

A Man with Excessive Sweating

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Case Report

ABSTRACT

Excessive sweating or hyperhidrosis is a rare clinical problem. Here we are presenting a case report of a man with excessive sweating.

Keywords: Hyperhidrosis, Essential or primary, Palmar hyperhidrosis, Antiperspirants, Iontophoresis, Botulinum toxin

INTRODUCTION

Excessive sweating also called hyperhidrosis can be due to various causes. Evaluation of hyperhidrosis depends upon the associated clinical features. Primary hyperhidrosis is a rare clinical condition.

CASE REPORT

A 30 year old male presented with excessive sweating of both hands and feet since last 10 years, which cause social embarrassment and difficulty to work resulting in anxiety (**Figures 1 and 2**). He is not having any significant history of weight loss, palpitation, heat intolerance, tremor, abnormal behaviour, seizure, loss of consciousness, headache, flashing episodes, neurological problems, diabetes or any malignancies. He is not taking any medicines. Clinical examination was normal except for presence of profuse sweating of both hands and foot. Routine investigations and thyroid function test were within normal limit and we made a clinical diagnosis of essential or primary hyperhidrosis.



Figure 1. A 30 year old male presented with excessive sweating of both hands.

He was treated with topical Aluminium chloride, with partial improvement in his symptoms. Other treatment options like systemic anticholinergic, Botulinum toxin injection and various surgical methods were also discussed with him, but he was not willing for further treatment.



Figure 2. A 30 year old male presented with excessive sweating of both feet.

DISCUSSION

Excessive sweating or hyperhidrosis is a rare clinical problem and occurs only in 1% of the population, which can cause social embarrassment, lack of confidence, anxiety, difficult to work, social phobia and withdrawal leading to depression [1].

Hyperhidrosis can be physiological or pathological. Physiological causes includes hot climate, physical activity, anxiety, stress, severe pain, food intake, defervescence, pregnancy, obesity or after menopause. Pathological hyperhidrosis can be due to various causes including endocrine disorders (hyperthyroidism, pheochromocytoma, and hypoglycaemia), chronic infection (tuberculosis, malaria, brucellosis), neoplasm (carcinoid tumours, Hodgkin disease), neurological disorders (autonomic dysregulation, familial dysautonomia) and medication induced (**Table 1**) [2]. Hyperhidrosis can be emotionally induced, exertional or pyrexia induced. Emotionally induced or exertional hyperhidrosis is usually transient and associated with tachypnea, tachycardia and fluctuation in blood pressure.

Table 1. Drugs causing hyperhidrosis.

| Category | Drugs |
|----------------------------|---|
| Anti-viral | Acyclovir |
| Anti-hypertensive | Amlodipine, verapamil, lisinopril, nifedipine |
| Antibiotics | Ciprofloxacin, moxifloxacin, bacitracin |
| Anti-diabetic and hormones | Glipizide, insulin regular, levothyroxine, prednisolone |
| Anti- histamine | Loratadine |
| Analgesics/anesthetic | Naproxen, indomethacin, mepivacaine, lidocaine and epinephrine, fentanyl, oxycodone, hydrocodone |
| Bronchodilators | Albuterol |
| CNS drugs | Citalopram, desipramine, nortriptyline, protriptyline, sertraline, bupropion, paroxetine, trazodone, zolpidem |
| Cholinergic | pilocarpine |
| Cardiac drugs | Digoxin |
| Proton pump inhibitors | Esomeprazole, omeprazole |
| PDE-5 inhibitors | Tadalafil, vardenafil |
| Statins | Atorvastatin |
| Supplements | trace metals, zinc supplements |
| Tryptans | Sumatriptan |
| Others | Nicotine |

Hyperhidrosis can be focal (Localized) or generalized [2]. Focal hyperhidrosis is usually idiopathic and depending upon the site of involvement, it can be either under arms (axillary hyperhidrosis), hands (palmar hyperhidrosis), sole of the foot (planter hyperhidrosis) or face (Facial or cranial hyperhidrosis or Cranio facial). Focal hyperhidrosis can also be due to

Freys syndrome or gustatory sweating, chorda tympani syndrome or eccrine angiomatoid nevus. Regional hyperhidrosis can be compensatory. Compensatory hyperhidrosis is a phenomenon associated with increased sweating in parts of the body unrelated to the location of treatment or in the case of surgery, unrelated to surgery or anatomy. Regional hyperhidrosis can be due to spinal cord lesions (tetraplegia and high level paraplegia, syringomyelia, focal brain lesions), trauma or reflex sympathetic dystrophy. Generalized hyperhidrosis is usually due to secondary causes.

When there is no obvious case for hyperhidrosis it is called primary or essential hyperhidrosis, which is idiopathic and begins from childhood or adolescence and persist throughout life.

