What Are “Hot Rashes”? 
Most common are Viral Exanthemas

All the important stuff is in the handout.

Partial List of Hot Rashes

- Dengue
- Rickettsial infections
- Leptospirosis
- Murine typhus
- Rat-bite fever
- JIA (JRA)
- Bacterial sepsis
- Kawasaki disease
- Toxic shock
- Erythema multiforme
- Stevens-Johnson
- Toxic epidermal necrolysis (TEN)
- Classic numbered exanthema (1 – 6)
Case

The setting is a Pediatric Clinic in San Antonio, Texas on a Saturday in 1989.

However, it could have been “yesterday” in many places around the world, including here in Atlanta.

12-Year-Old Female

- 5-day Hx of worsening fever, cough, nasal congestion (coryza) and conjunctivitis & 1-day Hx of rash.
- No Hx of N/V/D, joint pain, or sore throat and is on no medications.
- Family Hx = normal (no sick contacts).
- Immunizations are up to date (1989).

12-Year-Old Female

- Temp = 104°F
- Nasal congestion.
- Conjunctival injection with discharge.
- Has a dry cough & clear breath sounds.
- Maculopapular rash as shown:
Slight yellowish Exudate - wiped off prior to photo.

12-Year-Old Female Lab Tests

- CBC
- Urinalysis
- Quick group A strep test
- Chest radiograph

All normal or negative
What’s Her Diagnosis?

A. Rubeola (1st disease)
B. Strep. scarlet fever (2nd disease)
C. Rubella (3rd disease)
D. Filatov-Dukes disease (4th disease)
E. Erythema infectiosum (5th disease)
F. Roseola (6th disease)

What’s Her Diagnosis?

A. Rubeola (1st disease)
   - Measles
   - Red measles
   - Hard measles
   - 7-day measles
   - 10-day measles
   Not to be confused with Rubella (3-Day measles, German Measles) or Roseola (infantile measles)

Measles (Rubeola)

- Referred to as 1st disease in the 17th century to distinguish it from scarlet fever.
Koplik Spots

Measles (Rubeola)
Diagnosis – Clinical
- Feels Sick with increasing Fever.
- Cough, Coryza, Conjunctivitis (3C's).
- Morbilliform (L) rash on day 3 or 4:
  - Always begins on the face.
  - Never vesicular, pustular, bullous.
Measles (Rubeola)

Diagnosis – Lab criteria:

✓ Confirm serologically &/or viral identification (PCR secretions).

Beware; MMR = live-virus vaccines. A recent MMR will result in a positive Measles IgM antibody and positive PCR from respiratory secretions.

Measles Treatment

✓ Supportive

✓ Vitamin A supplementation:

✓ Give once a day for 2 days:

- 50,000 IU for babies < 6 mo
- 100,000 IU for 6 mo – 1 yr
- 200,000 IU for > 1 yr

2015 AAP Red Book

Measles

- Hospital Isolation – standard + Airborne X 4 days after onset of rash or duration of illness if immunocompromised.
- This is the single MOST CONTAGIOUS agent known.
Measles

• 2nd dose of vaccine added in 1989 to the recommendations due to this outbreak.

• Moving on a bit quicker - - -

What’s Her Diagnosis?

A. Rubeola (1st disease)
B. Strep. scarlet fever (2nd disease)
C. Rubella (3rd disease)
D. Filatov-Dukes disease (4th disease)
E. Erythema infectiosum (5th disease)
F. Roseola (6th disease)

2nd Disease
Or
Streptococcal Scarlet Fever
Strep. scarlet fever (2nd disease)

Erythrogenic (pyrogenic) exotoxins = disease expression

DOC is oral penicillin for 10 days or IM Penicillin G benzathine
(Bicillin® L-A).

Other choices equally effective.
What’s Her Diagnosis?

A. Rubeola (1st disease)
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4th Disease
Staphylococcal Scarlet Fever?


Staph Scarlet Fever

Responds quickly to antimicrobials.
Epidermolytic Toxins A & B circulating in the bloodstream.

Proteolytic toxins that target the desmosomal cadherins high in the granular layer of the epidermis.
What’s Her Diagnosis?

A. Rubeola (1st disease)
B. Strep. scarlet fever (2nd disease)
C. Rubella (3rd disease)
D. Filatov-Dukes disease (4th disease)
E. Erythema infectiosum (5th disease)
F. Roseola (6th disease)

5th Disease

Parvovirus B19

Also not a Hot Rash
What’s The Problem?

