Journal of Animal Research: v.14 n.01, p. 95-97. February 2024

DOI: 10.30954/2277-940X.01.2024.13

SHORT COMMUNICATION

Hospital based Incidence of *Bordetella bronchiseptica* in Canines in Mizoram

Kh. Thanila Rose[1], J.B. Rajesh[1*], Sherry Carelyne Marwein[1], Payel Kar[1], S.K. Behera[1], Chethan, G.E.[1], J.M. Rao[2], Parimal Roychoudhary[3], T.K. Dutta[3], T.C. Tolenkhomba[4], K. Sarma[1] and H. Prasad[1]

[1]Department of Veterinary Medicine, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih PO, Aizawl, Mizoram, INDIA

[2]Department of Veterinary Physiology & Biochemistry, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih PO, Aizawl, Mizoram, INDIA

[3]Department of Veterinary Microbiology, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih PO, Aizawl, Mizoram, INDIA

[4]Department of Animal Genetics & Breeding, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih PO, Aizawl, Mizoram, INDIA

**Corresponding author: JB Rajesh; E-mail: leovet@gmail.com*

Received: 02 Nov., 2023 **Revised:** 05 Jan., 2024 **Accepted:** 09 Jan., 2024

ABSTRACT

Bordetella bronchiseptica is one of the major pathogens affecting canine respiratory tract. The study was conducted in Veterinary Clinical Complex of the college involving a total population of 618 canines. After initial screening with clinical score study, 113 animals were selected based on the presence of respiratory tract symptoms. These animals were subjected to detailed study with culture and isolation, haemato-biochemical study, 12 animals were found to be affected with *Bordetella bronchiseptica*. The hospital based incidence of *Bordetella bronchiseptica* infections in dog was found to be 1.94% and the hospital based incidence of canine respiratory tract infection was 18.2% in Aizawl, Mizoram. The infection was more reported in dogs below 1 year of age (3.62%), more in males (2.11%), more in Labrador breed of dog (7.14%). Coughing (83.33%) was the predominant symptom observed in *B. bronchiseptica* infection in dogs.

HIGHLIGHTS

- First reported study of *Bordetella bronchiseptica* in canines in Mizoram
- Coughing (83.33%) is the predominant syptoms in *B. bronchiseptica* infection.

Keywords: *Bordetella bronchiseptica,* Canine, incidence, respiratory tract infection

Respiratory tract of canines are affected by different etiological agents that include bacteria, virus and fungi. These agents cause a variety of symptoms in the canine respiratory tract and some are having zoonotic potential. *Bordetella bronchiseptica* is one of the principal etiologic agents that cause 'Infectious Tracheobronchitis' (ITB) or kennel cough (Nafe, 2014). *Bordetella bronchiseptica* are small (0.2-0.5 µm in diameter and 0.5-2.0 µm in length) gram negative, motile, aerobic coccobacilli belonging to class of Beta Proteobacteria, order Burkholderiales and the family Alcaligenaceae (Kadlec and Sehwarz, 2018). ITB is characterised by congestion of the mucosal lining of the trachea and bronchi. Typical clinical signs include coughing with or without dyspnoea, ocular or nasal discharge and weight loss. The severity of the diseases increases with the concomitant infection with other pathogenic respiratory agents. Due to their immature immune systems, young pups tend to acquire the most serious consequences. Aged animals, those with weakened immune systems are more

How to cite this article: Rose, Kh. T., Rajesh, J.B., Marwein, S.C., Kar, P., Behera, S.K., Chethan, G.E., Rao, J.M., Roychoudhary, P., Dutta, T.K., Tolenkhomba, T.C., Sarma, K. and Prasad, H. (2024). Hospital based Incidence of *Bordetella bronchiseptica* in Canines in Mizoram. *J. Anim. Res.,* **14**(01): 85-87.

Source of Support: None; **Conflict of Interest:** None

vulnerable. Tracheal collapse could result from the illness (Oskouizadeh *et al*., 2011).

