Rash and Fever – Is it just a viral illness?

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Rashes that Disappear
Case #1

• A 7 year-old girl with no significant past medical history presents with fever for six days and joint pain. The left ankle was the first joint affected, but now the right knee is swollen and painful instead.

• Child appears ill during times of fever, but improves with Motrin. Mother also noted a rash that appeared initially but has now resolved.
**Erythema marginatum**

- The EM rash begins as pink macules that enlarge to form annular plaques with central clearing.

- The expansion of the ring can be rapid and approach 10 mm in 12 hours. The borders can appear serpiginous. Confined to the trunk – spares hands, feet and face.

- The rash is evanescent – can appear and disappear in hours and generally is faint and not painful or pruritic.

**Erythema marginatum**

- Can be confused with *urticaria* but is not pruritic.

- Can be confused with *giant urticaria* or *erythema multiforme* but has no central discoloration and is much more transient.
Acute Rheumatic Fever

• Modified Jones (low risk)

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carditis (clinical or ECHO)</td>
<td>Fever</td>
</tr>
<tr>
<td>Polyarthritis (migratory)</td>
<td>Arthralgia</td>
</tr>
<tr>
<td><strong>Erythema Marginatum (5%)</strong></td>
<td><strong>ESR &gt; 60 or CRP &gt; 30</strong></td>
</tr>
<tr>
<td>Subcutaneous nodules (3%)</td>
<td>Prolonged PR interval</td>
</tr>
<tr>
<td>Chorea (6 months)</td>
<td></td>
</tr>
</tbody>
</table>

• If Jones criteria is not met (i.e. no cardiac findings) - diagnosis of **post streptococcal reactive arthritis**.

Case #2

• A toddler boy presents with high spiking daily fever for one month. Has had an extensive work up for infectious causes with no diagnosis. During the time of fever child looks ill, but returns to baseline happiness in between.

• Caregiver reports a rash that is present during the times of high fever, but quickly disappears.
Systemic Onset Juvenile Idiopathic Arthritis

• Challenging diagnosis as joint involvement can be delayed by month or longer

• The joints affected might be in the cervical spine. This would require high degree of suspicion to notice more limitation of motion or pain on movement of the head.
<table>
<thead>
<tr>
<th></th>
<th><strong>Acute Rheumatic Fever</strong></th>
<th><strong>Systemic Onset JIA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fever</strong></td>
<td>+/-</td>
<td>Prolonged</td>
</tr>
<tr>
<td><strong>Arthritis</strong></td>
<td>Yes, migratory</td>
<td>Yes but can be delayed</td>
</tr>
<tr>
<td><strong>Associated Symptoms</strong></td>
<td>Carditis</td>
<td>LAD, Splenomegaly or</td>
</tr>
<tr>
<td></td>
<td>Subcutaneous nodules, chorea</td>
<td>hepatomegaly, serositis</td>
</tr>
<tr>
<td><strong>Ill</strong></td>
<td>With fever</td>
<td>With fever</td>
</tr>
<tr>
<td><strong>Rash</strong></td>
<td>Erythema marginatum:</td>
<td>Salmon-colored;</td>
</tr>
<tr>
<td></td>
<td>Macules $\rightarrow$ plaques with central clearing, serpiginous borders; trunk only; evanescent</td>
<td>evanescent</td>
</tr>
<tr>
<td><strong>Mimics</strong></td>
<td>(Giant) Urticaria</td>
<td>Viral exanthem</td>
</tr>
<tr>
<td></td>
<td>Erythema multiforme</td>
<td></td>
</tr>
</tbody>
</table>

**Rashes of the Palms and Soles**
Case #3

• 5 year-old boy previously healthy presenting with high spiking fever for six days with headache and intermittent, non-bilious vomiting. The left ankle was the first joint affected, but now the right knee is swollen and painful.

Lives in a place where rodents have been noted previously
Rat Bite Fever

- *Streptobacillus moniliformis* – pleomorphic, microaerophilic Gram-negative bacillus.

