37- Hyperhidrosis

- Hyperhidrosis (HH) definition: excess sweating that causes emotional, physical, or social impacts that worsen a person's quality of life
- Very common: 5% of Americans
  - Typically begins at 14-25 years old
- Areas affected
  - Armpits: 50% of HH patients
  - Hands and feet: 90% of cases presenting *before puberty*
  - Forehead and scalp: > common in males
  - Trunk, inframammary areas, groin areas may also be affected

Pathophysiology

- Two types of sweat glands
  - **Eccrine**: numerous and responsible for HH
    - 90% of sweat glands
  - **Apocrine**: active after puberty and secrete sweat with pheromones
    - Dense in armpits, 1:1 ratio with eccrine glands
- Purpose of sweat glands
  - **Release waste products**
  - **Regulate body temperature** by cooling the skin when sweat evaporates
    - Too few sweat glands- hypohidrotic ectodermal dysplasia → risk of overheating and *hyperthermia*
- Anatomy of eccrine glands
  - **Secretory portion + long duct** traveling through the dermis and epidermis and opens onto skin's surface
    - Secretory portion: makes sweat and is located in the bottom 1/3 of dermis or at the dermal-sub-Q junction
- Location of glands
  - Eccrine: Everywhere on skin besides lips, external auditory canal, nipples, nail beds, glands penis, labia minora, and clitoris
  - Apocrine "**4 A's**": axilla, areola of the nipple, anogenital region, auditory canal (make earwax)
- Eccrine glands **not** associated with hair follicle, unlike apocrine and sebaceous glands
- Eccrine glands have *muscarinic acetylcholine receptors* which bind Ach released from sympathetic nerves.
  - Exception where **sympathetic nerves release Ach instead of epi or norepi**
  - Cause of nervous sweat
  - Botulinum toxin injections are effective for HH via preventing presynaptic Ach release
- Apoeccrine glands: characteristics of both gland types, may make up to 10-45% of sweat glands in armpits

Diagnosis

- Primary HH (93% of cases): isolated event with localized pathogenesis
- Secondary HH (7% of cases): something else is causing the patient to sweat (menopause, tumor)
- To **diagnose primary HH**, need **excessive sweating for 6 months** without apparent cause **plus 2 or more of these 6 criteria**:
  1. Bilateral and *relatively symmetric* sweating
  2. Occurrence of excessive sweating *at least* once per week
  3. Impairment of daily activities
  4. Onset less than 25 years old
  5. A positive family history of hyperhidrosis
  6. Lack of sweating during sleep
- Red flags for secondary HH:
  - Begins at age > 25
  - Unilateral or generalized involvement
  - Night sweats
    - Ask about other B symptoms
- Causes of secondary HH (DENIM)
  - **D**rugs
    - antidepressants, antibiotics like ciprofloxacin, NSAIDS, alcohol, or cocaine
  - **E**ndocrine
    - diabetes or hypoglycemia, hyperthyroidism, pheochromocytoma, or carcinoid syndrome
  - **N**eurologic disease
    - Parkinson's disease, stroke, psychiatric disorders
  - **I**nfections
    - acute viral or bacterial infections causing fevers, tuberculosis or malaria
  - **M**enopause or **M**alignancies
    - Lymphomas or myeloproliferative disorders

Treatment

- Topicals
  - Antiperspirants
    - Aluminum chloride (6% to 40% strength) forms precipitant with sweat to block sweat ducts
    - Work best for armpits
    - Make sure patients use medication correctly - apply at night when NOT actively sweating, takes 1-2 weeks to work, continue to use intermittently for maintenance, can cause miliaria
  - Glycopyrrolate cloths
    - Anticholinergic - competitively inhibits Ach receptors on sweat glands
- Oral agents (anticholinergics)
  - Glycopyrrolate
    - Dosed at 1 or 2 mg 2-3 times daily, start low and titrate up
  - Oxybutynin
    - Start with single 2.5 mg pill QD and titrate up to 10-15 mg/day
  - Anticholinergic side effects:
    - Dizziness, drowsiness, orthostatic hypotension, blurry vision, dry eyes, dry mouth, GI issues like constipation or diarrhea, difficulty urinating
    - May cause patients to stop medications- start slow and titrate up
    - Check patient's PMH and med list for contraindications (e.g. tricyclic antidepressants)
- Botulinum toxin injections
  - Blocks SNAP-25 protein which prevents Ach release from pre-synaptic nerves
  - Start with 50 units/armpit, 10-20 injections spaced 1-2 cm apart, inject 2-3 mm deep
  - Can also try with hands and feet, but less effective and greater risk for side effects
- Devices
  - Iontophoresis
    - Patients soak hands or feet in fluid filled basin connected to the iontophoresis machine for 20-30 min, then positively charged electrode drives hydrogen ions into sweat ducts → stops sweating
    - Repeat 3-4x weekly, works in 2-4 weeks, then use as needed for maintenance
    - Works 80% of time
- Surgical procedures
  - Excision of the sweat glands, liposuction curettage to destroy the sweat glands, sympathectomy
    - Sympathectomy is a last resort due to invasiveness and high likelihood of compensatory sweating
- Adjunctive measures
  - Avoiding triggers
  - Adjusting clothing and shoes