VIDEO-ASSISTED THORACOSCOPIC SYMPATHECTOMY FOR PRIMARY PALMAR HYPERHIDROSIS: SHORT-TERM RESULTS

Hany Mohamed El-Rakhawy, MD
Department of Cardiothoracic Surgery, Faculty of Medicine, Benha University

Abstract

Objectives: To evaluate the effectiveness of thoracoscopic sympathectomy at level of T2 and T3, for treatment of primary palmar hyperhidrosis and to evaluate the short term results of the procedure regarding the recurrence and complications.

Patients & Methods: The study included 24 patients complaining of severe palmar hyperhidrosis, the study conducted at Department of Cardiothoracic Surgery, Benha University Hospital since Jan 2008 till Jan 2010 to allow a minimum follow-up period of 6 months from the last case operated upon. After doing the routine laboratory work and chest x-ray for all patients, they were operated under general anesthesia with single lumen endotracheal tube, using three ports, the patients were operated thoracoscopically by cauterizing and dividing T2 and T3 ganglia.

Results: The study included 17 males and 7 females with mean age of 23.9±4.1; ranged from 18 to 33 years. Bilateral sympathectomy done for 79.2% of patients and unilateral right sided done for 20.8%. In 83.3% of patients there were no intraoperative, nor early postoperative complications. 4.2% of patients complicated intraoperatively by injury and bleeding from the 3rd intercostal vein. 8.3% of patients complicated by pneumothorax postoperatively. 4.2% of patients complicated by right sided Horner’s syndrome. Hospital stay ranged from 1 to 7 days with mean of 2.25 ±1.6 days. Follow-up monthly for 6 months showed no recurrence of palmar hyperhidrosis and 37.5% of patients complained of compensatory sweating.

Conclusion: Thoracoscopic sympathectomy had excellent results in treating palmar hyperhidrosis with no recurrence on short term follow-up. The only undesirable effect of the procedure is the compensatory sweating which affected more than one third of the patients.

Keywords: Sympathectomy, Thoracoscopic, palmar hyperhidrosis.

Introduction

Primary palmar hyperhidrosis (PPH) is a condition marked by excessive sweating beyond physiologic need, and is aggravated during periods of stress and anxiety. The true etiology of PPH remains unknown, and it is suggested to result from overactivity of the sympathetic nervous system. Patient symptoms generally begin in childhood or early adolescence, around the time of
puberty, and rarely improve with age. The degree of sweating is variable, ranging in severity from moderate moisture to severe dripping. Epidemiologic survey indicates that severe primary palmar hyperhidrosis was found in 0.37% of adolescents and it may pose serious psychological, social, occupational, and learning problems for many students and adults. (Li et al., 2008 & Dewey et al., 2006 & Lin, 2001 & Tu et al., 2007)

Different non-surgical modalities tried to treat palmar hyperhidrosis but non of them had satisfactory results, among these methods; topical agents that contain aluminum chloride. (Krasna et al., 2008)

Iontophoresis; by exposing hands to direct current between 0.5 and 20 mA. In this method, both hands immersed in tap water in pronated position; the palms are placed flat and in contact with a felt pad that connected to the anode. The cathode is placed on the elbows. A pulsed direct current of a 900-ms pulse width and a 100-ms rest period are used to minimize the risk of burn. Treatment administered for 20 minutes per session, with three sessions a week, for 6 weeks. (Chan et al., 1999) The effects generally wane over time, and patients often complain of inability to tolerate the "shock" sensation.  

Oral agents such as anticholinergic agents and beta-blockers may have some chance of success in treating hyperhidrosis; however, the duration of these effects may be short and these drugs carry significant side effects. (Krasna et al., 2008 & Luh JY and Blackwell, 2002)

Intradermal injection of the palms of the hands by botulinum toxin type A in a dose of 30 to 100 U per hand; however, this technique is extremely expensive, very uncomfortable, and the effect often lasts only 3 to 6 weeks, even when successful. (Saadia et al., 2001 & Krasna et al., 2008)

Surgical treatment of palmar hyperhidrosis in the form of thoracic sympathectomy has been known for years to be the most effective treatment with reported success rates of 94% to 98%. For palmar hyperhidrosis sympathectomy done at level of T2-T3 ganglia. Thoracic sympathectomy can be done through open thoracotomy or thoracoscopy. With the advance of minimally invasive surgery and video-assisted thoracic surgery, endoscopic thoracic sympathectomy has become the treatment of choice, as open thoracotomy is accompanied by a prolonged recovery period and significant morbidity including Horner's syndrome. (Doolabh et al., 2004 & Moya et al., 2004 & Gossot et al., 1997)

Patients & Methods

This is a prospective study conducted at Department of Cardiothoracic Surgery, Benha University Hospital since Jan. 2008 till Jan. 2010 to allow a minimum follow-up period of 6 months for the last case operated upon. All patients complained from sever palmar hyperhidrosis. After clinical evaluation, plain chest X-ray done for all patients to exclude any pulmonary and/or pleural pathology. Complete laboratory assessment in the form of CBC, complete coagulation
profile, liver function tests and kidney function tests done for all cases. ECG and Echocardiography done for selected cases.

