIENTS AND METHODS

From September 2014 to February 2017, A total of 16 patients underwent thoracoscopic sympathectomy for primary palmar hyperhidrosis in the surgical department of the Ain Shams University hospitals.

All patients suffered from primary palmar hyperhidrosis that affected their daily activities and all secondary causes were excluded. Also, we excluded patients with facial flushing and isolated axillary hyperhidrosis.

All patients underwent preoperative evaluation that included detailed history taking and physical examination, chest X-ray, pulmonary function tests and other routine preoperative blood tests.

Patients were randomized into 2 groups; each group included 8 patients. In group A, we applied a clip at the desired level and in group B we used electrocautery for division of the chain.

Surgical Technique:

Under general endotracheal anesthesia with double lumen intubation was used and the patient was placed in supine position, patients underwent one-stage bilateral endoscopic transthoracic sympathectomy (T2 to T3). After Verres needle insufflation, insertion of a 10-mm video-telescope via ten mm trocar on the anterior axillary line of the third intercostal space was done and the pleural cavity was inspected for identification of the sympathetic chain lying along the necks of the ribs in the extra-pleural space. 2 more 5 mm ports were inserted in the anterior and the posterior axillary lines of the third intercostal space.

Blockade of the sympathetic chain with titanium clips (figure 1) was performed in Group A while monopolar electrocautery (figure 2) was used for ablation of the sympathetic ganglia in Group B. In the contralateral hemithorax, the same procedure was repeated.

Fig. 1: Thoracoscopic clipping of sympathetic chain.

Fig. 2: Thoracoscopic electrocautery ablation of the sympathetic chain.

Routine chest x-rays were done postoperatively to confirm lung re-expansion.

Follow up:

Follow-up for the occurrence of CS and its severity was performed at 1,6 month intervals and at the end of the first postoperative year. The severity of CS was defined as follows: mild CS as patients who were aware of their increase in sweating and did not have to take any social precautions and had no lifestyle impact; moderate CS were patients who had to take social precautions, such as providing an extra shirt but with no lifestyle impact; and severe CS were patients who not only took social precautions but had a major impact on lifestyle, such as avoiding social functions, change of job and emotional strain.

Data were analyzed using Fisher's and chi-square test. All tests are considered significant if ($p \leq 0.05$).

RESULTS

16 consecutive one-stage bilateral endoscopic transthoracic sympathectomy (T2-T3) were performed. Our study included 11 males and 7 females with average age of 35 years (range 19-51 years). group A (8 patients) underwent chain clipping while group B (8 patients) underwent electrocautery for division of the chain.

There were no operative differences between both groups as regards the average operating time for bilateral sympathectomy, in the clipping group, it was 65 minutes (range 35-90 minutes); while in the electrocautery ablation groups it was 70 minutes (range 40-100 minutes). There were no major intraoperative complications and conversion to open thoracotomy was not required.

50% (8 patients) had CS developed 2 to 8 months after endoscopic transthoracic sympathectomy (table 1). When comparing the results in each group separately, postoperative CS affected 5 patients (62.5%) from group A and 3 patients (37.5%) from group B.

No patients in both groups (0%) judged their compensatory sweating as severe. 4 patients from group A (50 %) and 2 patients from group B (25 %) judged their compensatory sweating as mild CS. One patient in each group (12.5 %) judged his compensatory sweating as moderate CS (table 2)

Table 1: Percentage of CS in All patients.

	No. of patients affected	**%**
CS (in general)	8 patients	50%
Mild CS	6 patients	37.5%
Moderate CS	2 patients	12.5%
Severe CS	No patients	0%

Table 2: Percentage of CS in each group. NS: non-significant. S: significant.

	Group A	**%**	**Group B**	**%**	**P value**
CS (in general)	5 patients	62.5%	3 patients	37.5 %	0.004 (S)
Mild CS	4 patients	50 %	2 patients	25%	0.011 (S)
Moderate CS	1 patient	12.5 %	1 patient	12.5 %	1.0 (NS)
Severe CS	No patients	0%	No patients	0 %	1.0 (NS)

DISCUSSION

Hyperhidrosis which is relatively a frequent disorder which is not a life-threatening disease, but represents an extremely uncomfortable situation that can cause deep social and psychological problems [8,9].

Endoscopic thoracic sympathectomy offers a safe procedure with simple, precise and reliable access to the sympathetic chain and can be performed by many techniques including excision of the sympathetic chain and T2 and T3 ganglia or ablation by electro-cautery, harmonic scalpel, radiofrequency, laser or interruption of the trunk by titanium clips [8,9,10].

Compensatory sweating is one of the most troublesome and commonly noted complications after thoracic sympathectomy. The reported incidence rate of CS after thoracic sympathectomy varies from 24% to 98.6%, [11] The variability of the reported incidence of compensatory sweating could reflect the heterogeneity of the population, different surgical procedures being performed, or perhaps a consequence of different definitions of compensatory sweating.

Disruption of the sympathetic ganglia by electrocautery or clipping is highly effective for relief of palmer hyperhidrosis, but it is irreversible in the event of severe compensatory sweating as regard the electrocautery ablation but theoretically, clipping the sympathetic chain has the potential for reversibility by removing the clips. Therefore, the clipping technique has become more popular [12].

In our study, the incidence rate of CS was 50% but the incidence is significantly more in sympathectomy using clipping technique (group A) than sympathectomy using Transection technique (group B).

Whitson [13] reported 30 % incidence of CS post sympathetic chain clipping vs 17% post sympathetic transection. In our study, the incidence of CS was 62% post clipping vs 37% post transection with P value 0.004 (highly significant).

CONCLUSION

Compensatory sweating was the most common long-term complication of thoracodorsal sympathectomy for primary hyperhidrosis. Its incidence and severity might be related to the technique of the sympathectomy.

It seems that CS is significantly more common with sympathectomy clipping than transection, however much more researches should be done to give more supportive evidence.

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