Connecting the Dots: SCRIPTS for Success in the Evaluation of Pediatric Rashes

Robert P. Olympia, MD

Although skin rashes may not necessarily prompt a visit to the school nurse’s office, a rash associated with other systemic symptoms, such as fever, headache, difficulty swallowing or breathing, weakness, or abdominal pain, may cause a child to visit your office. This article describes the initial assessment and management of skin rashes in children and adolescents and delineates reasons that may prompt the school nurse to transfer a student with a rash to a local emergency department.

Keywords: rashes; meningococcemia; sepsis shock; dermatology emergencies

Who Is the ER Pediatrician?

Robert Olympia, MD, is a pediatric emergency medicine physician with almost 20 years of experience, currently working in an emergency department in the Sweetest Place on Earth (Hershey, Pennsylvania). His research interests include emergency and disaster preparedness for children in the setting of schools and school-based athletics as well as sport-related illness and injuries. He has presented his research both regionally and nationally and has lectured on a variety of topics pertaining to pediatric emergency medicine, such as fever and infectious diseases, trauma, sport-related injuries, and disaster preparedness. In 2015, he was invited to speak at the NASN 47th Annual Conference in Philadelphia, Pennsylvania, on the topic of pediatric emergencies and sport-related emergencies in the school-based setting.

What Is the Purpose of the “School Nurses on the Front Lines of Medicine” Series?

The “School Nurses on the Front Lines of Medicine” series will present cases reflecting emergencies commonly encountered in the school setting, focusing on an evidence-based approach to the initial management, stabilization, and disposition of the ill or injured child. Topics to be covered in this series will include children presenting with a chief complaint of fever; vomiting, diarrhea, or dehydration; shortness of breath; severe allergic reaction; lacerations or abrasions; sprains, strains, or contusions; head injury or headaches; heat-related illness; acute mental status changes; seizures; cardiac arrest; chest pain; fainting; abdominal pain; and extremity fractures.

Special features unique to each article are Extra Credit Points and Report Cards. Extra Credit Points are trivia questions or clinical pearls scattered throughout the article related to the topic at hand. Report Cards are concise tables summarizing key points in each article that you can photocopy and laminate, or photograph and keep on your smart device, for easy access.

Case

A 9-year-old boy presents to your office after passing out in the hallway. You call his mother and find out that he has been sick for the past 24 hours with low-grade fever, headache, and a rash. His rash started around his underarms and wrists (Figure 1) and now has progressed to his entire trunk and face. He is toxic in appearance and moans incoherently when asked a question. His temperature is 103°F, heart rate is 140 beats per minute, and respiratory rate is 44 breaths per minute. His extremities are cool and his distal...
pulses are “thready.” His rash looks like dark purple spots and bruises, some are raised and others flat, they do not blanch when you press on them, and they seem to be coming together on the face, trunk, and extremities. What do you do?

**Connecting the Dots**

Although skin rashes, in and of themselves, may not prompt a visit to the school nurse’s office, a rash associated with other systemic symptoms, such as fever, headache, difficulty swallowing or breathing, weakness, or abdominal pain, may cause a child to visit your office. It is the responsibility of the school nurse to determine whether the rash may be associated with a potential life- or limb-threatening condition and, based on that determination, to suggest a disposition to either an emergency department (ER), an urgent care center, the child’s primary care provider, or home with the child’s guardian (Kress, 2011). We will discuss an organized approach to a student presenting to your office with a rash.

**ABC’s Before D (Dermatologic Assessment)**

The initial assessment of a student who presents to your office always begins with the ABCs:

**Airway and Breathing**

Is the student able to speak to you? Is there any swelling of the face, lips, or tongue? If he is able to speak, then the airway is open. If the student is unconscious or cannot speak, open his airway with simple positioning (head tilt-chin lift) and clear any secretions or vomitus from the airway, if present. What is the student’s respiratory rate? Are his lips blue (consistent with cyanosis, or lack of oxygen in their blood)? Does the student have evidence of respiratory distress (fast or labored breathing, shallow breaths, absent chest rise) or evidence of airway obstruction (visualization of vomitus or excessive saliva in or around the mouth, gurgled upper airway sounds)? If you have a stethoscope readily available, listen for breath sounds in all lung fields. There should be good aeration in all lung fields without crackles, rales, or wheezing.

**Circulation**

What is the student’s heart rate and blood pressure? Are his extremities well perfused (warm and pink skin, strong and regular pulses, capillary refill time <2 seconds)? A student with a fast heart rate and evidence of poor extremity perfusion may be exhibiting shock (inability of the body to provide important nutrients and oxygen to vital organs).

**Disability**

What is the student’s neurologic status? Is the student alert and oriented to person, place, and time? The nurse can quickly assess the overall neurologic status of a student by using the mnemonic “AVPU”: Alert, responsive to Verbal stimulus, responsive to Painful stimulus, Unresponsive.

