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# In hyperhidrosis (excess sweating), look for a pattern and cause

## ■ ABSTRACT

Hyperhidrosis (excessive sweating) can be generalized or localized, and secondary or primary; thus, understanding the pattern can help in finding the cause. Generalized hyperhidrosis may be due to an underlying systemic disease or to medication use. Focal hyperhidrosis is often primary (idiopathic) and triggered by emotional stimuli, although it is not generally a psychiatric disease.

## ■ KEY POINTS

Because hyperhidrosis can be socially and occupationally disabling, effective management is essential.

Generalized hyperhidrosis usually begins in adulthood, and the sweating occurs during both waking and sleeping. Such cases require investigation of potential underlying causes, such as medications and systemic illnesses.

Primary or focal hyperhidrosis usually begins in adolescence or childhood and is localized to the hands, axillae, or feet.

A number of topical, systemic, electrical, and surgical treatments are available for hyperhidrosis. Iontophoresis is a good choice for an initial trial of conservative therapy for patients with hyperhidrosis of the palms or soles.

**H**YPERHIDROSIS, ie, sweating beyond what is necessary to maintain thermal regulation, is challenging to determine the cause of and challenging to treat. It may be primary (idiopathic or essential) or secondary to a number of diseases and drugs. It also may be localized or generalized.

Regardless of the cause or type, hyperhidrosis often is occupationally disabling and socially embarrassing.<sup>1</sup> Excess sweat on the hands may soil paper and artwork and make it virtually impossible to play many musical instruments. People with hyperhidrosis may find it impossible to pursue careers in fields that require contact with paper, metal, or electrical devices. Axillary and plantar hyperhidrosis may stain and damage clothing and shoes. Generalized hyperhidrosis leaves affected individuals with wet clothing that may have to be changed a number of times each day.

This article briefly reviews the causes of hyperhidrosis and potential treatments.

## ■ GENERALIZED HYPERHIDROSIS

A key question in determining the cause of hyperhidrosis is whether the sweating is generalized or localized to the hands, axillae, and feet (TABLE 1).

Heat, humidity, and vigorous exercise are by far the most common causes of generalized hyperhidrosis, as the body struggles to maintain its thermal equilibrium. However, generalized hyperhidrosis may also be a sign of a systemic disease; therefore, the physician must be prepared to look for an underlying disorder.

Most patients who present with generalized hyperhidrosis are adults whose sweating occurs during both the waking and the sleeping hours. Potential causes of generalized



hyperhidrosis include:

- **Infections** such as tuberculosis, which characteristically causes night sweats
- **Malignancies** (eg, Hodgkin disease)
- **Metabolic diseases and disorders**, including thyrotoxicosis, diabetes, hypoglycemia, gout, pheochromocytoma, and pituitary disease
- **Menopause**
- **Severe physiologic stress** such as shock, pain, or drug withdrawal, which may cause release of acetylcholine at sympathetic eccrine nerve endings
- **Many prescribed drugs.** Venlafaxine, an antidepressant, inhibits the reuptake of serotonin and norepinephrine. Excess sweating occurs in as many as 12% of all patients receiving venlafaxine or other selective serotonin reuptake inhibitors. Tricyclic antidepressants also can induce excess sweating despite their anticholinergic action.

### Treatment of generalized hyperhidrosis

**Benzodiazepines**, such as diazepam, may have an ameliorating effect for patients whose hyperhidrosis is related to specific anxiety-producing events such as a speaking engagement or a school dance.

**Systemic anticholinergics** may be helpful, but the dosages required to reduce sweating also cause side effects such as xerostomia, mydriasis, cycloplegia, and bowel and bladder dysfunction, and most patients with hyperhidrosis cannot tolerate them for long. However, the anticholinergic oxybutynin (Ditropan) is useful in the relatively rare syndrome of episodic hyperhidrosis with hypothermia. Another anticholinergic, benzotropine (Cogentin), is useful for treating venlafaxine-induced hyperhidrosis.

**Clonidine**, a centrally acting adrenergic agonist, has been found to be useful in treating hyperhidrosis due to tricyclic antidepressants and menopause.

### ■ LOCALIZED HYPERHIDROSIS

The most common form of localized hyperhidrosis is focal hyperhidrosis, which is localized to the palms, soles, axillae, or face.

Focal hyperhidrosis affects an estimated 7.8 million Americans. It may be inherited.

