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Facultad de Medicina Veterinaria y Zootecnia, Asociación Científica Mundial de Cunicultura – Rama Americana  
Secretaría de Desarrollo Agropecuario del Gobierno del Estado de México, Secretaría de Agricultura, Ganadería, Desarrollo Rural,  
Pesca y Alimentación, Consejo Mexiquense de Ciencia y Tecnología

**CLINICOPATHOLOGIC STUDY OF *Bordetella bronchiseptica* IN RABBITS  
SUBMITTED FOR DIAGNOSIS AT CIESA-UAEMéx  
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**ABSTRACT**

*Bordetella bronchiseptica* has been recognized as a cause of respiratory disease en domestic animals, as a primary agent it can cause several diseases in animals as: kennel cough (dogs), snuffles (rabbits) and atrophic rhinitis (pigs). According to the important implications it has to human health, we expose a case report of a rabbit farm with 2000 animals where 35-60 days old rabbits were affected, showing respiratory signs (dyspnea, serous nasal secretion) and green diarrhea. At necropsy the most revealing findings were severe pulmonary congestion in craneoventral regions, suppurative and fibrinous exudates with presence of adherences to the thoracic wall and suppurative secretion when sliced. Microscopic changes include severe congestion, haemorrhagia, great amounts of edema and fibrinous material with neutrophils and macrophages infiltration and an interstitial thickening by accumulation of mononuclear cells infiltration. The lung bacteriological isolation reported *Bordetella bronchiseptica* (++) . The importance of this case is based on the repercussions to public health, considering that some human infections for this agent have been related to human contact with infected rabbits.

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**Key words:** rabbits, health public, *Bordetella bronchiseptica*.



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## INTRODUCTION

There are four species in the genus *Bordetella*: *B. pertussis*, *B. parapertussis*, *B. bronchiseptica* and *B. avium*. The general characteristics of this genus are: Gram-negative coccobacilli, it could be mobile or non-motile, strictly aerobic, metabolism respiratory, never fermentative (Gueirard *et al.*, 1995; Staveley *et al.*, 2003). *B. bronchiseptica* is closely related to *Bordetella pertussis*, the agent of whooping cough, as shown by DNA hybridization, multilocus enzyme electrophoresis, and sequence analysis. The abilities of these species to colonize and to establish upper respiratory tract infection depend on the formation and production of several virulence factors. *B. bronchiseptica* synthesizes all of the factors implicated in *B. pertussis* virulence, except for pertussis toxin. These factors include adhesins, such as: filamentous hemagglutinin (it causes hemagglutination), fimbriae and pertactins; and toxin such as dermonecrotic toxin tracheal cytotoxin (induces epithelial damage) and adenylate cyclase-hemolysin (increases the cAMP levels in the target cell, modify the cell function or destroy it); those factors confer the lethality characteristic of this respiratory tract pathogen. In accordance with some reports there is evidence using pulse-field gel electrophoresis (PFGE) that some human *Bordetella bronchiseptica* infection was related to contact with infected rabbits (Binns *et al.*, 1998; Gore *et al.*, 2005; Gueirard *et al.*, 1995).

*B. bronchiseptica* has been recognized as a respiratory tract pathogen of domestic animals. Evidence suggests that the agent may occasionally colonize the human respiratory tract and cause infection implicating their health. In some cases infected animals were found in the patients' environment, but direct transmission was never demonstrated (Gore *et al.*, 2005; Gueirard *et al.*, 1995; Snyder *et al.*, 1993).

According to the pathologic lesions described by Dungworth (1993), a severe suppurative and fibrinohemorrhagic broncopneumonia in rabbits remitted to the diagnostic laboratory CIESA was diagnosed, by isolation of *B. bronchiseptica* from lungs. Here is the report case. Take this pathogen human risk transmission into account. There have been reports of domestic and farm animals incriminated.

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**CLINICAL HISTORY.** Rabbit farm with over 200 population for meat. Six animals, 40 days old, were remitted for anatomopathological study. The most common features found were: dark-green diarrhea, dyspnea, gasping and serous nasal discharge. External inspection showed conjunctival deshidratation and evidence of feces in perineal region.

