Foundations Frameworks

Approach to the Undifferentiated Rash

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The diagnosis and management of undifferentiated rashes is an expansive and difficult topic. Here is a basic, prioritized way for EM providers to think through the undifferentiated rash. The goal isn't to correctly diagnose every patient's benign, idiopathic rash; the purpose of the ED, as with all medical complaints, is to rule out the life-threatening rashes.

Rash Red Flags: fever, toxic appearance, severe pain, mucosal involvement, new medications, immunosuppressed, very old/young

Can't Miss/immediately Life-Threatening Rashes

1. **Purpura/Petechiae**: non-blanching, red/purple spots caused by bleeding under the skin
    - **Infectious: meningococcemia/septicemia (typically palpable purpura)**
        - Patients are typically febrile, toxic appearing, may have altered mental status
        - Caused by gram negative bacteremia leading to DIC
        - Start broad spectrum antibiotics (cover for meningitis), fluid resuscitate, source control, obtain blood/CSF cultures, ICU admission
    - **Microangiopathic hemolytic anemias (MAHA): DIC/HUS/TTP (typically non-palpable purpura)**
        - **Disseminated Intravascular Coagulation (DIC)**:
            - Systemic, inappropriate activation of coagulation cascade leading to formation of intravascular fibrin clots, depletion of clotting factors, bleeding, and end organ injury
            - Occurs in setting of sepsis (most common), severe trauma, pregnancy (septic abortion, HELLP), malignancy (leukemia)
            - Low platelets, prolonged hemostasis, low fibrinogen
            - Consider replacing factors if patient bleeding
        - **Hemolytic Uremic Syndrome (HUS)**:
            - Mostly seen in children, preceded by diarrheal illness, characterized by hemolytic anemia, thrombocytopenia, acute renal failure (typically with preserved coagulation and fibrinogen)
        - **Thrombotic Thrombocytopenic Purpura (TTP)**:
            - TTP is due to destruction of ADAMTS13, a von Willebrand factor multimer cleaving enzyme, which results in abnormal platelet and clot formation
            - Can also be induced by certain medications (quinolones, ticlopidine, clopidogrel), infection, pregnancy
            - Characterized by microangiopathic hemolytic anemia, fever, thrombocytopenia, neurologic abnormalities, and renal disease
    - Other causes: **vasculitis, ITP** (afebrile, non-toxic patients)

2. **TEN/SJS**
    - **Stevens-Johnson syndrome (SJS)** and **toxic epidermal necrolysis (TEN)** are severe mucocutaneous reactions, most commonly triggered by medications, characterized by extensive necrosis and detachment of the epidermis.
    - Typically begins with ill-defined, coalescing erythematous macules with purpuric centers, can also begin as diffuse erythema, painful in nature
    - Progress to vesicles and bullae, positive Nikolsky's sign (slight rubbing of the skin results in exfoliation of the outermost layer)
    - Evaluate for mucus membrane involvement (oral, ocular, urogenital)
    - Evaluate for recent use of medications that are common precipitants (allopurinol, sulfonylureas, antibiotics, lamotrigine, NSAIDs)
    - Management: removal of inciting exposure, fluids resuscitation, admission to burn unit or ICU
3. **Anaphylaxis**
    - Diffuse hives, erythema/flushing, itching associated with other signs of allergic reaction (nasal/oral swelling, reactive airway disease, hypotension, tachycardia, vomiting and diarrhea)
4. **Necrotizing Fasciitis**
    - Infection of the deeper tissues that results in progressive destruction of the muscle fascia and overlying subcutaneous fat
    - Affected area may be erythematous (without sharp margins), swollen, warm, shiny, and *exquisitely tender*, progresses from red-purple to blue-gray patches, then skin breaks down forming bullae and eventually cutaneous gangrene

<u>Other Important Rashes</u>

- **Rocky Mountain Spotted Fever** (**RMSF**): Rash develops 2-5 days post onset of fever, rash begins as small, flat, pink, non-itchy spots (macules) on the wrists, forearms, and ankles. Progresses to involve palms and soles, may become petechial rash
- **Lyme**: bull's-eye rash, erythema migrans, forms at site of tick bite, 3 or more days post exposure
- **Bullous pemphigoid**: autoimmune blistering, may be intensely itchy, bullae evolve over weeks to months, start as hives and progress to bullae, Nikolsky's negative
- **Pemphigous vurlagris**: autoimmune blistering, painful but rarely pruritic, commonly begins as oral lesions, + Nikolsky's, prone to secondary infection
- **Staphylococcal scalded skin syndrome** (**SSSS**): exotoxin mediating, diffuse erythroderma progress to diffuse areas of exfoliation, Nikolsky's positive, *spares mucous membranes*, most patients < 2 yo, almost all < 6 yo, admit for fluids, antibiotics, consider transfer to burn center if severe
- **Erythema multiforme**: acute, self-limited, target raised edematous papules distributed peripherally, can involve mucous membranes (major), most caused by HSV (also other viral, bacterial infections, drugs, and RA/SLE), usually self-limited and resolves in 2-6 weeks, punch biopsy to differentiate from SJS/TEN
- **Shingles**: vesicular eruptions along dermatomes, pain/paresthesia/pruritus can precede rash by 2-3 days

- **Scarlet Fever**: caused by group A strep, starts on neck, axillae, groin, spreads to trunk and extremities, red, finely punctate, sandpaper feel, eventually leads to desquamation, treat with antibiotics
- **Kawasaki's Disease**: fever for 5 days plus conjunctivitis, mucus membrane involvement, swelling/peeling in hands/feet, cervical adenopathy, maculopapular rash

Benign Entities

- **Eczema**: erythematous, crusts, fissures, pruritis, excoriations, lichenification, dryness and thickening of skin
- **Contact Dermatitis**: type IV hypersensitivity reaction, itching and burning, exposure to irritant
- **Scabies**: eruption with linear burrows, papules, pustules. Very itchy.

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