Pediatric Rashes: From Deadly to Benign

Ghazala Sharieff, MD
What makes you think that a rash may be life-threatening?

1. Mucous membrane involvement
2. Extensive blisters or peeling of skin
3. Extensive erythema and fever
4. Severe pain that appears to be out of proportion to the physical examination
5. ALOC
6. Petechial or purpuric lesions
7. Persistent fever

Case presentation

- A 2 1/2-month old female presents with temperature to 101.8 for 6 days. She has had a few episodes of non-bloody, loose stools. She has no rash now but had a faint one one 2 days ago, no “irritability” and no vomiting. There are no ill-contacts. No PMH.

- What would you do?
Case Presentation

• A 3-year old girl presents with 5 days of fever to 104F, sore throat, diffuse rash, and “red eyes” and “lumps under her jaw” per her mother.
• There is no significant PMH, no meds except APAP
• The child has stable vital signs and the following findings on exam:
KAWASAKI SYNDROME
Signs and symptoms
Fever ≥ five days and four of following five:
1. Bilateral conjunctival injection
2. Oral mucosal changes
3. Rash: not vesicular
4. Extremity changes
5. Cervical adenopathy
KAWASAKI SYNDROME

- Peak age is 1-2 years old
- 80% of cases occur before 5 years of age
- Acute phase lasts 7-14 days and is followed by the subacute phase (2-4 weeks):
  - Thrombocytosis, desquamation of the fingers and toes, arthralgias, greatest risk for coronary artery thrombosis.

KAWASAKI SYNDROME
Differential Diagnosis

- Measles
- Scarlet fever
- Drug reactions
- Staphylococcal Scalded Skin Syndrome
- Viral and rickettsial exanthems
- Toxic shock syndrome
- JRA

KAWASAKI SYNDROME
Diagnosis & Treatment

- Elevated WBC, ESR >40, CRP>3
- GGT elevation in up to 70% of patients
- Pyuria due to urethritis
- EKG, echocardiogram
- Admit for ASA 80-100mg/kg/day until day 14 then 3-5mg/kg/day until platelet count is normal
- Gamma globulin therapy-single dose 2g/kg over 10 hours
- New studies underway
KAWASAKI SYNDROME
Complications
- Coronary artery aneurysms in 20-25% of pts not treated within 10 days of symptoms
- Risk factors include:
  - Male sex, age less than 12 months or over 8 years
  - Fever for greater than 10 days or fever after IVIG
  - High baseline neutrophil count
  - Hemoglobin less than 10g/dL
  - Thrombocytopenia

KAWASAKI SYNDROME
Other Complications
- Aseptic meningitis
- Gallbladder dilation
- Pancreatitis
- Facial nerve palsies

Case presentation
- A 2 1/2-month old female presents with temperature to 101.8 for 6 days. She has had a few episodes of non-bloody, loose stools. She has no rash now but had a faint one 2 days ago, no “irritability” and no vomiting. There are no ill-contacts. No PMH.
Atypical Kawasaki
Newburger J etal. Pediatrics 2004
• Infants can present with fever for more than 5 days with fewer than 2-3 of the principal features
• Infants < 6 months of age can also present with fever and few if any, principal clinical features.
• Perform KD workup in infants with prolonged fever

Toxic Shock Syndrome(TSS)
• Staph aureus-TSST-1 exotoxin
• Can also be seen with group A strep exotoxins A, B,C
• Many cases of non-menstrual TSS occur with upper airway infection
• Abrupt onset of high fever (>38.9C)
Toxic Shock Syndrome (TSS)

- Diffuse macular erythroderma
- Desquamation 1-2 weeks after onset of sx
- Hypotension - SBP < 5th percentile
- Negative CSF, throat cultures, RMSF, measles

Toxic Shock Syndrome (TSS)

- Involvement of ≥3 organ systems:
  - GI - vomiting/diarrhea
  - Mucous membranes - hyperemia
  - Muscular - CPK > 2X normal
  - Renal - BUN or creatinine > 2X normal
  - Hepatic - TBili, SGOT, SGPT > 2X normal
  - Platelets < 100K
  - CNS - ALOC without focal findings

TSS
Young AE, Arch Dis Child

- Patients less than 5 years of age with < 9% total body surface area burns were at risk for TSS on average 2 days after the burn
Toxic Shock Syndrome

- Supportive care
- Vasopressors may be necessary
- IV antibiotics

Case Presentation

- A 1 year old boy presents with a small lesion on his lower extremity which is warm and tender to palpation.
- The child appears quite uncomfortable
- 2 hours later you notice a bullae within the lesion
Necrotizing Fasciitis

