Original Article

Access this article online
Website: www.afrjpaedsurg.org
DOI: 10.4103/0189-6725.99402
Quick Response Code:

Thoracoscopic sympathectomy ganglia ablation in the management of palmer hyperhidrosis: A decade experience in a single institution

Dragan Kravarusic, Enrique Freud

ABSTRACT

Background: Hyperhidrosis can cause significant professional and social handicaps. Surgery is the preferred treatment modality for hyperhidrosis. There has been evolution in the surgical management of hyperhidrosis. This study evaluated the place of minimally invasive surgical approach and its long-term outcome in the management of hyperhidrosis. **Patients and Methods:** A 10-year prospective study of all children and adolescents who underwent thorascopic sympathectomy at the Schneider Children's Hospital of Israel. Data were validated for the procedure and analysed for outcome of procedure. **Results:** There were 148 patients, 66 were males and 82 were females, with a median age of 13.8 SD ± 4.0 years. Two hundred and ninety-six thoracopic sympathectomies were performed with no conversion to open procedure. The mean operation time was 18 min. Ninety-five per cent of the patients were discharged the next day with a mean hospital stay of 1.2 days. Postoperative complications included segmental atelectasis in seven (4.72%) patients, pneumothorax in two (1.35%) and transient unilateral Horner's syndrome in one (0.67%). Seventy-one (38.8%) experienced some form of compensatory hyperhidrosis. Complete relief of palmer hyperdidrosis was achieved in all patients (mean follow-up = 5.03 ± 1.76 years). The outcome was very satisfactory in 91 (61.5%) and satisfactory in 48 (32.4%). Only nine (6.1%) were not satisfied with the outcome. **Conclusion:** Thorascopic sympathectomy provides effective and satisfactory cure for palmer hyperhidrosis with acceptable complication rate and excellent satisfactory outcome. There is a possibility of compensatory sweating in some individuals.

Key words: Hyperdirosis, thorascopic sympathectomy, treatment

Department of Pediatric Surgery, Schneider Children's Medical Center of Israel, Rabin Medical Center, Petach Tikva, Israel

Address for correspondence:
Dr. Dragan Kravarusic,
Department of Pediatric Surgery, Schneider Children's Medical Centre,
14, Kaplan St., Petach Tikva 49202, Israel.
E-mail: dkravarusic@yahoo.com

INTRODUCTION

Hyperhidrosis may be defined as excessive sweating beyond that required to cool the body, and which interferes with the patient's social activity or work.[1,2] Great majority of hyperhidrosis in pediatric and adolescent population is idopatic in nature with unknown etiology. There have been many reports discussing the probable mechanism of hyperhidrosis, but the exact cause is unknown, and the anatomy of the sympathetic outflow to the upper extremities remains controversial.[3,4] With a prevalence of 0.6−1.0% in young population,[5-6] hyperhidrosis can be cause of significant professional and social handicaps.[1,2]

There has been an evolution in the surgical management of hyperhidrosis. The treatment of choice for primary, palmar hyperhidrosis is surgical. Traditionally, this involves thoracic upper dorsal sympathectomy performed by surgical thoracotomy;[7] however, because this method is an extensive procedure associated with an unacceptable morbidity and recurrence rates, the open method has been supplanted by thorascopic approach which is now the gold standard for treatment of palmar and axillary hyperhidrosis.[8-10]

Reports in past decade reflect the resurgence of interest in endoscopic surgery, including thoracoscopic surgery, in the treatment of hyperhidrosis disorders. This study reports our experience with thorascopic management of hyperhidrosis and its long-term outcome.

PATIENTS AND METHODS

This was a 10-year retrospective study of all children and adolescents who underwent thorascopic sympathectomy at the Schneider Children's Hospital of Israel between 1995 and 2006. All patients who suffered from palmar and axillary hyperhidrosis were recruited for the study. Patients either had T2-3 sympathectomy

if the hyperhidrosis is limited to the palm (Group A), or extended T2-4 sympathectomy if the hyperhidrosis also involves the axilla (Group B). Patients were followed-up for between 6 months and 7 years. Data were derived from clinical examinations and/or telephone interviews. Clinical outcome questionnaires were administered to patients, collected by stuff other than treating surgeon, and retrospective analysis was performed. Patients were also evaluated for their perception of the procedure and the outcome of their clinical symptoms. Data generated were validated for the procedure and analysed for outcome of procedure.

