Measles Virus by Qualitative PCR

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Measles is a highly communicable respiratory disease characterized by symptoms such as fever, malaise, cough, conjunctivitis, coryza, Koplik spots, and a maculopapular rash that radiates downward from the head.[1,2] Molecular testing can be used to diagnose measles infection and differentiate a rash induced by a recent vaccination from a wild-type measles virus infection.[2] Samples for RNA detection should be collected as soon as possible after rash onset, as viral shedding declines with time after rash.[3]

Test Interpretation

Analytic Sensitivity/Specificity

Real-time PCR tests for measles allow for earlier detection of the virus as compared to measles IgM antibodies. PCR tests demonstrate a sensitivity of 94% and a specificity 99%.[4]

Results

Measles Virus Vaccine Strain	Measles Virus	Interpretation
Detected	Not detected	Detection of measles virus vaccine strain RNA indicates that this patient's symptoms were likely due to vaccine reaction following recent vaccination; individuals with vaccine reactions are not contagious
Not detected	Detected	Detection of wild-type measles virus RNA is consistent with a diagnosis of measles infection Infected patients are at high risk of transmitting the virus to unimmunized individuals Hospital infection control and a state or local public health laboratory should be notified immediately
Not detected	Not detected	Negative for measles virus RNA Consider other viral and noninfectious causes for patients who present with rash

Limitations

- Specimens with low levels of vaccine strain measles virus may be reported as wild type due to the lower sensitivity of the vaccine-specific target (MeVA) compared with the pan-measles virus target (MeV).
- A negative result does not rule out the presence of PCR inhibitors in the patient specimen or assay-specific nucleic acid in concentrations below the level of detection of this assay.
- Serology testing may be indicated if measles is still suspected following a negative result.
- This assay does not enable the definitive identification of wild-type/vaccine strain coinfections.

References

1. Centers for Disease Control and Prevention. Measles/rubeola: 2013 case definition. Last reviewed Apr 2021; accessed Oct 2024.

2. Centers for Disease Control and Prevention. Clinical overview of measles. Last reviewed July 2024; accessed Sep 2024.

3. Kimberlin D. Measles. In: Bannerjee R, Barnett E, Lynfield R, et al, eds. *Red Book: 2024–2027 Report of the Committee on Infectious Diseases*. American Academy of Pediatrics; 2024:570-585.

4. Strebel PM, Orenstein WA. Measles. *N Engl J Med*. 2019;381(4):349-357.