

STUDY OF PROTOZOAN DISEASES IN PET DOGS AT DISTRICT VETERINARY HOSPITAL, BALAGHAT, (M.P.)

Durgesh Tembhre
Research Scholar Zoology
Swami Vivekanand University Sagar (M.P.)

ABSTRACT :- Protozoan infections in animals are responsible for significant losses of production and many protozoan parasites are of zoonotic importance. Among various parasitic infections, several protozoan parasites cause severe morbidity and mortality in animals and thus affect the economy of livestock in tropical and sub-tropical regions including India. A study was conducted to investigate the prevalence of protozoan diseases of 272 sick pet dogs submitted to the District Veterinary Hospital (DVH), Balaghat during the two years period from January, 2023 to December, 2023. A total 7 types of protozoan diseases were identified in only 61 dogs and their variation in prevalence were analyzed on the basis of age and sex. The overall prevalence of protozoan diseases of pet dogs in the study area was observed 22.42%. The highest prevalence (%) of the diseases was found as Giardiasis (42.62%) followed by Amoebiasis (26.23%), Coccidiosis (14.75%), Balantidiasis (9.84%), Toxoplasmosis (3.28%), Babesiosis (1.64%) and Leishmaniasis (1.64%). Age-wise highest cumulative prevalence (%) of protozoan diseases was identified in age group above 1 year (54.10%), compare to that in less than or equal to 1 year (45.90%) age groups of pet dogs. On the other hand, sex-wise overall cumulative prevalence (%) of the diseases of dog was noticed in the female (55.74%) than male (44.26%). Results of this study revealed that the protozoan disease problems of dogs may be high in Balaghat district and it also showed that people of this district does not follow scientific method of dogs rearing.

KEYWORDS:- Prevalence, Protozoan diseases, Domestic animals, Balaghat district (M.P.).

INTRODUCTION:-

Protozoa are unicellular, eukaryotic, microscopic organisms belonging to subkingdom protozoa. They are characterized by having a distinct nucleus as well as

endoplasmic reticulum, Golgi apparatus and mitochondria in the cytoplasm. About 65000 species of protozoa have so far been identified majority of which are free-living, while only 7000 protozoan species are parasitic both in vertebrate and invertebrate animals (Levine ND; 1985). Protozoan parasites are considered one of the major constraints causing extensive morbidity and mortality in animals (Knox DP; 2010). Among these many of the protozoan parasites are zoonotic in nature that also increases their economic importance. At present, no vaccine for human protozoal disease is available; however, several veterinary vaccines are marketed with varying efficacy (Meeusen et.al; 2007).

Dog is very intelligent animal and can easily understand the psychology of a person. Among all the domestic animals, dogs appeared on the earth about 20 million years ago (Sharma et al., 2008). Their pleasing disposition, cooperative behavior, and natural instinct for affinity with human beings were the reasons for choosing them as domestic animals companionship. It is used in the defense department to detect enemy arms and position and in the police department it is used to detect crime (Rahman, 1988). Since pet share the same environment with humans, they constitute an important reservoir of zoonotic diseases (Kornblatt and Schantz, 1980). Household pets have been found to play a direct role in transmitting zoonosis (Dada et al., 1979; Kornblatt and Schantz, 1980). Review of literatures revealed that at least 36 important zoonotic diseases are acquired from dogs worldwide, although the occurrence of some important zoonotic diseases acquired from dogs have reported but the inland reports on this aspect are very limited (Samad, 2011). Domestic dogs pose a significant risk as reservoirs for infectious diseases, especially for wild canids (Bronson et al., 2008). In the absence of vaccination, a reservoir of susceptible animals remains vulnerable to new disease introductions (Levy et al., 2008). In rural areas of Balaghat very few people keep dog as a pet animal but in urban areas dog

Impact Factor- 5.991

rearing is getting popularity day by day. But they have limited knowledge about scientific rearing system of dog. For this reason they are affected with different zoonotic diseases and cause public health hazard. Some reports on incidence of diseases and disorders encountered in dogs at Central Veterinary Hospital, (Rahman, 1988) and a case control study was conducted to ascertain the prevalence of clinical diseases of sick pet dogs presented to the central Veterinary Hospital, (Tarafter and Samad, 2010). But there was no study conducted in District Veterinary Hospital, Balaghat. However, the objective of present work was to determine the prevalence of protozoan diseases in pet dogs in Balaghat district (M.P.).

