PCR Testing for Pertussis May Be Too Sensitive

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TORONTO — *Bordetella pertussis* polymerase chain reaction tests can be positive months after clinical illness, Dr. Bryan Stone reported in a poster presentation at the annual meeting of the Pediatric Academic Societies.

It took a full 7 months for patients who initially tested positive for *B. pertussis* by polymerase chain reaction (PCR) to convert to a negative status, according to data from a prospective cohort study of 36 patients.

Rapid PCR testing has a sensitivity of 94%-98%. But there are concerns the test may be overly sensitive and may produce clinically irrelevant positives.

Patients with pertussis are believed to be contagious through the first 21 days of illness or completion of 5 days of antibiotics. What hasn't been known is the length of time after reported onset of symptoms that PCR testing remains positive, said Dr. Stone, medical director of the neuroscience trauma unit and assistant professor of pediatrics at the University of Utah, Salt Lake City.

"What we usually do clinically is, once we test, we treat for 5 days in isolation and assume that they are no longer contagious and basically cured, and let them out of isolation," Dr. Stone said in an interview. "This has some implications because these people are clearly still carrying this organism for weeks and months; and all of these patients were treated with antibiotics."

The analysis was based on 36 participants providing 61 samples taken over a range of 4 days to 204 days from onset of symptoms. Thirteen "index" cases were PCR-positive infants admitted to a tertiary care center and 23 were in close contact with an infected infant and had a cough lasting 7 or more days. The mean age of the index cases was 78 days, and none had received any pertussis immunizations.

Testing occurred weekly for 3 weeks and then monthly or every other month for 12 months, or until the test became negative. Overall, 15 patients allowed serial sampling; 16 allowed only one sample; and 5 were initially negative, but remained ill for more than 21 days from onset of symptoms.

Antibiotics were started 4-136 days after onset of symptoms, and from 35 days prior to 1 day after enrollment. There was no difference in antibiotic exposure in patients who tested PCR positive or negative, Dr. Stone and his associates reported.

A PCR-positive result may confound the diagnosis of cough illness in certain patients.

DR. STONE

Half of the participants remained PCR positive between 60 and 150 days after onset of symptoms. Post-tussive emesis, cyanosis, and hypoxemia by pulse oximetry were more common in PCR-positive patients, while sore throat and rhinorrhea were more common in PCR-negative patients. But the sample numbers were insufficient for significance.

The findings have not changed PCR testing at Dr. Stone's institution. But they have raised the index of suspicion in the clinical setting, as a PCR-positive result may confound the diagnosis of cough illness in patients who have had a pertussis infection in the prior 6 months, but are not currently infected, Dr. Stone said.

"I think it's going to have to be taken into clinical context a lot more strongly," he said. "We can't just say, 'Oh this PCR was positive, this patient has pertussis.' We have to put it into clinical context."

The study was prompted by a case in which a 7-week-old infant was admitted to the pediatric intensive care unit for respiratory failure and seizure with a prolonged 6-week hospital course, only to be readmitted with coughing paroxysm and classic whoop 17 days after discharge and 58 days after onset of symptoms and initiation of treatment. At both admissions, pertussis PCR was positive and direct fluorescent antibody culture negative. It was unclear whether she had pertussis again, a macrolide-resistant organism or simply a persisting positive PCR—raising the question as to the duration of PCR positivity, Dr. Stone explained. ■

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