

Leptospirosis Within the Territory of Guam: Prevalence Among Canines¹

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Abstract

A serological survey of leptospirosis in 180 stray or abandoned dogs was conducted on Guam and revealed that the prevalence of dog serum reactivity to leptospiral antigens was unexpectedly low. Only three of the specimens examined were considered positive. One specimen was positive for both *Leptospira icterohaemorrhagiae* and *L. canicola*, and two specimens were positive for *L. icterohaemorrhagiae* only.

Introduction

Leptospirosis has been a major public health problem in many areas of the world, particularly in those areas where man's environment happens to include both abundant water and concentrations of either feral or domesticated animals. In the rice growing areas of Italy, vaccines have been used extensively to combat leptospirosis. In other areas, Hawaii for example, the use of protective clothing such as rubber boots has proven to be effective in reducing the incidence of illness from this disease.

Only one case of human leptospirosis on Guam is known to the authors; this occurred in a teenaged male living in a rural area and exposed to water buffalo (A. Loerzel, personal communication). Possible reasons for this apparent low incidence of the disease on Guam may include the absence of intensive agriculture or the lack of adequate on-island diagnostic facilities. In an attempt to evaluate the true public health significance of leptospirosis on Guam, a serological survey of local dogs was conducted.

Materials and Methods

A total of 180 stray or abandoned dogs to be euthanized by the Government of Guam Dog Pound were tested. Cardiac blood samples were collected by syringe and several drops were placed on a filter paper strip. Samples were held at room temperature until dry to destroy erythrocytes and then refrigerated until ready for shipment to the examining laboratory.

¹ The authors wish to express their appreciation to Mrs. C. Y. Chung for technical assistance in this study.

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Samples were tested by the rapid microscopic agglutination method as modified by Ryu (1970). A 1 cm² portion of a blood impregnated test strip was placed in a test tube and 1 ml of phosphate buffered saline added to return the sample to a solution. After the sample had been incubated at room temperature for 1 hour, 1 drop (approximately .07 ml) of the solution was pipetted into a well of a microscopic agglutination test plate and an equal amount of antigen was added. The antigen was prepared from 5 to 10 day old cultures of *Leptospira icterohaemorrhagiae* and *L. canicola* grown in Korthhof's medium and was diluted to contain not less than 30 organisms per field at 400X magnification.

After the serum-antigen mixture had incubated an additional 5 minutes at room temperature, a large loopful was transferred to a standard glass slide, covered with a cover slip and examined immediately at 400× magnification under dark field illumination. A positive reaction was indicated by the observation of at least one instance of swelling or clumping of organisms in each visual field.

Results

Three of 180 specimens examined were considered positive. One specimen was positive for both *L. icterohaemorrhagiae* and *L. canicola*, two specimens were positive for *L. icterohaemorrhagiae* only (see Table 1).

Table 1. Results of investigation of leptospiral agglutinin in dog sera.

| Month | Year | Number Examined | Number Positive | Serotype | |
|-----------|------|-----------------|-----------------|--|---|
| May | 1970 | 10 | 1 | <i>L. icterohaemorrhagiae</i> (++) | |
| June | | 10 | 0 | | |
| July | | 10 | 0 | | |
| August | | 10 | 0 | | |
| September | | 10 | 0 | | |
| October | | 10 | 0 | | |
| November | | 10 | 0 | | |
| December | | 10 | 0 | | |
| January | | 1971 | 10 | | 0 |
| February | | | 10 | | 0 |
| March | | | 0 | | — |
| April | | | 10 | | 0 |
| May | 10 | | 1 | <i>L. icterohaemorrhagiae</i> (++) | |
| June | 20 | | 0 | | |
| July | 0 | | — | | |
| August | 0 | | — | | |
| September | 10 | | 1 | <i>L.i.</i> (++) and <i>L. canicola</i> (++) | |
| October | 0 | | — | | |
| November | 0 | — | | | |
| December | 30 | 0 | | | |
| TOTAL | | 180 | 3 | | |

Percent positive=1.7%

Discussion

Considering the tropical environment of Guam and the average annual rainfall in excess of 80 inches which would presumably provide an ideal setting for the transmission of leptospirosis, the prevalence of dog sera reactivity to leptospiral antigens was unexpectedly low. Serological surveys in other areas have indicated a higher prevalence of the disease among canines. An earlier study by the senior author, for instance, revealed a prevalence of 12.8% positive reactors to leptospiral antigen among dogs of Taiwan (Ryu, 1970). Studies in other areas report the following prevalence of leptospirosis-positive serological reactions among canines: Fiji, 19% (Sparrow, 1970); Korea, 14.95% (Ryu and Shu, 1971); Hawaii, 39% (Alicata and Breaks, 1942); California, 34% (Meyer *et al.*, 1939); and New York, 11.8% (Meyer *et al.*, 1939).

Results of the present study suggest that the infrequency of reported human cases of leptospirosis on Guam may reflect not only a general absence of extensive occupational risk of exposure to leptospiral organisms (there is no rice or sugar cane culture on Guam, for instance) but also the probability that the prevalence of infection in the common animal reservoirs is relatively low. Available evidence suggests that leptospirosis is not, at present, a serious public health problem on Guam.

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