Hyperhidrosis impact questionnaire (HIQ)/hyperhidrosis diseases severity scale helps to assess disease severity and its impact in day to day life [3].

In patients with primary focal hyperhidrosis positive family history is there for 55-65% of cases and is probably due to autosomal dominant inheritance [4].

Multiple site hyperhidrosis is common in patients with primary focal hyperhidrosis, palmo-plantar (28%) being most common, followed by axillary plus palmo-plantar (6%) and axillary plus palmar (2%).

In patients with hyperhidrosis, due to increased skin moisture, risk of cutaneous infections like verruca vulgarise, dermatophytosis, pitted keratolysis, etc., are more.

Patho-Physiology

There are 3 types of sweat glands in human body. They are:

- Eccrine glands: Eccrine glands involved in thermo regulation and secrete hypotonic solution with valuable amount of electrolyte. It is widely distributed.
- Apocrine glands: Apocrine glands secretion contains more fat, protein and salts. It is restricted to face and hands.
- Apoeccrine glands: Apoeccrine glands secretion also contains more fat, protein and salt. It is seen mainly in the mammary, axillary and genital areas.

Eccrine sweat glands are primarily seen in palm, sole and axilla, but widely distributed throughout body except external auditory canal, lips clitoris and labia minora. Eccrine sweat glands are primary involved in primary focal hyperhidrosis but apoeccrine glands also play a role in axillary hyperhidrosis.

Higher concentrations of eccrine sweat producing glands are seen in the axilla, palms and soles, and to a less concentration in face and scalp. These sweat glands are innervated by sympathetic postganglionic unmyelinated class C nerves fibres, which have acetylcholine as primary neurotransmitter.

A central sudomotor efferent pathway starts from cerebral cortex to hypothalamus and to medulla which crosses to opposite side at modularly level to descend lateral horn of spinal cord to reach sympathetic ganglia and from there to sweat glands as postganglionic C fibres. Sweat glands in the palms and soles are activated by emotional stimuli and emotional sweating will not occur during sleep or sedation.

Thermal sweating is controlled by hypothalamic centre and emotional sweating is controlled by cerebral cortex. In patients with primary focal hyperhidrosis, the pathology is exaggerated central response to normal stress.

Primary hyperhidrosis is believed to be due to abnormal central control of emotional sweating and hence it affects the same body area involved in emotional sweating like palms, soles and axilla. As mentioned in the diagnostic criteria for primary hyperhidrosis, excessive sweating is absent during sleep.

Approach to hyperhidrosis

Hyperhidrosis is a clinical diagnosis, which can be confirmed by Iodine-starch reaction, which involve spraying iodinated starch powder on the affected area, which will change to black colour on exposure to sweat. This will help to map the areas involved. The diagnostic criterion for Primary hyperhidrosis is given in **Table 2** [5].

Table 2. Diagnostic criteria for hyperhidrosis.

| |
|--|
| Focal excessive sweating that lasts at least six months without any obvious cause |
| Plus at least two of the following features: |
| Impairs daily activities |
| A bilateral and relatively symmetric pattern of sweating |

| |
|--|
| Occurring at least once per week |
| An age of onset younger than 25 |
| Cessation of focal sweating during sleep |
| Positive family history |

In patients with hyperhidrosis ask for history of weight loss, palpitation, heat intolerance, tremor, abnormal behaviour, seizure, loss of consciousness, headache, flashing episodes, neurological problems, diabetes, intake of medicines, any malignancies or major illness in the past to rule out secondary cause of hyperhidrosis. Look for Tachycardia, hypertension, thyroid swelling, and tremor of hands, lymphadenopathy and focal neurological deficit to identify the cause of hyperhidrosis. Investigations can be planned as per clinical suspicion. High ESR may be an indicator of underlying chronic infections or serious malignancy. In a patient with hyperhidrosis without any obvious secondary cause, primary or essential hyperhidrosis is diagnosed.

Minor's starch iodine test or quinizarin test is used to map areas of excessive sweating to assess the response to therapy.

Treatment

Localized hyperhidrosis like axillary hyperhidrosis can be managed with antiperspirants containing aluminium chloride. In more severe hyperhidrosis aluminium chloride hex hydrate (20%) dissolved in anhydrous ethyl alcohol can be applied to dried skin every night and can be washed next day morning initially and then tapered to lowest minimum frequency depending upon the clinical response [6]. Systemic anticholinergic agents like glycopyrrolate; oxybutynin is useful in patients with localized and generalised hyperhidrosis (Table 3).