**RESULTS**

Lesions founded at necropsy were: in respiratory system, nasal cyanosis, hydrothorax, severe cranioventral pulmonary congestion, fibrinous adhesions to the thoracic wall and suppurative exudate on cut surface. In digestive system: hepatomegaly, fibrinous exudate in intestinal serosa, whitish spots on the liver parenchyma and severe intestinal congestion. In heart: hydropericardium and myocardial softness. Nervous system: mild leptomenigeal congestion. Lesions founded at microscopy were: lung, severe congestion, hemorrhage, pulmonary edema, pulmonary fibrin deposition with great amount of neutrophils and macrophages, mononuclear infiltration of alveolar walls; heart, mild congestion, focal hemorrhages, nuclear pleomorphism and wavy myocytes; intestine, mild congestion and lymphocytic and eosinophilic infiltration in the lamina propria.

**ADDITIONAL STUDIES.** Bacteriological examination of pneumonic lung reported isolation of *B. bronchiseptica* by conventional methods (API 20E system). The complete blood count interpretation reveals a chronic active inflammatory process and hemoconcentration, severe dehydration and a normocytic normochromic anemia. The parasitological study reported mild coccidiosis. The most important finding was the *Bordetella bronchiseptica* purulent and fibrinohemorrhagic broncopneumonia.

**DISCUSSION**

Based on the bacteriological isolation from lung of *B. bronchiseptica* (++) as only agent isolated, it matches with lesions and damage described in pulmonary tissue by others authors. There was no presence of other pathogens as *P. multocida*, which has been described in several reports of rabbits affected (Dungworth 1993; Leman and Straw 1994). Reports of clinical adult rabbits infection related a concurrent presence of *P. multocida* and *B. bronchiseptica*, aging increases

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susceptibility to infection in this specie. *Bordetella bronchiseptica* show a high affinity for attaching to the ciliated epithelial cells that paralyze the cilia of mucociliary clearance apparatus. Ciliary stasis caused by *B. bronchiseptica* can induced *P. multocida* adhesion and loss of macrophages activity (Tuomanen *et al.*, 1993; Zeligs *et al.*, 1986).

This pathogen transmission is circumstantial. Pets and farm proprietors (cats and dogs, laboratory animals, pigs) are at risk of get opportunism infection. Some circumstances as: bad ventilation, dampness, incorrect temperature, overcrowding and bad cleaning may favor its transmission and spreading (Pajuelo *et al.*, 2002; Schipper *et al.*, 1994; Woolfrey and Moody 1991).

The zoonotic role of *B. bronchiseptica* infection is important, and common in children and immunocompromised adults. There is an important risk of getting infection in people with immunodeficiency related to alcoholic malnutrition, hematologic malignant disease, long course glucocorticoids therapy, pregnancy, and tracheostomy patients or those with endotracheal intubation. Patients with respiratory tract disease such as chronic bronchitis and pneumonia are especially susceptible (Gueirard *et al.*, 1995; Shipper *et al.*, 1994).

Latent infections can be activated under certain circumstances. According to some authors 0.1% of clinical cases of human whooping cough are caused by *B. bronchiseptica*; and laboratory staff sometimes gets a chronic pharyngitis from *B. bronchiseptica* infected lab animals (Burns *et al.*, 2003; Carlyle and Duncan 1990; Zeligs *et al.*, 1986).

Gueirard *et al.*, (1995) epidemiological and bacteriological investigation documented a woman with respiratory infection. The recurrent bronchopneumonia was related to contact with infected domestic animals (rabbits and cats); the patient has no response to treatment with recurrence of pneumonia. Cultures from the upper respiratory tract of the animals were sterile (nasal and pharyngeal swabs), but *B. bronchiseptica* (strain L2) was isolated in pure culture from the hilus and bronchi. A third and a fourth episode of disease in the patient appeared when she was no longer in contact with infected animals, suggesting persistence of the bacteria, despite a 5-week course of treatment with minocycline. She needed two 5 weeks long identical courses to eradicate the bacteria. A long duration of antibiotic therapy, especially in compromised patients, seems to be important for a definitive cure. This is why this report aim constitutes an alert for farm staff,

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on account of many times biosecurity kit is not used by workers, veterinary surgeon or even family. Otherwise, it is important to consider the risk for respiratory infections this staff has been exposed in which *Bordetella bronchiseptica* could be implicated.

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