

HYPERHIDROSIS & SYMPATHECTOMY

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- ✱ **Hyperhidrosis** is a dysfunction of the sympathetic nervous system that causes excessive sweating. This usually happens under emotional stimuli. **Hyperhidrosis** can be located in the: **Palms (Hands) Axilla (Armpits) Face (Sweating or Blushing) Feet** .

- ✱ It affects between **0.6 to 1%** of the population and **25%** of these patients are affected severely. **Hyperhidrosis** could be either **primary or secondary**. **Primary Hyperhidrosis (idiopathic)** has no cause. **Secondary Hyperhidrosis** could be the result of a number of other medical problems, including:
hyperthyroidism, pheochromocytoma, carcinoid syndrome, diabetes mellitus, acromegaly, hyperpituitarism, other auto immune diseases.

- ✱ **SYMPTOMS** Individuals with hyperhidrosis complain of profuse sweating without any stimulus. They may carry a towel or handkerchief in their hands. Both high temperature and stress may exacerbate the problem. Individuals with hyperhidrosis may sweat excessively both in the winter and the summer. This can cause psychological, medical and occupational problems for these individuals. Intimate relationship can adversely be affected. The symptoms can start at any age and continue to the adult life. Regardless of the location of hyperhidrosis, it can be a debilitating problem making day to day life activities difficult for affected individuals.

- ✱ **1. Palmar Hyperhidrosis** the most common type of hyperhidrosis. These individuals have sweaty hand and are reluctant to shake or hold other people's hands. Other symptoms are:
 - ✱ Difficulty grasping objects Difficulty holding a pen, running ink Papers becoming wet in their hands, cold hands Bluish/ purple discoloration of their hands, As a consequence, they may become socially withdrawn and be limited in their choice of profession.

- ✱ **2. Axillary Hyperhidrosis** excessive sweating at the armpits. This can cause:
 - ✱ Wetness and odor Staining Rotting of clothing, consequently, they can be emotionally and psychologically affected and be socially withdrawn to avoid embarrassment.

- ✱ **3. Plantar Hyperhidrosis** excessive sweating of the feet. They may complain of:
 - ✱ Bad odor Blisters of the feet Infections Rotting of socks, this can be associated with hyperhidrosis of other areas of the body. When ETS is performed for palmar, facial or axillary hyperhidrosis, many individuals who also suffer from plantar hyperhidrosis improve dramatically.

- ✱ **4. Facial Blushing/ Hyperhidrosis** Mild social stimuli or stress can cause facial sweating or blushing. These individuals can become self-conscious and develop low self esteem.

- ✱ *In general, patients with hyperhidrosis suffer everyday from excessive sweating or blushing. They avoid social contact, are self conscious and this can result in low self-esteem.*

- ✱ **CHARACTERISTICS**

- ✱ Sweating could be either sudden onset or continuous. There is usually no initiating factor. It is usually not aggravated by exercise. Stress, gustatory stimuli and high temperature can aggravate the problem. Hyperhidrosis does improve in the cold temperatures. Sweating usually stops once the patient is sleeping. About 25% of patients with hyperhidrosis have family members with the same symptomatology.

- ✱ **PATHOPHYSIOLOGY**

- ✱ Primary Hyperhidrosis is caused by **an over active sympathetic nervous system**. The hypothalamus (part of the brain) regulates the body's temperature in the range of 36 - 37.5 °C. These glands are innervated by the sympathetic nerve endings and they respond to the acetylcholine released from the sympathetic nerve ending. It is over stimulation of these glands that causes hyperhidrosis or facial blushing.

- ✱ Humans have about 2 to 4 millions *Eccrine sweat glands* distributed over the entire body surface. These glands are primarily responsible for sweat production. The palms of the hand have a very high concentration of these sweat glands

MEDICAL TREATMENT

- ✱ The treatment of secondary hyperhidrosis involves the control of the underlined cause. The treatment of choice for severe primary hyperhidrosis is ETS, however, a variety of techniques have been used to decrease excessive sweating.

- ✱ **A. Local measures:** The patients with planter hyperhidrosis can apply foot powder after bathing, leather shoes and cotton or wool socks should not be worn. Rubber and synthetic materials should be avoided.

- ✱ **B. Topical agents:** *Aluminum chloride* is the most widely used topical agent and may be adequate for some patients with axillary hyperhidrosis but in the case of planter and palmar hyperhidrosis is not as useful. It mechanically obstructs the Eccrine sweat gland pore. The treatment is limited by axillary irritation from the aluminum chloride but the *aluminum hexahydrate chloride in an alcohol base* may cause less irritating. Tanning agents such as *glutaraldehyde tannic acid* are usually effective in the treatment of hyperhidrosis, however, they could cause browning of the skin, brown staining of clothing and could be irritating and expensive.