We adopted with minimal variations technique described by Cohen *et al*. The operation was performed bilaterally, sequentially, under general anesthesia, with endotracheal intubation. The patient was placed in supine position, slightly elevated at the shoulders with both arms abducted to 90 and 45° head up position. The skin of the chest and axillae was disinfected and draped widely in case conversion to open thoracotomy became necessary. A 10 mm anterior-axillary incision was made in the third or fourth intercostal space [Figure 1]. The anestesiologist was requested to stop ventilation for a few seconds while a 10 mm trocar was inserted carefully and trough it 10 mm 0° operating thoracoscope with a built-in working channel was introduced [Figure 2]. Carbon dioxide was insufflated up to a pressure of 10−12 mmHg.

The sympathetic chain was easily identified under the parietal pleura, running vertically over the necks of the ribs in the upper costo-vertebral region [Figures 3 and 4]. The grasping forceps, connected to electrocoagulation, was introduced through the working channel and the sympathetic chain was coagulated at the level T2-3. In cases with axillary hyperhidrosis, the T4 ganglion was ablated as well [Figure 5]. To avoid bleeding, the sympathetic chain should be elevated from its bed and then coagulated until complete discontinuity of the chain was achieved. Care was taken to ensure complete ablation of ganglia and severance of the sympathetic chain. The stellate ganglion was not usually seen endoscopically, as it is covered by characteristic yellow fat pad. Caution was taken during electrocoagulation of the second thoracic ganglia so as to avoid retrograde propagation of the coagulation to the stellate ganglion.

The grasping forceps were removed and the lung was re-expanded under direct vision. The operating thoracoscope was removed and the subcutaneous tissue and skin closed. It is important to have the anesthesiologist exert continuous positive pressure until skin is closed to avoid residual pneumothorax. No thoracic drain was necessary. The same procedure was repeated in the other side. A chest radiograph was requested in recovery room to ensure complete lung expansion.

RESULTS

There were 148 patients, 66 were males and 82 were females. Their median age was 13.8 SD ± 4.0 years. Twenty-seven (18.24%) patients had family history of hyperhidrosis. The hyperhidrosis started in early childhood in most cases and became aggravated during puberty. All of the patients complained of physical inconvenience caused by excessive sweating, disturbances at school and at manual work, as well as psychological and social inconvenience. Majority of the patients had been treated conservatively elsewhere, without notable improvement.

Two hundred and ninety-six thoracopic sympathectomies were performed on these 148 patients with no conversion to open procedure. The mean operation time was 18 min. Ninety-five per cent (140) of the patients were discharged the next day with a mean hospital stay of 1.2 days.

Complete relief of palmer or axillary hyperdidrosis was achieved in 142 (96%) patients while six (4%) had recurrences (mean follow-up = 5.03 ± 1.76 years). Patients were very satisfied in 61.5% (91) of cases and satisfied in 32.4% (48). Only nine (6.1%) were not satisfied with the outcome. More than two-thirds of the patients 129 (87.2%) had no regrets to have undergone the operation.

The main postoperative complications was pneumothorax in 17 (1.35%) with two (1.35) necessitating chest tube insertion, the majority resolved spontaneously. Other complications included segmental atelectasis in seven (4.72%) patients, and transient unilateral Horner's syndrome in one (0.67%). Fifty-six (38.8%) patients experienced some form of compensatory hyperhidrosis mainly around the buttock and upper thighs.

DISCUSSION

In this study, thoracoscopic sympathectomy achieved an excellent success rate similar to those reported in other series.[11,12] The optimal procedure, ablation (electrocautery) or sympathectomy (excision) has remained a controversy. Some surgeons prefer to ablate the ganglia because they opine that it is easier,