Common cause of non-immune hydrops

What’s Her Diagnosis?

A. Rubeola (1st disease)
B. Strep. scarlet fever (2nd disease)
C. Rubella (3rd disease)
D. Filatov-Dukes disease (4th disease)
E. Erythema infectiosum (5th disease)
F. Roseola (6th disease)
Roseola

Also not a Hot Rash

6th Disease

Human Herpesvirus 6

J.W. Bass, MD

Days of Illness

Temperature

104
103
102
101
100
99
98
Rash
Irritability

Exanthem subitum

Rx
Antibiotic

Days of Illness

Temperature

104
103
102
101
100
99
98
Rash
Irritability

Exanthem subitum

Antibiotic working!
Other Hot Rashes

- Kawasaki disease
- Toxic shock
- Erythema multiforme
- Stevens-Johnson
- Toxic epidermal necrolysis (TEN)

- JIA (JRA)

Juvenile Idiopathic Arthritis
Frequently presents with FUO

Toxic Shock Syndrome
- TS Toxin-Producing Strain of *Staphylococcus aureus*.
- May be due to group A strep.
- Multisystem disorder (≥ 3 organ sys).
- Diffuse erythematous rash.
- Staph TSS Desquamates in sheets on palms and soles.

Toxic Shock

Major Criteria
- Must have fever ≥ 38.8°C (101.8°F).
- Must have hypotension (evidence of poor perfusion).
- Must have a compatible rash.
Toxic Shock - Minor Criteria

- Must involve ≥ 3 of the following:
  - Mucous membrane involvement
  - GI involvement
  - Muscle abnormalities
  - CNS abnormalities
  - Liver abnormalities
  - Renal abnormalities
  - Thrombocytopenia (< 100,000)

Toxic Shock - Exclusionary Criteria

- Absence of other explanation.
- Negative blood cultures except for *Staphylococcus aureus* or *Strep pyogenes* (group A strep).
- Supportive:
  - Negative serologies – measles, RMSF, Leptospirosis.
Toxic Shock Treatment

- Fluids and ICU support as needed.
- Treat / remove / drain the source.
- Aggressive Anti-Staph antimicrobials.

Kawasaki Disease

5 Days of Fever, plus
Must have 4 of the 5 diagnostic criteria:
1. Conjunctivitis without discharge.
2. Polymorphous Rash.
3. Extremity changes.
4. Other mucous membrane involvement – mouth, urethra, vagina, anus.
5. Lymphadenopathy (>1.5 cm diameter).
Conjunctival Erythema without Discharge
Beware

“Incomplete” Kawasaki Disease
- Less than 4 criteria.
- More common in infants and older children.
- May have only one of the 5.

1. Albumin ≤ 3 Gm/dL.
2. Anemia for age.
3. High liver enzymes.
4. Elevated WBC count.
5. ≥ 10 WBC’s in urine.
6. Platelets ≥ 450,000 after 7 days after onset.

AAP Red Book

Kawasaki Disease Treatment
- IVIG @ 2 grams/kg
- ASA @ 80-100 mg/kg/day * Q 6 h.
- Echocardiogram
- Cardiology consult
- Ophthalmology consult?
Stevens – Johnson Syndrome

- Albert M. Stevens (1884 – 1945) & Frank C. Johnson (1894 – 1934), pediatricians who reported two males, 7 & 8 years, in AJDC in 1922.
- Maculo-Pap-Vesicular rash.
- Must have mucous membrane involvement.
- Formerly Erythema Multiforme Major.

Stevens – Johnson Syndrome

- Often preceding use of medications or evidence of recent infection, i.e. Mycoplasma, EBV, HSV, CMV.
- General consensus of academic dermatologists that this is part of a spectrum of severe vesiculobullous diseases of the reactive blistering variety that includes TEN.
Toxic Epidermal Necrolysis?

- Severe Stevens-Johnson Syndrome?
- Preceding medication more likely:
  - Sulfa, Anticonvulsants, NSAIDS.
- Severe, blistering rash.
- Mucous membrane involvement.
- Deeper cutaneous injury.
- Treat like a burn!

Admission 10 hours later
Infected Dog Bite

Treated With TMP/SMX (Septra)
Therefore

Always Treat In A Burn Unit or Equivalent Facility.

TEN Due To An Anticonvulsant
Erythema Multiforme

- Acute, self-limiting immune mediated vesiculobullous disorder that damage keratinocytes.

