

# Less Common Side Effects of Sympathetic Surgery



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## KEYWORDS

- Endoscopic thoracic sympathectomy • Complications • Morbidity • Autonomic function
- Side effects of ETS

## KEY POINTS

- Endoscopic thoracic sympathectomy (ETS) is a highly effective surgical procedure for patients with severe palmar hyperhidrosis.
- Because of the elective nature of this procedure, safe performance of ETS is imperative.
- Although it is a relatively straightforward procedure, intraoperative complications can occur, especially if thoracic anatomy is not well-understood.
- Patient selection and surgical accuracy are imperative for reproducible results with high patient satisfaction.
- Certain side effects of ETS are well-known and patients must be informed of these.

## INTRODUCTION

Video-assisted thoracic sympathectomy also known as endoscopic thoracic sympathectomy (ETS), is a well-established, effective therapy for patients with severe palmar hyperhidrosis that is refractory to medical therapy. ETS has been shown to effectively eliminate palmar hyperhidrosis, while improving quality of life and reducing associated social anxiety.<sup>1–3</sup> Before the development of endoscopic thoracic techniques in the late 1980s, thoracic sympathectomy for palmar hyperhidrosis was rarely performed. Minimally invasive thoracic techniques, which evolved through the 1990s, facilitate performance of thoracic sympathectomies with minimal surgical trauma and led to the widespread acceptance of ETS for patients with palmar hyperhidrosis.<sup>4</sup>

Despite its effectiveness in eliminating palmar hyperhidrosis and widespread use, there are many variations of the ETS technique, especially with regard to trocar placement, lung isolation, exposure of the sympathetic nerve, and the type of and location of surgical sympathectomy. These

technical variations, in addition to physiologic side effects of sympathectomy such as compensatory sweating, have resulted in significant controversy with regard to the role of ETS in the overall management of patients with palmar hyperhidrosis.

It is, therefore, imperative that ETS be performed safely, without surgical complications so that the benefits are not overshadowed by either side effects or long-term complications. In this paper, we review the more common early and late potential complications of ETS and offer our recommendations for avoidance, based on our personal experience, having performed thousands of ETS procedures over several decades (**Box 1**).

## INTRAOPERATIVE COMPLICATIONS

### *Lung Isolation*

To perform ETS, lung isolation is generally required. This can be achieved either by placing a double-lumen tube, or creating a unilateral pneumothorax with CO<sub>2</sub> insufflation. Both techniques are equally effective, with specific advantages and disadvantages inherent with each, and

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**Box 1****Complications of endoscopic thoracic sympathectomy***Intraoperative*

- Failure to obtain adequate lung isolation
- Bleeding
- Pneumothorax
- Incomplete sympathectomy
- Inaccurate or wrong level sympathectomy
- Phrenic nerve injury
- Aorta or great vessel injury
- Thoracic duct injury

*Early postoperative*

- Pneumothorax
- Hemothorax
- Intercostal neuralgia
- Chest pain/pleuritis
- Horner's syndrome

*Late postoperative*

- Intercostal neuralgia
- Cardiac
- Recurrent symptoms of palmar hyperhidrosis

therefore the choice of technique is surgeon specific. Although this author personally has moved away from using a double-lumen endotracheal tube for a routine ETS procedure, in patients who had a prior intrathoracic procedure, where there may be significant pleural adhesions, a double-lumen tube could be advantageous. Excellent visualization of the upper thorax and the sympathetic trunk are obtained by insufflating CO<sub>2</sub> at 10 mm Hg pressure (not to exceed), without impacting venous return or hemodynamics. Frequent blood pressure measurements are necessary while insufflating CO<sub>2</sub>, especially when the patient's head is elevated, because venous return can be impaired; however, we do not routinely use an arterial line.

Pleural adhesions are uncommon in this patient population, but on occasion will be encountered. Depending on the severity adhesions, an extra port may be required to provide countertraction on the lung while dividing adhesions. Care must be used to not only avoid visceral pleural injury, but also be aware of the regional anatomy so as to avoid injury to the aorta, esophagus, subclavian vessels, phrenic nerve, or stellate ganglion. If major adhesions are divided, leaving a small pleural chest tube connected to pleural

drainage while the contralateral sympathectomy is performed will avoid hemodynamic instability if there is undetected visceral injury and a small air leak.

**Unusual Anatomy**

Most patients undergoing ETS for palmar hyperhidrosis are young and healthy, without medical or pulmonary comorbidities. On occasion, however, unexpected anatomy can be encountered. The most common is an azygous lobe, found on the right upper lobe. Reported incidence is 1% of population. When encountered, the pleural mesentery needs to be opened immediately superior to the azygous vein to expose the sympathetic trunk. The azygous vein does not impair exposing the sympathetic trunk, or completion of the sympathectomy, and can be left intact. After completion of the sympathectomy, the azygous lobe does not need to be placed behind the pleural mesentery when the lung reexpands.

Rarely, an asymptomatic apical bleb or bulla can be encountered, especially when performing ETS on teenage or young adult males. The natural history asymptomatic apical blebs or bulla is not known. On 2 occasions, this author has chosen to resect asymptomatic bullae from the lung apex. If a bleb or bulla is not removed, the anesthesiologist should be mindful during lung reexpansion not to hyperinflate the lung.

**Pneumothorax**

Inadvertent lung injury can occur when inserting a Veress needle, trocars, or lysing adhesions. This may only become apparent when the contralateral sympathectomy is being performed resulting in unexplained hypotension. If a contralateral tension pneumothorax is suspected, CO<sub>2</sub> insufflation should be discontinued immediately and a chest tube inserted on the contralateral side. Once the pneumothorax has been treated then the sympathectomy can be completed safely.

There are many different techniques to evacuate CO<sub>2</sub> from the pleural space. However, it is not uncommon to see a very small apical pneumothorax on the immediate postoperative chest radiograph. Provided it is small, no further treatment is required, because CO<sub>2</sub> is absorbed relatively rapidly from the pleural space. We generally evacuate the space with a small chest tube (12 Fr) and remove it while the anesthetist is administering a large positive pressure breath. Of those persistent pneumothorax cases, fewer than 10% require a chest tube, and few of those require overnight drainage.

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