Figure 1: Site for insertion of port

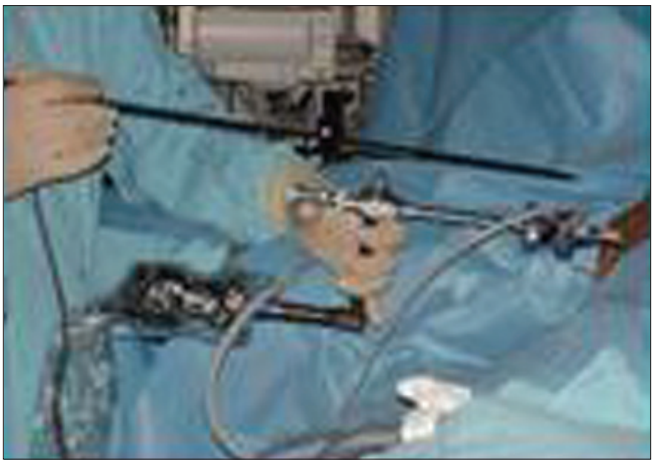


Figure 2: Insertion of single port

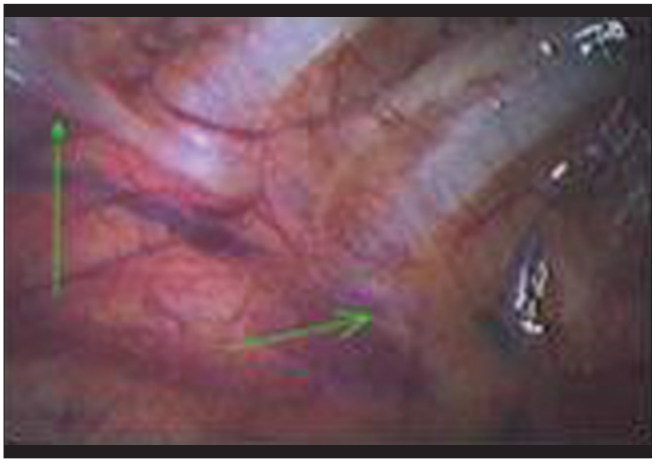


Figure 3: Arrows showing the location of ganglia

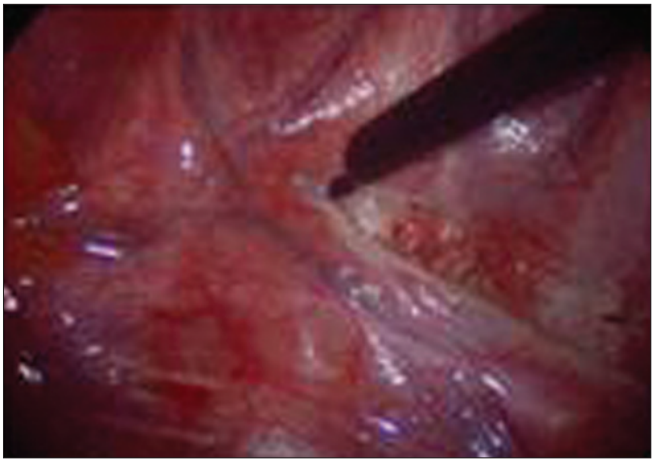


Figure 4: Dissection of ganglia



Figure 5: Coagulation of ganglia

requires a shorter operating time, leads to fewer cases of recurrence and Homer's syndrome,[12-15] our experience in this study equally indicates that thoracoscopic sympathectomy is a satisfactory and easy method for treating hyperhidrosis with acceptable operation time and complication rate with no failures necessitating the possibility of re-operating on the patients to achieve dry hands.

The ultimate goal of this treatment should be the attainment of a dry hand rather than anchoring it on the patient's satisfaction. Patients may be dissatisfied with the procedure even though excessive sweating of the hands was abolished. Thus measuring patient's satisfaction is very subjective since a patient may be dissatisfied with the operation because it failed on one side, even though the procedure was successful on the other side. Such dissatisfaction arises due to the severity of postoperative sequelae, such as compensatory hyperhidrosis or neuralgia.

The complications in the present study were generally minor and self limited. Horner's syndrome is the most feared complication, leading to slightly smaller pupil and disfiguring asymmetry of the face due to slightly drooping upper eye-lid, caused by damage to the stellate

ganglion. The risk for this event depends mainly on the surgeon's experience and familiarity with the procedure. Fortunately, Horner's syndrome is usually transient but plastic surgery involving shortening of the upper eye-lid (blepharoplasty) in required if it becomes permanent.