Compromise of airway, breathing, or circulation and/or the presence of disability requires prompt transfer to the closest emergency department.

**SCRIPTS for Success**

An organized way of assessing a skin rash can be described by the mnemonic “SCRIPTS” (Table 1).

**Shape**

What does the rash look like? Is there one lesion or multiple lesions? If there are more than one lesion, how are the lesions distributed (scattered or confluent)? What is the size of the lesion or lesions (in centimeters)? What is the shape of the lesion or lesions (round, oval, linear)? What is the morphology of the lesion or lesions (flat or raised, solid or fluid filled; TABLE 2)? Is the border of the lesion serpiginous (like a snake)? Is the border of the lesion arcuate (like an arch)? Has the lesion changed in morphology or shape over time? Is the border of the lesion darker in color than the middle of the lesion (described as “annular”, such as erythema multiforme, a rash associated with a delayed hypersensitivity reaction, FIGURE 2)? Does the lesion appear like a “bulls-eye” (consistent with a Lyme disease rash, erythema migrans, FIGURE 3)?

**Color**

What color is the lesion (red, pink, purple, brown, black, white, etc.)? Based on the student’s normal skin color, is the lesion hyperpigmented or hypopigmented? Does the lesion blanch (rash goes away when you push on the skin, and returns when you let go of the skin)?

**Region**

Where did the rash start? Where is the rash now? Does the rash come and go? Is the rash more prominent in one area of the body? How fast did the rash progress? (Rapidly progressing rashes may be consistent with more life-threatening processes, such as septic shock, anaphylaxis, or deep skin infections.)

**Itchy**

Is the rash itchy (more consistent with an allergic or infectious process, such as
hives or scarlet fever? Is the rash crusty (consistent with an infectious process, such as impetigo)?

**Painful**

Is the rash painful (more consistent with an allergic, inflammatory, or infectious process)? Is the rash warm (consistent with an infectious process)?

**Trauma-Related**

Is the rash associated with trauma? Although most rashes associated with trauma are accidental (abrasions, lacerations, bruises), always have a high index of suspicion for nonaccidental or inflicted injury when the history is inconsistent or changing, if bruises are found in soft tissues not associated with bony surfaces (such as the cheeks, abdomen, or buttocks), if any burns are present, or if lesions have defined borders consistent with inflicted objects (such as cigarette or cigar burns, hot objects such as irons or radiators, hand prints, belt buckles or straps, electrical cords, etc.). Disruption of the skin associated with trauma can become infected and present with redness, pain, warmth, and/or purulent discharge.

**Systemic Symptoms**

Is the rash associated with systemic symptoms, such as fever, headache or neck pain, change in mental status (consider shock or meningitis), generalized weakness or fatigue, mucous membrane changes (such as redness or swelling of the eye conjunctiva, lips or tongue, or genitalia), sore throat, difficulty swallowing, chest pain or abdominal pain, shortness of breath, joint pains or swelling, extremity weakness or numbness, or nausea, vomiting, or diarrhea?

**Heroic Actions Begin With Connecting the Dots**

You recognize very quickly that the student in your office is very ill. You go through your ABCs and SCRIPTS before making a determination on disposition:

- **Airway and breathing:** The airway is open and the student is breathing on his own without evidence of cyanosis or swelling of the lips or tongue; respiratory rate is fast.
- **Circulation:** The student's heart is beating fast and his extremity perfusion is poor (consistent with shock).
- **Disability:** He moans incoherently to questions, so he would be “responsive to verbal stimuli” on the AVPU scale.
- **SCRIPTS dermatologic assessment:**
  1. **Shape:** round macules and papules, scattered yet with areas of confluence

<table>
<thead>
<tr>
<th>Table 2. Report Card: Description of the Rash: Morphology</th>
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<td><strong>Term</strong></td>
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</tr>
<tr>
<td>Macule</td>
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<tr>
<td>Patch</td>
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<td>Papule</td>
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<td>Plaque</td>
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<tr>
<td>Nodule</td>
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<td>Maculopapular</td>
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![Figure 2. Erythema multiforme](image)

![Figure 3. Erythema migrans](image)
Fever + Purple Spots That Do Not Blanch = Possible Septic Shock

A student with septic shock may present early with petechiae (pinpoint, purple lesions that do not blanch) or purpura (purple patches or papules that do not blanch), beginning in the axilla, groin, wrist-palms, or ankles-soles and rapidly progressing to the rest of the body (Silverman, 2015). A common organism associated with septic shock is Neisseria meningitidis, an encapsulated gram-negative diplococcus that may cause either meningitis or septic shock (“meningococcemia”). Early symptoms may include fever, generalized weakness or lethargy, headache or neck pain, upper respiratory symptoms, vomiting, abdominal pain, and/or myalgias. Progression to seizures, hemodynamic collapse, disseminated intravascular coagulation, multisystem organ failure, coma, and death may occur within 12 hours of the initiation of symptoms if not treated appropriately (Wing, 2013). Prompt recognition and treatment (intravenous fluids and antibiotics) improve morbidity and mortality significantly.

