Hyperhidrosis Surgical Management & Consequences

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History

• 25 y/o female, with PMH significant for long standing hyperhidrosis of both palms and soles, presented for elective B/L Thoracoscopic Sympathectomy after failed medical management x5 years.

• PMH- Hyperhidrosis, HTN
• PSH- left breast cyst excision
• Meds- HCTZ
• Allergy- NKDA
• SH- No ETOH , smokes 2cig./day
• Allergy- NKDA
• FH- Uncle with hyperhidrosis
Physical Exam

- BP 134/87  HR 84  T 98.1  O2 100
- AAOx3, NAD
- + Profuse sweeting from both palms > face, axillae and soles
S/P TS B/L Sympathectomy

The location of the two 2 mm incisions created in the performance of VATS sympathectomy.

Healed Incisions

T2 Ganglion

T3 Ganglion

Third Rib

Second Rib

Coagulated T2 and T3 Ganglia
Overview

- Anatomy
- Epidemiology
- Pathophysiology
- Diagnostic Criteria
- Treatment options
- Consequences
- Conclusions
Sympathetic division

- Dilates pupil
- Inhibits salvation
- Relaxes bronchi
- Accelerates heart
- Stimulates glucose release by liver
- Inhibits digestive activity
- Contracts rectum
- Secretion of epinephrine and epinephrine from kidney
-Relaxes bladder

Sympathetic ganglia
What is Hyperhidrosis?

- Pathological condition of excessive sweat production greater than physiologically needed for thermoregulation.

- 'silent handicap'

![Diagram of Classic Locations of Hyperhidrosis: Face, Underarm, Hands, Feet](image)
Types

• **Primary focal Hyperhidrosis** - chronic idiopathic conditions

• **Secondary (Generalized)** - secondary to excessive heat or medical conditions (spinal cord injury, respiratory or heart failure, drugs, alcohol abuse, infectious, endocrine & malignancy).
Epidemiology of primary focal Hyperhydrosis

• 1 : 3 percent of the population
• More common in hot climate
• Affects Both sexes equally
• Onset is mostly at puberty or early adulthood
• Predilection sites: axillae, palms, soles, face
• 70% undiagnosed
• Peaks in early adulthood
• 50% of the patients have a family history
• Affect patients both socially and functionally
• It is not considered a psychological disorder.
Three types of sweat glands (2-5 million sweat glands)

- **Eccrine-**
  - Responsible for hyperhidrosis
  - Located throughout the body (face, palm, sole & axilla)
  - Primary function thermoregulation
  - Activated by emotional and thermal stimuli
  - Secrets clear, odorless sweat
  - Innervated by the postganglionic sympathetic nerve fibers
  - Acetylcholine as the primary neurotransmitter.

- **Apocrine-**
  - Androgen dependent, Inactive until puberty (Axilla, genital areas)
  - Produce viscous fluid with characteristic body odor sweat
  - Unclear function in humans/some role in olfactory communication
  - Catecholamines as the primary neurotransmitter.

- **Apoeccrine-**
  - Found in Axilla, only adults, unclear function
• Thermal sweating is controlled by hypothalamus (exercise, hormones, Temp. change, stress)

• Emotional sweating is regulated by the cerebral cortex

• the cause of hyperhidrosis appears to be an abnormal or exaggerated central response to normal heat and emotional stress.
Sympathetic innervation

- **Face** T2-T4
- **Trunk** T4-T12
- **Upper limbs** T2 – T8
- **Lower limbs** T10-T12
Diagnosis of Primary Focal Hyperhidrosis

• Focal, visible, excessive sweating of at least 6 months duration without apparent cause with at least 2 of the following characteristics:
  ✓ Bilateral and symmetric
  ✓ Impairs daily activities
  ✓ At least one episode per week
  ✓ Onset before age 25
  ✓ Positive Family history
  ✓ Stops during sleep
Quality of Life:
Primary Palmar Hyperhidrosis

100 patients, palmar, presenting for sympathectomy

✓ Interference with daily task  95%
✓ Social embarrassment       90%
✓ Psychological difficulties  40%

Adar et al  Ann Surg;186: 1977 34-41
Pathogenesis of PFH

• Exact cause is unknown

• Familial or genetic?