Pneumothorax is due either to incomplete re-suction of the inflated gas or to minor leakage from the lung. Small amounts of air are generally reabsorbed spontaneously and need no further treatment. The patient should avoid taking a flight as long as the pneumothorax persists. Greater amounts of air (very infrequent) may require insertion of drain and drainage for a day or two. With proper technique, the surgeon can almost always avoid this complication while entering the thoracic cavity and when aspirating the gas at the end of the procedure. Small pleural effusions do not require drainage but should be followed with repeated chest radiography.

Intercostal neuralgia results from injury to the intercostal nerves that can occur during port placement or from direct pressure on the intercostal nerves during the procedure. Soft flexible or smaller instruments may further reduce the incidence of intercostal neuralgia. Hashmonai *et al*.[12] cited a lower incidence of intercostal neuralgia as the major difference comparing open with endoscopic sympathectomy.

Compensatory and gustatory sweating were remarkably frequent after thoracoscopic sympathectomy in our patients as in other reports.[16] Compensatory hyperhidrosis is generally believed to be a thermoregulatory mechanism,[16] and the extent of sympathectomy is said to influence its frequency,[10,17] but published results are conflicting. We found no significant difference between the level of sympathectomy and the occurrence of compensatory sweating. However, it appears that severe sweating is significantly more frequent after Th2-4 sympathectomy for axillary hyperhidrosis.

The reported frequencies of post sympathectomy compensatory and gustatory sweating vary considerably from none,[18] to almost 100%.[19-22] Since most often the severity is arbitrarily defined, and there is no correlation between extent of sympathectomy and degree of compensatory sweating we like others,[21-27] regard compensatory hyperhidrosis as a side effect except when its frequency is embarrassing or disabling to the patient. Thus, we routinely do explain this clearly to our patients before operation the possibility of this 'side effects'. Obviously, a prospective randomized trial may be necessary to distinguish between the two. Probably this was why the majority of our patients accepted compensatory sweating as a side effect, since their answer to the question on the results of the operation was excellent or satisfactory.

The single port a transaxillary approach thorascopic sympathectomy in this study is a new innovation, achieving excellent results similar to the video assisted technique. The present approach has the advantage that the effect is immediately evident; the patients awake with dry and warm hands from anaethesia. Short hospital stay, excellent cosmetic results, significantly reduced morbidity rates, improved satisfaction and reduced costs are other benefits resulting in increased patient demand for this procedure. In addition, using soft single 10 mm port is a simple and fast technique with acceptable cosmetic results.

We conclude that single port transaxillary thoracoscopic sympathectomy is an effective method of treating hyperhidrosis with excellent functional and cosmetic results, high patient satisfaction and acceptable complication rate. However, a high rate of compensatory sweating is a very common side effect. We, therefore, suggest that it is crucial to inform patients who are scheduled for an extensive sympathectomy because of hyperhidrosis should thoroughly be counseled and warned before surgery about the risk of severe compensatory sweating.

REFERENCES

1. Lin CC. A new method of thoracoscopic sympathectomy in hyperhidrosis palmaris. Surg Endosc 1990;4:224-6.
2. Doolabh N, Horswell S, Williams M, Huber L, Prince S, Meyer DM, *et al*. Thoracoscopic sympathectomy for hyperhidrosis: Indications and results. Ann Thorac Surg 2004;77:410-4.
3. Adar R, Kurchin A, Zweig A, Mozes M. Palmar hyperhidrosis and its surgical treatment: A report of 100 cases. Ann Surg 1977;186:34-41.
4. Berguer R, Smit R. Transaxillary sympathectomy (T2 to T4) for relief of vasospastic/sympathetic pain of upper extremities. Surgery 1981;89:764-9.
5. Drott C, Claes G. Hyperhidrosis treated by thoracoscopic sympathicotomy. Cardiovasc Surg 1996;4:788-90.
6. Dumont P, Hamm A, Skrobala D, Robin P, Toumieux B. Bilateral thoracoscopy for sympathectomy in the treatment of hyperhidrosis. Eur J Cardiothorac Surg 1997;11:774-5.
7. Hashmonai M, Kopelman D, Assalia A. The treatment of primary palmar hyperhidrosis: A review. Surg Today 2000;30:211-8.
8. Chao C, Tsai C-T, Hsiao H-C. Wu W-C, Lee C-K. Transaxillary endoscopic sympathectomy--a report of experience in 150 patients with palmar hyperhidrosis. Surg Laparosc Endosc 1993;3:365-9.
9. Drott C, Grthberg G, Claes G. Endoscopic procedures of the upper-thoracic sympathetic chain: A review. Arch Surg 1993;128:237-41.
10. Hedcrman WT. Endoscopic sympathectomy. Br J Surg 1993;80: 687-8.
11. Dumont P, Denoyer A, Robin P. Long-term results of thoracoscopic sympathectomy for hyperhidrosis. Ann Thorac Surg 2004;78:1801-7.

