Laboratory Diagnosis of Clinical Measles

Laboratory confirmation is required for suspected measles and includes both serology and direct detection, usually by polymerase chain reaction (PCR).

Serology

Measles-specific IgM antibody is the mainstay of the diagnosis of acute measles. An IgM response will be present in approximately 75% of patients 3 days after rash onset, rising to almost 100% after 7 days. A measles IgG antibody test should preferably be performed together with the IgM assay to aid interpretation. False positive measles IgM results can occur and in those who have previously received MMR vaccine the IgM response may be attenuated.

A 5mL tube of clotted blood is the preferred specimen for serological testing.

When no measles IgM or IgG antibody is detected in a sample collected within 3 days of rash onset from a case of clinical measles, repeat testing is recommended after 7 days.

Direct detection

Measles virus nucleic acid can be detected in the respiratory tract for up to 3 weeks after rash onset using PCR. It is detectable for a shorter time by immunofluorescence and culture (1 to 2 days). Measles virus can also be detected by PCR in peripheral blood and clean first-catch urine.

Recommended samples

1. Nasopharyngeal aspirates or nasopharyngeal swabs are the preferred sample for antigen detection by immunofluorescence, PCR, and culture. Otherwise throat swabs or nasal washes should be sent for culture and PCR, but are less suitable for the antigen detection tests. A dry sterile swab of the nasal passage combined with a similar swab from the back of the throat is the recommended specimen for detection of viral nucleic acid by PCR. Swabs should be cotton, rayon or dacron-tipped, plastic-coated or aluminium shafted swabs. They should be placed into viral transport medium if available. Samples should be stored and transported at 4°C. If arrival at the testing laboratory will be delayed more than 72 hours then, if possible, samples should be frozen at -70°C and transported on dry ice. Do not freeze at -20°C.

2. Clean first-catch urine (at least 5 mL) should be stored and transported as for swabs.

3. EDTA (whole) blood for PCR should preferably be stored and transported at room temperature.

4. Clotted blood is suitable for serology.

Guidelines

1. Patients seen within 1 week of onset of rash should have samples for direct detection specimens and clotted blood for serology collected.

2. Patients seen between 1 week and 3 weeks after the onset of rash should have clotted blood collected for serology and a respiratory sample for PCR. If within 2 weeks of rash onset, urine should be collected.

3. Patients seen more than 3 weeks after onset of rash should only have clotted blood collected for serology.

4. The reliability of serological and direct detection tests for asymptomatic contacts is not known and cannot be relied upon to exclude incubating measles infection.

Further Advice

Advice can be sought from your pathology provider’s clinical microbiologist.

Source

1 Not a swab pack with its own bacterial transport medium.
Dr David Smith, PathWest.