Egyptian Journal of Surgery Vol. (22), No. (3), July, 2003

SEQUENTIAL THORACOSCOPIC SYMPATHECTOMY FOR PALMAR HYPERIDROSIS LIMITS COMPENSATORY AND IMPROVES PLANTAR HYPERIDROSIS

By
Mosaad Soliman, Ayman Salem,Essam Hammad and Mohamed Noor
Mansoura University Hospital, Vascular Surgery Unit. Zagazig University Hospital,Vascular Surgery Unit.Menofia University Hospital. Mansoura Insurance Hospital

Palmar hyperidrosis is excessive sweating beyond physiological needs in the palm without recognized etiology. Although a benign disease, it is annoying to most patients. Currently the best treatment for this condition is upper thoracic sympathectomy via many different approaches. The video-thoracoscopic approach has been recommended as a minimally invasive procedure and universally accepted as an effective and enduring treatment for primary hyperidrosis. However, the simultaneous ganglionectomy for bilateral cases has been reported to be associated with a troublesome compensatory hyperidrosis in between 22% and 81% of patients. In this prospective study, 2-months interval of sequential ganglionectomy was carried out in 30 consecutive children between 4 and 16 years of age (group A); whereas simultaneous bilateral sympathectomy was done in 18 patients (group B) Unilateral sympathectomy was accomplished generally within 7 minutes. All patients but 4 were discharged after an overnight stay. None of the patients required conversion to open sympathectomy. Horner's syndrome did not occur in any case. Compensatory hyperidrosis did not develop in any of the patients of group A but in all patients of group B, moreover this technique was proved to be useful in up to 60% of patients associated with plantar hyperidrosis. Conclusion : 1- Based on the accumulated experiences, it is justified to recommend early surgery even in the preschool age 2- Sequential ganglionectomy should be the standard practice in the management of primary hyperidrosis 3- The mechanism of improvement in plantar hyperidrosis following sequential sympathectomy still needs to be clarified in a larger study

Keywords: Sequential - Thoracoscopic - Sympathectomy

INTRODUCTION

Palmar hyperidrosis (PH) has a strong negative effect on patients' social and professional lives and may interfere with functional activities for many patients [1] Adar estimated an incidence of 0.6% to 1% [2] PH often starts in childhood or adolescence [3,4] However, they may persist through adult life and cause a long-term problem. The existing nonoperative therapeutic options, such as systemic anticholinergic drugs, topical astringents or absorbing powders, 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 PH because it is safe, effective, minimally invasive, and time saving method [5,6] since the introduction of TES, the procedure has become safer, with fewer general surgical complications [7,8] The commonest of these complications is the compensatory hyperidrosis (CH). This report addresses the effect of sequential sympathectomy on the sequelae of sympathetic denervation, notably compensatory and plantar hyperidrosis

PATIENTS AND METHODS

Thirty patients with primary PH (group A) were subjected to sequential TES (T2–T3 ganglionectomy, 2 months interval between the two operations) (Fig 1). This group of patients was compared to 18 patients (group B) for whom simultaneous bilateral TES was done. The patients had received complete follow-up assessments for a period of 4-26 months. There were 26 male and 22 female