**TABLE 1**

## Common causes of hyperhidrosis

### Generalized

- Heat, humidity, exercise
- Febrile diseases
  - Acute and chronic infection
  - Neoplasia
- Metabolic diseases
  - Thyrotoxicosis
  - Diabetes mellitus
  - Hypoglycemia
  - Gout
  - Pheochromocytoma
  - Hyperpituitarism
  - Menopause
- Sympathetic discharge
  - Shock and syncope
  - Intense pain
  - Alcohol and drug withdrawal
- Neurologic diseases
  - Riley-Day syndrome
  - Autonomic dysreflexia
  - Hypothalamic lesions
- Medications
  - Propranolol, physostigmine, pilocarpine, venlafaxine, tricyclic antidepressants

### Localized

- Emotional stimuli, particularly those that cause anxiety
- Heat
- Olfactory
- Gustatory
  - Citric acid, apples, coffee, chocolate, peanut butter, spicy foods
- Neurologic lesions
  - Frey syndrome
  - Spinal cord injury
- Focal hyperhidrosis of palms, soles, face, and axillae

Unlike generalized hyperhidrosis, in which the onset is usually in adulthood, focal hyperhidrosis usually begins in adolescence, but it can also begin in childhood or even in infancy. It characteristically does not occur during sleep.

Focal hyperhidrosis is triggered by emotional stimuli and may be made worse by heat. It is important to note, however, that although emotional stimuli are necessary for focal hyperhidrosis to occur in affected individuals, it is a physiological rather than a psychological disorder. In patients with focal



hyperhidrosis, the hypothalamic centers involved in the regulation of sweating appear to be more sensitive to emotional stimuli than in unaffected people. The occasional onset of focal hyperhidrosis in the neonatal period is evidence that this is far more than an emotional disorder.

Localized forms of hyperhidrosis that may be considered secondary include gustatory, and olfactory hyperhidrosis, and Frey syndrome.

### Treatment of localized hyperhidrosis

**Topical treatment** of localized hyperhidrosis is sometimes helpful. Many topical agents are available, including aluminum chloride, potassium permanganate, formalin, glutaraldehyde, and various topical anticholinergic compounds. However, these products can be irritating and sensitizing and sometimes cause cosmetically offensive staining of the skin.

Drysol, a prescription antiperspirant containing 20% aluminum chloride hexahydrate, is useful for some patients with axillary hyperhidrosis that does not respond to over-the-counter antiperspirants, and may also be effective in mild cases of palmar and plantar hyperhidrosis.

Anticholinergic compounds have little effect on sweating for most people when applied directly to the skin.


**Botulinum A toxin** can be used to treat axillary hyperhidrosis that does not respond to topical agents such as Drysol. Injections to the hyperhidrotic areas of the axillae can relieve symptoms for as long as 12 months.

Botulinum A toxin injections are also effective for palmar hyperhidrosis, and relief can last many months. However, the pain involved in injections in the hands, occasional problems of muscle weakness, and the expense of this treatment make botulinum A toxin a less-than-optimal therapy.

Botulinum A toxin has proven to be a particularly effective and long-lasting treatment for Frey syndrome, a form of gustatory hyperhidrosis related to parotid gland surgery.

**Alternative treatments** for axillary hyperhidrosis include surgical resection, subcutaneous curettage, and liposuction of the axillary sweat glands.

**Surgical sympathectomy** is an effective treatment for palmar hyperhidrosis,<sup>6</sup> but it can cause significant problems, specifically compensatory hyperhidrosis, Horner syndrome, and neurologic lesions.<sup>3</sup> Compensatory hyperhidrosis occurs in approximately 50% of all patients treated for hyperhidrosis by endoscopic sympathectomy. Compensatory hyperhidrosis refers to the development of excess sweating following sympathectomy in areas that were previously dry. For example, truncal sweating may be so severe that some patients wish they could have their sympathectomies reversed. Indeed, the fact that patients are willing to resort to surgical techniques such as sympathectomy shows how much hyperhidrosis can interfere with quality of life.<sup>4</sup>

**Iontophoresis.** I have found that iontophoresis, using a device such as the Fischer galvanic unit, is a simple, safe, and relatively inexpensive remedy for palmar or plantar hyperhidrosis.<sup>5</sup> Iontophoresis involves the administration of direct current via tap-water baths to the skin of the palms, or soles, or both. After a series of five to 10 treatments, 85% of patients cease sweating. Most patients find that the beneficial effects of iontophoresis are prolonged, and maintenance treatments are needed only every 2 to 3 weeks. 

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Iontophoresis can be effective and is relatively inexpensive for primary hyperhidrosis