- Thought to be 2º to Herpes simplex, especially if recurrent.
- Also Drugs and other infections.
- Fixed lesions:
  - Red plaques / papules
  - Target-like lesions
  - Central necrosis / brief vesicle
E. multiforme

Admitted for Atypical Varicella

Erythema Multiforme
And when is it just Urticaria?
E. multiforme

Urticaria multiforme

NOT E. multiforme
Erythema Multiforme

Treatment

• Stop the drug.
• Treat the infection (Herpes).
• Support.

Lastly
Bacterial Sepsis (Meningococcal)

Bacterial Sepsis (Group A Strep)

The End
# Febrile Exanthema (Hot Rashes)

Atlanta; April 29, 2017

| Disease                          | Cause                          | Eyes                  | Lips                     | Mouth                | Skin                      | Hands & Feet | Desquamation | Other Findings                                      | Diagnosis                                      | Treatment                                      |
|---------------------------------|--------------------------------|-----------------------|--------------------------|-----------------------|--------------------------|--------------------------|--------------|----------------|---------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Measles (1st Disease)           | Rubeola virus                  | Hyperemia +/- purulent | Normal                   | Normal                | Morbilliform rash (confluent on face) | +/- involved | Fine beginning at the 5-7th day | Cough, coryza, conjunctivitis prodrome          | Clinical, confirmed with rising IgG titers or + IgM | Supportive, vitamin A for all. Ribavirin???   |
| Scarlet Fever (2nd Disease)     | Group A Streptococcus          | Normal. Exception is Toxic Shock. | Normal                   | Normal Exception is Toxic Shock. | Sandpaper-like rash, Pastia lines, circumoral pallor. | Relatively spared | Fine – Flaking, maybe hands/feet, in 2nd week | Strep Throat or other focus. Remote Risk of Rheumatic Fever & Acute GN | Clinical, confirmed only with Culture & Serology if questionable. | Penicillin for 10 days for RF prevention. |
| Staph Scarlet Fever (4th Disease?) | Phage group I Staphylococcus Aureus – epidermolytic toxins A & B | Clear, Purulent blepharitis | Normal, with copious nasal mucopurulent discharge. | Normal (see lips) No enanthem | Diffuse painful Erythroderma & Pastia lines & may see mild blistering. | Relatively spared | Flaking in the acute stage. | May have a focal Staph infection | Nasopharyngeal (NP) or wound culture | Anti-staph antibiotic, Beware of MRSA. Clindamycin pending culture and sensitivity. If septic, use Vancomycin. |
| Staph Scalded Skin Syndrome (Ritter’s Disease in newborns) | Same as above with much clinical overlap | Purulent with minimal Hyperemia | Normal | Normal | Painful Erythroderma, bullae that easily rupture, & + Nikolsky’s | + Erythema | Gross in sheets & bullous skin | Irritable / newborns appear septic / toxic with bacteremia | NP, blood & wound cultures, Skin Bx (intraepidermal cleavage at the granular layer) | Anti-staph antibiotic, as above. |
| Toxic Shock Syndrome            | Phage group I Staph aureus (TSST-1 or other toxins) / group A Strep | Hyperemia, may be hemorrhagic | Red | Erythema, strawberry tongue | Erythroderma | Swollen | Especially palms & soles in sheets | GI, renal, hepatic, CNS, DIC, muscle, shock (has been reported w/o shock) Must have ≥ 3 above. | Clinical, + culture for TSST-1 producing S. aureus. May occur without TSST-1/ group A Strep! | Anti-staph antibiotic as above and ICU support. Clinda for toxin reduction. |
| Toxic Epidermal Necrolysis      | Most severe, due to Drug reaction. | +/- Hyperemia +/- red | +/- erythema | Diffuse Erythroderma & Intact Bullae & + Nikolsky’s | Marked erythema | Gross in sheets | Toxicity, Usually in older children. Often confused with Staph Scalded Skin Synd. | Skin Bx (subepidermal cleavage with scarring possible) | STOP THE DRUG Treat as a burn patient – up to 40% Mortality |
| Leptospirosis                   | Leptospira interrogans         | Hyperemia              | Normal                   | Normal                | Erythroderma May be jaundiced. | Minimal involvement | +/- | Liver, CNS, myositis, cholangitis, nephritis | Special culture of blood, urine and CSF, also titer rise | Penicillin or tetracycline |
| Stevens-Johnson Syndrome        | Drug reaction, Mycoplasma, Herpes simplex, & other infectious agents. | Purulent. Hyperemia. Blindness has been reported. | Red, bleeding, fissured | Ulcerative enanthem may occur. | Erythema multiforme, vesicles & bullae | Erythema | Generalized | At least 2 mucous membrane sites, may have manifestations of an infectious agent i.e., pneumonia, may be drug-induced? | Clinical / deep vasculitis on skin Bx. If severe, some overlap with Toxic Epidermal Necrolysis. | Supportive, As a burn patient if severe. Tx underlying infection if present. Consult Ophthalmology. |