In this work, we screened 618 dogs of either sex which was brought for treatment to the Veterinary Clinical Complex of College of Veterinary Sciences and Animal Husbandry, Aizawl, Mizoram. The epidemiological data and other details of the animals were collected using a prepared module. Initially the dogs were screened based on the clinical score formulated for the study that includes inappetence, anorexia, pyrexia, ocular and nasal discharge, dyspnoea, gagging, retching, tachycardia, coughing and other symptoms associated with respiratory tract infection. Vital parameters of all the animals were recorded.

A total of 113 animals were selected for the next phase of study which includes culture, isolation and identification of *Bordetella bronchiseptica*. This was supported with haemato-biochemical parameters of the animals and other methods. Finally 12 animals were selected with confirmed *Bordetella bronchiseptica* infection. These animals were categorised under age-wise, sex-wise, breed-wise, categories. The results were discussed and presented.

Different clinical signs were observed in all cases of *Bordetella bronchiseptica* infection in dogs during the study period. Major clinical signs observed were pyrexia (41.66%), coughing (83.33%), ocular and nasal discharge (58.33%), dyspnoea (16.67%), tachycardia (16.67%), inappetence (58.33 %), anorexia (33.33%), retching (16.67%) and gagging (33.33%). This study was in agreement with Sariga *et al*. (2022) and Arsevska *et al*. (2018). Bordetella attaches to the respiratory tract cilia and produces toxin which leads to ciliostasis of respiratory epithelial cells and also helps in other secondary infections. The organism within the inflammatory cell alters the host immune system and affects the host (Kessie, 2021).

To find out the age-wise incidence of *Bordetella* infection in dogs, animals were grouped into 3 *viz.* below 1 year age, 1 – 2 years of age and above 2 years of age. Age wise incidence was found to be higher in below 1 year of age (3.62%) and above 2 years of age (1.64%) followed by between 1 to 2 years of age (1.27%). These findings were in agreement with Sariga *et al*. (2022) and Mochizuki *et al.* (2008) who reported that Bordetellosis was mainly found in puppies. Ayodhya *et al.* (2013) also found the highest prevalence of respiratory infection in the younger dogs. But according to a study by Day *et al.* (2016), found that adult animals were more prone to canine lower respiratory tract infections than young animals.

The breed wise incidence of respiratory tract infection associated with *Bordetella bronchiseptica,* was observed more in Labrador (7.14%) followed by German shepherd (5.5%), Golden Retriever (3.13%) and lowest in non-descript (2.25 %) and in Mixed (2.24%). These findings were also in accordance with the observations of Bhardwaj *et al*. (2013) where *B*. *bronchiseptica* antigen was detected in Labrador which might be due to some unknown factors associated with occurrence of infection in Labrador dogs. But workers like Uddin *et al.* (2021) found the highest prevalence of respiratory infection in Rottweiler (0.10%), Pug (20.74%) and Doberman (1.70%) respectively and the lowest in Pomeranian (4.33%) and Golden Retriever (0.50%). The difference in the breed-wise prevalence percentage from the current study and in comparison with the other authors could be attributed to the different breeds presented during the study period.

Sex-wise incidence of *Bordetella bronchiseptica* infection in dogs was found to be more in male dogs (2.11%) than female dogs. In the study of Ayodhya *et al.* (2013) and Qekwana *et al.* (2020) found that females were suffering more than that of male dogs. The higher incidence in males may be due to the higher number of male animals presented to hospital and the preference of male dogs by the pet owners.

There are reports of human infection with *Bordetella bronchiseptica* in United Kingdom (Clements *et al*., 2018), United States of America (Woolfrey and Moody, 1991).

CONCLUSION

The incidence of *Bordetella bronchiseptica* in the canine population is found to be 1.94%. The presence of agent in the canine population is necessitating the requirement of a detailed study. Canines of all age and breeds are susceptible to the agent. A detailed study is warranted for understanding the epidemiology and transmission of the agent in the population.

