A SURVEY OF PARASITE PATHOGENS IN STRAY DOGS FROM PUDU PASAR AND CHOW KIT AREA OF KUALA LUMPUR

PREMAALATHA B.[1]*, CHANDRAWATHANI P.[2], JAMNAH O.[1], ZAINI C.M.[1], MARIAPPAN C.[3], RAMLAN M.[2], LOSHENI S.[4] AND BANUMATHY G.[4]

1 Veterinary Research Institute, 59 Jalan Sultan Azlan Shah, 31400 Ipoh, Perak
2 Department oBabesiajinary Services, Putrajaya , Kuala Lumpur
3 Department of Health and Environment, Kuala Lumpur Municipal Council, Kuala Lumpur
4 Faculty of Veterinary Medicine, Universiti Putra Malaysia, Selangor Darul Ehsan
* Corresponding author: princess_latha2280@yahoo.com

ABSTRACT. Stray dogs are carriers of several zoonotic diseases such as leishmaniasis and canine monocytic ehrlichiosis (CME) as a result of poor nutrition, low hygienic conditions and lack of veterinary care. Thus, the Veterinary Research Institute (VRI) conducted a survey to determine the parasite pathogens such as blood protozoans, gastrointestinal parasites and ectoparasites in stray dogs with the collaboration of the Kuala Lumpur City Council Pest Control Unit. Skin, organ, faecal and blood samples were analysed and results indicate that *Babesia canis*, *Babesia gibsoni*, *Ehrlichia canis*, *Hepatozoon canis* and microfilaria of *Dirofilaria immittis* are the common parasites species found in the blood and organ samples in 2014. The faecal floatation technique showed the presence of helminth ova such as *Trichuris, Ancylostoma* and *Toxocara* species. All skin samples were positive for *Rhipicephalus sanguineus* ticks. As strays are closely linked to human habitats such as market and housing areas, it is vital that stray population control is strategically implemented to safeguard these common zoonotic infections from spreading to humans.

Keywords: stray dog, parasites, urban areas, Kuala Lumpur, pathogens

INTRODUCTION

Dogs are competent reservoir hosts of several zoonotic agents and in developing countries pose new concerns for public health (Otranto *et al*., 2009). In 2014, a study on the prevalence of gastrointestinal (GI) parasites in dogs and cats from rural areas was conducted whereby a total of 105 fresh faecal samples were collected. There were 14 different GI parasites species (nematodes, cestodes and protozoa) detected, including *Ancylostoma* spp. (62.9%), *Toxocara* spp. (32.4%), *Trichuris vulpis* (21.0%), *Spirometra* spp. (9.5%), *Toxascaris leonina* (5.7%), *Dipylidium caninum* (4.8%), *Ascaris* spp. (2.9%), *Hymenolepis diminuta* (1.0%) and others. General prevalence of GI parasites showed a significant difference between helminth (84.4%) and protozoan (34.3%) infections (Romano Ngui *et al*., 2014). In another study conducted by VRI, 29 stray and 38 pet dogs were tested for parasite infection and the results showed a higher percentage of stray dogs infected (76%) with parasites compared to pet dogs (16%)

from government veterinary clinics (Erwanas *et al*., 2014). A total of 103 blood samples from pet dogs around Ipoh were screened for common blood protozoa and 14 were positive for *Erhlichia canis* and one positive sample for microfilaria of *Dirofilaria immitis* (Jamnah *et al*., 2016). Previous results from the monitoring of blood parasites in pet dogs and cats showed that these animals harbor *B. gibsoni*, microfilaria of *Dirofilaria immitis*, *Ehrlichia canis*, *Anclostoma* sp., *Ascaridia* sp., *Toxocara* sp. and *B. canis* (Veterinary Research Institute, n.d.). The aim of this study is thus, to determine the presence of common parasitic pathogens in stray dogs from suburban areas especially identifying zoonotic agents from dogs. This will facilitate control programmes of zoonotic disease carried by stray dogs with special reference to parasitic diseases.

MATERIALS AND METHOD

Animals and samples

Stray dogs were caught from the streets and kept in the shelter for adoption for 7 days before putting them to sleep. A total of 20 stray dogs, made up of 10 females and 10 males, were caught around Pasar Pudu and Chow Kit areas in Kuala Lumpur and then autopsied.

Laboratory tests

Faecal samples were screened microscopically by floatation method using saturated sodium chloride solution to identify helminth eggs. Blood samples were collected in the EDTA tubes and the samples were subjected to thin blood smear examination and buffy coat examination. Skin scrappings and tick specimens were examined microscopically. Ectoparasite detection and skin scrappings were processed according to the Manual of veterinary investigation: laboratory techniques (Davis E.T. and Great Britain, 1978). Faecal samples were subjected to floatation technique while thin blood smear examination was conducted on blood samples. The spleen was examined by impression smear to detect for blood protozoa in the tissues (Christopher *et al*., 1992).