patients, with an average age of 19.3 years. None of the patients had undergone a previous hyperidrosis operation. Thirty four patients (71%) experienced excessive sweating since childhood and the remaining since their adolescence. Thirty nine patients (81%) complained of plantar hyperidrosis associated with PH. Five patients (10.4%) suffered from mild and eight (16.6 %) from moderate hyperidrosis whereas 35 patients (93%) were classified as having severe hyperidrosis (Table 1). TES was done under general anaesthesia; double–lumen endotracheal was used in all patients. Throughout the procedure, the patients' lungs were ventilated with 100% inspired oxygen. Peripheral arterial oxygen saturation (SaO2) was monitored with a pulse oximeter to prevent hypoxemia. All patients were placed in a supine position with both arms abducted by 90 degrees. A 0.8-cm incision at the third intercostal space was made in the anterior axillary line through which a surgineedle (United states surgical corporation, Norwalk, CT) was inserted. Thereafter, artificial pneumothorax was produced with air injection into the thoracic cavity. A O-degree thoracoscope (Solos company, USA) , 8 mm , was introduced into the pleural cavity through an obtuse head trocar. Sympathetic ganglia and trunks were identified on a television monitor through a camera video system. The sympathetic trunk and any Kuntz fibers were then transected at the second and third rib bed with conventional electrocautery introduced through a 5-mm trocar inserted in the fifth intercostal space in the midaxillary line. After adequate sympathectomy, the lung was reinflated under visual control. Five milliters of xylocain 2% were then injected in the pleural space through the trocar. The anaesthiologist is asked to exert continuous positive pressure for few seconds while the skin is closed to prevent residual air within the pleural cavity and to avoid incomplete lung expansion. Routine chest X-ray was done postoperatively to rule out hemopneumothorax or incomplete lung expansion. All patients but 4 were discharged next day to be scheduled for the operation of the other side two months later.

RESULTS

Transthoracic endoscopic sympathectomy was generally performed within 7 minutes (range 5-18 minutes) unless severe pleural adhesions were encountered. Incidental findings during operation included pleural adhesions (6 cases 12.5%), aberrant venous arch draining to the superior vena cava (1 case), prominent aortic knob overlying the sympathetic chain (1 case). In group A of sequential approach, successful unilateral sympathectomy was achieved in all patients. However, the success rate of dryness of both hands after simultaneous TES in group B was 94.4%. One patient failed to relieve the excessive sweating. The reason for this failure was the incompleteness of the sympathectomy because of the thickened preganglionic adipose tissue. In group A, none of the patients developed compensatory hyperidrosis (Fig 5) Moreover, 18 patients (60%) had simultaneous disappearance or decreased perspiration on the soles. In group B, all patients complained of compensatory sweating, and most of them suffered from moderate (50%) to sever (23.7%) CH (Table 2). All patients with severe palmar hyperidrosis before surgery developed severe CH after sympathectomy. CH frequently appeared on the back (Fig 6) and less often on the chest & thighs (Fig 7). This side effect often developed within one month after sympathectomy. The surgical complications were minimal with 2 pneumothorax, 1 pleural effusion and one segmental lung atelectasis that required thoracostomy tube drainage for 2 days. One patient developed severe bradycardia during the inflation of pleural space mostly because of inadvertent elevation of pressure and got improved once pressure is released. Neither permanent nor transient Horner's syndrome occurred in any patient. Eighty nine patients were satisfied with the operative results. However, 5 patients were dissatisfied and regretted doing the operations. These patients were unable to accept the consequences of CH, even though their palms had become dry postoperatively.

Table (1): ***Grading of palmar hyperidrosis and the associated plantar hyperidrosis***

Grading	*Group A*		*Group B*	
	No. of patients	Associated PL H		Associated
mild	3	1	2	1
moderate	5	4	3	1
severe	22	22	13	10