Operative technique:

Patient placed in supine position and under general anesthesia a single-lumen endotracheal tube inserted, a small roll is placed transversely behind the scapulae to slightly elevate the axilla and arms are abducted to 90-degrees. In patients for whom bilateral sympathectomy was done, the right side done first.

Three incisions made for insertion of the ports, a 10mm skin incision is made just lateral to the anterior axillary fold in the 4th intercostal space, dissection done by mosquito forceps till reaching the intercostal pace, the anesthetist is asked to disconnect the ventilator from the endotracheal tube then the intercostal space dissected and the pleura entered, the anesthetist is asked to reconnect ventilator to the endotracheal for resuming ventilation, through this incision the first port placed for the camera and along the side way of the port CO$_2$ insufflated at rate of 0.5 L/min for sustained intrathoracic pressure of 6 mmHg, this offers better visualization of the thoracic cavity by increasing the lung collapse, a 30-degree endoscope inserted through this port, the camera is connected to the video and the interior of the thoracic cavity is inspected. The second port placed through a 5mm incision made in the infra-mammary fold in the midclavicular line for hook and scissor. The third port placed through a 5mm incision made in the infra-mammary fold midway between the previous two ports for grasper.

The sympathetic chain is identified by being a longitudinal structure overlies the rib heads as they articulate with the spine. Stellate ganglion is identified to be avoided, it lay on the 1st rib and always covered by a pad of fat (**Figure-1**).

![Figure (1): The stellate ganglion is identified by the pad of fat overlying it (marked by dots).](image)
The pleura below it is grasped and incised (Figure-2), to expose the 2\textsuperscript{nd} ganglion that overlay the 2\textsuperscript{nd} rib, the ganglion is elevated by a hook (Figure-3), to be cauterized and cut from its upper end by electro-cautery and same is done for the 3\textsuperscript{rd} ganglion which is cauterized and cut from its lower end, finally the lateral fibers arising these ganglia are cut by electrocautery to cut Kunt's fibers.

Figure (2): Grasping and incising the pleura just below the stellate ganglion.

Thoracic cavity inspected to assure hemostasis and chest tube connected to underwater seal is placed through the first incision, the other two incisions closed by 0 silk stitches. The same technique done on the left side in cases for whom bilateral sympathectomy was done.

Figure (3): Elevating the ganglion by hook
Results:

The study included 24 patients; 17 males and 7 females with mean age of 23.9±4.1; ranged from 18 to 33 years. Bilateral sympathectomy done for 19 (79.2%) patients and unilateral right sided sympathectomy done for 5 (20.8%) patients.

Operative time ranged from 18 to 47 minutes with mean of 35.9±8.9 minutes, the mean operative time for patients of bilateral sympathectomy was 39.2±5 minutes while the mean operative time for patients of unilateral right sided sympathectomy was 23.6±9.8 minutes.

In 83.3% (n=20) of patients there were no intraoperative nor early postoperative complications. One patient (4.2%) complicated intraoperatively by injury and bleeding from the 3rd intercostal vein, the amount of blood lost was 150 ml, the bleeding controlled thorascopically by coagulating the two ends of the vein, the patient was hemodynamically stable and there was no need for blood transfusion. 8.3% (n=2) of patients had pneumothorax postoperatively in spite of the presence of the chest tube. After chest physiotherapy and physical exercise the pneumothorax resolved on the 4th and 5th days.

One patient (4.2%) complicated by right sided Horner’s syndrome which resolved spontaneously on the 3rd postoperative day after removal of the chest tube. Table (1); shows intraoperative and early postoperative complications.

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</table>

Table (1): Intraoperative and early postoperative complications.

After sympathectomy there was immediate intraoperative improvement in all patients regarding coldness and sweeting of the ipsilateral hand. No cases converted to open thoracotomy. There was no intraoperative nor postoperative mortality.

Chest tube stay ranged from 1 to 6 days with mean of 2 ±1.4 days. Hospital stay ranged from 1 to 7 days with mean of 2.25 ±1.6 days.

Follow-up monthly for 6 months showed that 37.5% (n= 9) of patients complained of compensatory sweating, that was evident from the first visit. One of these patients had to change
his clothes during the day because of the severity of the compensatory sweating. However, the
degree of compensatory sweating considered acceptable the other 8 patients.

Discussion:

Thoracoscopic sympathectomy have been well known procedure for hyperhidrosis since
the early nineties. Surgical techniques vary in different hospitals.(Sung et al., 2000)

This study included 24 patients for whom 43 thoracoscopic dorsal sympathectomies
done. In 5 patients unilateral right sided sympathectomy and in 19 patients bilateral
sympathectomy done.

