

## **Genus: *Bordetella***

### **Morphology**

The bordetellae are small, Gram-negative, encapsulated, strict aerobic coccobacilli. It is arranged singly or in small groups and is not easily distinguished from *Haemophilus* species. The most important species related to human are:

- 1. *Bordetella pertussis***
- 2. *Bordetella parapertussis***

### **Pathogenicity and clinical findings**

*Bordetella pertussis* causes **whooping cough (pertussis)**, an acute respiratory infection marked by severe, spasmodic coughing episodes characterized by a “whooping” sound when the person breathes in. Pertussis is a common and dangerous childhood disease in unvaccinated infants and children. The bacteria colonize only ciliated cells of the respiratory mucosa, and they multiply rapidly, leukocytosis with lymphocytosis is also common during this phase of the illness.

*Bordetella parapertussis* can cause a milder form of pertussis.

*Bordetella pertussis* produces a number of virulence factors, including pertussis toxin, adenylate cyclase toxin, filamentous hemagglutinin, and hemolysin. Agglutinogens and other outer membrane proteins are important antigens.

### **Clinical Manifestations**

After an incubation period of 1 to 2 weeks, whooping cough begins with three phases as follows:

- 1. catarrhal phase:** this phase lasts 1 to 2 weeks and is usually characterized by low-grade fever, rhinorrhea, and progressive cough; the patient is highly infectious in this phase.
- 2. paroxysmal phase:** lasting 2 to 4 weeks, is characterized by severe and spasmodic cough episodes. At the end of the catarrhal phase, a leukocytosis with an absolute and relative lymphocytosis frequently begins, reaching its peak at the height of the paroxysmal stage.
- 3. convalescent phase:** lasting 1 to 3 weeks, is characterized by a continuous decline of the cough before the patient returns to normal.

Bronchopneumonia and acute encephalopathy are serious complications, sometimes fatal, are associated with pertussis, the latter being characterized by convulsions may resulting in death or lifelong brain damage.

## **Transmission**

Occur directly from person to person by airborne droplets from patient's with early cases and via carriers. Patients are most infectious during the early, catarrhal phase of the disease and remain infectious for about 5 weeks.

## **Laboratory diagnosis**

1. Culture the gold standard because it is the only 100% specific method for identification of *Bordetella pertussis*. This bacterium can be cultured on modified Bordet-Gengou medium, charcoal-horse blood agar (Regan-Lowe). Nasopharyngeal (NP) specimens collected during the first 2 weeks of cough. This is when viable bacteria are still present in the nasopharynx.

2. *Bordetella* DNA can also be detected by PCR.
3. Serological diagnosis.
4. Vitek

## **Treatment**

Pertussis can sometimes be very serious, requiring treatment in the hospital. Babies are at greatest risk for serious complications from pertussis.

Treatment for pertussis if started early, it can help reduce severity, duration and the risk of complications, particularly in infants. So, once a diagnosis is made, the treatment should start on antibiotics immediately. The most popular antibiotics used are **azithromycin, clarithromycin** and **erythromycin**.

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