What Other Dermatologic Presentations Need to be Sent Directly to the ER From Your School?

Table 3 presents reasons for direct referral to the ER in a student presenting with a skin rash.

1. Rash (any description) + shock (tachycardia, tachypnea, change in mental status, poor perfusion of the extremities, “thready” or “bounding” pulses). In addition to meningococcemia, toxic shock syndrome may present with a rash and signs of shock:

   1. Color: Very bright redness and warmth; blanches with pressure (looks like a sunburn involving the entire body; Figure 4).

   2. Trauma-related: May be associated with traumatic disruption of the skin or mucous membranes.

   Systemic symptoms: Streptococcal or staphylococcal exotoxin-mediated infection associated with tampon use, foreign body placement, primary Staphylococcus aureus infection, postoperative wound infection, and mucous membrane or skin disruption. Systemic symptoms include fever and hypotension and may involve mucous membranes, the gastrointestinal tract, musculoskeletal and central nervous systems, and liver or kidneys. Treatment entails prompt administration of intravenous fluids and antibiotics.

2. Rash (red, warm, well-demarcated, with or without red streaking [lymphangitis], with or without abscess formation) + significant pain may be consistent with cellulitis.

Table 3. Report Card: Reasons for Direct Referral to the ER in a Student Presenting With a Skin Rash

<table>
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<th>Reason</th>
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<tr>
<td>Petechiae or purpura + fever</td>
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<tr>
<td>Rash (any description) + shock</td>
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<tr>
<td>Rash (red, warm) + significant pain or pain out of proportion to physical findings</td>
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<tr>
<td>Rash (urticarial) + signs of allergic reaction (facial or lip swelling, difficulty breathing or swallowing, shortness of breath, abdominal pain or cramping, vomiting or diarrhea, difficulty walking or change in mental status)</td>
</tr>
<tr>
<td>Rash (any description) + mucous membrane changes (redness of the eyes, lips, tongue or genitalia with or without sloughing)</td>
</tr>
<tr>
<td>Any rash consistent with possible nonaccidental or inflicted trauma</td>
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(infection of the skin and adjacent soft tissue; Berk, 2010). Warmth, redness, and significant pain associated with a very swollen body part may be consistent with a life- or limb-threatening condition called necrotizing fasciitis (Sturgeon, 2015):

**Shape:** Often well-demarcated, plaque.

**Color:** Very red; may be associated with rapid progression to central patches of bluish discoloration with or without blistering, followed by ulceration or gangrene.

**Region:** Limited to affected body part (often extremities).

**Itchy:** Not often.

**Painful:** Often pain out of proportion to physical examination findings; may be associated with crepitus (feeling of subcutaneous air, described as “crunchy” on palpation of the swollen body part).

**Trauma-related:** Often associated with antecedent varicella infection, general debilitation following surgery or trauma, or wound complication.

**Systemic symptoms:** Fever, other signs of septic shock.

3. Rash (urticarial; Figure 5) + signs of allergic reaction (facial or lip swelling, difficulty breathing or swallowing, shortness of breath, abdominal pain or cramping, vomiting or diarrhea, difficulty walking or change in mental status) may be indicative of an acute anaphylactic reaction.

4. Rash (any description) + mucous membrane changes (redness of the eyes, lips, tongue, or genitalia with or without sloughing) may be consistent with a delayed hypersensitivity reaction, such as Stevens Johnson syndrome or toxic epidermal necrolysis (Noguera-Morel, 2014; Figures 6 and 7).

**Shape:** Ranging from discrete macules, sometimes with a necrotic center, to widespread bullae and extensive sloughing of the skin.

**Color:** Often dark red.

**Region:** Generalized.

**Itchy:** Not often.

**Painful:** Very painful.

**Trauma-related:** Not often.

**Systemic symptoms:** A delayed hypersensitivity reaction often associated with drug reactions, viral infections, bacterial antigen exposures, and immunodeficiency; often presents with involvement of the conjunctiva, mucous membranes, and/or genitalia; associated with high morbidity and mortality due to temperature instability, fluid losses, high output heart failure, and sepsis; treatment is aggressive skin care, nutritional support, antibiotics for secondary infections, and intravenous immunoglobulin.

5. Any rash consistent with possible nonaccidental or inflicted trauma.

**Acknowledgments**

All figures were used with permission from the personal collection of Dr. Andrea L. Zaenglein, MD, Professor of Dermatology and Pediatrics, Penn State Hershey Medical Center.

**References**

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other cutaneous bacterial emergencies. *Pediatric Annals*, 39(10), 627-635.


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If you have a clinical question, send your question to Dr. Olympia (rolympia@hmc.psu.edu). Questions will be selected and discussed as part of the “School Nurses on the Front Lines of Medicine” series.