New ideas - Thoracic non-oncologic

Bilateral single-port thoracoscopic sympathectomy with the VasoView® device in the treatment of palmar and axillary hyperhidrosis

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Received 18 August 2010; received in revised form 6 October 2010; accepted 15 October 2010

Abstract

Primary or essential hyperhidrosis is a disorder characterized by excessive sweating beyond physiological needs. It is a common disease (with an incidence of up to 2.8%) that causes intense discomfort for patients. Video-assisted thoracoscopic bilateral sympathectomy is an effective surgical treatment with high success rates and improvement in quality of life. In the last decade, the advantages of a single-port thoracoscopic approach have become clear. Problems with intraoperative bleeding management have been solved by using thoracoscopes with integrated electrocautery scissors. In this report, we describe successful transaxillary bilateral single-port thoracoscopic T2-T5 sympathectomy with the VasoView® device in three patients with palmar and axillary hyperhidrosis. The VasoView® device, with its integrated electrocautery scissors, was originally designed for endoscopic vessel harvesting in coronary artery bypass surgery, but it has proven highly effective for single-port thoracoscopic sympathectomy.

Keywords: Hyperhidrosis; Minimally invasive; Thoracoscopy; Sympathectomy; Sympathicotomy

1. Introduction

Primary or essential hyperhidrosis is a disorder with an unknown cause and is characterized by excessive sweating beyond physiological needs, particularly in response to temperature and emotional stimuli [1]. It is a common disease that affects men and women equally, with a peak incidence in the late second and early third decades of life, and an incidence in the Western world of up to 2.8% of the population [2]. Most affected patients have palmar (-plantar) hyperhidrosis, but combined palmar-axillary hyperhidrosis, isolated axillary hyperhidrosis (AH) and craniofacial hyperhidrosis are relatively common as well [3]. The principal characteristic of this disease is the intense discomfort of patients, which affects their social, affective, and professional life.

Medical management is often frustrating and the response is usually transient [4]. Surgical therapy is effective, especially for palmar(-plantar) hyperhidrosis, and is based on the interruption of transmission of impulses from the sympathetic ganglia to the sweat glands [4]. The first sympathectomy by thoracoscopy was reported in 1951. After its introduction, endoscopic thoracic sympathectomy (ETS) evolved considerably and became a popular and well-established treatment modality for hyperhidrosis in the early 1990s. Large series have shown success rates of 71–100% following ETS for all forms of primary hyperhidrosis with improved quality of life and treatment satisfaction of 93–95% [5, 6].

Comparing with the biportal or triportal thoracoscopic approach, advantages of a single-port approach include less postoperative pain, shorter operation time and recovery time, and better cosmetic results [7, 8]. A minor disadvantage of the single-port approach is the difficulty in dealing with intraoperative bleeding; a problem that has been solved by using ‘thoracoscopes’ with integrated coagulating scissors [8]. This development has made the procedure safer and does not require patient repositioning on both sides.

Although the single-port approach and the use of a thoracoscope with integrated electrocautery scissors have been described before, this is the first description of transaxillary single-port thoracoscopic sympathectomy with the VasoView® device, which is already available on a worldwide basis.

2. Materials and methods

Between July 2009 and February 2010, three patients (two male, one female) underwent bilateral single-port thoracoscopic T2-T5 sympathectomy with the VasoView® device (Maquet Inc, Rastatt, Germany) (Fig. 1) for palmar hyperhidrosis (PH) and axillary hyperhidrosis. All patients

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were referred with disabling combined PH and AH, which severely interfered with their work or social activities.

A chest X-ray was performed prior to surgery to exclude gross pulmonary and pleural abnormalities. General anesthesia was given and a single lumen endotracheal tube was inserted. Single lung ventilation was obtained with the EZ-blocking device. The patient was positioned on the left side with the arm flexed over the head to expose the axilla. The right side was approached first. A finger temperature probe was used to record the rise in peripheral cutaneous temperature that results following sympathectomy. After deflation of the right lung, a single 1-cm long axillary incision was made in the third intercostal space posterior to the pectoralis muscle. A 7-mm trocar was inserted in the third intercostal space followed by CO₂ insufflation and introduction of the VasoView® device. The dorsal sympathetic chain was identified running along the neck of the ribs close to the costovertebral junctions (Fig. 2a,b and Video 1). The first and second rib were identified under direct vision (Fig. 2a,b and Video 1). The sympathetic chain was then transected above and below the ganglia (segments T2-T5) with coagulation and cut with diathermy (Fig. 2c,d and Video 1). A rise in peripheral cutaneous temperature of over 1 °C within 5–10 min confirmed complete sympathectomy. The surgical procedure was completed by reinsufflation of the collapsed lung under direct vision, insertion of an 8-F thoracic catheter through the same incision, and closure of the wound with a single skin suture. The patient was repositioned on the right side and the entire procedure

Fig. 1. The VasoView® device and a magnification of the working channel with the electrocautery scissors. Modified and reproduced with permission from Maquet Inc, Rastatt, Germany.