In this study single lumen endotracheal tube used with insufflation of CO₂ at rate of 0.5
L/min for sustained intrathoracic pressure of 6 mmHg and this did not affect the hemodynamics;
the same technique used by El-Dawlatly et al., in a similar study include 125 patients, in 57 of
them single lumen endotracheal tube used with intrathoracic CO₂ insufflation at a rate of 0.5-1
L/min for sustained intrathoracic pressure of 6 mmHg with adequate oxygenation, and perfect
hemodynamic.(El-Dawlatly et al., 2002)

In this study, Operative time ranged from 18 to 47 minutes with mean of 35.9±8.9
minutes, the mean operative time for patients of bilateral sympathectomy was 39.2±5 minutes
while the mean operative time for patients of unilateral right sided sympathectomy was 23.6±9.8
minutes. This operative time was much more than that reported by Georghiou et al., in a study
included 176 patients the mean operative time per side was 9 minutes, and less than that reported
by Goh et al., who reported a mean operative time of 56 minutes in a study included 35
patients.(Georghiou et al., 2004 & Goh et al., 2000)

In 83.3% (n=20) of patients there were no intraoperative nor early postoperative
complications. One (4.2%) patient complicated intraoperative by injury and bleeding from the
3rd intercostal vein, the amount of blood lost was 150 ml, the bleeding controlled
thoracoscopically by coagulating the two ends of the vein, the patient was hemodynamically
stable and there was no need for blood transfusion. Gossot et al., in a similar study included 467
patients there were 25 cases (5.3%) of bleeding (300 to 600 mL) during dissection of the
sympathetic trunk due to injury to an intercostal vein; in all cases bleeding controlled
thoracoscopically.(Gossot et al., 2001)

In this study two (8.3%) patients had pneumothorax postoperatively in spite of the
presence of the chest tube. Chen et al., reported the occurrence of pneumothorax in 11.1% (n=5)
of patients in a study included 45 patients. In this study the pneumothorax resolved on the 4th and
5th days after chest physiotherapy and physical exercise.(Chen et al., 2009)

Only one patient in this study complicated by Horner’s syndrome. Singh et al., in a
similar study included 567 patients, only one patient developed a unilateral Horner’s syndrome
on the first postoperative day; it resolved spontaneously within 6 months. (Singh et al., 2006) In this study Horner’s syndrome resolved spontaneously on the 3rd postoperative day after removal of the chest tube which indicate that the tip of the chest tube was compressing the stellate ganglion and was not due to injury of the stellate ganglion. Kaya et al., in a study included 933 patients of different thoracic procedures, detected Horner's syndrome in twelve patients (1.3%). Chest tube pressure was etiologic factor in five patients. (Kaya et al., 2003)

All patients included in this study showed immediate intraoperative improvement in the form of dryness and warmth of the ipsilateral hands. There was no intraoperative nor postoperative mortality.

Although Wait et al., reported no patient required chest tube drainage in a similar study included 44 patients, in this study chest tube inserted for fear of development of pneumothorax. Chest tube stay ranged from 1 to 6 days with mean of 2 ±1.4 days and this also was much than that reported by Lardinois and Ris who reported the mean time for chest tube removal of 6 hours in a study in included 37 patients. (Wait et al., 2010 & Lardinois and Ris, 2002)

Hospital stay in this study ranged from 1 to 7 days with mean of 2.25 ±1.6 days and this was more than that reported by Wait et al., who reported a mean hospital stay of 0.5 days in a similar study included 322 patients for whom 642 procedures of thorascoscopic sympathectomies were done. Also hospital stay in this study nearly double that reported by Matthews et al., who reported a mean postoperative stay of 1.2 days in a similar study included 18 patients. (Wait et al., 2010 & Matthews et al., 2003)

In this study follow-up monthly for 6 months showed that 37.5% of patients complained of compensatory sweating on the chest, back, abdomen and thigh, the degree of compensatory sweating does not show improvement throughout the follow-up period this result is close to that obtained by Kwong et al., in a similar study included 202 patients compensatory sweating was found in 40% (n=81) of the patients. also regarding this point the results of this study was better than that obtained by Rodríguez et al., who reported the appearance of compensatory sweating in 55% of patients in a similar study included 406 patients. (Kwong et al., 2005 & Rodríguez et al., 2008)

Conclusion

Thorascoscopic sympathectomy by cauterizing and cutting T2 and T3 ganglia is safe, relatively easy procedure, with few intraoperative and early postoperative complications. The results of thorascoscopic sympathectomy in treating palmar hyperhidrosis are excellent, and follow-up till 6 months postoperatively show no recurrence of the palmar hyperhidrosis. The only noted undesirable effect of thorascoscopic sympathectom is the compensatory sweating which affects more than one third of the patients and do not fade by time throughout the 6 months of follow-up.
References:


