

Pertussis

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ABSTRACT

Background: Pertussis, a disease that has been well described since the Middle Ages, has a worldwide distribution and can infect all ages. It is caused by the gram-negative, pleomorphic bacillus *Bordetella pertussis*, which is transmitted from human to human via aerosolized droplets at close range. Descriptions such as the *one-hundred day cough* in Chinese and *whooping cough* in English, describe the severity of this disease seen in both the developed and the developing world.

Clinical

The clinical manifestations of pertussis differ depending on the age and immunity status of the patient infected. In its most classic form, pertussis has three phases: catarrhal, paroxysmal, and convalescent. The catarrhal phase starts much like the “common cold” with rhinorrhea, a mild cough, and minimal to no fever. This phase of the illness typically lasts 7 to 10 days, although it may last up to 3 weeks. If untreated in the catarrhal phase, the disease progresses to the paroxysmal phase, where protracted episodes of coughing are followed by an inspiratory “whoop” as the patient struggles to breathe. Paroxysmal fits of coughing are not constant but occur on average 15 times in a 24-hour period. Pertussis in infants is most severe, as patients can become apneic and suddenly die with no episodes of paroxysmal coughing. This phase of the illness typically lasts up to 6 weeks and is followed by the convalescent phase. The final or convalescent phase of pertussis generally lasts for several weeks and is characterized by a gradual return to normalcy with longer durations between paroxysmal coughing episodes. Severe cough with minimal to no fever, a clear chest radiograph, and lymphocytosis on a complete blood count are typical manifestations of this disease (Figure 1).

Diagnosis

The organism that causes this disease, *B. pertussis*, is fastidious and cultured growth may be difficult to obtain.

A Dacron® or Rayon® swab should be used for a nasopharyngeal specimen, which must be placed onto a transport media, typically Regan-Lowe, immediately after collection. Pretreatment with appropriate antibiotics; the use of cotton-tip swabs, which can kill the organism; and improper collection technique can result in false-negative culture results.

Polymerase chain reaction (PCR) testing for pertussis is becoming more widespread and can rapidly give results with excellent sensitivity and adequate specificity. Patients should be tested in the first 3 weeks after the onset of cough, as the sensitivity drops after 1 month due to a decrease in the amount of the organism present. Dacron swabs must be used to collect specimens submitted for PCR, because calcium alginate swabs inhibit PCR testing. Serology testing can be performed 2 weeks after the onset of cough with an assay designed by the Centers

Figure 1 A pediatric patient likely infected with pertussis.



Source: CDC Public Health Image Library.

for Disease Control and Prevention (CDC) and the U.S. Food and Drug Administration. This assay works best up to 8 weeks after the cough has started, although specimens may be collected up to 12 weeks after the onset.

Treatment and Vaccination

Retired Army Colonel James W. Bass, a longtime pediatric infectious disease physician, performed landmark research regarding antimicrobials and pertussis infections. Guidelines for antibiotic use in patients are 2-fold: to treat the patient and to reduce the infectiousness of the patient to others. Antimicrobial treatment to reduce the severity of the disease must be started during the catarrhal phase of the illness. Once the illness has reached the paroxysmal phase, antibiotic treatment is only useful in lessening the spread of the disease to others. Azithromycin, clarithromycin, and erythromycin are all potential antimicrobial choices for pertussis infections. Patients are considered contagious until 5 days of appropriate antibiotics have been administered; droplet precautions should be observed during that period of treatment. Pediatric patients in the United States receive diphtheria-tetanus-pertussis (DTaP) vaccinations at 2, 4, and 6 months of age, with boosters between 15 to 18 months and 4 to 6 years of age as well as a booster tetanus-diphtheria-pertussis (Tdap) vaccination at age 10 or 11 years, depending on the brand used. All healthcare personnel should receive a single Tdap immunization regardless of when they last received a tetanus booster. There are no current guidelines for booster immunizations in adults, except in pregnant healthcare personnel, who are recommended to get additional Tdap doses with each subsequent pregnancy.

Importance in a Deployed Setting

Immunizations or even past infections do not provide complete lifetime immunity to pertussis infections. It has been shown that up to 80% of immunized household contacts will be infected, due to the imperfect nature

of the vaccine and the lack of lifetime protection a past infection brings. Pertussis should be in the differential diagnosis of any Servicemember or patient encountered with a persistent cough who has low or no fevers regardless of immunization status.

Disclosure

The author has nothing to disclose.

Bibliography

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- Spector TB, Maziarz EK Pertussis. *Med Clin North Am*. 2013; 97:537–552.

Recommended Internet Links

<http://www.cdc.gov/pertussis/>

Included on this page are several videos of children and an adult demonstrating the classic cough of pertussis.

<http://www.who.int/topics/pertussis/en/>

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KEYWORDS: *pertussis, Bordetella pertussis, whooping cough, vaccinations*