MATERIALS & METHODS:-

Balaghat is a city and a municipality in Balaghat district in the state of Madhya Pradesh, India. It is the administrative headquarters of Balaghat District. The town was originally called “Burha”, but this name was replaced by “Balaghat”, which was originally the name of the district only. Balaghat means “above the ghats or passes.” In bollywood, there are two gems which are from balaghat. Firstly, Mushtaq khan a television actor, they are from baihar tehsil of balaghat. Secondly, Anil munge a television actor, they are from properly Balaghat city. Balaghat District is located in the southern part of Jabalpur Division. It occupies the south eastern portion of the Satpura Range and the upper valley of the Wainganga River. The district extends from 21°19' to 22°24' north latitude and 79°31' to 81°3' east longitude.

Experimental animals-

This research work was conducted at the District Veterinary Hospital (DVH), Balaghat on the clinical cases of pet dogs during the period from January, 2023 to December, 2023. During two years study period, a total of 272 case of sick pet dogs were studied which were brought for treatment at the DVH, Balaghat. Only 61 dogs were infected by protozoa among 272 sick dogs. Date, age, sex, breed and complaint of the owner of all studied pet dogs were noted in the registered book. All this information and data were collected from the disease register book of the DVH, Balaghat.

Experimental animals

This research work was conducted at the District Veterinary Hospital (DVH), Balaghat on the clinical

cases of pet dogs during the period from January, 2023 to December, 2023. During one years study period, a total of 272 case of sick pet dogs were studied which were brought for treatment at the DVH, Balaghat. Only 61 dogs were infected by protozoa among 272 sick dogs. Date, age, sex, breed and complaint of the owner of all studied pet dogs were noted in the registered book. All this information and data were collected from the disease register book of the DVH, Balaghat.

Postmortem Examination-

Post mortem examinations of dead pet dogs submitted either at the DVH or FDIL, Balaghat was done to record gross pathological changes. The samples were collected and sent to Central Disease Investigation Laboratory (CDIL), Dhaka for the diagnosis to be confirmed. The interpretations were then recorded.

Statistical analysis-

The prevalence of infection for each protozoan disease was calculated as the number of positive samples divided by the total number of samples infected among the total number of dog tested and expressed as percentage. All analyses were performed with standard software (SPSS, version 13.0, SPSS Inc, Chicago, III).

RESULTS AND DISCUSSION:-

Prevalence (%) of protozoan diseases of pet dogs is shown in Table 2. The highest prevalence of protozoan diseases in dog was observed as Giardiasis (42.62%) followed by Amoebiasis (26.23%), Coccidiosis (14.75%), Balantidiasis (9.84%), Toxoplasmosis (3.28%) and both Babesiosis and Leishmaniasis (1.64%). The overall prevalence of protozoan diseases in dogs was 22.42%. Similar study was observed by Gare daghi Yagoob (2014) where he observed the overall prevalence of intestinal protozoan parasites of dog was 19 %. He also showed that the prevalence of Giardia spp of dog ranked the highest percentage (9%) followed by Isospora spp (7%) and Cryptosporidium spp (6%). Similar study was also found by Mohammad Mirzaei (2010) where he reported that the overall prevalence of parasitism was 13 (13.26%) dogs among 98 stool samples. The parasites most frequently detected were: Giardia spp (7.14%), Isospora spp. (5.1%) and Cryptosporidium spp (4.08%). There have many studies of the general prevalence of intestinal protozoan parasites in dogs population worldwide (Dubna et al., 2007; Little et al., 2009;

Impact Factor- 5.991

Mundim et al., 2007; Oliveira-Sequeira et al., 2002; Palmer et al., 2008; Papazahariadou et al., 2007; Ramirez-Barrios et al., 2004; Rimhanen-Finne et al., 2007).

The highest prevalence was reported as Giardiasis (42.62%) in our study area. Similar study was noticed by Papini et al. (2005) and Szenasi et al. (2007) where they found that the overall prevalence of Giardia infection was 55.2% and 58.8% in kennel dogs respectively. But it was observed that the overall prevalence of this parasite has been reported in Brazil 12.2% (Oliveira-Sequeira et al., 2002), in Australia 9.4% (Palmer et al., 2008). The variable prevalence may be attributed to climate conditions (Mohammad Mirzaei, 2010). Age-wise and sex-wise cumulative prevalence (%) of protozoan diseases in dog are shown in Table 3. The highest prevalence of the diseases in dog was observed in the age of >1 year (54.10%), followed by ≤ 1 year (45.90%). Higher rate of Giardia infection was found in younger dog (22.95%) than older dog (19.67%). Coccidiosis was observed most common in younger animal (9.84%) than older animal (4.92%). But the prevalence of Amoebiasis and Balantidiasis was reported as higher in > 1 year of age than ≤ 1 year of age (Table 3). The study supported by Ramirez-Barrios et al.