- Arthralgias or arthritis in 50% of patients; tends to be migratory, non-symmetric, painful.

- Red-pink maculopapular rash, petechial or purpuric rash in 75% of patients involving palms and soles.

Rat Bite Fever

- Diagnosis: blood culture [anaerobic unless high index of suspicion and special aerobic cultures performed]

- Can rarely see or grow the organism from joint fluid, abscesses, pericardial fluid, CSF.

- Treatment: Penicillin G for at least 7 days; can use oral penicillin V is mild cases.
Case #4

- A 12-year old boy presents with a 6 day history of fever which began fairly suddenly and was accompanied by headache, myalgia and arthralgia. On day 6 of illness there were faint macules that developed on the palms, wrists and ankles. He is ill appearing on exam.

Appears after 2 – 5 days of fever
Hands, feet first then spread centrally
Likes palms and soles
Not pruritic
Progression to petechial
Rocky Mountain Spotted Fever

• The rash is macular at first, starts on ankles and wrists and spreads. The rash will tend to become petechial and then purpuric.

• This is an ill appearing patient! Helpful when hyponatremia present or known tick bite.

• Treat with doxycycline [7-10 days] regardless of age
Murine typhus

- Maculopapular or petechial (50/50) rash
- Starts on the trunk and tends to spare the palms and soles.
  - A late finding: usually appears after 7 days of illness
- Cases are generally milder in systemic symptoms but can be on the differential for FUO and Kawasaki Disease
<table>
<thead>
<tr>
<th></th>
<th>Rat Bite Fever</th>
<th>RMSF</th>
<th>Murine Typhus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Arthralgias / Arthritis</td>
<td>Yes, migratory polyarthritis</td>
<td>Yes, arthralgia at first</td>
<td>No</td>
</tr>
<tr>
<td>Ill Appearance</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Type of Rash</td>
<td>Maculopapular → petechial, involves palms &amp; soles</td>
<td>Maculopapular → petechial; involves palms &amp; soles; starts at wrists &amp; moves centrally</td>
<td>Maculopapular / petechial; starts on extremities, moves centrally; usually not palms &amp; soles</td>
</tr>
<tr>
<td>Exposure</td>
<td>Rat saliva or urine</td>
<td>Ticks</td>
<td>Fleas</td>
</tr>
</tbody>
</table>

Rashes in Patients that are Ill
Case #5

- 14 month-old girl presents with one day of fever and irritability. Mother reports no other symptoms, but a few spots on her legs that appeared just a few hours ago. The child is ill appearing.
Meningococcemia

• Early lesions are macular but progress quickly in number and to petechial and purpuric lesions.

• The rash develops in extremities and tends to spare the trunk. It also spares the palms and soles.

Case #6

• 11 month-old girl with no significant history presents with a low grade fever and rash that appeared on the face and legs 2 days ago. Mother reports she had an URI 1 week ago.
Acute hemorrhagic edema of infancy

- Fever; edema; and round shaped purpura primarily over the face and extremities

- Generally well appearing infant

- Rare to be associated with other features of HSP such as arthritis, intussusception, GI bleed or nephritis.
<table>
<thead>
<tr>
<th></th>
<th>Acute Hemorrhagic Edema of Infancy</th>
<th>Henoch-Schölein Purpura</th>
<th>Meningococcemia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak Age</strong></td>
<td>&lt;24 months</td>
<td>4-7 years old</td>
<td>3-6 mo &amp; 15-17 yo</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Anywhere; Predominance of face and extremities</td>
<td>Buttock and lower extremities</td>
<td>Trunk and lower extremities (<em>not isolated to SVC</em>)</td>
</tr>
<tr>
<td><strong>Clinical Appearance</strong></td>
<td>Well</td>
<td>Well</td>
<td>Ill</td>
</tr>
<tr>
<td><strong>Swelling</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Systemic symptoms</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Case #7

- A 6 year-old boy presents with two weeks of fever, fatigue, myalgia and arthralgia. He had a rash on his legs and history of some eye redness and enlarged nodes in the neck area.
The rash now has progressed to this

