International Journal of Medical Science in Clinical Research and Review
Online ISSN: 2581-8945
Available Online at https://ijmscrr.in/ Volume 7|Issue 05 (September-October) |2024 Page: 1061-1064

Case Report

A case report of rare primary hyperhidrosis undergoing VATS Bilateral thoracic sympathectomy Anesthesia Considerations

Authors:
Dr. Mohan Babu A, MD[1], Dr. Rajashekar R Mudaraddi, MD DESAIC[2], Dr. Hany Fawzi W Griess, M.B.B.ch, MSc, PhD, EDAIC[3], Dr. Osama Sami Maki Al Ani, MD[4]
[1]*Senior Specialist Anaesthesia, Rashid Hospital and Trauma center Dubai*
[2]*Clinical Assistant professor/Specialist Anaesthesia, Rashid hospital and Trauma center Dubai*
[3]*Consultant and Head of Anesthesia section, Rashid Hospital and Trauma Centre Dubai*
[4]*Consultant, Rashid Hospital Trauma Centre Dubai*
Corresponding Author*:*
Dr. Mohan Babu A, MD, Senior Specialist Anaesthesia, Rashid Hospital and Trauma center Dubai

Article Received: 26-August-2024, Revised: 16-September-2024, Accepted: 05-October-2024

ABSTRACT:
Sympathectomy and its variations have been performed in thoracic surgery for more than 100 years. However, its indications have undergone profound modifications in this period. Currently, primary hyperhidrosis is, by far the main indication for thoracic sympathectomy and this procedure is usually carried out thoracoscopically with excellent results. However, until today, hyperhidrosis is a part of thoracic surgery still surrounded by controversy, persisting as an open field over which some confusion still resides regarding its pathophysiology, terms definitions and operative approaches. The aim of this article is to provide Anesthetic management of a case with primary hyperhidrosis under General anesthesia.

Keywords: ***Sympathectomy, hyperhidrosis, video-assisted thoracic surgery, sympathetic nervous system, sweating***

INTRODUCTION:

The first sympathectomy in history was described by Alexander (1) in 1889, to treat an epileptic patient. In 1920, the first sympathectomy to treat hyperhidrosis was done by Kotzareff (2). In 1942, Hughes (3) published the first thoracoscopic sympathectomy and with the development of minimally invasive techniques/instruments, open surgical procedures for the thoracic sympathetic chain have become progressively obsolete. In present days, endoscopic thoracic sympathectomy (ETS) is performed by minimally invasive video thoracoscopy. Nowadays, the main indication for ETS is palmar primary hyperhidrosis. Much less frequently, ETS can still be indicated and lead to satisfactory outcomes in highly selected patients with some specific cardiologic disorders, and in a few painful and ischemic conditions to the upper limbs. To perform ETS, the surgeon needs to be able to visualize the upper thoracic sympathetic chain as it runs over the neck of the ribs. In the vast majority of cases, this necessitates general anaesthesia although successful ETS has been performed using thoracic epidural anaesthesia or intercostal blockade.

CASE REPORT:

16 years old male weighing 75 kilograms and height 195 cm with history of excessive sweating over both palms and soles, refractory to medical therapy and no other significant past medical illness, no past surgeries undergone, no known allergies. On examination head to examination. high arched palate, Marfan's -like features were noted. Systemic examination was normal. Preoperative all the risks were explained to the patient and his mother and anesthesia consent was obtained.

Standard ASA monitors including invasive blood pressure, BIS Monitor were applied.
Two large bores 18-gauge intravenous cannulas were secured and 0.9% normal saline was started. Pre-oxygenation with FiO2 of 100%, for 3 minutes was provided followed by injection fentanyl 2 mcg/kg, propofol 2mg /kg, rocuronium 0.9 mg/kg for induction of anaesthesia. Left sided double lumen tube size 39 Fr was secured using video laryngoscopy with full view of glottis. The proper position of the double lumen endobronchial tube was confirmed using fibro-optic

scope. Maintenance of anesthesia was provided with Oxygen, air and sevoflurane with MAC 1.2 (O2/AIR/SEVOFLURANE) on pressure-controlled ventilation.

Patient positioned both Right and left lateral position with both arms outstretched on arm boards and the trunk in a 30° Fowler position for procedure on either side.. The incision was done and the thoracoscope was introduced through a port placed in the mid-clavicular line in the second intercostal space. CO2 was insufflated to 8–10 cmH2O of pressure to collapse the dome of the lung. One lung ventilation was started with collapsed right lung. The sympathetic chain from T2- T5 was identified and removed followed by two lung ventilation with expansion of right lung. The patient was repositioned to right lateral and the left lung was collapsed followed by identification and resection of the sympathetic chain from T2-T5.

Intraoperative was uneventful. Bilateral intercostal drains were inserted. The patient received 5 mg of morphine, paracetamol 2g intravenously. The patient was returned to supine position and was extubated after the reversal of the residual neuromuscular blockade with sugammadex 2 mg /kg IV after confirmation of Train of Four Ratio (TOF Ratio) above 0.9. After the surgery, the patient was awake and the postoperative assessment was done by surgeon in both upper limbs and revealed that the palms were hot without sweating or flushing compared to pre-operative. The patient was pain free in the post anesthesia care unit. The post-operative chest x-ray was done for position of chest tube and any residual pneumothorax, it was normal.