Table 3. Treatment options in hyperhidrosis and its mechanism, side effects and dosage.

| Agent | Mechanism | Side effects and contraindications | Dosage |
|---|---|--|---|
| Topical agents | | | |
| Aluminum chloride 6.25%-25% Topical Glycopyrrolate | Interaction between aluminum chloride and keratin in the sweat ducts (duct closure) or to a direct action on the excretory eccrine gland epithelium. This results in structural and functional degeneration of sweat glands | Skin irritation Eczematous reaction | Applied to dried skin every night initially. Wash next day morning. Taper to lowest minimum frequency. |
| Oral agents | | | |
| Anticholinergic agents Glycopyrrolate Menthatheline bromide Oxybutynin | Competitive inhibition of acetylcholine at muscarinic receptors | Dry mouth, blurring of vision, urinary hesitancy, dizziness, tachycardia, and confusion Contraindications: Myasthenia gravis, pyloric stenosis, narrow angle glaucoma, paralytic ileus. Caution: Gastroesophageal reflux disease, glaucoma, bladder outflow obstruction, and cardiac insufficiency | Glycopyrrolate 1-2 mg twice a day Oxybutynin 5-7.5 mg twice a day Methantheline bromide 50 mg twice a day |
| Alpha-adrenergic agonists Clonidine | Enhance the function of alpha adrenergic receptors (α_2 agonist) and inhibits the sympathetic output | Dry mouth, dizziness, constipation, sedation and symptomatic decrease in blood pressure | 0.1mg twice a day |
| Tranquilizers Diazepam | Anxiety associated hyperhidrosis | Sedation, dependence | |
| Calcium channel blockers Diltiazem | | | |
| Other treatments | | | |

| | | | |
|--|--|---|----------------------------------|
| Iontophoresis With Tap water, anticholinergic agents (glycopyrrolate) and Botulinum Toxin | Electrical potential gradient generated facilitates transdermal movement of solute ions | Minor pain, skin irritation (burning, tingling, erythema and discomfort) and vesicles Contraindications: Metallic implants (cardiac pacemakers, artificial orthopedic joints or bone implants), pregnancy | |
| Botulinum Toxin | Block the release of acetylcholine and other neurotransmitters from pre-synaptic vesicles by deactivating SNARE proteins resulting in functional denervation | Transient and minor handgrip weakness, Minor hematoma at injection site Skin infections and allergies Relative contraindications: Illnesses resulting in muscle weakness (ALS, Lou Gehrig's), Dysphagia (Myasthenia Gravis or Lambert Eaton Syndrome) or respiratory compromise | May require multiple injections. |
| Surgical Therapy | | | |
| Local excision of the gland or subcutaneous curettage (for axillary hyperhidrosis) | Destruction of the glands | Lymphoedema, diminished sensation, decreased arm mobility, infection, slow healing, wound hematoma, wound dehiscence, hidradenitis, necrosis at the edge of the skin | |
| Axillary liposuction | Removal or destruction of the apocrine glands and disruption of nerve supply to the sweat glands. | | |
| Sympathectomy Endoscopic transthoracic sympathectomy (ETS) | Resection at T2 and T3 | Compensatory hyperhidrosis, Horner's syndrome, gustatory sweating, neuralgia, and pneumothorax, wound infection, haemothorax, empyema, thoracic duct injury and phrenic nerve injury Contraindication: Respiratory impairment and pleural adhesions | |
| Lumbar sympathectomy | L3 (plantar) | Sexual dysfunction | |

Iontophoresis is useful in patients with palmo-plantar hyperhidrosis. Iontophoresis is introduction of an ionized substance through intact skin by application of mild electric current carried through water. There are two theories about its mechanism of action. They are:

- Electrical gradient theory: Iontophoresis disturb the electrical gradient in the sweat glands which is responsible for the normal movement of sweat along with sweat ducts [7].
- Plug theory: Iontophoresis result in the formation of Schiff- positive, diastase-resistant material (plugs) in the lumen of eccrine sweat glands, resulting in obstruction of sweat glands [8].

Botulinum toxin injection is useful in patients with focal hyperhidrosis and the effect lasts for 4-12 months and may require multiple injections. Transient weakness of the small muscles of hand, which lasts for 2-3 weeks, can occur with botulinum toxin [9].

Clonidine is useful in hyperhidrosis secondary to menopause and tricyclic anti-depressant induced hyperhidrosis. Fludrocortisones acetate (0.3 mg daily) is useful for hyperhidrosis in quadriplegic with orthostatic hypotension. Psychotherapy is useful in patients with emotion induced hyperhidrosis.

In resistant cases, various surgical methods like excision of axillary tissue, axillary liposuction and thoracic sympathectomy are carried out.

CONCLUSION

Primary hyperhidrosis is a rare clinical problem, which is usually focal, most commonly involving palmo-plantar region, leading to social embarrassment, anxiety and social phobia. Local antiperspirants, systemic anticholinergics, Iontophoresis and Botulinum toxin injection are the medical treatment options available.

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