(2004); Visco et al. (1977) and Vanparijs et al. (1991) where they reported that the coccidia were the main intestinal protozoa found in the pet dogs, mostly in younger animals. Similar results were also obtained by Vanparijs et al. (1991). Coccidiosis is a cause of haemorrhagic diarrhea in young immuno-comprised dogs, which appears to be prevalent to all age groups of dogs (Tarafder and Samad, 2010). Comparatively higher prevalence rate of canine coccidiosis has been reported elsewhere (Nisar et al., 2009). Giardia has been also reported to be found in up to 39% of fecal samples from pet and shelter dogs, with a higher rate of infection in younger animals (The Merck Manual for pet health, edition July 2011) which was supported to the present study. But the prevalence of both Babesiosis and Leishmaniasis was 0% in ≤ 1 year of age and 1.64% in >1 year of age (Table 3) that was supported by Tarafder and Samad (2010) where they reported that higher rate of Babesiosis was observed in older dog (above 36 months of age) than younger dog (7 to 36 months of age) but none in the age group below 6 months old groups, and which were confirmatory to the earlier reports (Samad, 2008). However, the higher prevalence rate of Canine Babesiosis has been reported elsewhere (Kumar et al., 2009; Wu et al., 2009; Amuta et al., 2010).

Table 1. Recommended procedures for the diagnosis of protozoa of the dog

Organism	Stage	Procedure
<i>Balantidium Coli</i>	Trophozoites Cysts D	Direct smear Zinc sulfate centrifugation flotation technique
<i>Coccidia (Toxoplasma, Isospora, Cryptosporidium)</i>	Oocysts	Sheather’s sugar centrifugation flotation technique
<i>Entamoeba histolytica</i>	Trophozoites Cysts D	Direct smear
<i>Giardia sp</i>	Trophozoites Cysts D	Direct smear, occasionally seen on flotation Direct smear, zinc sulfate centrifugation flotation technique

Table 2. Prevalence of protozoan diseases of pet dogs in District Veterinary Hospital, Balaghat

Name of the Diseases	No. of total animal	No. of positive sample	Prevalence (%)
<i>Amoebiasis</i>	61	16	26.23
<i>Giardiasis</i>	61	26	42.62
<i>Coccidiosis</i>	61	09	14.75
<i>Balantidiasis</i>	61	06	9.84
<i>Toxoplasmosis</i>	61	02	3.28
<i>Leishmaniasis</i>	61	01	1.64
<i>Babesiosis</i>	61	01	1.64
Total		61	100

Table 3. Age-wise and sex-wise cumulative prevalence (%) of protozoan diseases of dog

Name of the Diseases	≤ 1 year No (%)	>1 year No (%)	Total No (%)	Male No (%)	Female No (%)	Total No (%)
Amoebiasis	5(8.20)	11(18.03)	16(26.23)	9(14.75)	7(11.48)	16(26.23)
Giardiasis	14(22.95)	12(19.67)	26(42.62)	10(16.39)	16(26.23)	26(42.62)
Coccidiosis	6(9.84)	3(4.92)	9(14.75)	4(6.56)	5(8.20)	9(14.75)
Balantidiasis	2 (3.28)	4(6.56)	6(9.84)	2(3.28)	4(6.56)	6(9.84)
Toxoplasmosis	1(1.64)	1(1.64)	2(3.28)	1(1.64)	1(1.64)	2(3.28)
Leishmaniasis	0(0.00)	1(1.64)	1(1.64)	1(1.64)	0(0.00)	1(1.64)
Babesiosis	0(0.00)	1(1.64)	1(1.64)	0(0.0)	1(1.64)	1(1.64)
Total	45.90	54.10	100	27(44.26)	34(55.74)	61(100)

The highest prevalence of protozoan diseases in dog was observed in the female (55.74%) than male (44.26%) (Table 3). Higher rate of giardia, coccidia and balantidia infections was observed in female (26.23%, 8.20% and 6.56% respectively) than male (16.39%, 6.56% and 3.28%), respectively. But prevalence of amoebiasis was found as higher in male dog (14.75%) than female dog (11.48%) (Table 3). Similar results were also found by Mohammad Mirzaei (2010) where he reported that the giardia and coccidia infection was higher in female than male. Prevalence is variable and depended on a number of factors including age, living conditions, diagnostic methodology employed and region studied (Mundim et al., 2007). It may be attributed to climate conditions and management of pet animals rearing.