Polyarteritis Nodosa

• Rare medium vessel vasculitis. Some overlap with KD and SLE

• Diagnosis requires
  - Histopathologic evidence of necrotizing vasculitis in medium or small arteries (painful nodules that are biopsied) or
  - Angiographic abnormality (aneurysm, stenosis, or occlusion) as a mandatory criterion
  - Plus 1 of the following 5 features: skin involvement, myalgia or muscle tenderness, hypertension, peripheral neuropathy, and renal involvement
Did you say morbilliform =

measles-like,

maculopapular exanthem

Case #8

• 3 year old girl presents with high fever for 7 days with rash. Additionally findings on exam include lymphadenopathy and facial edema. The rash started as non-specific disseminated morbilliform, maculopapular rash on the face and upper trunk, spreading down and then developed a bluish tint.

• ------ Nitrofurantoin was started 4 weeks ago
Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)

- Rash + hyper eosinophilia, liver involvement, fever, and lymphadenopathy (facial edema, can also involve kidneys, lungs, heart)

- Rash generally morbilliform, however all types of rashes can be associated with this syndrome

- Lesions first appear on the face, upper trunk, and proximal extremities

- Delayed onset of symptoms 2-6 weeks after the initiation of causative drug

- The morbidity comes from liver disease
Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)

**RegiSCAR Diagnosis Score for DRESS**

<table>
<thead>
<tr>
<th>Features</th>
<th>No</th>
<th>Yes</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever (≥ 38.5°C)</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>Enlarged lymph nodes (≥2 sites, ≥1 cm)</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Atypical lymphocytes</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Eosinophilia 700-1499 or 10%-19.9%</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>≥1500 or ≥20%</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Skin rash</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent &gt;50%</td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>At least 2: edema, infiltration, purpura, scaling</td>
<td>-1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Biopsy suggesting DRESS</td>
<td></td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>Internal organ involvement</td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>One</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two or more</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Resolution in more than 15 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 3 biological inv done and negative to exclude alternative diagnosis</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>Final score: &lt;2 = no; 2-3 = possible; 4-5 = probable; &gt;5 = definite</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DRESS medications**

<table>
<thead>
<tr>
<th>Antiepileptic drugs</th>
<th>Antibiotics</th>
<th>Antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytoin</td>
<td>Sulfonamides</td>
<td>Terbinafine</td>
</tr>
<tr>
<td>Carbamazepine</td>
<td>Minocycline</td>
<td>Dapsone</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>Nitrofurantoin</td>
<td>Allopurinol</td>
</tr>
<tr>
<td>Lamotrigine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pediatrics
Case #9

• 5 year old girl with fever and rash – the rash started on the face and moved down toward the trunk. Additional symptoms include URI. She had lesions in her mouth before the rash appeared that are now gone.
Measles

• Prodromal illness with cough, congestion, coryza

• Exanthem usually appears 1-2 days after the appearance of Koplik spots

• Rash develops on the face and upper neck and spreads to the extremities.

Measles or scarlet fever

Case #10

• 2 year boy with fever and recent URI presents with a rapid spreading rash that appears to be pruritic and associated with edema of hands and feet.
Giant urticaria / Urticaria multiforme

• This a benign rash seen in the toddler age children

• Spares palms and soles

• Can be very pruritic

• Progression is for individual lesions to coalesce into bigger patches covering the torso and extremities.
Case # 11

• 8 year boy presents with a rash, painful mouth sores, as well as pain with urination. He has had low grade fever and is mildly dehydrated due to oral pain. No joint or muscle pain noted.
Erythema multiforme

- Type IV hypersensitivity reaction triggered by infectious agents (HSV, Mycoplasma) or drug reaction.
- Wide spectrum of skin and mucosal involvement
- It is a distinct entity from SJS/TEN and self-limited condition without long term complications.

