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Some studies on leptospirosis in Dogs in Egypt

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بسم الله الرحمن الرحيم

" قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم "

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ABSTRACT

Leptospirosis is a zoonotic disease has a worldwide distribution, stray dogs are potential carriers of the disease and contribute to the spread of infection with direct contact to other animal species. In an epidemiological study of leptospirosis in dogs in Egypt, a serological survey was carried out on 189 dogs (167 stray dogs and 22 household dogs) in different governorates (Cairo, Gharbia, Behera, Kafr El-Sheiksh and Giza) for determination of the prevalence of leptospira specific antibodies using the microscopic agglutination test (MAT) against 12 different leptospira serovars and demonstration of the most prevalent serovars. Out of the total examined serum samples, 13 were positive (10 stray dogs and 3 household dogs) with overall seroprevalence of 6.87% (the seroprevalence was 5.98% in examined stray dogs while in the examined household dogs, it was 13.63%). It was noted that the seroprevalence was higher in male dogs (10.14%) than in female dogs (3.06%) which may be attributed to the sexual habit of male dogs during the foreplay phase of mating that includes frequent licking and sniffing of female genitalia (leptospira mainly excreted via urine). It was concluded that the most prevalent Leptospira serovars were Icterohaemorrhagiae (2.11%), Canicola (1.58%), Georgia (1.58%), Pomona (1.05%), Alexi (1.05%) and Grippotyphosa (1.05%). In another study for evaluation of the efficacy of one of leptospira vaccine used in Egypt (Vanguard plus 5/CV-L), five dogs were vaccinated with primary and booster dose (after 3 weeks) and two dogs kept as control. Blood samples were collected from these dogs before primary vaccination, 3 weeks after primary vaccination (the time of the booster dose) and in monthly interval for four months after booster dose, for monitoring of leptospia serovars (Icterohaemorrhagiae and Canicola) specific antibodies titers by quantitative microscopic agglutination test (MAT). Considering serovar Icterohaemorrhagiae, all serum samples collected before vaccination were negative for antibodies while the mean antibody titer three weeks after primary vaccination was 400 which increased gradually till reaching mean titer of 9640 at the fourth month after the booster dose. Considering serovar Canicola, all serum samples collected before vaccination were negative for antibodies while the mean antibody titer at three weeks after primary vaccination was 480 which increased gradually till reaching mean titer of 8960 at the fourth month after the booster dose. From the result of this study it could be concluded that the dogs which were vaccinated with Vanguard plus 5/CV-L vaccine showed good immunological response against 2 serovars of Leptospira (Icterohaemorrhagiae and Canicola) over 5 months after giving 2 doses (primary and booster doses) so that this vaccine can control the two types of leptospirosis infection in dogs in Egypt.

Key words: Leptospirosis, Leptospira serovars, Stray dogs, MAT, Vanguard plus, Prevalence

Dedication

Dedicated to:

My Mother,

And My Family.

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LIST OF ABBREVIATION

µL	Micro liter
C	Canicola
Egy.Vet.Hos	Egyption Veterinary Hospital
ELISA	Enzyme Linked Immunosorbant Assay
EMJH	Ellinghausen–McCullogh-Johnson–Harris medium
Gram.	Gram Stain
Gripp.	Grippotyphosa
H.H	House hold
I/M	Intra Muscular
Ictero	Icterohaemorrhagiae
L.	Leptospira
MAT	Microscopic Agglutination Test
ML	Milliliter
OIE	Office International des Epizootics
PBS	Phosphate buffer saline
S/C	Subcutaneous
Spp.	Species

1. INTRODUCTION

Dogs considered one of the important pets, owing to see an increasing scale in keeping and raising them. Breeding dogs are increasingly spreading among the different social standards in Egypt. Also stray dogs in Egypt represent a very important problem because of the increasing number, the difficulty to treat and vaccinate them as well as the possibility for transmitting infectious diseases to other animal and human being. Therefore we planned to study one of the important bacterial diseases named leptospirosis.

Leptospirosis is a zoonotic disease has a worldwide distribution, but is most common in developing countries and warm climates where contact with infected animals or water contaminated with their urine **(Forbes *et al.*, 1998).**

Leptospirosis is an acute, febrile, systemic disease affects man and animals caused by serologically distinct pathogenic members of family *leptospiraceae*. One species of *leptospira* interrogans containing over 212 two-hundred twelve serovars arranged in 23 serogroups **(Coetzer *et al.*, 1994).**

Domestic animals in contact with reservoir rodents or the contaminated urine of infected animals may acquire the infection; the rate of transmission between mammals by indirect contact largely depends upon those environmental conditions that favor the survival of leptospires **(Hookey, 1991).**

Stray dogs housed at private shelters are potential carriers of leptospirosis and contribute to the spread of infection of leptospirosis due to direct contact with other animal species, by the habit of scavenging garbage and hunting in search of food, drinking and contaminating standing water, smelling other animals' urine, licking female genitalia and sexual act itself.