The highest prevalence of diseases and/or conditions was tick infestation (11.88%) followed by flea infestation (9.84%), ancylostomiasis (6.20%), diarrhea (5.21%), dermatitis (4.99%), echinococcosis (3.92%), mange (3.76%), aspiration pneumonia (3.32%) and dermatomycosis (3.30%). They also reported that the prevalence of protozoan diseases (only Coccidiosis and Babesiosis) was 2.02%. They showed that diarrhea (5.21%) is not a disease itself but rather a symptom which was recorded in 191 pets among 3670 sick dogs; there are many causes of diarrhea but protozoan infection is one of the main causes. Tarafder and Samad (2010) was also observed that age-wise overall prevalence of clinical diseases revealed highest in older dogs that was in age group above 36 months (48.12%) compared to that in 7 to 36 months (34.33%) and up to 6 months (17.55%) age groups of pet dogs that was supported to the present study. Rahman (1988) observed highest prevalence rate of diseases of dog recorded in above 3 years of age groups (53.33%). In another study, he considered stray dogs in Bangladesh to be an

important disseminator of zoonotic parasitism. The infective stages of protozoan parasites are cysts and oocysts passed in the faeces and are capable of prolonged survival in the environment. Infection and re-infection of human, domestic animals or wildlife can occur when the cysts or oocysts are ingested via contamination water, food materials or through host to host (Leonhard et al., 2007). Frequency of protozoan parasites in the studied dogs was high. Giardia spp, Entamoeba spp and Coccidia spp were the most frequent parasites found in the study area.

CONCLUSION :-

Present study is concluded that the overall prevalence of protozoan diseases in pet dogs in Balaghat district was high (22.42%). It was probable due to climatic condition and mismanagement of dog rearing. The prevalence of giardiasis (42.62%) was the highest among all the protozoan diseases. It was may be due to malabsorption, unhygienic kennel and mismanagement. Coccidiosis was most commonly observed in younger dog which may be due to age-factor, poor sanitation, poor nutrition and overcrowding/ stress. High rate of Entamoebia infection was found in this flood affected/disaster prone area which may be due to ingestion of infected food and water. The prevalence of protozoan diseases was observed higher in the age of >1 year (54.10%) than in the age of ≤ 1 year (45.90%). Female dogs showed the highest prevalence of diseases (55.74%) whereas male showed less (44.26%). That variances was probably due to variation in number of the animal’s management factors of the owner. The study noticed that the dogs are reservoirs for zoonotic protozoan parasites and should be considered important to public health. Dogs may have an important role in the transmission of some diseases. So, preventive measures against intermediate host should be

taken to prevent the transmission of protozoan diseases including vaccination program, sanitation measures and public awareness. This should be combined with more government intervention on regulations and policies in the area in order to limit the risk of contaminating the vegetation, and thus decreases both human infection and the animal reservoir.

