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Endoscopic thoracic sympathectomy for upper limb ischemia. A 16 year follow-up in a single center

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ABSTRACT

Introduction: The aim of our study was to evaluate the long term results of Endoscopic Thoracic Sympathectomy (ETS) in the management of upper limb ischemia (ULI).

Methods: We retrospectively reviewed the records of all consecutive patients who underwent ETS for ULI between January 1994 and May 2009. A standardized questionnaire was used to evaluate the long term success, morbidity and overall patient satisfaction.

Results: Thirty-five patients (20 female, mean age 49 years (range 23–79)) underwent bilateral (n = 9) and unilateral (n = 27) ETS procedures, respectively. Six patients had Primary (idiopathic) Raynaud Disease. Twenty-nine patients had upper limb ischemia secondary to systemic disorders (n = 12), embolic disease (n = 10), occlusion of the arteries of the arm (n = 5) or hypothernar hammer syndrome (n = 2). Tissue loss at time of surgery was present in nineteen patients. Short term beneficial effects were reported by 12 patients (63%). Eleven of the 35 patients experienced a total of 13 complications or adverse events, whereof 11 were minor or transient. Limb salvage was unsuccessful in three patients because of major amputations (n = 2) or severe functional impairment (n = 1). Necrotectomies or minor amputations without functional impairment were performed in 9 patients. Medium or long term follow up (mean 98 months (range 18–198)) was available in 19 out of 22 living patients (86%). Long term beneficial effects were reported by 10 (53%). Overall patient satisfaction was 56%. Compensatory sweating was experienced by 11 patients (58%).

Conclusion: Although the long term efficacy of ETS in our study was moderate (53%), due to its low invasiveness ETS is a valuable option in the management of ULI.

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Introduction

Endoscopic thoracic sympathectomy (ETS) is widely used in the management of patients with hyperhidrosis.^{1–3}

Vasospastic and ischemic disease of the upper limb is a less common indication for surgery on the thoracic sympathetic chain.^{4,5} Short term results and side effects are well-known and have been reported extensively in literature. Long term follow up of the results and side-effects are rare.⁵

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Compensatory sweating (CS) is the most frequently occurring side effect. It varies in level, extent and intensity and plays a major role in patient's dissatisfaction with the operation. CS seems to be unavoidable, untreatable and is often considered to be the price that patients have to pay for the treatment of their (ischemic) complaints.^{6–9} We retrospectively surveyed the long term results of patients with upper limb ischemia (ULI) who were managed by ETS in our department from January 1994 to May 2009. The aim of our study was to evaluate the long term success, overall patients' satisfaction and morbidity, in particular CS.

Methods

Data collection

Medical charts of all patients undergoing ETS for treatment of ULI in a single center from January 1994 to May 2009 were reviewed. Collected data included patient's age and gender, indication for surgery, whether the procedures were unilateral or bilateral, operation time, length of hospital stay, peri-operative complications and side effects. All patients underwent routine office follow up at 6 weeks. To evaluate the long term results a questionnaire was performed by telephone. To standardize patient response, the questionnaire was designed to include single words or numbers or categorical options rather than free text. [Appendix 1] We integrated the Hyperhidrosis Disease Severity Scale (HDSS) in our questionnaire. This is a validated disease specific scale that provides a qualitative measure of the effect of patient's symptoms on their daily activities.^{10,11} The effect of symptoms on daily activities is graded in order of severity from 1 to 4; (1) sweating is hardly noticeable and never interferes with daily activities; (2) sweating is tolerable and sometimes interferes with daily activities; (3) Sweating is barely tolerable and frequently interferes with daily activities; (4) sweating is intolerable and always interferes with daily activities.

Operative technique

Endoscopic Thoracic Sympathectomy, both unilateral and bilateral, was preferably performed in a single stage procedure

under general anesthesia. Airway and Low-volume-high-frequency mechanical ventilation was secured by endotracheal intubation using a single or double-lumen tube. Patients were placed in a lateral, prone or supine position depending of the surgical procedure or preference of the attending surgeon. The procedure was performed through three or four thoracoscopic trocars, one of 10 mm in diameter was placed in the 5th intercostals space at the midaxillary line and two 5 mm trocars in the 4th intercostals space at the anterior and posterior axillary line. If necessary an additional 5 mm trocar was placed. We used a 30° videothoracoscope (Olympus, Hamburg, Germany) and electrocautery. The mediastinal pleura opened and the sympathetic chain was identified. The sympathetic trunk was respected by diathermy from T2 to T4. A 16 French chest tube was inserted into the chest during closure and removed 24 h postoperative.

Results

Between January 1994 and May 2009 a total of 45 sympathectomies were performed on 35 patients in 9 bilateral and 27 unilateral procedures. All patients were referred to our department after conservative treatment was unsuccessful. Our study population consisted of 15 males and 20 females with an average age at the time of surgery of 49 years (range 23–79). Six patients had Primary (idiopathic) Raynaud Disease. Twenty-nine patients had ULI secondary to systemic disorders (N = 12), embolic disease (N = 10), occlusion of the arteries of the arm (N = 5) or hypothenar hammer syndrome (N = 2). Tissue loss at time of surgery was present in nineteen patients, none of these patients had Primary Raynaud Disease [Table 1] Mean procedure duration was 93 min (range 35–340). Conversion to open thoracic sympathectomy was needed in 4 patients, due to suboptimal visualization (n = 3) and venous hemorrhage (n = 1). Eleven procedures were combined with additional surgical interventions [Table 2] The average hospital stay was 11 days (range 2–57). Eight patients experienced postoperative neuralgia, of which four could not be managed during the admission. Four patients were seen after discharge in the outpatient clinic by an anesthesiologist because of persistent neuralgia, of those only two patients had prolonged complaints of neuralgia (>6 months). Four patients had a

Table 1 – Patient characteristics.

Indication	Patients	M/F	ETS	Procedures	Limb salvage		
					Tissue loss ^a	Major amputation	Minor amputation
Primary Raynaud disease	6	2/4	9	7 ^b	0	0	0
Secondary ischemia	29	13/16	36	29	19	3	9
Systemic disorders ^c	12	4/8	18	12	7	1	5
Emboli, stenosis or aneurysms proximal	10	5/5	11	10	8	1	3
Arterial occlusion of the arm	5	2/3	5	5	4	1	1
Hypothenar hammer syndrome	2	2/0	2	2	0	0	0
TOTAL	35	15/20	45	36	19	3	9

ETS = endoscopic thoracic sympathectomy, F = female, M = male.

^a Necrosis or ischemic ulcers at time of sympathectomy.

^b One bilateral sympathectomy performed in two unilateral procedures.

^c Scleroderma, CREST syndrome, polyarthritis nodosa, M. Sjögren, etc.

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