RESULTS AND DISCUSSION

Table 1 shows that out of 20 blood and organ samples, 16 dogs samples were found positive for common parasites such as *Babesia canis*, *Ehrlichia canis*, *Babesia gibsoni, Hepatozoon* sp. and microfilaria of *Dirofilaria immittis*. Examination of faecal samples showed positive for eggs of *Trichuris* spp. (3/20), *Ancylostoma* spp. (17/20) and *Toxocara canis* (2/20). Spleen samples were taken to identify blood protozoans and the results were positive for *Babesia canis* (1/20), *Ehrlichia canis* (9/20) and *Hepatozoon canis* (1/20). From the blood samples, the dogs were positive for *Babesia gibsoni* (1/20), *Babesia canis* (2/20), *Ehrlichia canis* (6/20) and microfilaria species (2/20). All of the 20 dogs were positive for *Rhipicephalus sanguineus* tick from skin samples. Parasites from dogs that were port-mortemed are shown in Figures 1 to 7.

In the context of current global political and economical crisis, stray dogs

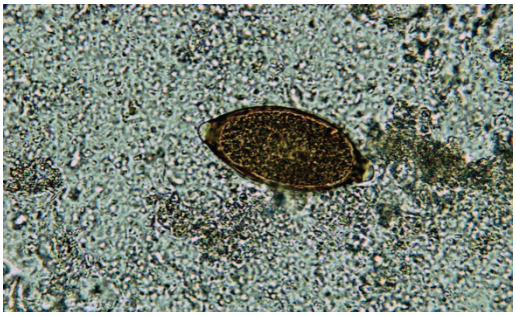

Figure 1. *Trichuris* spp. egg

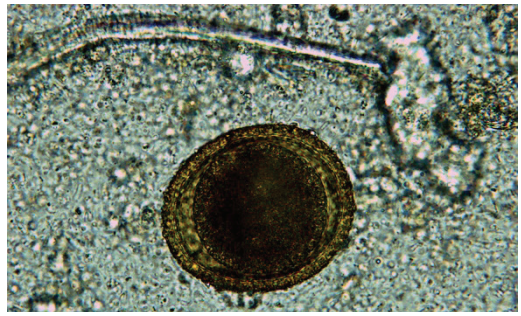

Figure 2. *Toxocara canis* egg

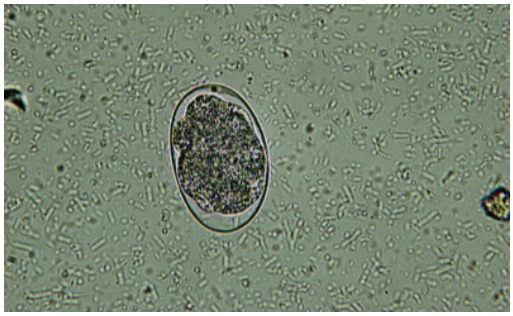

Figure 3. *Ancylostoma spp.* egg

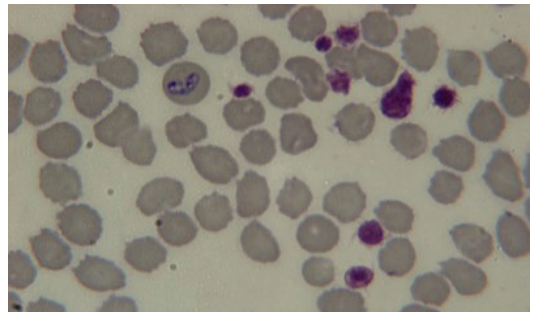

Figure 4. *Babesia canis* in blood

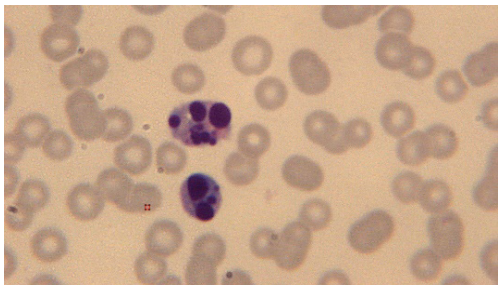

Figure 5. *Ehrlichia canis* in blood

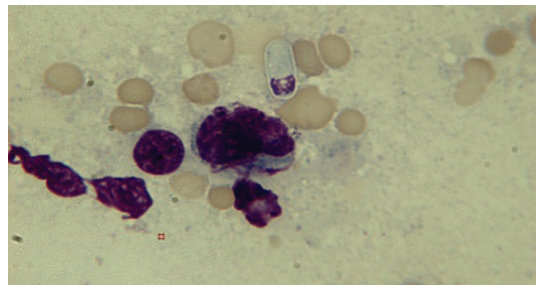

Figure 6. *Hepatozoon canis* in spleen

Figure 7. *Dirofilaria immitis* from heart sample

Table 1. Number of male and female stray dogs (%) infected by endoparasites and ectoparasite in faeces, spleen, blood and skin samples. Total number of dogs examined was 20.