Fig. 2. Single-port transaxillary thoracoscopic T2-T5 sympathectomy with the VasoView® device. (A) Thoracoscopic view of the right superior mediastinum. Identification of the subclavian artery (A) and vein (V), the lung (L), the first (R1) and second rib (R2), and the sympathetic chain (S). (b) Schematic diagram of showing the position of the sympathetic chain (S). The sympathetic chain runs over the anterior surface of the posterior rib heads. The sympathetic ganglia (T1, T2) are seen just below the respective rib level. (c, d) T2-T5 sympathectomy with the VasoView® electrocautery scissors. T2 sympatheticotomy (c) and T4-T5 sympatheticotomy (d) are shown. The sympathetic chain is transected above and below the ganglia with coagulation and cut with diathermy. The ganglia themselves are spared. A, subclavian artery; L, lung; R1, first rib; R2, second rib; R3, third rib; R4, fourth rib; R5, fifth rib; R6, sixth rib; S, sympathetic chain; T1, first thoracic ganglion (‘stellate ganglion’); T2, second thoracic ganglion; T3, third thoracic ganglion; T4, fourth thoracic ganglion; T5, fifth thoracic ganglion; V, subclavian vein.
was then repeated on the left side. Before detubation the pleural drain on the right side was removed.

Operative time, hospital stay, complications, and recurrences were recorded. Outcome was assessed by a clinical evaluation three months after surgery.

3. Results

Three consecutive patients, including two men and one woman with a mean age of 25 years (23–27 years), underwent bilateral single-port thoracoscopic T2-T5 sympathectomy with the VasoView® device.

The mean operation time was 91 min (53–120 min). Conversion to an open procedure was not required in any patient. A rise in ipsilateral peripheral cutaneous temperature of over 1 °C within 5–10 min after sympathectomy was recorded in all patients.

Pleural drains were removed at the end of the day and all patients were discharged from the hospital on the next day. Complications, such as intraoperative bleeding, postoperative pneumothorax, infections, and Horner’s syndrome were not observed.

A follow-up of three months revealed excellent functional and cosmetic results, without residual pain. There was no recurrence of hyperhidrosis or occurrence of compensatory hyperhidrosis (CH) (compensatory sweating of other body areas) in all three patients.

4. Discussion

Since the 1990s, ETS has become a well-established surgical treatment for hyperhidrosis. Further refinement involved single-port sympathectomy [7, 8] and use of thoracoscopes with coagulating scissors [8]. We report our early experience with the VasoView® device in bilateral single-port thoracoscopic sympathectomy for PH and AH in three patients. Our technique provided excellent visualisation of the sympathetic chain up to the first rib. We did not encounter any perioperative complications and follow-up after three months showed excellent functional and cosmetic results without residual pain. CH did not occur after a three-month follow-up, which is encouraging, since there is evidence that if CH does not occur within the first two to four weeks after sympathectomy, it will not develop later [9].

The term sympathectomy is widely used in the literature without clear definitions and may be referred to as resection of a portion of the sympathetic chain with ablation of ganglia (true sympathectomy), clipping of the sympathetic chain (sympathetic block), or transection of the chain above and below the ganglia (sympathicotomy). In this preliminary study, we used the last option.

Controversy exists as to which levels and how many levels of sympathectomy ensure the highest success rate and carry the lowest incidence of CH. In patients with PH, a T2-T3 sympathectomy is highly effective (success rate of 99%–100%) and shows a low incidence of severe CH of 1.3–12% [4, 10, 11]. Lower level sympathectomy (T3 and/or T4) may decrease the incidence and severity of CH, but may be less effective than T2-T3 sympathectomy [4, 12]. The treatment of AH by sympathectomy remains controversial. T4-T5 sympathectomy is successful in 86% with a CH incidence of 29% [13].

We prefer sympathectomy of segments T2-T5 for combined PH and AH to adequately treat this condition and prevent recurrence. We therefore accept a somewhat higher level of CH, since it has been shown that in up to 90% of cases, CH is well-tolerated [14]. Discussing this risk of CH with each patient preoperatively is of paramount importance, because it can be a major cause of regret.

Postoperative pain can further be reduced by preinjection of a local anaesthetic (short acting, such as lidocaine) before ETS. This suppresses local pain mediators, hence resulting in significantly less pain in the first postoperative 24 hours [15]. The clinical advantage may be the possibility of early discharge in an outpatient setting and early return to active life.

A limitation of this study is the small number of patients. Obviously, a larger study cohort with a longer follow-up is required to evaluate the long-term results of this technique.

In conclusion, our preliminary results are promising and suggest that single-port thoracoscopic sympathectomy with the VasoView® device may offer excellent functional and cosmetic results. The VasoView® device may play an important role in the future of outpatient single-port ETS for hyperhidrosis.

References


