13-Contact Dermatitis

Background

- Eczematous reaction patterns include
  - Acute: Ex. **Irritant** vs **Allergic Contact Dermatitis**
  - Subacute: Ex. Stasis Dermatitis
  - Chronic**:** Ex. Atopic Dermatitis
  - Note: Any of these forms of dermatitis can present in an acute, subacute, or chronic fashion. Above are the more common presentations for each

- **Irritant** (80% of cases): chemical that **directly damages** the **skin** barrier **with minimal immune system involvement** (via innate immunity)
  - Variants: Acneiform, sensory, airborne, plant-derived
    - Acneiform: exposure to metal or metal like fluids
    - Sensory: Burning sensation w/out skin changes
    - Airborne: dust or fiberglass
    - Plant-derived
  - Can affect **anyone** with **enough contact** w/ **substance**
  - Can occur in hours of contact since there is no need to recruit memory cells
  - Acid vs **Base**: **Bases** are **more damaging**! Denature proteins in skin and also disrupts lipids in stratum corneum
    - Bases: Detergents, soaps, bleaches, cleaning products
    - Acids: Sulfuric, hydrochloric, nitric acids

- **Allergic** (20%): mediated by **immune system**, **Type IV hypersensitivity** to allergen
  - Only affects **small %** of pts exposed to **allergen**
  - 1st exposure: (APCs + allergen) → **sensitization** (primed + CD8 T-cells)
  - 2nd exposure: Primed Memory CD8 T-cells + allergen → inflammatory response w/in 1-2 days
- **7 Main Causes of allergic contact dermatitis (ACD)**:
  - *Topical medications*: **Nitrogen Mustard**, triple antibiotic ointments, **Oxybenzone (sunscreen ingredient)**, **procaine**, **topical steroids**, lanolin, propylene glycol, ethylenediamine, propolis, urushiol oil

PEARL: Which ingredients in antibiotic ointment cause allergic contact dermatitis? "**BNP**": bacitracin, neomycin, polymyxin B

  - *Plants*: **urushiol oil** (ivy, oak, sumac) → "**rhus**" **dermatitis**

PEARL: Poison ivy, oak, sumac → toxicodendron, anacardiaceae family

  - *Metals*: **nickel** (earrings, belt-buckle), **chromates** (leather, cement, green felt on pool tables), **cobalt**, gold, mercury
  - *Cosmetic Products*: **Fragrance**, **Balsam of Peru**, **para-phenylenediamine** (hair dye, henna tattoos)

PEARL: Cross Rxn w/ **para-phenylenediamine** "PASTA": Paraben, Para-aminobenzoic acid (PABA), Azo dyes, sulfonamides, thiazides, anesthetics –

  - Preservatives: **formaldehyde**

PEARL: What causes allergic contact dermatitis on baby's buttocks? Methyl-iso-thiazolinone used in baby wipes

  - Adhesives: **cyanoacrylates**, **methacrylate (artificial nails)**, epoxy resin
  - Rubber: **latex**, neoprene in wetsuits, **mercaptobenzothiazole** (shoe dermatitis)

PEARL: What does latex cross-react with? "BACK PASSION": Bananas, Avocados, Chestnuts, Kiwi, Passionfruit

Clinical Presentation:

- **Acute**:
  - **Inflamed lesions, weeping fluid,** w/ **vesicles** & **bulla** w/in **hours** to **days**
- **Subacute**:
  - **Progressive acute** lesions that may have **scale**
- **Chronic:**
  - Lasting months to years
  - Look for **lichenification**: thickened skin w/ accentuated skin lines
- ROS:
  - Ask about **new personal care products**/**clothing**: make-up, chap sticks, lotions, laundry-detergents, jewelry, shoes
  - If **chronic**, ask the pt. if the rash gets **better** on **vacation**
- Physical Exam:
  - **Earlobes**: **Nickel** from earrings
  - **Neck**: **Fragrances**, **Perfumes** such as Balsam of peru
  - **Hands**: **Latex** gloves or **poison ivy**
  - **Arms**: **Poison ivy**
  - **Wrist**: **Nickel** in watches, **chromates** in leather on wristband
  - **Foot**: **mercaptobenzothiazole** in rubber or **chromates** in leather shoe
  - **Armpits**: **Fragrance** or **propylene glycol** in deodorants
  - **Abdomen**: **Nickel** in belt buckles or **rubber** in elastic waistbands
  - **Lower Legs**: **bacitracin** or **neomycin** used for stasis dermatitis
  - **Lips**: **propolis** in natural chap sticks or those that contain sunscreen w/ **oxybenzone**
  - **Eyelids**: **tosylamide** in nail polish w/ pt rubbing eyes, mascara, eyeshadow rubber sponge
  - **Penis**: **latex** or **rubber**, **poison ivy**
  - **Anus**: **methylisothiazolinone** in wet wipes

Diagnosis:

- **Patch Testing**: TRUE test (most common)
  - 3 panels w/ 12 test spots for allergens = **35 allergens** + **1 control**
  - **Location**: typically **Upper Back**

- **Procedure**: Apply TRUE test → return in 2 days for patch removal + 1st reading → return 2-5 days for 2nd reading
    - Ideally: Apply Monday, Remove Wednesday, Read Friday/Monday
    - **Rules**:
        - Don't apply to inflamed skin where pt may have acne or sunburns
        - No topical steroids on site w/in a week or systemic steroids w/in 1-2 weeks
        - No showering or vigorous exercise for initial 2 days while patches on (may dislodge them)

- **Results**:
    - - = no rxn
    - +/- =doubtful pink rxn
    - 1+ = weak red rxn
    - 2+ = vesicular rxn
    - 3+ = bullous rxn

PEARL: If rxn improves in 2nd reading, it's likely irritant contact. If rxn, progressively gets worse at 2nd reading, it's likely allergic contact.

-**Biopsy**

Histology: Hallmark is "**spongiosis**" → edema in epidermis

- Acute: **swelling** can be abrupt, forming **vesicles** and **bulla**
- Chronic: **acanthosis** (thickening of epidermis)

PEARL: Allergic vs Irritant? **Allergic** will have **more spongiosis** and **inflammation** in dermis compared w/ irritant. **Irritant** will also have more "**dead-red"** keratinocytes

Treatment:

- **Avoid irritants** and **allergens**
- **Topical steroids – mild**
- **Systemic steroids** -**moderate/severe**
- Topical Calcineurin inhibitors on face and intertriginous