James H. Brien, D.O.
## Febrile Exanthema (Hot Rashes)

**Atlanta; April 29, 2017**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Cause</th>
<th>Eyes</th>
<th>Lips</th>
<th>Mouth</th>
<th>Skin</th>
<th>Hands &amp; Feet</th>
<th>Desquamation</th>
<th>Other Findings</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky Mountain SF &amp; other Rickettsials</td>
<td><em>R. rickettsii</em> (RMSF)</td>
<td>Hyperemia &amp; puffy</td>
<td>Normal</td>
<td>Erythema</td>
<td>RMSF rash centrifugal macular to maculopapular to Petechial. MT centrifugal</td>
<td>RMSF rash may include palms and soles.</td>
<td>Fine</td>
<td>CNS (headache), arthralgias, GI Sx, Cough, low platelets.</td>
<td>Clinical, confirmed with rising titers.</td>
<td>Doxycycline or Chloramphenicol empirically. Cannot wait for confirmation.</td>
</tr>
<tr>
<td>Dengue fever</td>
<td>Dengue viruses, types 1 - 4</td>
<td>+/-</td>
<td>Normal</td>
<td>+/- Erythema</td>
<td>Macular rash, Petechial</td>
<td>Involved but not palms &amp; soles.</td>
<td>+/-</td>
<td>Severe myalgias &amp; arthralgias (break bone fever), epistaxis.</td>
<td>Clinical and serological.</td>
<td>Supportive, no NSAID’s or salicylates, control bleeding.</td>
</tr>
<tr>
<td>Rat Bite Fever</td>
<td><em>Streptobacillus moniliformis &amp; Spirillum minus</em></td>
<td>Normal</td>
<td>Normal</td>
<td>+/- Erythema</td>
<td>Maculo-papular or petechial</td>
<td>May be Involved, palms and soles</td>
<td>Minimal</td>
<td>Arthritis in most, myalgias +/- Pneumonia &amp; heart.</td>
<td>Special culture Darkfield exam; check with lab.</td>
<td>Penicillin, Doxycycline</td>
</tr>
<tr>
<td>Polyarteritis nodosa</td>
<td>Unknown, Hepatitis B, etc?</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Maculo-pap, vesicular, Bullous, necrotic.</td>
<td>May be Involved</td>
<td>+/-, Bullous and necrotic lesions.</td>
<td>Renal disease, myalgia arthralgias, occasionally fatal.</td>
<td>Biopsy; any area of involvement, e.g. skin and kidney.</td>
<td>Steroids, other immune modulators.</td>
</tr>
<tr>
<td>Kawasaki disease</td>
<td>Unknown. Probably infectious trigger in susceptible host.</td>
<td>Hyperemia w/o exudate (1)</td>
<td>Red, cracked, bleeding, fissured (2)</td>
<td>Erythema (Also 2)</td>
<td>Polymorphous, extensor surfaces erythoderma, more intense in groin area - no vesicles or blisters (3)</td>
<td>Erythema &amp;/or edema of feet, hands, palms &amp; / or soles. (4)</td>
<td>Generalized, especially fingers, toes, palms, soles; fine flaky on trunk &amp; groin. Begins in 2nd week.</td>
<td>Prolonged fever (≥5 days), elevated ESR/CRP in acute stage, thrombocytosis &amp; coronary aneurysms in the 2nd week, enlarged lymph node (5)</td>
<td>Child &lt; 12 yrs old with clinical evolution of 4 of the 5 numbered findings to the left and no evidence of any of the above diseases. <strong>May be incomplete!</strong> More severe in young infants.</td>
<td>IVIG (2 Gm/Kg), ASA (80 mg/Kg) Use of Steroids &amp; other immune modulators (Remicade)? Consult with ID, cardiology, and ophthalmology if eyes are red.</td>
</tr>
</tbody>
</table>

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