International Journal of Animal and Veterinary Advances 5(2): 58-60, 2013
DOI:10.19026/ijava.5.5577
ISSN: 2041-2894; e-ISSN: 2041-2908

Submitted: October 30, 2012 Accepted: December 21, 2012 Published: April 20, 2013

Research Article

Exposure to *Brucella canis* in Owned and Stray Dogs in Grenada, West Indies

[1]Alfred Chikweto, [1]Keshaw, P. Tiwari, [1]Sachin Kumthekar, [3]Quetin Langeois,
[3]Jeremy Gozlan, [2]Marta Lanza, [2]Tara Paterson and [1]Ravindra, N. Sharma
[1]Pathobiology Academic Program, School of Veterinary Medicine,
[2]Small Animal Medicine and Surgery Academic Program, St. George's University, P.O. Box 7,
Grenada, West Indies
[3]Ecole Veterinary Institute, Toulosue, France

Abstract: The aim of this cross sectional study was to estimate the prevalence of exposure to *Brucella canis* in owned and stray dogs in Grenada. Documentation of exposure to this important bacterial pathogen in dogs will facilitate instituting appropriate prevention and control measures and education of the public about potential zoonotic implications. Serum samples were collected from 255 stray and 204 owned dogs in Grenada from 2009 to 2011. Sera were initially screened with the rapid slide agglutination test and the positive samples further tested with 2-mercaptoethanol rapid slide agglutination test. Exposure to *B. canis* was found in 10 stray dogs but none in owned dogs.

Keywords: *Brucella canis*, dogs, seroprevalence

INTRODUCTION

Infections with *Brucella* spp have been reported worldwide in different species of domestic animals and in humans Corbel (2006). The most clinically important Brucella species, *Brucella abortus*, *Brucella melitensis*, *Brucella canis* and *Brucella suis* appear to be host specific, although infections of other animal species may occur sporadically. For example, dogs can acquire infection with *B. abortus*, *B.melitensis* or *B. suis* from ingesting aborted ruminant or swine fetuses and placental material. They can then excrete these bacteria which may present a serious hazard to humans and livestock (Acha and Szyfres, 2003).

Canine brucellosis, due to *B. canis*, was first recognized in 1966 in the USA from episodes of abortion and reproductive failure in kennels (Carmichael, 1966). Infection with *B. canis* is a significant cause of reproductive failure in dogs worldwide (Wanke, 2004). The infection localizes in the reproductive system where it characteristically causes placentitis with subsequent abortion and still births in pregnant bitches (Lopes *et al*., 2010). Typically, abortions occur in the last trimester of pregnancy. However, early embryonic deaths and resorption have been reported few weeks after mating, and may be mistaken for failure to conceive (Lopes *et al*., 2010). In male dogs, *B. canis* has been implicated in epididymitis, orchitis, poor sperm quality and loss of libido (Hollett, 2006). In most cases, many dogs remain asymptomatic and appear to be healthy, despite being infected (Behzadi and Mogheiseh, 2011).

Infection due to *B. canis* has been reported in different parts of the world. It is endemic in the Southern states of the USA and South America but sporadic in Europe and Asia (Corrente *et al*., 2010). In Africa, it has been reported in Nigeria (Adesiyun *et al*., 1986; Cadmusa *et al*., 2011). In Canada seroprevalence surveys have been undertaken in Ontario and Quebec (Bosu and Prescott, 1980; Higgins *et al*., 1979). Mosallanejad *et al*. (2009) have reported evidence of *B.canis* exposure in dogs from Iran.

The status of brucellosis in the Caribbean food animals has been reported for Trinidad (Adesiyun and Cazabon, 1996); Antigua, Cuba, Haiti, Hoduras, Jamaica, Dominican republic, Belize, Barbados and St. Kitts (Corbel, 1997); and Grenada (Stone *et al*., 2012). In dogs evidence of *B. canis* exposure has already been reported by Brown *et al*. (1982) in Trinidad. We are not aware of any other published study on *B. canis* in dogs in the other Caribbean islands including Grenada. The objective of this study was to estimate the prevalence of antibodies to *B. canis* in owned and stray dogs and to compare prevalence in the two populations of dogs.