REFERENCES :-

1. Amuta EU, Alu BO, Houmsou RS and Ayashar JG (2010). Rhipicephalus sanguineus infestation and Babesia canis infection among domestic dogs in Makurdi, Benue State-Nigeria. International Journal Academic Research 2: 170 – 172.
2. Bronson E, Emmons LH, Murray S, Dubovi EJ and Deem SL (2008). Serosurvey of pathogens in domestic dogs on the border of Noel Kempff Mercado National Park, Bolivia. Journal of Zoo and Wildlife Medicine 39: 28-368.
3. Claerebout E, Casaert S, Dalemans AC, De Wilde N and Levecke B (2009). Giardia and other intestinal parasites in different dog populations in Northern Belgium. Veterinary Parasitology 161: 41-46.
4. Dada BJO, Adegboye DS and Mohammad ANA (1979). A survey of gastrointestinal parasites of stray dogs in Zaria Negeria. Veterinary Record 104: 145-146.
5. Disorders caused by protozoa in the digestive systems of dog. The Merck Manual for pet health, (edition July 2011).
6. Dubna S, Langrova I, Napravnik J, Jankovska I and Vadlejch J (2007). The prevalence of intestinal parasites in dogs from Prague, rural areas and shelters of the Czech Republic. Veterinary Parasitology 145: 120-128.
7. Garedaghi Y (2011). Seroprevalence of Neospora Caninum in Stray Dogs. American Journal of Animal and Veterinary Sciences 6: 100-104.
8. Garedaghi Y and Karimi B (2014). Prevalence of intestinal protozoan parasites in stray dogs of Tabriz city, Iran. Indian of Fundamental and Applied Life Sciences 4: 20-24.
9. Knox DP. Parasite vaccines: Recent progress in and problems associated with their development. Open Infectious Diseases Journal. 2010; 4:63-75.
10. Kornblatt AN and Schantz PM (1980). Veterinary and public health considerations in canine roundworm control. A survey of practicing veterinarians. Journal of American Veterinary Medical Association 195: 1212-1215.
11. Kumar KS, Vairamuthu S and Kathiresus D (2009). Prevalence of haemoprotozoa in canines in Chennai City. Tamilnadu Journal of Veterinary and Animal Science 5: 104-108.
12. Leonhard S, Pfister K, Beelitz P, Wielinga C and Thompson RCA (2007). The molecular characterization of Giardiasis from dogs in Southern Germany. Veterinary Parasitology 150: 33-38.
13. Levine ND. Veterinary Protozoology. Iowa State University Press, Ames, Iowa. 1985; ISBN-13: 9780813818610, pp: 414
14. Little SE, Johnson EM, Lewis D, Jaklitsch RP and Payton ME (2009). Prevalence of intestinal parasites in pet dogs in the United States. Veterinary Parasitology 166: 144-152.
15. Meeusen ENT, Walker J, Peters A, Pastoret PP, Jungersen G. Current status of veterinary vaccines. Clinical Microbiology Review. 2007; 20:489-510.
16. Mirzaei M (2010). Prevalence of Stray Dogs with Intestinal Protozoan Parasites. American Journal of Animal and Veterinary Sciences 5: 86-90.
17. Mundim MJS, Rosa LAG, Hortêncio SM, Faria ESM and Rodr RM (2007). Prevalence of Giardia duodenalis and Cryptosporidium spp in dogs from different living conditions in Uberlândia, Brazil. Veterinary Parasitology 144: 356-359.
18. Nisar M, Khan JA, Khan MS and Khan IA (2009). Prevalence of Coccidiosis in dogs along with haematological alterations as a result of chemotherapeutic trial. Pakistan Veterinary Journal 29: 138-140.
19. Oliveira-Sequeira TCG, Amarante AF, Ferrari TB and Nunes LC (2002). Prevalence of intestinal parasites in dogs from Sao Paulo State, Brazil. Veterinary Parasitology 103: 19-27.
20. Palmer CS, Thompson RCA, Traub RJ, Rees R and Robertson ID (2008). National study of the gastrointestinal parasites of dogs and cats in Australia. Veterinary Parasitology 151: 181-190.
21. Papazahariadou M, Founta A, Papadopoulos E, Chliounakis S and Antoniadou-Sotiriadou K (2007). Gastrointestinal parasites of shepherd and hunting dogs in the Serres Prefecture, Northern Greece. Veterinary Parasitology 148: 170-173.

22. Papini R, Gorini G, Spaziani A and Cardini G (2005). Survey on giardiasis in shelter dog populations. *Veterinary Parasitology* 128: 333-339.
23. Ramirez-Barrios RA, Barboza-Mena G, Muoz J, Angulo-Cubillan F and Hernandez E (2004). Prevalence of intestinal parasites in dogs under veterinary care in Maracaibo, Venezuela. *Veterinary Parasitology* 121: 11-20.
24. Rimhanen-Finne R, Enemark HL, Kolehmainen J, Toropainen P and Hanninen ML (2007). Evaluation of immunofluorescence microscopy and enzyme-linked immunosorbent assay in detection of *Cryptosporidium* and *Giardia* infections in asymptomatic dogs. *Veterinary Parasitology* 145: 345-348.
25. Sharma MC, Pathak NN and Bhat PN (2008). *Dogs, Breeding, Nutrition, Diagnosis and Health Management*. 1st edn. S. K. Jain for CBS Publisher & Distributor New Delhi, India, p. 34-73.
26. Szenasi Z, Marton S, Kucsera I, Tanczos B and Horvath K (2007). Preliminary investigation of the prevalence and genotype distribution of *Giardia* intestinalis in dogs in Hungary. *Parasitology Research* 101: 145-152.
27. Vanparijs O, Hermans L and Van Der Flaes L (1991). Helminth and protozoan parasites in dogs and cats in Belgium. *Veterinary Parasitology* 38: 67-73.
28. Visco RJ, Corwin RM and Selby LA (1977). Effect of age and sex on the prevalence of intestinal parasitism in dogs. *Journal of the American Veterinary Medical Association* 170: 835-837.
29. Wu T, Sun H, Wu Y and Huang H (2009). Prevalence and risk factors of canine ticks and ticks borne diseases in Taipei, Taiwan. *Journal of Veterinary Clinical Sciences* 2: 75 – 78.