- Group A Strep is more common in young patients and healthy adults
- Diabetics and immunocompromised are at risk
- Cellulitis initially, typically on the extremities
- Bullae can appear within 2 hours
- A purulent center develops followed by a necrotic black, eschar over a few days
- 30% have crepitance
- Lymphadenopathy is not present typically

Necrotizing Fasciitis

Differential Diagnosis

- Spider bite
- Erythema marginatum
- Erysipelas
- Cellulitis

Necrotizing Fasciitis

Treatment

- Surgical debridement down to the fascia
- Aggressive fluid management
- IV antibiotics
CA-MRSA

- Occurs in healthy patients
- Abscesses or cellulitis
- Trimethoprim-sulfamethoxazole or clindamycin
PERIANAL STREPTOCOCCUS
• Group A beta-hemolytic streptococcus.
• Occurs in children less than 10 years of age.
• Males > females
• Well-marginated erythematous ring extending evenly around the anus

PERIANAL STREPTOCOCCUS
• No induration, fever, or lymphadenopathy
• Perianal itching or pain with defecation
• Positive culture/recent GABHS infection or has a +throat culture
• Rx: Oral penicillin or Amoxicillin
STAPHYLOCOCCAL SCALDED SKIN SYNDROME (SSSS)

- Age less than 5 years
- Irritability when skin is touched
- Fever
- Generalized erythema followed by bullae formation and desquamation
- Nikolsky’s sign
- No mucous membrane involvement!

STAPHYLOCOCCAL SCALDED SKIN SYNDROME (SSSS)

Treatment

- IV hydration
- IV antibiotics
- Admit
ERYTHEMA MULTIFORME

• Hypersensitivity reaction
• Recurrent herpes simplex infections occur 10 days before lesions
• Mycoplasma pneumoniae
• Drugs-PCN, phenytoin, cephalosporins

ERYTHEMA MULTIFORME

• Target lesions evolving over days and not hours
• Symmetric on elbows, knees, and extensor surfaces
• EM major involves mucous membranes
• Remove offending agent, symptomatic Rx
• May need hospitalization
Stevens Johnson Syndrome

- Age: 2-10 years
- NSAID’s, sulfonamides, anticonvulsants
- Mycoplasma pneumoniae and HSV
- 1-14 day prodrome with fever, HA, sore throat, malaise, V/D, cough
- Severe mucosal membrane involvement with at least 2 sites-oral and eyes common

Stevens Johnson Syndrome

- Typical SJS-only a few red macules accompanying mucous membranes
- SJS-TEN overlap-10-30% skin involvement
- Toxic epidermal necrolysis (TEN) >30% body surface area involvement
Stevens Johnson Syndrome

- Burn protocols
- Aggressive IV hydration
- Removal of offending agents
- Close fluid and electrolyte monitoring
- May need opthalmologic consult for eye involvement
- IV immunoglobulin therapy 1.5-2gm/kg/day for 3 days
Measles

- 1-2 week incubation period
- High fever, cough, rhinitis, conjunctivitis, and cervical adenopathy: 3-5 days prior
- Morbilliform rash starts on face and then spreads
- Koplik’s spots on mucous membrane
- Contagious through day 3 of lesions

Measles

- Measles immunoglobulin 0.25mg/kg should be given within 6 days of exposure for unimmunized children
- 0.5mg/kg for immunocompromised children
- Complications: otitis media, myocarditis, encephalitis, hepatitis, glomerulonephritis, Steven’s Johnson syndrome

CASE PRESENTATION

A one week old female presents with erythema surrounding the umbilical stump that is starting to extend to the abdominal wall. She is afebrile, vital signs are stable, she is alert and interactive. She is breast-feeding well, and has no history of vomiting, and no ill contacts. What is the diagnosis? Should this patient be discharged?
OMPHALITIS
What is it?
• Inflammation and infection surrounding the umbilicus that can spread to the liver or peritoneum

OMPHALITIS
Clinical Presentation
• Fever may or may not be present
• Mild erythema surrounding the umbilicus
• Necrosing lesions surrounding the umbilicus and extending to the abdominal wall
• Systemic symptoms may be absent
OMPHALITIS
Treatment

• Perform septic workup
• Start IV antibiotics
• Surgical debridement for abscessed lesions
• Do not discharge these patients!
**PETECHIAE/PURPURA**

**What are they?**
- **Petechiae**: Non-blanching, purple lesions less than 2mm in diameter, resulting from bleeding into the skin from abnormal platelet function, vasculitis or thrombocytopenia
- **Purpura**: Circumscribed lesions >0.5cm in diameter, do not blanch