MATERIALS AND METHODS

Peripheral blood samples from 459 dogs (204 owned and 255 stray dogs) were collected from the

Corresponding Author: Alfred Chikweto, Pathobiology Academic Program, School of Veterinary Medicine, St. George's University, P.O. Box 7, Grenada, West Indies

Table 1: Dog category and test result for RSAT and 2-ME-RSAT

		RSAT			2-ME- RSAT	
Dog type	No. Tested	Positive	Negative	No. Tested	Positive	Negative
Owned	204	5	199	5	0	5
Stray	255	14	241	14	10	4
Total	459	19	440	19	10	9

Table 2: Number of dogs tested according to parish/region and prevalence for each

Parish/region	Tested	Owned	Stray	No. positive	Prevalence (%)
St. George	286	166	120	3	1
St. David	33	5	28	0	0
St. Andrew	29	0	29	6	20.7
St. John	14	0	14	0	0
St. Patrick	6	0	6	0	0
St. Mark	58	0	58	1	1.7
Carriacou	33	33	0	0	0

parishes of the tri-island state of Grenada from 2009 to 2011.Owned dogs were part of One health-One Medicine camps held by the School of Veterinary Medicine, St. George's university. Stray dogs were captured by the Veterinary services division of Ministry of Agriculture in conjunction with the Ministry of Health of Grenada in a stray dog control program. Age, sex, breed, body condition and location were recorded for both groups of dogs. Approximately 5 ml of blood were collected by venipuncture into serum tubes and allowed to clot before centrifugation. Serum was harvested from each sample and stored at-20°C until tested. Sera were first screened with a commercial rapid slide agglutination test (RSAT, Symbiotic corporation, USA). Samples that were positive were further tested by a 2-mercaptoethanol rapid slide agglutination test (2ME-RSAT, Symbiotics corporation, USA) for detection of IgG antibodies. Testing was performed according tothe manufacturer's instructions (Symbiotics corporation, USA).

RESULTS

Four hundred fifty nine dog sera from 204 owned and 255 stray dogs were tested for antibodies against *B. canis* antigen. Out 459 samples, 14 stray dogs and 5 owned dogs tested positive for the Rapid Slide Agglutination Test (RSAT). On the subsequent test of 2- mecarptoethanol rapid slide agglutination test (2-ME-RSAT), 10 stray dogs tested positive but none of the owned dogs was positive (Table 1). Therefore, the overall prevalence calculated based on dogs that tested positive to both tests is 2.2%. There was a highly significant difference between stray and owned dogs in terms of infection or exposure to *B. canis* ($p = 0.0062$, Fishers exact test). The 10 stray dogs that tested positive were from the parishes St. George (3), St. Andrew (6) and St. Mark (1). They comprised 5 males and 5 females (Table 2).

DISCUSSION

The Rapid Slide Agglutination Test (RSAT) has high sensitivity but low specificity; it is rare for false negatives but as many as 50-60% false positives do occur (Hollett, 2006). RSAT is not definitively diagnostic since cross reaction occurs with *B. ovis*, Bordetella, Pseudomonas, Moraxella-type organisms, and other Gram-negative bacteria (Wanke, 2004). It therefore becomes necessary to retest the RSAT positive samples with a more specific test, hence the use of a subsequent 2 ME-RSAT in this study. The modified RSAT (2ME-RSAT) adds 2-Mercaptoethanol (2-ME) drops to inactivate IgM thereby increasing the specificity of the test.

Based on the criterion mentioned above, we found a prevalence of 2.2% for *B. canis*. All the positive sera were from stray dogs. A study in stray dogs in Trinidad, a neighboring island of Grenada found a prevalence of 5.3% (Brown *et al*., 1982). The difference in prevalence between Grenada and Trinidad was not significant ($p>0.05$, X^2). In the Southern states of the USA, Brown *et al*. (1976) found an overall prevalence of 5% for *B. canis* antibodies in both owned and stray dogs. Of these, 9 were stray dogs and one was a pet dog. Similar to our findings, the difference between stray and owned dogs was significant ($p<0.05$, X^2). Another study In Memphis, USA got a prevalence of 8.3% for *B. canis* and in stray dogs only but none in owned dogs (Lovejoy *et al*., 1976). This was similar to our study, though the prevalence was relatively higher than what we found. In another geographic region, south-west Nigeria, results showed that 5.46 % and 0.27 % of the dogs screened were seropositive to *B. abortus* and *B. canis*, respectively. The prevalence for *B. canis* was significantly lower than in our study. Although we only screened dogs for *B. canis*, it would be suggested to screen them for *B. abortus* and *B. melitensis* as well to determine if dogs in Grenada are also exposed to these organisms.