DISCUSSION:

Hyperhidrosis can be defined as a pathologic condition characterized by excessive sweating beyond the organism's physiological needs to maintain the body temperature within an adequate range.

This condition can be didactically divided into primary or secondary. Primary hyperhidrosis is the pathology itself, characterized by the excessive sweating which exceeds the physiological needs for a normal thermoregulation. It occurs in about 2% of the world population, affecting equally men and women, and it seems to have a genetic predisposition. (4) The exact pathophysiology of primary hyperhidrosis is not totally clarified yet. It is already known that the disease is not caused by abnormalities on the eccrine sweat glands themselves, since they are histologically and functionally normal in affected individuals. More than just "excessive quantity of sweat", primary hyperhidrosis seems to be related to a dysfunction on the thermoregulation capacity of the sympathetic component of the autonomic nervous system, in which there is a huge disproportion between the trigger represented by stress and/or ambient heat conditions and the body response represented by sweat production.

In primary hyperhidrosis, the excessive sweat is usually localized and can be described mostly as palmar (hands), axillar (armpits), and/or plantar (feet). Craniofacial hyperhidrosis can also occur, alone or with facial blushing. Patients with primary hyperhidrosis classically present with sweating complaints dating from the first decade of life (remarkably in hands) and during the adolescence the symptoms normally become more relevant, leading to a negative impact in quality of life (QoL). (5) Physical, psychological and emotional stresses tend to worsen the symptoms, which are not related to the ambient temperature and are clearly disproportional to it. Another important aspect of the primary hyperhidrosis is that sweating episodes occur only when the patient is awake. Patients with facial hyperhidrosis and/or blushing constitute a particular group: their outcomes after sympathectomy are very effective with respect to cure of symptoms; Nevertheless, due to the need to interrupt the sympathetic trunk in a high level (second rib/second thoracic ganglion), they are more exposed than any other patients to a higher risk of compensatory hyperhidrosis. (6-9)

Non-surgical treatment of primary hyperhidrosis:

Anticholinergic drugs (oxybutynin, glycopyrrolate, propantheline) can be used, but their long-term use is frequently limited by side effects. Patients with hyperhidrosis/blushing linked to anxiety and emotional triggers can be treated with benzodiazepines and beta-blockers, besides psychological therapy. Botulinum toxin Local injections are frequently used to control hyperhidrosis, with good results. The main problems related to this treatment are time-limited efficacy and the fact that injections must repeated every three to six months to sustain the effects. Iontophoresis is another conservative therapy. It is based on the application of electrical currents over the affected areas, which must be immersed in an ionized solution. Sweat glands ablation by energy-based devices is a promising nonsurgical alternative to treat hyperhidrosis, especially for axillary cases. (11-12).

Sympathectomy surgery for hyperhidrosis: The optimal postoperative result is highly dependent on the adequate selection of the right patient for the right procedure. based on the sweating complaints, its location, intensity, triggers, age of onset and other information—is the most valuable tool to define the diagnosis of primary hyperhidrosis. The best results after VATS are achieved in patients with palmar hyperhidrosis, in which symptoms disappearance and quality of life improvement is near to 100%.(14-15).

Cranially, the most relevant anatomic landmark is the first rib, which describes a "closed C-ring trajectory". Right above its upper border, the pulsating subclavian artery can be easily found. The stellate ganglion is the most cranial part of the intrathoracic sympathetic chain and definitely must be avoided in all thoracic sympathectomies for hyperhidrosis. (13). Tiny collateral fibers arising from the trunk can be present in a variable number of patients. These are the "*Kuntz* nerves" Acting as alternative neural pathway to the brachial plexus, they can be responsible for persisting hyperhidrosis after ETS. In order to avoid that, it is advisable to extend the chain interruption in about 2 cm laterally over the inner face of the ribs until denudate the periosteum, so these small nerves can be properly transected. (16-18)

Complications:

VATS is a very well tolerated procedure and complications rarely occur. The most obvious intraoperative complications possible are lung injury, pneumothorax, major bleedings, chylothorax and phrenic nerve injury. All of them are rare and can be prevented by a meticulous and careful surgical technique. Early postoperative pneumothorax and pleural effusion requiring intervention are possible, but unlikely. Since the use of harmonic scalpels has been introduced and the G2 ganglion approach has been practically abandoned, the incidence of Horner's syndrome has dropped almost to zero.

Bradycardia, if occurs, is usually asymptomatic and clinically irrelevant. However, some high-performance professional athletes may have their physical capacity affected and must be warned about this risk before surgery. Postoperative pain is easily controlled by regular analgesics and non-steroid anti-inflammatory drugs and is usually self-limited, disappearing within the first month after surgery. With the advent of thinner instruments and trocars, the incidence of chronic pain is extremely low.