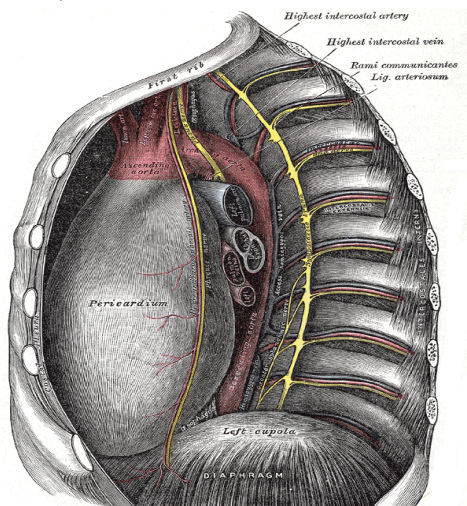
- ✱ **C. Iontophoresis:** This procedure coagulates the Eccrine glands electrically and can be used in the treatment of palmar and plantar hyperhidrosis. In this procedure the patients effected area is placed in a bucket of water, a current of 15 - 30 milliamps is applied by the galvanic generator via electrodes. These sessions last for 20 minutes and are repeated six times a week. This treatment is temporary and

maintenance treatment is done as frequently as necessary. This modality is not practical for axillary hyperhidrosis and facial blushing.

- **D. Medication:** There are no known drugs for the specific treatment of primary hyperhidrosis. Primary hyperhidrosis can be treated with systemic anticholinergics, however, unpleasant side effects such as blurred vision, dry mouth, and urinary tension occur and few patients accept these side effects.
- **E. Psychotherapy:** Some patients with primary hyperhidrosis have been treated with tranquilizers. Psychotherapy or bio feed techniques has been used with very limited success by some authors. Primary hyperhidrosis is not a psychiatric disorder. It would appear that psychological disturbances are caused by the difficulties that the patient experiences and they are not the cause of the hyperhidrosis.
- **F. Laser Abrasion:** This is totally ineffective for the control of primary hyperhidrosis.
- **G. Botox:** Botox is derived from the highly deadly botulism toxin. It has been used by some physicians to paralyze the nerves that stimulate the sweat glands. Unfortunately, this treatment is only temporary and has to be repeated. These injections are also not effective in the cases of palmar or facial hyperhidrosis.

SURGICAL TREATMENT

- Dorsal sympathectomy is the only effective surgical approach to the problem of hyperhidrosis.
- It involves destruction of the sympathetic ganglia supplying postganglionic sympathetic fibers to the sweat glands.
- They are dorsal ganglia T2 and T3, but, mainly T2. Some surgeons add the lower half of the Stellate ganglion (T1) and T4 .
- Operative approaches to these ganglia are : supraclavicular, axillary transthoracic, dorsal paravertebral, and the most recent and the most reliable endoscopic transthoracic approach.
- Actually the endoscopic approach is considered to be the only approach nowadays.
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ENDOSCOPIC TRANSTHORACIC SYMPATHECTOMY (ETS)

- ✿ This is a day case procedure that is considered the most effective way to treat hyperhidrosis and facial blushing. This procedure cuts or clips the T2 sympathetic ganglia in the chest that are at the root of the problem.
- ✿ This is done through 2 or 3 1/2 inch incisions in the armpit. Small instruments with miniature cameras are inserted into the chest cavity. The specific sympathetic ganglion are located and electro cauterized very carefully. It is very important to perform this part of the operation with great precision to avoid complications, then the instruments are removed and the wound are closed with internal sutures. Scars are minimal and well hidden. This procedure takes less than one hour. The relief of sweating is immediately noticed by the patient. Post operative pain is minimal and most patients go home the same day of surgery.

ETS side effects

- ✿ The most common side effect of ETS is compensatory sweating. It causes sweating of the back, trunk, abdomen and the thighs. This is tolerated well by most patients however it could be troublesome in 5% of affected individuals. Some individuals report excessive sweating of the hands and axilla shortly after the operation. This is temporary and resolves on its own.
- ✿ Some individuals report gustatory sweating which is sweating of the face while eating or smelling certain foods. This is a very rare side effect. ETS also carries a small risk of Horner syndrome, which is dropping of the eyelid and a smaller pupil on the affected side. *Infection, pneumothorax, excessive bleeding* and injury to the surrounding tissue are also possible, but rare in experienced hands.

ETS results

The success of treating primary hyperhidrosis has been generally very good. Cure is immediate and patients notice dry and warm hands, face and armpits when they wake up from anesthesia. The cure rates are: 98% for palmar hyperhidrosis (sweaty hands) 95% for facial blushing 85% for facial sweating 60% for plantar (feet) hyperhidrosis 90% for axillary sweating.

✿ **CONCLUSION**

- ✿ *Hyperhidrosis is a fairly common disorder which is under diagnosed and under treated. -Currently, Endoscopic Thoracic Sympathectomy (ETS) is the treatment of choice for severely affected patients with good results and high patient satisfaction rate.*