Although the prevalence of 2.2% we found is relatively low, there is continuous need for a stray dog control program and surveillance in owned and stray dogs. Despite this low prevalence, the potential zoonotic risk exists especially in the stray dog population in Grenada. Public health education on the danger of canine brucellosis is therefore recommended. This study has for the first time estimated the

prevalence of *B. canis* in dogs from Grenada. Future studies should focus on isolation of the organism and to determine if other *Brucella* spp are affecting dogs in Grenada.

ACKNOWLEDGEMENT

This study was supported by a grant from the small research initiative fund, St. George's University.

REFERENCES

Acha, N.P. and B. Szyfres, 2003. Zoonoses and Communicable Diseases Common to Man and Animals. 2nd Edn., Pan American Health Organization (PAHO), Washinton, DC.

Adesiyun, A.A., S.U. Abdullahi and J.B. Adeyanju, 1986. Prevalenceof*Brucella abortus*and *Brucellacanis* antibodies in dogs in Nigeria. J. Small Anim. Pract., 27: 31-37.

Adesiyun, A.A. and E.P. Cazabon, 1996. Seroprevalences of brucellosis: Q-fever and toxoplasmosis in slaughter livestock in Trinidad. Rev. Elev. Med. Vet. Pays. Trop., 49: 28-30.

Behzadi, M.A. and A. Mogheiseh, 2011. Outbreak Investigation of Brucellosis at a Kennel in Iran. Pak. Vet. J., 31: 379-380.

Bosu, W.T.K. and J.F. Prescott, 1980. A serological survey of dogs for *Brucella canis* in southwestern Ontario. Can. Vet. J., 21: 198-200.

Brown, J., J.L. Blue, E.R. Wooley and D.W. Dreesen, 1976. *Brucellacanis* infectivity rates in stray and pet dog populations. Am. J. Public Health, 66: 889-891.

Brown, J., D.W. Dreesen, R.E. Wooley, J.L. Blue and E.B. Shotts, 1982. Serosurvey for *Brucella canis* antibodies in stray dogs of North Georgia and Port of Spain, Trinidad. Caribbean J. Sci., 17: 95-105.

Cadmusa, S.I.B., H.K. Adesokana, O.O. Ajalab, W.O. Odetokuna, L.L. Perrettc and J. Stack, 2011. A seroprevalence of *Brucella abortus* and *B. canis* in household dogs in southwestern Nigeria: A preliminary report. JI. S. Afr. Vet. Ass., 82: 56-57.

Carmichael, L.E., 1966. Abortion in 200 beagles. J. Am. Vet. Med. Assoc., 149: 1126.

Corbel, M.J., 1997. Brucellosis: An overview. Emerg. Infect. Dis., 3: 213-221.

Corbel, M.J., 2006. The Disease in Animals, In: Brucellosis in Humans and Animals. WHO Press, Geneva, pp: 89.

Corrente, M., D. Franchini, N. Decaro, G. Greco, M.D. Abramo, M.F. Greco, F. Latronico, A. Crovace and V. Martella, 2010. Detection of *Brucella canis* in a dog in Italy. New Microbiol., 33: 337-341.

Higgins, R., F. Hoquet, R. Bourque and Y. Gosselin, 1979. A serological survey for *Brucella canis* in dogs in the province of Quebec. Can. Vet. J., 20: 315-317.

Hollett, R.B., 2006. Canine brucellosis: Outbreaks and compliance. Theriogenology, 66: 575-587.

Lovejoy, G.S., H.D. Carver, I.K. Moseley and M. Hicks, 1976. Serosurvey of dogs for brucella canis infection in Memphis, Tennessee. Am. J. Pub. Health, 66: 175-176.

Lopes, L.B., R. Nicolino and J.P.A. Haddad, 2010. Brucellosis-risk factors and prevalence: A review. Open Vet. Sci. J., 4: 72-84.

Mosallanejad, B., N.M. Ghorbanpoor and A.R. Mohammadian, 2009. A serological survey on *Brucella canis* in companion dogs in Ahvaz. Iranian J. Vet. Res., 10: 383-386.

Stone, D.M., S. Kumthekar, A. Chikweto, D. Thomas, K. Tiwari and R.N. Sharma, 2012. Exposure to zoonotic abortifacients among sheep and goats in Grenada. Int. J. Anim. Vet. Adv., 4(2): 113-118.

Wanke, M.M., 2004. Canine brucellosis. Anim. Reprod. Sci., 82-83: 195-207.