

Bordetella pertussis PCR

TECHNICAL UPDATE

DESCRIPTION/BACKGROUND INFORMATION

Bordetella pertussis is the causative agent of “whooping cough” or pertussis. Classic pertussis presents in three stages. The catarrhal stage is characterized by symptoms of a mild cold-like illness with an intermittent non-productive cough and lasts 1-2 weeks. This is the most infectious state because a large number of organisms are present in the upper respiratory tract and Bordetella pertussis is transmitted by respiratory droplets. This is followed by the paroxysmal or “whoop” stage in which there is paroxysmal coughing followed by post-tussive vomiting. Generally there is little or no fever during this stage, but cases usually have an elevated white blood count with lymphocytosis. Pneumonia is a common complication among infants. The disease peaks in severity after one or more weeks of paroxysmal coughing and begins to taper off with an extensive convalescent period of 2-6 weeks.

CLINICAL APPLICATION

The classic pertussis syndrome usually occurs in un-immunized and incompletely immunized children. However, unrecognized disease with mild or absent symptoms in adults whose immunity has waned contributes to the spread of the disease in infants and children. Because of the increased occurrence of pertussis there is a need for rapid and accurate diagnostic methods to guide therapeutic and preventive interventions.

Culture for Bordetella pertussis has high specificity but it is considered no more than 50% sensitive. Successful culture is highly dependent upon timing of the testing (first two weeks of illness when symptoms resemble the common cold), specimen collection and transport, and requires incubation periods of up to 10 days.

Polymerase Chain Reaction (PCR) is the method of choice for direct detection of Bordetella pertussis in clinical specimens. DNA is extracted from nasopharyngeal samples on dacron or rayon swabs, or other respiratory specimens and mixed with PCR reagents for DNA amplification. The diagnostic sensitivity of PCR for pertussis syndrome has been reported to be 93-95%. The results will be reported in 2-5 days.

LIMITATIONS

B. pertussis binds to the ciliated epithelial cells of the respiratory tract – cells that are found in the nasopharynx but not the human mouth or throat. Calcium alginate swabs are known to inhibit PCR and should not be used to collect samples. Sampling patients as early in the course of the illness as possible is recommended. Currently there is no data as to how long patients with pertussis remain PCR positive.

Over

REFERENCES:

1. ARUP Guide to Clinical Laboratory Testing 2005
2. Clinical Microbiology Newsletter 24:19.2002
3. Oregon Health Services Investigative Guidelines, Nov 2002

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SPECIMEN:	Respiratory specimens on rayon or dacron swab or direct respiratory specimen such as BAL, respiratory aspirate or sputum
COLLECTION NOTES:	Swab in viral transport media or 2 mL respiratory specimen in sterile container. SUBMIT FROZEN. Do not use calcium-alginate swabs
SERUM SEPARATOR TUBE:	N/A
SUBMIT:	Frozen (Specimen stability: ambient: 4 hours, refrigerated: 2 days, frozen: 2 weeks)
REFERENCE RANGE:	See report
METHODOLOGY:	Polymerase Chain Reaction
CPT CODES:	87801
TURN AROUND TIMES:	2-5 Days