• Excessive Sympathetic Activity?
Symptoms

- Excessive sweating (palms, soles, and axillae)
- Worse by heat or emotional stimuli
- Skin maceration and clothes staining
- Increased incidence of cutaneous disorders.
- Dehydration
- Associated with social and professional problems (Fear of shaking hands, soiling of papers, etc..)
Treatment of PFH

- **Topical meds** - antiperspirant (Aluminum chloride) 88% effective. Topical anticholinergic (Glycopyrrolate, oxybutinin)
- **Iontophoresis** - (palmar/planter), 83% effective
- **Systemic meds** - Anticholinergic (Robinul) 21% effective, SE- (xerostomia, mydriasis, blurry vision, Headache, Urinary retention).
  B-blockers, and benzodiazepines for emotional hyperhidrosis.
- **Botulinum Toxin** - blocks the release of acetylcholine from the presynaptic junction (lasts 6-7 mon.), 90% effective.
Treatment of PFH

- **Local sweat gland resection** - Used only for axillary hyperhidrosis (subcut. Curettage, excision of skin containing eccrine glands, suction curettage), 80-90% effective.

- **B/L Thoracoscopic Sympathectomy (ETS)** - involves the interruption of the upper thoracic sympathetic chain
  - T3 Ganglion - Craniofacial hyperhidrosis
  - T4 Ganglion - Palmar hyperhidrosis
  - T4 and T5 Ganglion - Axillary only or palmar, axillary and pedal hyperhidrosis
  - >95% success rate in palmar hyperhidrosis
ETS Consequences

- Hemo-pneumothorax – 1%
- Atelectasis
- Bradycardia
- Intercostal neuralgia – 1%
- Horner’s Syndrome – 1-3%
- Compensatory Sweating – 60%

Stellate ganglion – fusion of C8 and T1, Innervates the face. If Stellate ganglion is damaged, Horner’s Syndrome will occur. May be mistaken for T2 and T3. May receive electrical current from cautery of T2 and T3
Endoscopic transthoracic sympathectomy: an efficient and safe method for the treatment of hyperhidrosis.
Drott C, Göthberg G, Claes G

- A series of 850 patients with upper extremity hyperhidrosis
- Median follow-up of 31 months
- 98 percent of patients reported satisfactory results
- only 2 percent developing recurrent symptoms.
- Horner's syndrome occurred in 3 cases
- Compensatory sweating, primarily of the trunk, occurred in 55 percent of patients, but only 2 percent considered this to be as bothersome
Endoscopic thoracic sympathectomy for primary hyperhidrosis of the upper limbs. A critical analysis and long-term results of 480 operations.
Herbst F, Plas EG, Függer R, Fritsch A

- Review of 480 sympathectomies
- No major complications
- Initially, 95.5 percent were satisfied with the results of surgery.
- After a mean follow-up of 14.6 years, 66.7 percent were satisfied and 26.7 percent were partially satisfied
- Recurrence rate of only 1.5 percent
- Patients with axillary hyperhidrosis without palmar involvement were the least satisfied.
- Compensatory sweating, occurred in 67.4 percent of patients, was the most frequently stated reasons for dissatisfaction.
A retrospective review of 234 patients

palmar hyperhidrosis is most commonly performed at a T2 or T3 level

Similar efficacy was seen with T4-level ETS

T4 level had less compensatory sweating than those with higher sympathectomies
Satisfaction and compensatory hyperhidrosis rates 5 years and longer after video-assisted thoracoscopic sympathectomy for hyperhidrosis
Ayesha S. Bryant, MD, MSPH, and Robert James Cerfolio, MD, FACS, FCCP

- Prospective cohort study, 173 patients (1999-2012)
- 96 pts had very poor quality of life before surgery
- No postop. Bradycardia or Horner's syndrome, 1 patient required chest tube
- CH- 77% 1 year, 37% 5 years (decreases signif. from 1-2 yrs)
- 79% reported improvement in their quality of life at 1 year after surgery, 85% 3 years, 89% 5 years.
- CH significantly greater for R2/R3 vs R4/R5 sympathectomy, Multifocal hyperhidrosis on presentation, used oral anticholinergic meds. preoperatively and female
- 6.2% regretted having the operation for CH
Summary

• Patients with PFH, can suffer significant psychological, social, educational, and occupational consequences.
• The severity and location of hyperhidrosis helps guide the choice of therapies
• the patient's goals in therapy should be understood, and the side effects associated with each therapy should be carefully discussed.
• surgery should be reserved for those with the most severe manifestations and after other less invasive options have been exhausted.
• Conservative treatments has limited success rate
• Endoscopic Thoracic Sympathectomy (ETS), is the only highly effective and definitive treatment for PFH.
• The higher the level of blockade on the chain, the higher is the expected CH.
• Despite the appearance of postoperative complications, such as compensatory sweating, patient satisfaction is high and their quality of life improved.
Summary

- Iontophoresis—stops the sweat gland cells from making sweat
- Sympathectomy - Cutting the sympathetic nerves
- Botulinum Toxin blocks the nerve impulses
- Antiperspirants

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