

24 – Toxin-Mediated Rashes

Staph Scalded Skin Syndrome (SSSS)

Background:

- Caused by a specific strain of *Staphylococcus* (**Phage Group 2, Strains 55 & 71**)
 - o Produce **exfoliatins A & B**: cleave epidermal protein, **desmoglein 1**, which is responsible for **keratinocytes adhesion** → **detachment of superficial epidermis = skin sloughing**

PEARL: The same staph exfoliatins also cause **bullous impetigo** through the same mechanism, however, in bullous impetigo, *Staph* only grows locally. **SSSS** toxins disseminate systemically.

Clinical Presentation:

- Infants and young kids **<6 y/o** or **adults w/ immunosuppression** or **chronic renal failure**
- Look for fevers, **skin pain**, erythema, **superficial blistering** and **desquamation**
- 1) Rash classically starts on the **face w/ radial fissures around the mouth, eyes, and nose**
- 2) More severe in the **intertriginous areas** (armpits), considering there is more friction in these areas
- 3) **Lack oral involvement** (>desmoglein 3 compensates for loss of desmoglein 1 here)

Diagnosis:

- **Blood culture**
- Skin Culture
 - o Classic sites: umbilical stump or circumcision site in neonates, the nasopharynx or conjunctiva in kids, and pneumonia or bacteremia in adults
 - o Commonly **skin culture negative**, considering toxin disseminates to skin from distant site
- **Biopsy**

Histology:

- **Superficial splitting** at or just **below stratum granulosum**
- Full thickness epidermal necrosis **ABSENT** (If present, think SJS or TEN)

Treatment:

- Abx such as **nafcillin, 1st or 2nd gen. cephalosporins, or vancomycin**
 - o Clindamycin can be used (shown to decrease toxin production), however, some studies show resistance in 50% of causative *Staph* strains
- **Supportive Care:** Electrolytes, IV fluids, gentle woundcare w/ nonadherent dressings
- Prognosis: complete recovery w/in weeks

Toxic Shock Syndrome

Background:

- Caused by Staph or Strep
 - o **Staph: Toxin-1 (TSST-1)**
 - More common, less severe
 - Mortality 3%
 - o **Strep (Group A): A, B, C (SPE-A, B, C)**
 - Less common, more severe
 - **Mortality 30-60%**
- Toxins act as **superantigens** → **cytokine storm** → **nonspecific T cell activation**

Clinical Presentation:

- **Healthy adult w/ foreign body such as superabsorbent tampon, surgical packing, or mesh**
- **Sudden high fevers, headaches, GI complaints** → **hypotensive shock w/ internal organ involvement** (e.g. renal impairment, ARDS, liver failure, DIC)
- Look for **scarlatiniform rash** (diffuse redness w/ pinpoint papules) that **classically starts on the trunk and then generalizes**
 - o Erythematous rash desquamates 1-3 weeks later
- *Strep* can cause severe soft tissue infections leading to extremity pain

PEARL: Unlike SSSS, toxic shock syndrome can involve mucosal surfaces leading to strawberry tongue and inflamed conjunctiva

Diagnosis:

- **Blood Culture**
- **Skin Culture**

Treatment:

- **Extensive supportive care**
- **Surgical debridement**
- **Abx**

Kawasaki Disease

Background:

- Small to medium vessel vasculitis
- Incidence ~1 in 5,000 <5 y/o
- Most commonly seen in **Asian-Americans**

Clinical Presentation:

- **Fever of at least 5 days + 4/5 other diagnostic criteria**
- Think “**CRASH & Burn**”
 - o **Conjunctivitis** (Nonpurulent): bilateral, spares limbus
 - o **Rash**: polymorphous exanthem w/in 5 days of fever
 - **Morbilliform, urticarial with sandpapery papules** on a **background of erythema**
 - **Accentuates w/ friction (groin)**
 - o **Adenopathy**: Cervical lymphadenopathy of at least 1.5 cm
 - o **Strawberry Tongue**: tongue + other mucosal changes (e.g. cracked lips)
 - o **Hands + Feet** = erythematous & edematous → desquamation after 1-2 weeks
 - o **Burn**: fevers >39 degrees Celsius >5 days

PEARL:

- Cervical lymphadenopathy is the least common feature (50-75%, often unilateral)
- Fevers usually last at least 1 week and do not respond well to Tylenol

PEARL: Coronary Artery Aneurysms: develop several weeks after symptom onset in around 25% of untreated kids

Diagnosis:

- **Clinical Presentation**
- Lab abnormalities
 - o Think “**WATCH**”
 - White count elevation
 - Anemia
 - Thrombocytosis vs Thrombocytopenia
 - CRP
 - Hypoalbuminemia

Treatment:

- **80-100 mg/kg/day Aspirin**
 - o Divided into 4 doses
 - o Provide for 2-3 days after fever ends, then given at 3-5mg/kg/day until labs normalize and ECHO negative
- **2g/kg infusion IVIG over 12 hrs**

Scarlett Fever


Background:

- **1-10 y/o**
- **Strep (Group A): SPE A, B, C**
 - o Via respiratory droplets

Clinical Presentation:

- Classic strep throat w/ fevers, chills, headache, sore throat, **red** and **swollen tonsils w/ white exudate**, and tender cervical lymph nodes
- **Palate petechiae, strawberry tongue**
- No rhinorrhea or cough
- Fine **sandpapery rash** w/ fine **macules** and **papules** on the trunk and extremities lasting 4-5 days → healing w/ extensive desquamation
- Look for Pastia’s lines: accentuations of the rash in flexural areas w/ linear petechiae

PEARL: Acute glomerulonephritis & rheumatic fever (JONES)

- JONES Criteria for rheumatic fever
 - o Joints (Polyarthrititis)
 - o  (Pericarditis)
 - o Nodules
 - o Erythema Marginatum
 - o Sydenham chorea

Diagnosis:

- **Clinical Presentation**
- **Throat Culture**

Treatment:

- **Amoxicillin**
 - o **Allergic → Erythromycin, Clindamycin, 1st gen cephalosporins**