PL H; Plantar hyperidrosis

Table (2): ***grading of compensatory hyperidrosis in group B***

Grading	No. of patients	%
mild	4	22.3
moderate	9	50
Severe	5	27.7

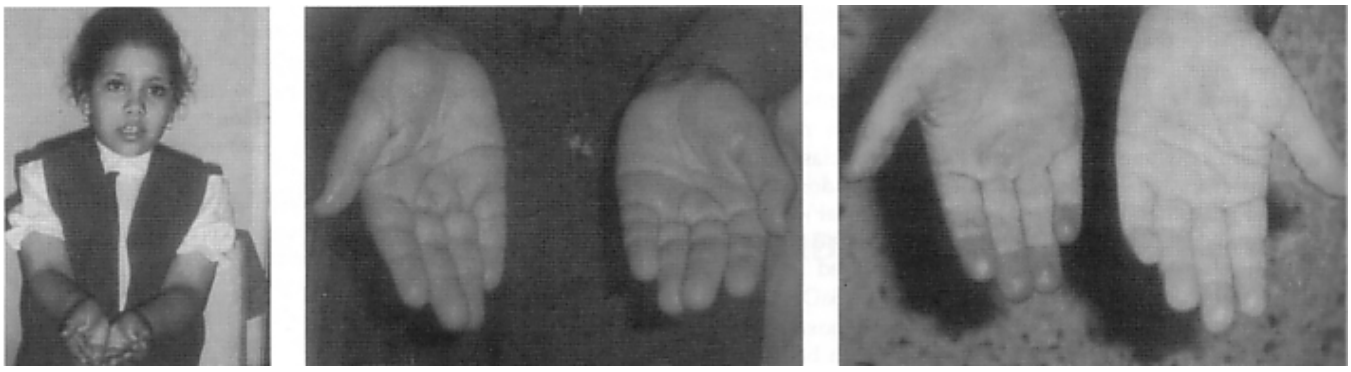

Fig.(1): a. 6- years old child with palmar hyperidrosis b. moderate degree of palmar sweating C. dry right hand after unilateral sympathectomy and wet left hand.