Endoparasites/Ectoparasites	Samples	Number of dogs (%)		
		Male	Female	Total
Trichuris spp. egg	Faeces	10 (2)	10 (1)	20 (3)
Ancylostoma spp.egg	Faeces	10 (10)	10 (7)	20 (17)
Toxocara canis egg	Faeces	10 (2)	10 (0)	20 (2)
Babesia canis	Spleen	10 (0)	10 (1)	20 (1)
Ehrlichia canis	Spleen	10 (5)	10 (4)	20 (9)
Hepatozoon canis	Spleen	10 (0)	10 (1)	20 (1)
Babesia gibsoni	Blood	10 (0)	10 (1)	20 (1)
Babesia canis	Blood	10 (1)	10 (1)	20 (2)
Ehrlichia canis	Blood	10 (5)	10 (1)	20 (6)
Microfilaria (Dirofilaria immitis)	Blood	10 (2)	10 (0)	20 (2)
Rhipicephalus sanguineus	Skin	10 (10)	10 (10)	20 (20)

have become the potential reservoirs of many zoonotic parasites around the world (Otranto *et al.,* 2017) which reflects a significant public health concern. The results of the current study provided an insight into the potential zoonotic parasites harbored by the strays dogs in a domestic environment.

Based on the microscopic examination, a total of three species of helminth eggs were found in the faecal samples. They were of *Ancylostoma* spp. (17%), *Trichuris* spp. (3%), and *Toxocara canis* (2%). These findings are in agreement with a study conducted in the Klang Valley in which 87.6% of the faecal samples collected contains helminth eggs with hookworm or *Ancylostoma* spp. having the highest occurrence at 53.3% (Tun *et al.,* 2015).

From the blood and organ samples collected, 16 out of 20 dogs tested were found to carry common parasites such as *Ehrlichia canis* (15%), *Babesia canis* (3%), microfilariae of *Dirofilaria immitis* (2%), *Babesia gibsoni* (1%) and *Hepatozoon canis* (1%). This was in accordance with the previous study conducted in Assam and north-east India which stated that microscopic examination of stray dogs revealed 63.64% haemoparasite infection (Bhattacharjee K. and Sarmah P.C., 2013). A study carried out over 25 years ago by Rajamanickam *et al*. (1985), the prevalence rate of *Ehrlichia canis* in dogs was just 0.2%. However, its prevalence had significantly increased to 15%, in a recent study in Perak state, Malaysia (Nazari *et al.,* 2013).

Based on the skin samples, all stray dogs were found to be carrying *Rhiphicephalus sanguineus*, an ectoparasite quite common in strays. According to a recent study by Erwanas *et al.* (2014), 14 out of 29 stray dogs tested in 2013 showed positive results for endoparasites and/or ectoparasites where the most frequently detected ectoparasite in stray dogs was *Rhiphicepalus sanguineus*. Another study in Kuala Lumpur reported that the most common tick found in stray dogs was *Rhiphicephalus sanguineus* (98.36%), followed by *Haemaphysalis* sp. (1.64%) (Anurddin *et al.,* 2010).

CONCLUSION

It is clear from this study that the common parasites in dogs were *Ancylostoma* spp, *Trichuris* spp, *Toxocara canis*, *Babesia canis, Babesia gibsoni, Ehrlichia canis*, Microfilaria sp. And Hepatozoon canis. The zoonotic parasites which could cause diseases in humans are *Ancylostoma* spp., *Toxocara canis, Ehrlichia canis* and *Trichuris* spp.

Zoonotic infections in stray dogs pose a serious threat to humans as the dogs are be found roaming around housing areas, markets and public parks. Infections such as helminthiasis and ectoparasites may infect humans sub-clinically, and affect the immune system. This condition may put humans at risk to other more serious infections such as dengue and Zika especially in mosquito endemic areas. The current emergence of rabies in dogs makes it crucial to educate the public on the concurrent diseases that stray dogs carry where several of these are zoonotic. It is vital therefore to control stray animal populations. All parties such as the veterinary providers, municipal councils and the general public can be an integral part to do this by understanding the common infections in dogs. As such, regular surveys is recommended to elucidate the current needs and problems associated with stray dogs in Malaysia.

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