ACKNOWLEDGEMENTS

The authors are thankful to the Hon'ble Vice Chancellor, Central Agricultural University, Dean, College of

Veterinary Sciences and Animal Husbandry, Selesih, Aizawl, Mizoram and Principal Investigator of the project with title, Establishment of a consortium for One Health to address zoonotic and Transboundary diseases in India, including the north east region. Order no.: BT/PR39032/ ADV/90/285/2020dated06/08/202.

REFERENCES

Arsevska, E., Singleton, D.A., Jones, P.H., Smyth, S., Brant, B., Radford, A.D., Dawson, S., Noble, P.J., Priestnall, S.L. and Sanchez-Vizcaino, F. 2018. Small animal disease surveillance: respiratory disease 2017. *Vet. Rec.*, **182**(13): 369-373.

Ayodhya, S., Rao, D.T., Reddy, Y.N., Sundar, N.S. and Kumar, V.G. 2013. Epidemiological, clinical and haematological studies on canine respiratory diseases in and around Hyderabad city, Andhra Pradesh, India. *Int. J. Curr. Microbiol. Appl. Sci.*, **2**(11): 453-462.

Bhardwaj, M., Singh, B.R. and Vadhana, P. 2013. *Bordetella bronchiseptica* infection and kennel cough in dogs. *Adv. Anim. Vet. Sci.*, **1**: 1-4.

Clements, J., McGrath, C. and McAllister, C. 2018. *Bordetella bronchiseptica* pneumonia: beware of the dog! *Case Rep.*, bcr-2018.

Day, M.J., Horzinek, M.C., Schultz, R.D. and Squires, R.A. 2016. Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). *J. Small Anim. Pract.*, **57**(1): E1-E45.

Kadlec, K. and Schwarz, S. 2018. Antimicrobial resistance in *Bordetella bronchiseptica*. *Microbiol. Spectr.*, **6**(4): 1-4.

Kessie, D.K. 2021. *Characterisation of Bordetella pertussis* virulence mechanisms using engineered human airway tissue models. Bayerische Julius-Maximilians-Universitaet Wuerzburg (Germany).

Mochizuki, M., Yachi, A., Ohshima, T., Ohuchi, A. and Ishida, T. 2008. Etiologic study of upper respiratory infections of household dogs. *J. Vet. Med. Sci.*, **70**(6): 563-569.

Nafe, L.A. 2014. Dogs Infected with *Bordetella bronchiseptica* and Canine Influenza Virus (H3N8). *Today's Vet. Pract.*, **1**:30-36.

Oskouizadeh, K., Selk-Ghafari, M., Zahraei-Salehi, T. and Dezfolian, O. 2011. Isolation of *Bordetella bronchiseptica* in a dog with tracheal collapse. *Comp. Clin. Path.*, **20**(5): 527-529.

Qekwana ,D.N., Naidoo, V., Oguttu, J.W. and Odoi, A. 2020. Occurrence and predictors of bacterial respiratory tract infections and antimicrobial resistance among isolates from dog presented with lower respiratory tract infections at a referral veterinary hospital in South Africa. *Front. Vet. Sci.,* **7**: 304.

Sariga, K., Bipin, K.C., Deepa, P.M., Rateesh, R.L. and Dinesh, P.T. 2022. Molecular identification and occurrence of bordetellosis among dogs in northern Kerala. *J. Vet. Anim. Sci.*, **53**(4): 541-544.

Uddin, M.M., Talukder, H., Islam, O., Asaduzzaman, M., Das, M. and Ahsan, M.I. 2021. Magnitude of diseases in dogs vary among different levels of age, gender, breed and season: A hospital based retrospective cross-sectional study. *Heliyon.,* **7**(11).

Woolfrey, B.F. and Moody, J.A. 1991. Human infections associated with *Bordetella bronchiseptica*. *Clin. Microbiol. Rev.*, **4**(3): 243-255.