12. Hashmonai M, Assails A, Kopelman D. Thoracoscopic sympathectomy for palmar hyperhidrosis: Ablate or resect? Surg Endosc 2001;15:435-41.
13. Pillay PK, Thomas I, Mack P. Thoracoscopic ganglionectomy for hyperhidrosis. Stereotact Funct Neurosurg 1994;63:198-202.
14. Tan V, Nam H. Results of thoracoscopic sympathectomy for 96 cases of palmar hyperhidrosis. Ann Thorac Cardiovasc Surg 1998;4:244-6.
15. Hsu C-P, Chen C-Y, Hsia J-Y, Shai S-E. Resympathectomy for palmar and axillary hyperhidrosis. Br J Surg 1998;85:1504-5.
16. Riet M, Smet AA, Kuiken H, Kazemier G, Bonjer HJ. Prevention of compensatory hyperhidrosis after thoracoscopic sympathectomy for hyperhidrosis. Surg Endosc 2001;15:1159-62.
17. Sung SW, Kim YT, Kim JH. Ultra-thin needle thoracoscopic surgery for hyperhidrosis with excellent cosmetic effects. Eur J Cardiothorac Surg 2000;17:691-6.
18. Kao MC, Chen YL, Lin JY, Hsieh CS, Tsai JC. Endoscopic sympathectomy treatment for craniofacial hyperhidrosis. Arch Surg 1996;131:1091-4.
19. Lai YT, Yang LH, Chio CC, Chen HH. Complications in patients with palmar hyperhidrosis treated with transthoracic endoscopic sympathectomy. Neurosurgery 1997;41:110-3.
20. Chiou TS, Chen SC. Intermediate-term results of endoscopic transaxillary T2 sympathectomy for primary palmar hyperhidrosis. Br J Surg 1999;86:45-7.
21. Lee DY, Yoon YH, Shin HK, Kim HK, Hong YJ. Needle thoracic sympathectomy for essential hyperhidrosis: Intermediate-term follow-up. Ann Thorac Surg 2000;69:251-3.
22. Gossot D, Galetta D, Pascal A, Debrosse D, Caliandro R, Girard P, *et al*. Long-term results of endoscopic thoracic sympathectomy for upper limb hyperhidrosis. Ann Thorac Surg 2003;75:1075-9.
23. Reisfeld R, Nguyen R, Pnini A. Endoscopic thoracic sympathectomy for treatment of essential hyperhidrosis syndrome: Experience with 650 patients. Surg Laparosc Endosc Percutan Tech 2000;10:5-10.
24. Drott C, Gothberg G, Claes G. Endoscopic transthoracic sympathectomy: An efficient and safe method for the treatment of hyperhidrosis. J Am Acad Dermatol 1995;33:78-81.
25. Gossot D, Toledo L, Fritsch S, Celerier M. Thoracoscopic sympathectomy for upper limb hyperhidrosis: Looking for the right operation. Ann Thorac Surg 1997;64:975-8.
26. Fredman B, Zohar E, Shachor D, Bendahan J, Jedeikin R. Video-assisted transthoracic sympathectomy in the treatment of primary hyperhidrosis: Friend or foe? Surg Laparosc Endosc Percutan Tech 2000;10:226-9.
27. Ueyama T, Matsumoto Y, Abe Y, Yuge O, Iwai T. Endoscopic thoracic sympathicotomy in Japan. Ann Chir Gynaecol 2001;90: 200-2.

Cite this article as: Kravarusic D, Freud E. Thoracoscopic sympathectomy ganglia ablation in the management of palmer hyperhidrosis: A decade experience in a single institution. Afr J Paediatr Surg 2012;9:143-7.

Source of Support: Nil. **Conflict of Interest:** None declared.