Thoroscopic sympathectomy performed using laser

SA BLACK¹, FGM TAYLOR¹, MH RUSSELL², R ARIGA¹, MH THOMAS¹

Departments of ¹Vascular Surgery and ²Anaesthesia, St Peter's Hospital, Chertsey, Surrey, UK

ABSTRACT

INTRODUCTION Thoroscopic sympathectomy is accepted as an effective treatment for palmar hyperhidrosis, facial blushing and to a lesser extent for digital ischaemia and axillary hyperhidrosis.

PATIENTS AND METHODS Data were collected retrospectively on patients undergoing thoroscopic sympathectomy at St Peter's Hospital between 1987 and 2006. Patients were followed up by telephone interview.

RESULTS A total of 233 thoroscopic sympathectomy procedures were performed by a single operator in 123 patients. Ages ranged from 9–71 years and 75 were women. In patients, 105 had a bilateral and 13 a unilateral procedure, 5 patients had a bilateral procedure performed in two stages. In 6 upper limbs, the procedure could not be done. Overall, 110 patients (90%) had the procedure performed for palmar hyperhidrosis, 8 (6%) for facial blushing and in 5 (4%) patients the operation was performed for digital ischaemia with tissue loss. There were no deaths and all patients were discharged on day 1 following the procedure. Complications included bleeding (2), pulmonary oedema (1) and failed procedure (2); however, no incidences of Horner's syndrome occurred. Only 40 of 123 (32.5%) patients gave follow-up information. Of this small group, 33 of 40 (83%) were cured, 4 of 40 (10%) were better, 2 of 40 (5%) were unchanged and 1 patient was worse. Only 22 out of 40 (55%) of these patients were troubled by compensatory sweating, with only 4 of 40 (10%) reporting this as a major problem.

CONCLUSIONS Thoroscopic sympathectomy is safe and can be carried out as a single bilateral procedure in the majority of cases. The laser allows the use of a single port, requires less dissection than surgical or clipping techniques, is more precise than diathermy and may be less likely to cause a Horner's syndrome.

KEYWORDS

Sympathectomy – Thoroscopic – Laser

CORRESPONDENCE TO

MH Thomas, Department of Vascular Surgery, St Peter's Hospital, Guildford Road, Chertsey, Surrey KT16 0PZ, UK
E: martin.thomas@doctors.org.uk

Primary palmar hyperhidrosis is a functionally and socially disabling condition for which thoroscopic sympathectomy is now the accepted treatment.^{1–7} Many studies have shown the benefit of this procedure over the older open surgical techniques but few have reported the use of the laser probe.⁵

In this paper, we report the results of a single surgeon's experience using the laser probe allowing for the use of a single port with minimal dissection.

Patients and Methods

From 1987 to 2006, 123 patients underwent 233 procedures. Of these, 105 patients had bilateral procedures in one operation, 5 patients had a bilateral procedure performed but each side was a separate occasion, and 13 underwent unilateral procedures.

The patient age range was 9–71 years and 75 (61%) were women. The indications for operation were palmar hyperhidrosis (110), facial blushing (8) and digital ischaemia with tissue loss (5).

The patients were intubated with a double lumen tube and placed in the crucifix position. After clamping the tube to the relevant lung, a Verres needle was inserted in the mid-axillary line in the 4th intercostal space and, depending on the size of the patient, 500–1000 ml of carbon dioxide was insufflated. A 10-mm trocar was then inserted followed by the fibrescope. The anatomy was identified and a Yag laser CL 60 fibre (Neomed UK Ltd, 56 Enterprise Centre, Cranborne Road, Potters Bar EN6 3QD, UK) passed down the scope (Fig. 1). The sympathetic chain was treated with the laser beam at 8–12 W using, in most cases, between 1500–2500 J and at a wavelength of 1064–1066 nm, treating T2, T3 and, occasionally, T4.

After laser treatment, the lung was then re-expanded under direct vision. If a bilateral procedure was performed, a short time interval was allowed to ensure adequate recovery of pulmonary ventilation and perfusion before proceeding to the contralateral side. Patients had a chest X-ray in recovery and oxygen administered overnight. All went home the following day.

Figure 1 Laser fibre being passed down thoracoscope in left axilla.

Patients were telephoned using available contact details for follow- up telephone interview.

these patients required a chest drain or open conversion. Both were discharged the following morning.

Results

Of the 110 patients planned for bilateral procedure, 5 required the procedure to be performed in separate stages for a variety of causes (Table 1). Eight procedures failed at the first attempt (Table 2). Of these, one patient whose initial procedure failed due to a missed chain went on to have the operation successfully completed at a second attempt while a further patient had a failed second attempt and subsequently declined further surgery.

There were 13 unilateral procedures; 8 of these were undertaken for digital ischaemia with tissue loss. Two patients had digital ischaemia from radiation arteritis and 5 had Raynaud's disease. One patient had had an open sympathectomy on the other side 20 years previously.