Leptospira are most important for dogs. They are reservoir hosts that serve as a potential source of infection and illness for human and other incidental animal hosts. Young animals are more severely affected than adult **(Greene *et al*., 2006).**

Infection on adult dogs with leptospires results in illness of varying severity depending on infecting strain, geographical location and host immune response. Some dogs display mild or no signs where other develops severe illness or even death as a result of renal injury.

In general veterinarians should suspect leptospirosis in dogs with signs of renal or hepatic failure, ureitis, pulmonary hemorrhage, acute febrile illness or abortion **(Weese *et al.*, 2011).**

The definitive diagnosis of leptospirosis is based on demonstrating leptospira in the suspected samples and upon serological finding **(Dacres, 1963)**.

The staphylococcal protein A (SPA) also used for detection of antibodies against leptospirae in domestic animals **(Biancifiori and Cardaros, 1983).** However the microscopic agglutination test (MAT) is still the standard reference procedure for serological diagnosis of leptospirosis and classification of leptospira in man and animals **(Jung *et al.*, 2008).**

ELISA has been used in dogs to detect IgG or IgM to leptospirosis, although both types of antibodies can cause agglutination. The ELISA is better suited to distinguish between natural infection and vaccine induced immunity **(Greene *et al*., 2006)**.

Currently vaccines containing serovars Icterohaemorrhagiae, Grippotyphosa and Pomona are available in North America for prevention of canine leptospirosis.

Bivalent vaccines containing Icterohaemorrhagiae and Canicola are available in other geographic locations including North America, Europe, South Africa and Australia.

An ideal leptospiral vaccine would prevent or minimize bacteraemia and consequently would prevent renal and fetal infection **(Bolin *et al.*, 1989 and Bolin, 1990).**

In a view of the treatment of leptospirosis **Smadel (1963), Khairani – Bejo *et al.*, (2006)** concluded that penicillin, streptomycin, aurecomycin and terramycin are effective prophylactic agent but relatively ineffective therapeutic agent on infected animals .The recommended treatment is doxycycline **(Weese *et al.*, 2011)**.

Aim of the work:

The present study was designated to investigate the epidemiological status of leptospirosis in dogs in Egypt. This aim was carried out through examination of stray dogs in different localities in Egypt to determine incidence of leptospirosis. To fulfill such target MAT test was carried out.

The study also discussed the efficiency of one of the available vaccine against leptospirosis in dogs in Egypt.

2. REVIEW OF LITERATURES

2.1. Classification and nomenclature of leptospira :

Weil (1886) was the first scientist who published a comprehensive description of leptospiral infection. He provided a detailed clinical picture with the differential diagnosis of the infectious jaundice syndrome in man. He could also separate it from other similar infection that was characterized by fever, hepatomegaly, splenomegaly, jaundice and petechial hemorrhages. Moreover, he mentioned that, the icteric leptospirosis syndrome associated with renal failure.

Goldenschmidt (1887) termed leptospirosis by Weil's disease, He designated this form of infectious jaundice that was studied by Weil. Since then, Weil disease was considered a universal term for leptospirosis; an event that happened 30 years before the discovery of the etiologic agent.

Cockayne (1912) found that Weil's disease could be due to contamination of food and water. He claimed that this disease was directly related to the surrounding area of the Mediterranean Sea.

Wolbach and Binger (1914) succeeded to isolate saprophytic leptosira for the first time from a fresh water pond in Massachusetts, U.S.A. They also gave a clear morphological microscope description of this agent which they named *Spirochaeta baiflex*.

The isolation of pathogenic *leptospira* was first held in Japan 1916 by **Inada *et al.,*** in a liver tissue of a Guinea pig injected with the blood of a patient suffering from Weil's disease, this organism was named *Spirochaeta Icterohaemorrhagiae*. In the same year **Ido *et al.,* (1916)** isolated the mentioned virulent organism from the kidneys of rats in Japan. Afterwards, they recommended the disinfection of the ground and removal of the stagnant water as a preventive measure against the transmission of infection.