**PETECHIAE**

**Etiology**
- Meningococemia
- Bacterial infections
  - *H. flu*
  - *E. Coli*
  - *S. Aureus*
  - Group A Strep
- RMSF
- Stress petechiae
- ITP
- HUS
- Viral infections
  - RSV
  - Enterovirus
  - Adenovirus
  - EBV
- Gonococcemia
- Endocarditis
- Leukemia
- Strep pharyngitis

**HEMOLYTIC-UREMIC SYNDROME**
- Triad of acute microangiopathic hemolytic anemia, thrombocytopenia and acute renal insufficiency/failure
- Diarrheal form associated with *E. Coli 0157:H7*
HEMOLYTIC-UREMIC SYNDROME

- 3-10 day prodrome of bloody or watery stools with crampy abdominal pain
- Petechiae/purpura, pallor, HTN occur when the GI symptoms seem to be improving
- Treatment-supportive, with early peritoneal dialysis

HENOCH-SCHOENLEIN PURPURA “ARENA”

- A- abdominal pain, +/- bloody stools
- R- purpuric rash
- E- edema
- N-nephritis
- A- arthralgias/ arthritis
Henoch-Schonlein Purpura

• Diagnosis
  – Classic rash, abdominal pain, microscopic hematuria, arthralgias in non toxic patient
  – Screening tests: CBC, UA, Blood cultures, ESR, PT/PTT

Henoch-Schonlein Purpura

• Management
  – Symptomatic with close follow up
  – Steroids are controversial and only for severe cases
MENINGOCOCCEMIA

- Neisseria meningitidis
- 1-4 day prodrome of URI, ST, malaise
- Petechiae with rapid progression, purpura in up to 90% of pts
- Contact prophylaxis:
  - Rifampin
  - Ciprofloxacin

PETECHIAE

How likely is meningococcal disease?

Wells LC et al. Arch Dis Child, 2001

- 218 children with petechial rash, infants to 15 years of age. The ability of clinical features and lab studies to predict meningococcal disease was studied
- 24 (11%) had proven meningococemia
- 5 kids had temperatures less than 37.5°C
- Median age was less than 2 years of age, with 55% of pts with petechiae being less than 3 years

PETECHIAE

How likely is meningococcal disease?

Wells LC et al. Arch Dis Child, 2001

- Patients with meningococcemia more likely to have temps >38.5°C, have purpuric lesions, be ill-appearing, have delayed capillary refill times, prolonged INR, and abnormal neutrophil counts
- No patients with petechiae above SVC had meningococemia and no child with a CRP less than 6 mg/dl had meningococcal disease
FEVER & PETECHIAE

• Authors conclude that patients with serious bacterial illness can be identified by clinical criteria and that treatment of well-appearing children with fever and petechiae as outpatients is supported.
• Patients should have normal lab studies, antibiotic administration and observation for several hours prior to discharge.

Clinical recognition of meningococcal disease

• 486 pts 0-16 yrs of age with meningococcal disease
• 103 pts died
• Classic meningococcal symptoms of rash, neck stiffness, aloc occurred late in the course of disease 13-22 hours
• First signs were leg pains, cold hands and feet and abnormal skin color-median onset 8 hours

Clinical recognition of meningococcal disease

• Personal interviews with parents or retrospective questionnaire
• Clear bias due to retrospective nature and selective memory potential
Skin and Soft Tissue Infections

CELLULITIS

Etiology

- Periorbital / preseptal
  - S. aureus: trauma
  - H. fla B: bacteremia
- Orbital
  - S. aureus: trauma, sinusitis
- Trunk, extremities
  - S. aureus
  - Group A beta hemolytic strep
<table>
<thead>
<tr>
<th></th>
<th>Preseptal</th>
<th>Orbital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Lid edema</td>
<td>May be severe</td>
<td>Severe</td>
</tr>
<tr>
<td>Proptosis</td>
<td>None/minimal</td>
<td>Yes</td>
</tr>
<tr>
<td>Chemosis</td>
<td>None/minimal</td>
<td>Yes</td>
</tr>
<tr>
<td>Pain and decreased eye movement</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Elevated WBC</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
VARICELLA

- Macules, papules, vesicles
- Spread over 24 hours
- Trunk, face to extremities
- Often in scalp, mouth
- Highly contagious until crusted

VARICELLA Complications

- Cellulitis
- Pneumonia
- Encephalitis: seizures, coma (early)
- Cerebellitis: benign ataxia (late)
- Reye syndrome