Persistence of the symptoms or early recurrence usually indicate surgical failure, mostly related to incomplete or inadequate denervation and require reoperation in the majority of cases. Misinterpretations due to local anatomic variations, blood vessels crossing over the trunk, local pleural thickening or adhesions are among the possible causes, in addition to technical faults. Approaching the sympathetic trunk at wrong levels can also lead to unsatisfactory early postoperative results. Late recurrence is not common but can occur, probably by nerve regeneration, prone to happen when the transected trunk ends remain close to each other or in children who still might grow after surgery. Both situations also may require reoperation. Re-sympathectomy is indicated using double-lumen endotracheal tubes, generally providing successful resolution of persistent/recurrent symptoms, but the risk of worsening a possible CH that has emerged after the first surgery shall not be neglected. (19,20).

SUMMARY:

Patients who suffer from primary hyperhidrosis frequently experiment a miserable quality of life. Thoracic sympathectomy and its variations are the most valuable tools in the curative treatment these patients. Those presenting with palmar hyperhidrosis are the most suitable to surgery as first-line treatment, in which the best results and grades of satisfaction are observed, with a significant upgrade in their Quality of Life. Anesthetic management is challenging in view of coexisting conditions and single lung ventilation.

Abbreviations: VATS- Video assisted Thoracoscopy, ETS-Endoscopic thoracic sympathectomy

Conflicts of Interest: None

REFERENCES:

1. Alexander W. The treatment of epilepsy. Edinburgh: Young J Pentland, 1889: 27-106.

2. Kotzareff A. Resection partielle du tronc sympathique cervical droit pour hyperhidrose unilaterale. *Rev Med Suisse Rom*1920; 40:111-3.

3. Hughes J. Endothoracic sympathectomy. *Proc R Soc Med* 1942; 35:585-6.

4. Ro KM, Cantor RM, Lange KL, et al. Palmar hyperhidrosis: evidence of genetic transmission. *J Vasc Surg* 2002; 35:382-6. 10.1067/mva.2002.119507

5. Bovell DL, Clunes MT, Elder HY, et al. Ultrastructure of the hyperhidrotic eccrine sweat gland. *Br J Dermatol* 2001; 145:298-301. 10.1046/j.1365-2133.2001. 04351.x

6. Minor V. Ein neues Varfahren zu der klinischen Untersuchung der Schwei absonderung. *Z Neurol* 1928; 101:302-8.

7. Low PA, Caskey PE, Tuck RR, et al. Quantitative sudomotor axon reflex test in normal and

neuropathic subjects. *Ann Neurol* 1983; 14:573-80. 10.1002/ana.410140513

8. Heckmann M, Plewig G. Low-dose efficacy of botulinum toxin A for axillary hyperhidrosis: a randomized, side-by-side, open label study. *Arch Dermatol* 2005; 141:1255-9. 10.1001/archderm.141.10.1255

9. Lang E., Foerster A, Pfannmuller D, et al. Quantitative assessment of sudomotor activity by capacitance hygrometry. *Clin Auton Res* 1993; 3:107-15. 10.1007/BF01818995

10. Kurta AO, Glaser DA. Emerging Nonsusgical treatments for Hyperhidrosis. *Thorac Surg Clin* 2016; 26:395-402. 10.1016/j.thorsurg.2016.06.003

11. Lillis PJ, Coleman WP, Liposuction for treatment of axillary hyperhidrosis. *Dermatol Clin* 1990; 8:479-82.

12. Wollina U, Kostler E, Schonlebe J, et al. Tumescent suction curettage of sweat glands versus minimal skin resection with subcutaneous curettage of sweat glands in axillary hyperhidrosis. *Dermatol Surg* 2008; 34:709-16.

13. Cerfolio RJ, De Campos JR, Bryant AS, et al. The Society of Thoracic Surgeons Expert Consensus for the Surgical Treatment of Hyperhidrosis. *Ann Thorac Surg* 2011; 91:1642-8. 10.1016/j.athoracsur.2011.01.105

14. Kao MC, Lee WY, Yip KM, et al. Palmar hyperhidrosis in children: treatment with video endoscopic laser sympathectomy. *J Pediatr Surg* 1994; 29:387-91. 10.1016/0022-3468(94)90574-6

15. Bell D, Jedynak J, Bell R. Predictors of outcome following endoscopic thoracic sympathectomy. *ANZ J Surg* 2014; 84:68-72. 10.1111/ans.12098

16. Zhang B, Li Z, Yang X, et al. Anatomical variations of the upper thoracic sympathetic chain. *Clin Anat* 2009; 22:595-600. 10.1002/ca.20803

17. Ramsaroop L, Singh B, Moodley J, et al. Anatomical basis for a successful upper limb sympathectomy in the thoracoscopic era. *Clin Anat* 2004; 17:294-9. 10.1002/ca.10238

18. Ramsaroop L, Partab P, Singh B, et al. Thoracic origin of a sympathetic supply to the upper limb: the 'nerve of Kuntz' revisited. *J Anat* 2001; 199:675-82. 10.1046/j.1469-7580.2001.1996067.

19. Continuing Education in Anaesthesia, Critical Care & Pain | Volume 9 Number 2 2009.