Questions to Ask Patients with Febrile Rash Illness

Fever Assessment:

1. When did the fever start? (fever should precede rash)
2. How high has the fever been without the use of antipyretics (or is the fever subjective)?
3. Did the fever persist, or did it disappear? (if fever disappeared before rash onset without the use of antipyretics, the patient is unlikely to have measles)
4. Fever generally peaks on day 2 or 3 after rash onset; fever persisting longer than this in a confirmed measles case is an indication of a complication.

Rash Assessment:

1. Measles rashes typically start on the forehead at the hairline and behind the ears and then spread downwards to the rest of the body; measles rashes in vaccinated people follow the same pattern but may be less intense and may not spread to the entire body.
2. Measles rashes are initially erythematous and maculopapular but progress to confluence in the same manner as the spread of the rash. Confluence is most prominent on the face.
3. The rash begins to clear on the third or fourth day in the same order it appeared; duration of the rash is usually 6-7 days. Rashes may resolve more quickly in vaccinated people.
4. During the initial stages of the rash, it is red and blanches with pressure. As the rash fades, it takes on a coppery appearance, after which a brownish discoloration is seen that does not clear with pressure.

Note: The only people who have measles rashes that do not start on the head or neck are adults who received killed measles vaccine during 1963-1967 and develop what is called “atypical” measles, but this is not common and testing should be prioritized to patients with typical measles rashes.

Questions for Rash Assessment:

1. When did the rash start? (persons with measles are infectious for 4 days before rash onset)
2. What does the rash look like? (typically red and maculopapular at onset)
3. Where is the rash located? (it should at least be on the head)
4. What was the progression of the rash? (i.e., did it begin on head and spread down?)
5. Has the rash started disappearing? (in classic measles, the rash does not begin to disappear until 3-4 days after rash onset; in vaccinated individuals, the rash may disappear faster, but it should still last at least several days)
6. Does the rash itch? (measles rashes may itch, but not until at least the fourth day after rash onset)
7. Consider taking a photo of the rash to share with the local public health department.
8. Are there alternative explanations for the rash (e.g., has the patient been on antibiotics)? See page 4 for possible alternative diagnoses.

Assessment of Other Symptoms:

- Classic measles symptoms typically include the “3 Cs” - cough, coryza and conjunctivitis.
- Does the patient have cough, runny nose, red eyes, or white (Koplik) spots in the mouth? (It is unusual for unvaccinated people not to have at least 1 or 2 of the 3 Cs).
- Is the patient miserable? (in classic measles, children are always miserable; adults may be less miserable).
- In previously vaccinated persons, symptoms may be milder and all 3 Cs may not be present.

Adapted from California Department of Public Health’s February 20, 2015 Health Advisory.
Other Questions:

1. Has patient received MMR vaccine? If so, how many doses, and when?
   **Note:** Although documentation of receipt of two doses of MMR vaccine or a prior positive measles IgG test result makes the diagnosis of measles less likely, measles can still occur in such persons.

2. Has patient traveled outside of North or South America or had contact with international travelers (including transit through an international airport or visit to an international tourist attraction in the U.S.), visits to healthcare facilities or crowded locations, or contact with ill individuals in the 7-21 days before rash onset?

3. Are any high-risk situations present? (e.g. patient attends childcare setting with infants or has visited other healthcare facilities while ill).
   **Note:** Approximately 5% of children who receive MMR vaccine may develop a vaccine-related rash and fever, typically 6-12 days after receipt of vaccine. These rashes can look like classic measles and children can appear quite ill. If such children are tested for measles, they will likely be PCR and IgM positive for measles. However, genotyping can be done to determine whether the virus is wild or vaccine-type.

Alternative Diagnoses to Consider for Fever and Rash:

- **Drug eruption:** history of current or recent medication, especially an antibiotic
- **Other non-infectious rashes:** hives or atopic dermatitis with coincidental febrile illness
- **Varicella (chicken pox):** vesicular lesions on erythematous base
- **Enteroviruses (e.g. hand-foot-and-mouth disease):** oral ulcers, rash on hands, feet, buttocks
- **Mononucleosis syndrome (EBV, CMV, HIV):** risk factors (young adulthood, MSM, IDU), sore throat or tonsillitis, prominent adenopathy, splenomegaly, atypical lymphocytosis
- **Parvovirus B-19 (also known as erythema infectiosum, or 5th disease):** slapped cheek appearance in children, arthritis and diffuse rash in adults
- **HHV-6 (also known as roseola infantum, exanthem subitum, or 6th disease):** disease of very young children (usually under 2 years of age), high fever followed by defervescence and the appearance of rash on trunk
- **Rubella (German measles):** history of international travel; mild illness with low-grade fever; arthralgias prominent in adults; prominent postauricular, posterior cervical, and suboccipital adenopathy
- **Streptococcal infection (with scarlet fever rash):** sore throat, “sandpaper” rash, circumoral pallor, strawberry tongue, positive strep test
- **Meningococcemia:** abrupt onset of flu-like illness with marked myalgias (especially the legs); skin evolves from pallid or mottled with cold hands to petechial then hemorrhagic rash, severe headache and mental status change if meningitis present
- **Kawasaki disease:** children < 5 years, fissured lips, strawberry tongue, edema of hands and feet, periungual desquamation, adenopathy
- **Travel-, animal-, and tick-related:** broad differential diagnosis of fever and rash

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