VARICELLA Treatment

- Antipruritics
- APAP
- No ibuprofen-
  - Involved in necrotizing fasciitis
  - Thrombocytopenia & hemorrhagic lesions may worsen
- 20mg/kg/dose qid acyclovir
- VZIG for kids at high risk within 72 hours of exposure
- Varicella vaccine 12-18 months of age
- After 13 years of age, need 2 shots
VARICELLA
Treatment
- Acyclovir for healthy kids?
  - Reduction in days of fever
  - 80 fewer lesions
  - No difference between acyclovir and placebo in terms of varicella complications
  - Importance of treating healthy kids with acyclovir is still uncertain

Eczema Herpeticum
- Severe herpetic virus infection
- Vesicles develop abruptly in eczematus areas
- Fever can be high and secondary infection can occur
- Disease varies from mild to fatal
- Treatment: acyclovir (IV or PO)
  - Add anti-staphyloccal agent
What makes you think that a rash may be life-threatening?

1. Mucous membrane involvement
2. Extensive blisters or peeling of skin
3. Extensive erythema and fever
4. Severe pain that appears to be out of proportion to the physical examination
5. ALOC
6. Petechial or purpuric lesions
7. Persistent fever
Pityriasis rosea

- Herald patch followed in 1-2 weeks by generalized rash lasting up to 6 weeks
- Pruritic
- Low grade fever, nausea and fatigue
- Treatment: anti-histamines, ? Steroids
- UV light helpful if used in first week
- 2% of patients have recurrent disease
Head Lice-Pediculosis Capitus

- Pruritus intensifies 3 to 4 weeks after the initial infestation
- Bites can be seen, especially in the neck of long-haired individuals when the hair is pushed aside.
- Itch/scratch cycle can lead to secondary infection
- Lymphadenopathy and fever are rare

Pediculosis Capitus

- Permethrin, malathione, ?vaseline
- 5% Benzyl alcohol
- Wash all clothes, brushes, blankets
- Repeat treatment in 7-10 days
- May require multiple treatments
SCARLET FEVER

- Group A beta-hemolytic streptococcus
- Sand paper rash first in the skin folds of the axillae, groin, and antecubital area (Pastia’s lines)
- Circumoral pallor, palatal petechiae
- Rash develops 12-48 hours after sore throat, and lasts 4-5 days
- Desquamation over the next 2 weeks
- Rx: Pen VK. No school until abx for 24 hrs
SCABIES

• Sarcoptes scabiei
• Pruritic lesions especially in web spaces, groin, hands, feet, elbows, knees
• Facial involvement in infants
• Mite feces or eggs on scraping of the lesions in oil immersion
• Permethrin overnight, avoid lindane
• Treat the whole household!

CANDIDA

• Diaper dermatitis
  – Use topical antifungal cream
  – Add 1% hydrocortisone cream sparingly for severe cases
  – The dermatologists disapprove of Lotrisone!
• Oral Thrush
  – Use nystatin 100,000 units/cc- 2 cc po qid
TINEA CAPITUS
- Trichophyton tonsurans most common
- Person to person transmission via fomites
- Alopecia, black dot sign, Kerion
- Treat with Griseofulvin 20mg/kg/day for 6 weeks.
- Fluconazole, terbinafine
- May add prednisone for kerion
- Selenium sulfide shampoo 2X/week
Viral Exanthema

ERYTHEMA INFECTIOSUM
- AKA Fifth Disease
- Parvovirus B 19
- Incubation 4 – 20 days
- Sickle cell patient → aplastic crisis
ERYTHEMA INFECTIOSUM

• Fever in 15 – 30%: low grade
• Rash
  – Slapped cheeks on face
  – Lace-like rash on arms, trunk
  – Recurrent with heat, sunlight
• Adults and teens: arthralgia, arthritis

ERYTHEMA INFECTIOSUM

Treatment

• Supportive
• No labs
• Contagious for few days before and after rash
• Isolate inpatients: pregnant at risk
ROSEOLA

- Human herpes virus 6
- Exanthem subitum (“sudden onset”)
- Children 6 months – 2 years
- Incubation 5 – 15 days
- Contagious: unknown

ROSEOLA

Signs and symptoms

- High fever 3 – 5 days
- Febrile seizures possible
- Irritability
- Rash: sudden onset after defervescence
- No specific therapy
ERYTHEMA TOXICUM NEONATORUM

- Erythema toxicum neonatorum
  - Occurs in up to 50% of infants
  - Small, yellow papules or pustules with an erythematous base
  - Gram stain shows eosinophils
  - Self-resolves in 5-7 days