<table>
<thead>
<tr>
<th>Urticaria multiforme</th>
<th>Erythema multiforme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants and toddlers</td>
<td>All ages, but usually older kids</td>
</tr>
<tr>
<td>Annular and polycyclic wheals with dusky, ecchymotic centers – lesions are not fixed, last 2 – 12 days. + Dermatographism</td>
<td>Target lesion with purpuric center that may blister. - Dermatographism</td>
</tr>
<tr>
<td>Trunk and extremities, face</td>
<td>Palms and soles, feet and extremities</td>
</tr>
<tr>
<td>No ulcers on mucous membranes, can have oral edema</td>
<td>Erosions and ulcerations on mucous membranes.</td>
</tr>
<tr>
<td>Pronounced pruritus</td>
<td>Mild pruritus or burning</td>
</tr>
<tr>
<td>Normal CBC and inflammatory markers</td>
<td>Elevation in ESR, WBC and mild transaminitis</td>
</tr>
<tr>
<td>Low grade fever</td>
<td>Low grade fever</td>
</tr>
<tr>
<td>Viral infections, medications</td>
<td>Mycoplasma, HSV</td>
</tr>
<tr>
<td>Systemic H1 and H2 antihistamines</td>
<td>Steroids</td>
</tr>
</tbody>
</table>
Case # 12

• 3 year old boy presents with fever, painful rash, mouth sores, red eyes and ill appearing. He is dehydrated due to inability to tolerate PO and also burning pain with urination. He is being admitted for possible KD.
Daily news article

Stevens-Johnson Syndrome (SJS)

Toxic epidermal necrolysis (TEN)

• Initial manifestations: fever, malaise, myalgia, arthralgia, dysphagia, photophobia, conjunctival itching/burning

• Macules with purpuric centers → blisters → bullae → sloughing of the entire epidermal layer (deep)

• Common on the face and thorax → spread outward symmetrically. On palms and soles early in the process. Distal portions of the arms and legs can be relatively spared.
• Early recognition paramount – recommendation to treat in a burn unit if available given the similar complications seen in this entity.

• Morbidity from

• Death occurs mainly from sepsis.

• Call your friendly neighborhood dermatology ASAP

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Case # 13

http://image3.slideserve.com/7023604/staph-scalded-skin-syndrome-n.jpg
SSSS

• Typical lesions start with erythema

• Erosions and sloughing of the mucous membranes do not develop in SSSS

• Conjunctivitis can be occasionally present but tends to be purulent

Case # 14

• ER admission request regarding a patient with possible Kawasaki disease. Rash + conjunctivitis + strawberry tongue + 6 days of fever.

• Patient has significant tachycardia, but normal perfusion and blood pressure for age. This is however a 9 year old girl with recent cellulitis.
Toxic Shock Syndrome

1. Fever
2. Rash
3. Desquamation
4. Hypotension
5. Multisystem involvement
6. Exclusion of other causes

Temperature of more than 38.9°C
Diffuse, macular, and erythematous
Especially of palms and soles
In adults, systolic blood pressure less than 90 mm Hg
Severe myalgias
Diarrhea, vomiting
Liver dysfunction
Thrombocytopenia
Renal insufficiency
Mental status changes
Negative results of blood, throat, cerebrospinal fluid cultures (usually not positive for *Staphylococcus aureus*)

Pronounced facial edema - **SSSS** and **DRESS** (high fever, ill patient, eosinophils)

Lymphadenopathy (> 1 cm) – **DRESS** (bilateral) and **KD** (unilateral)

Conjunctivitis – **ALL except scarlet fever**, less so in SSSS

Posterior pharyngitis – **Scarlet fever and TSS**

Strawberry tongue– **Scarlet fever, KD, TSS**

Oral ulceration – **EM, SJS**

Hypotension/ shock – **TSS and KD** (early can be clinically difficult to tell apart)

Progression to vesicles and bullae with desquamation in acute phase – **SSSS, SJS/TEN**

Progression to desquamation in the convalescent phase – **KD, TSS, Scarlet fever**

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**Special thanks to**

• Raegan Hunt, MD (Dermatology)

• Lucy Marquez, MD (ID)

• Marietta DeGuzman, MD (Rheumatology)