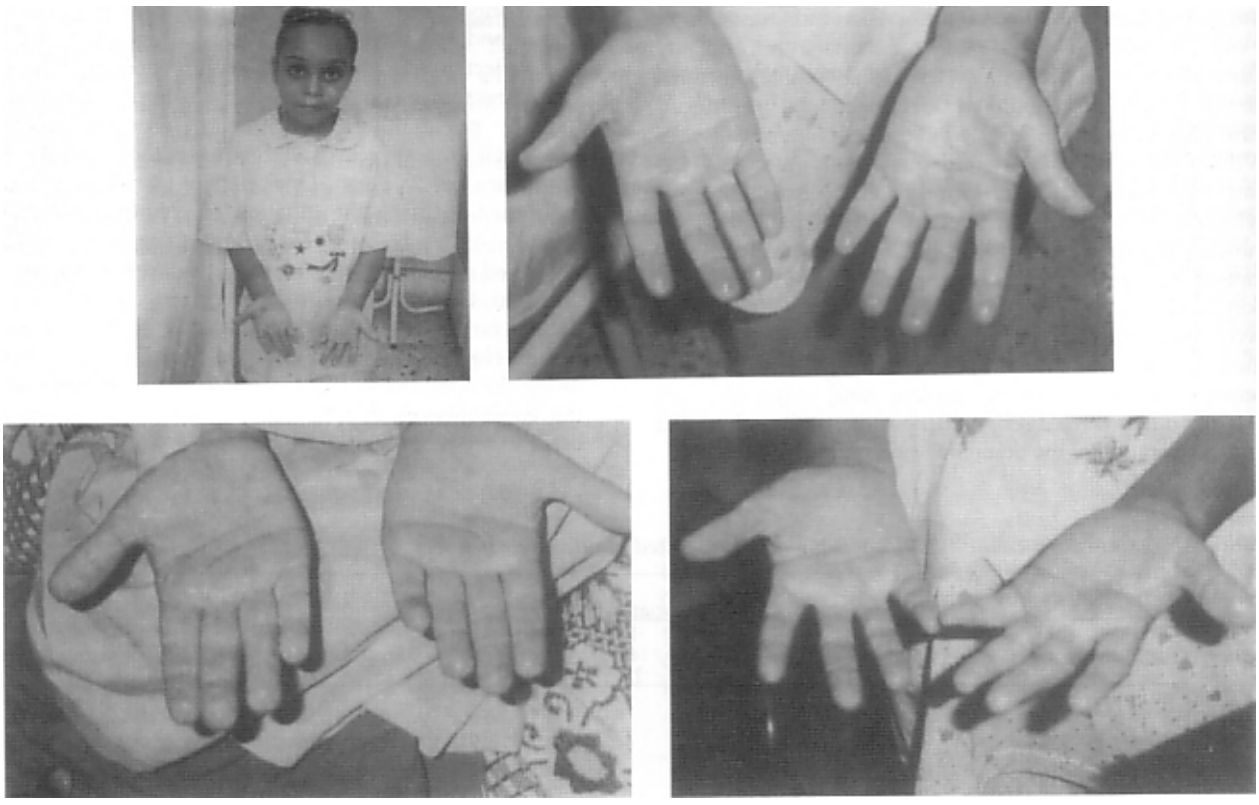

Fig. (2): a. 8- years old child with palmar hyperidrosis b. severe degree of palmar sweating C. dry left hand after unilateral sympathectomy and wet right hand d. dry both hands after 2- months sequential sympathectomy.

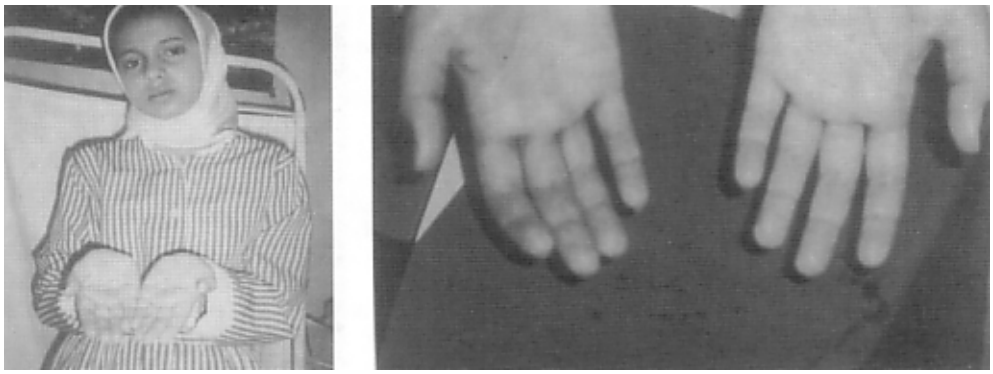

Fig.(3): a. 12- years old child with palmar hyperidrosis b- dry right hand after unilateral sympathectomy and wet left hand.

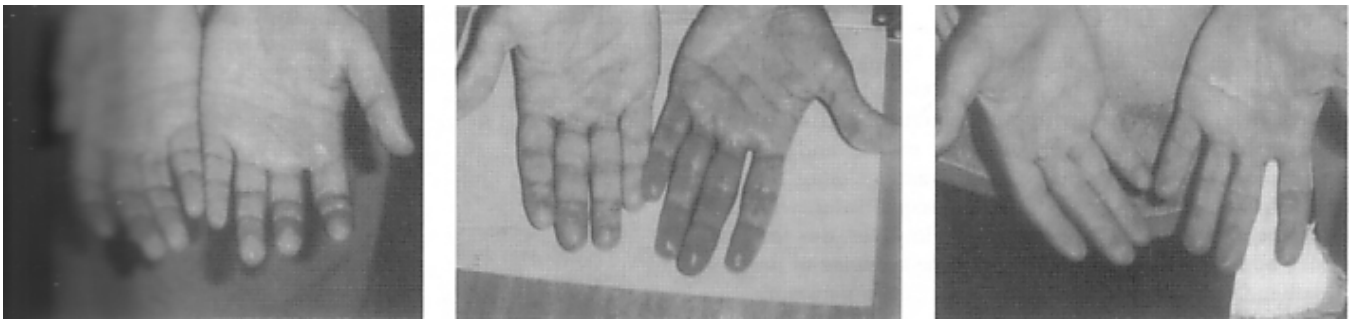

Fig.(4): a. 15 years old child with palmar hyperidrosis b- dry right hand and wet left hand following unilateral sympathectomy C- dry both hands after completion of the second stage.