There were no deaths or major complications (Table 3). None of the patients required intercostal drainage. All the patients were able to return home the next day. Two patients developed peri-operative bleeding necessitating insertion of a second port and diathermy to the bleeding point. The intrapleural blood was aspirated and neither of

Table 1 Reasons for bilateral but separate procedures

	Procedure	Patients
Obesity	4	2
Age	4	2
Anaesthetic	2	1

Table 2 Failed procedures

	Procedure	Patients
Intrapleural anomaly (azygos)	2	2
Intrapleural adhesions	2	1
Intrapleural lipoma	2	1
Missed chains	2	2

Table 3 Complications

Complication	Number
Thoracotomy	0
Chest drain insertion	0
Return to theatre	0
Haemorrhage	2
Pulmonary oedema	1
Re-operation for recurrence	2
Horner's syndrome	0

One patient, a 12-year-old girl, developed flash pulmonary oedema during the procedure necessitating a short (4 h) stay on the intensive care unit. She made a complete recovery and was also discharged the next day.

In the immediate postoperative period, all the patients who had had a sympathectomy were satisfied with the result.

Patient follow-up was by telephone interview; however, only 40 of 123 (32.5%) patients were contactable. Follow-up ranged from 6–120 months with 33 of 40 (83%) patients cured of their hyperhidrosis, 4 of 40 (10%) slightly better, 2 the same and only one was worse. Significant recurrence of hyperhidrosis did not seem to be a problem with the exception of the one patient. Compensatory sweating complicated 22 of the 40 cases (55%); however, in only 4 of 40 (10%) cases was this reported as major. Patients operated upon over 3 years prior to their follow-up mentioned compensatory sweating less often than the more recent cases. All the patients bar one were glad they had the procedure done. This patient regretted the operation because of the level of compensatory sweating.

Of the 6 patients who had surgery for facial blushing, 4 were very satisfied, 1 was reasonably satisfied and 1 patient was not improved.

Discussion

Thoroscopic sympathectomy is the accepted treatment for hyperhidrosis, facial blushing and some severe cases of Raynaud's disease.^{1–7} It can also be used for axillary hyperhidrosis but the results are less successful. Most surgeons prefer to treat only one side at a time because of potential respiratory complications. When doing both sides, some surgeons, as a precaution, insert a chest drain into the first side while doing the second side. Our results suggest that bilateral procedures through a single port are safe and such a cautious approach is not necessary. Hospital stay more than one night, chest drainage and conversion

thoracotomy were not required. Only patients with unilateral disease, congenital intrathoracic anomalies and obesity required one side done at a time.

The sympathetic chain can be treated by surgical division, diathermy, clipping or laser. In this series, a Yag laser inserted through a single port was used. The laser fibre seems to provide a more precise beam of energy than with diathermy and thus a more precise destruction of the sympathetic chain. We believe that this allows a reduction in the incidence of Horner's syndrome when laser is used due to better precision and, possibly, to less transmission of heat up the chain.

Recently, there have been reports of a clipping technique.^{8,9} The claimed advantage is that the clips can be removed should compensatory sweating become intolerable. However, it can be difficult to apply the clips with the correct force. They can be applied so strongly that the nerve is destroyed or too lightly so that they fall off. A second thoroscopic procedure, should it be required, is never easy.

The causes of flash pulmonary oedema are multifactorial. The major factor is likely to be an increase in pulmonary vascular permeability following re-expansion of the lung, which may be dependent on total operative time.^{10–12} Further factors may include sympathetic denervation at a high thoracic level¹⁵ and the response of lung tissue to the increase in inflammatory mediators following re-expansion.¹⁴ In this study, we were fortunate to experience this complication on only one occasion.

The follow-up data in this study are incomplete because the majority of patients were young; over the 20-year study period, many had moved away and were uncontactable. The small number of patients who provided long-term follow-up makes firm conclusions on long-term outcome difficult. The limited data available confirm that one of the commoner reported complications from thoroscopic sympathectomy is compensatory sweating.¹⁵ Some degree of compensatory sweating probably occurs in all patients and rates as high as 97–100% have been reported.^{16,17} The incidence will vary depending on how assiduously it is sought. In our series, the rate of compensatory sweating reported by patients was low at 55% and the rate of major compensatory sweating only 10%. In our experience, severe intolerable compensatory sweating that can ruin a patient's life is rare and occurred in one of our 40 follow-up patients, although 3 others suffered significantly. Patient selection is important, as those with severe pre-operative palmar hyperhidrosis will tolerate modest postoperative sweating elsewhere. The current belief is that by limiting the sympathectomy to T3, this complication can be reduced for those patients requiring the sympathectomy for hyperhidrosis,^{18,19} although this has been disputed.²⁰ Botox injections have also been used in some cases of severe compensatory sweating with variable results.^{21–23} In addition, it has been

reported that compensatory sweating may improve with time and, in our small follow-up sample, this trend was noted.¹⁷

The lack of significant complications in this series confirms that the procedure can be performed safely. This treatment has already been performed in a day unit.^{5,6}

Conclusions

Thoroscopic sympathectomy using laser is safe. The laser technique requires only a single port. The majority of patients can have a bilateral procedure done in a single operation. In addition, the laser may be less likely to cause Horner's syndrome.

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