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Sean C. Grondin

Hyperhidrosis: What is it and Why Does it Occur? **125**
Yaron Shargall, Ernie Spratt, and Robert A. Zeldin

Hyperhidrosis is excessive sweating in response to heat or emotional stimuli beyond physiologic need. The ailment is not new and has been described in the literature dating back several centuries. It can be classified as either primary or secondary based on its etiology. Mechanisms that cause excessive sweating can be traced to the sympathetic nervous system, part of the autonomic nervous system. It has been speculated that the primary abnormality is central, and that the hypothalamic sweat center that controls the palms, axillae, and soles is distinct in hyperhidrosis individuals.

Evaluating the Patient Presenting with Hyperhidrosis **133**
Nowell Solish, Rena Wang, and Christian A. Murray

Hyperhidrosis affects approximately 2.8% of the population. This condition is often socially and professionally debilitating, leading to significant quality-of-life impairment. Primary focal hyperhidrosis stems from neurogenic overactivity involving normal eccrine glands, while secondary generalized hyperhidrosis is due to any one of a number of causes. The approach to patient evaluation and differential diagnosis are discussed.

Nonsurgical Management of Hyperhidrosis **141**
Sarah Gee and Paul S. Yamauchi

Affecting up to 3% of the United States population, hyperhidrosis (HH) is a condition defined by excessive sweat secretion. HH is a physical disease that can have a severe negative impact on a patient's quality of life with respect to occupational, personal, and social relationships. It is imperative to diagnose patients who have HH immediately and to treat them effectively. Given the potential complications of surgery, nonsurgical modalities are considered first. This article reviews in detail the conservative and nonsurgical options for HH management, which include topical agents, oral medications, iontophoresis, and botulinum toxin injections. It also reviews the current suggested use of these therapies according to disease severity and distribution.

Evidence-Based Review of the Nonsurgical Management of Hyperhidrosis **157**
Rafael Reisfeld and Karen I. Berliner

The most common nonsurgical modern treatments for hyperhidrosis include topical treatments such as aluminum chloride, iontophoresis (usually with tap water), oral

medications such as anticholinergics, and botulinum toxin type A. Topical treatments should always be first-line therapy. For those for whom such treatment fails, iontophoresis is typically recommended for those who have palmar or plantar hyperhidrosis, whereas botulinum toxin is often considered as first- or second-line therapy for severe axillary hyperhidrosis. Oral anticholinergics are considered after failure of all other nonsurgical treatments.

Surgical Approaches and Techniques in the Management of Severe Hyperhidrosis **167**
Fritz J. Baumgartner

The idea that a patient suffering from severe hyperhidrosis can benefit from surgery is not new. The first endoscopic sympathetic ablation was described by Kux in the 1950s. With the evolution of modern thoracoscopic techniques over the past 20 years, surgery has now been established as playing an important role in the management of this condition. Controversy still remains, however, as to the best technique for the surgical management of palmar, axillary, and craniofacial hyperhidrosis. Details regarding optimal approach, level, and extent of sympathectomy are discussed.

Endoscopic Thoracic Sympathectomy: At What Level Should You Perform Surgery? **183**
Benny Weksler, James D. Luketich, and Manisha R. Shende

The literature is inundated with a plethora of procedures that are not standardized and are hard to compare. Several interventions on the sympathetic chain are possible and the nomenclature has been confusing. The authors propose a uniform naming for each procedure, mainly, sympathectomy for resection or ablation of the ganglion, sympathicotomy for the transaction of the chain, ramicotomy for the procedure preserving the chain and ganglia and severing the rami, and, finally, sympathetic block by clipping above and below the ganglia. The authors recommend intervention on the T2 ganglia for facial hyperhidrosis and rubor, on the T3 ganglia for palmar hyperhidrosis, and on the T3 and T4 ganglia for axillary hyperhidrosis.

Side Effects and Complications of Surgery for Hyperhidrosis **193**
Pascal Dumont

Side effects and complications are the main worries of hyperhidrosis surgeons. They must be considered separately, however, because the problems created by each are different. Indeed, side effects are almost constant, unavoidable, and are often the price that patients pay for treating hyperhidrosis with surgery. Conversely, complications are rare and exceptional. Some can be avoided by experience or by technical improvement. Others, exceptionally, can occur in any surgery and are unforeseeable. Patients should be fully informed of all of these potential pitfalls before they decide on surgical treatment.

Evidence-Based Review of the Surgical Management of Hyperhidrosis **209**
Harry J. Henteleff and Dimitri Kalavrouziotis

The authors have systematically reviewed the evidence supporting thoracic sympathectomy in the management of patients with primary hyperhidrosis. Substantive observational literature suggests that endoscopic thoracic sympathectomy is a safe and effective therapeutic strategy in patients with hyperhidrosis, with excellent long-term results and high rates of patient satisfaction. However, randomized, controlled trials directly comparing sympathectomy with alternative treatments are lacking in this

patient population. Adequately powered clinical trials are needed to elucidate the role of sympathectomy in the face of emerging nonsurgical therapies and may help identify subsets of patients most likely to benefit from surgical intervention.

Long-term Results and Quality-of-Life Measures in the Management of Hyperhidrosis **217**
Ibrahim B. Cetindag, Theresa M. Boley, Kelli N. Webb, and Stephen R. Hazelrigg

This article describes the quantitative and qualitative assessment of hyperhidrosis. Generalized quality-of-life and specific hyperhidrosis tools are used to measure disease severity and effects of treatment of hyperhidrosis. Quality-of-life tools include general health surveys. Quantitative tools include gravimetry, evaporimetry, and Minor's starch and iodine test. Surgical and medical treatments are best assessed using a combination of tools. Video-assisted thoracoscopic sympathectomy can have a major positive impact on the quality of life of patients who have hyperhidrosis.

Management of Facial Blushing **223**
Peter B. Licht and Hans K. Pilegaard

Patients complaining about facial blushing should be investigated by a dermatologist or internist to rule out a serious underlying disorder. Patients with emotionally triggered blushing should be encouraged to try nonsurgical options as the first line of treatment. Provided there is still an indication for treatment, facial blushing may be treated effectively by thoracoscopic sympathectomy. In the short term, the key to success in sympathetic surgery for facial blushing lies in a meticulous and critical patient selection and in ensuring that the patient is thoroughly informed about the high risk of side effects. In the long term, the key to success in sympathetic surgery for facial blushing lies in more quality research comparing surgical, pharmacologic, and psychotherapeutic treatments.

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