

A 13-year-old boy is brought to the office with 2 weeks of rhinorrhea followed by a week of irritating, dry cough. The coughing episodes are worsening, occur without warning, and have caused him to vomit on 2 occasions. He has a history of mild, intermittent asthma during early childhood but has not needed an inhaler for several years. The patient takes no other medications. He completed his primary immunization series at age 4 but has received no vaccinations since then. Vital signs are normal. Examination shows nasal congestion and subconjunctival hemorrhages. Lungs are clear to auscultation. Lymph nodes and spleen are not enlarged. White blood cell count is $18,000/\text{mm}^3$ with 90% lymphocytes. Which of the following would most likely confirm this patient's diagnosis?

- ☐ A. CT scan of the chest
- ☐ B. Heterophile antibody testing
- ☐ C. Pertussis polymerase chain reaction testing
- ☐ D. Pulmonary function testing
- ☐ E. Rapid antigen testing for influenza
- ☐ F. Trial of inhaled beta agonist therapy

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- ☐ A. CT scan of the chest [1%]
- ☐ B. Heterophile antibody testing [3%]
- ☒ C. Pertussis polymerase chain reaction testing [83%]
- ☐ D. Pulmonary function testing [2%]
- ☐ E. Rapid antigen testing for influenza [8%]
- ☐ F. Trial of inhaled beta agonist therapy [2%]

Proceed to Next Item

Explanation:

User Id: [REDACTED]

Pertussis	
Clinical phases*	<ul style="list-style-type: none">• Catarrhal (1-2 weeks): Mild cough, rhinitis• Paroxysmal (2-6 weeks): Cough with inspiratory "whoop," posttussive emesis• Convalescent (weeks to months): Symptoms resolve gradually
Diagnosis	<ul style="list-style-type: none">• Pertussis culture or PCR• Lymphocyte-predominant leukocytosis
Treatment	<ul style="list-style-type: none">• Macrolides

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Diagnosis	<ul style="list-style-type: none">• Pertussis culture or PCR• Lymphocyte-predominant leukocytosis
Treatment	<ul style="list-style-type: none">• Macrolides
Prevention	<ul style="list-style-type: none">• Acellular pertussis vaccine

*Infants may present with apnea.

PCR = polymerase chain reaction.

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The patient's paroxysmal cough, posttussive emesis, subconjunctival hemorrhages (due to increased intraorbital pressure), and lymphocytosis are consistent with *Bordetella pertussis* infection (**whooping cough**). The diagnosis can be made clinically when classic symptoms are present. However, **polymerase chain reaction** testing of the nasopharynx is helpful for gathering epidemiologic data or when the diagnosis is uncertain. **Macrolides** (eg, azithromycin, clarithromycin) are the gold standard treatment and should be initiated based on clinical suspicion without waiting for confirmatory diagnosis.

Neither prior pertussis infection nor immunization with the acellular pertussis vaccine provides lifelong immunity, although both can attenuate the risk for and severity of infection and boost herd immunity. Five doses of diphtheria-tetanus-acellular pertussis (DTaP) vaccine are given during infancy and early childhood (final dose at age 4-6). A tetanus toxoid-reduced diphtheria toxoid-acellular pertussis (Tdap) booster should be given during adolescence (age 11-18) and during each pregnancy. Therefore,

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(Choice A) CT scan of the chest should be obtained in patients with prolonged cough of unclear etiology, prolonged fever, and hemoptysis. However, it would be low yield and involve unnecessary radiation exposure in a patient with a history suggestive of pertussis.

(Choice B) Heterophile antibody testing is used to diagnose infectious mononucleosis due to Epstein-Barr virus. Infectious mononucleosis typically presents with fever, fatigue, pharyngitis, cervical lymphadenopathy, and splenomegaly rather than bouts of coughing.

(Choices D and F) Pulmonary function testing is helpful in measuring airflow and bronchodilator response in patients with persistent asthma. A trial of inhaled beta agonist therapy is reasonable when acute asthma exacerbation is suspected. This patient has cough and wheezing, but the cough of asthma is characteristically worse during activity or at night rather than paroxysmal as in pertussis. Beta agonists have no benefit in pertussis infection.

(Choice E) Influenza infection commonly presents with fever, cough, and myalgias. This patient has no fever or myalgias.

Educational objective:

Pertussis should be suspected in patients with paroxysmal cough and posttussive emesis. The diagnosis can be confirmed by polymerase chain reaction testing of the nasopharynx. Vaccination reduces infection risk but does not confer lifelong immunity.

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Educational objective:

Pertussis should be suspected in patients with paroxysmal cough and posttussive emesis. The diagnosis can be confirmed by polymerase chain reaction testing of the nasopharynx. Vaccination reduces infection risk but does not confer lifelong immunity.

References:

1. [Pertussis: a reemerging infection](#)
2. [Laboratory diagnosis of pertussis.](#)
3. [The diagnosis of pertussis: which method to choose?](#)