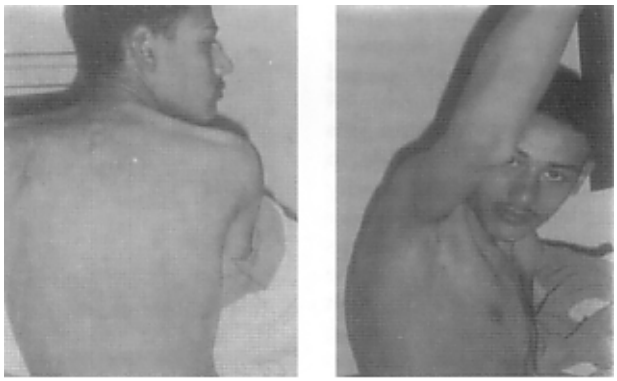

Fig.(5): Absence of compensatory hyperidrosis in the trunk (a) and chest (b) following sequential sympathectomy.

Fig. (6) . compensatory hyperidrosis of the trunk.

Fig.(7): Compensatory hyperidrosis of the chest and thigh

DISCUSSION

The commonest indication for upper dorsal sympathectomy is palmar hyperidrosis [9,10] when severe palmar sweating interferes with daily activities and social contacts, surgical removal or ablation of T2 and T3 sympathetic ganglia will stop palmar sweating. Since the introduction of TES, the procedure has become safer, with fewer general surgical complications [7,8] However, this less invasive approach has had no effect on the sequelae of the sympathetic denervation such as compensatory hyperidrosis, phantom sweating and cardiovascular reactions [11] The commonest of these complications is the compensatory increase in sweating in other areas of the body, notably chest, abdomen and buttocks. It occurs to some extent in most patients, the reported incidence varying with the intensity of questioning and the thoroughness of the follow-up examination. In the present study, compensatory hyperidrosis developed in all patients of group B which agreed with many other authors who regard CH as a common postsympathectomy complication [2,4,5,12,13] the cause of this compensatory response is obscure. This might be related to the mechanism of heat regulation [14]. No definite relationships were determined between the severity of CH and the family history or the extent of PH before surgery [15]. In other reports[3,16], the incidence of CH was lower than in group B of our series. It is possible that the hot and humid climate in Egypt may be a factor in the high incidence of CH in our series. It was proposed that sweating of innervated skin in the trunk and thighs increased to compensate for the abolished thermoregulatory function of denervated palms. Several efforts had been exerted to avoid the morbidity of CH following TES. It is well known that T2 is the key ganglion responsible for the palmar sweating. Ablation of T2 ganglion results in dryness of the palms. Many authors [17,18] concluded that the incidence of CH was correlated with the extensiveness of the sympathectomy. O'Riodrain et al [19] postulated that the low incidence of compensatory sweating might be explained by the limited extent of the sympathectomy and advocated that limited sympathectomy might minimize the incidence of CH. However, Lai et al [15] did not show a significant difference in the incidence of CH between T2 and T2-T3 sympathectomy groups. In the present study, sequential sympathectomy resulted in control of CH and improvement of associated plantar hyperidrosis. This can be explained by the alteration of the quantitative distribution of thermoregulatory sweating in response to external heat following removal of T2-T3 ganglia. In other words, unilateral sympathectomy results in switch of the thermoregulatory sweating to the contralateral hyperidrotic upper limb being flooded with the most ready sweat glands that can accommodate this extrasweating. Meanwhile, downregalation of sweating in the trunk and lower limbs will be the counterpart of extrasweating in the hyperidrotic upper limb. Two months later, when the contralateral limb is denervated, the end result will be dryness of both upper limbs and downregulation of sweating in the innervated trunk and lower limbs. It is noteworthy that, upregulation of sweating in the deferred limb may pass unnoticed by the patient as we usually start with dominant hand so upgrading from mild to moderate or severe hyperidrosis in the non-dominant hand did not attract the patients´ attention.

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