

Prevalence of Sarcocystosis in Goats slaughtered at an abattoir in Bangalore, Karnataka state

Arun M. Dafedar¹, Placid E. D' Souza², Ananda, K.J.³ and G.C.Puttalakshamma⁴

Centre of Advanced Studies, Department of Parasitology,
Veterinary College, Hebbal, KVAFSU, Bangalore- 24

Abstract

The specieswise prevalence of sarcocystosis in goat was recorded as 72.24 and 21.12 percent for *S.capracanis* and *S.hircicanis* species, respectively at an abattoir in Bangalore. The mixed infections with both species were observed in 14.08 percent of the animals. The organ wise prevalence was found to be of 69.45, 36.10, 62.50, and 12.5 percent in oesophagus, heart, diaphragm and tongue, respectively. Morphologically both *S.capracanis* and *S.hircicanis* were microscopic, elongated, spindle-shaped and both ends were tapering. The sarcocysts of *S.capracanis* measured 898 to 1009 mm in length and 52 to 168 mm in width with an average of 540 ± 50 mm and 72.5 ± 13 mm. Where as the sarcocyst of *S.hircicanis* measured 760 to 1600 mm in length and 65 to 180 mm in width with average measurements of 980 ± 10 mm and 110 ± 3.5 mm.

Keywords: Prevalence, *S.capracanis*, *S.hircicanis*, Goat, Morphology, Micrometry

Introduction

Sarcocystis an apicomplexan protozoan, once regarded as a non-pathogenic parasite has been found associated with disease conditions in both animals and man. *Sarcocystis* is a genus of cyst forming coccidian parasite with obligatory two-host lifecycles, involving carnivores as definitive hosts and herbivores and omnivores as intermediate hosts (Dubey *et al.*, 1989). Sarcocystosis is one of the emerging diseases of livestock in recent time; it has been recognized as a distinct disease entity.

The pathogenicity and economic importance in food animals includes loss of weight, anorexia, decreased milk production, anemia, and prostration often culminating in death. During schizogonic proliferation, changes such as lymphadenopathy, hydrothorax, hydropericardium, ascites, petechial hemorrhages in heart, brain, alimentary and urinary tracts have been reported.

The goat is a versatile animal, it is known as poor man's cow in India and as 'wet nurse' of infants in Europe. Goats can be kept with little expense and add

to the rural economy even in areas where it is difficult to raise cows and buffaloes. Goat is a hardy and resistant animal but many of the bacterial (Anthrax, B.Q, H.S, Brucella), viral (Pox, F.M.D, P.P.R) and parasitic diseases (Helminths and Protozoa) pose major threat to the goat production. Among protozoan diseases, Sarcocystosis is an important emerging disease of goats, therefore, the present study was undertaken to ascertain the status of Sarcocystosis in goat and to note the morphological features of *Sarcocystis* species affecting goats in Karnataka state.

Materials and Methods

Oesophagus, heart, diaphragm and tongue muscles of 100 Goat slaughtered at KMPMCL - Bangalore (Karnataka Meat and Poultry Marketing Corporation Limited) slaughter house were examined for Sarcocystis infections. For macroscopic sarcocysts, naked eye examination was done while for the microscopic type, the following methods were employed. The different morphological characters like size, shape, cyst wall thickness and structures on the

1. Part of M.V.Sc. Thesis of first author submitted to KVAFSU, Bidar

2. Professor and Head.

3. Corresponding author, Asst. Professor Present address: Veterinary College, Hebbal, Bangalore. 4. Asst. Professor, Dept. of Parasitology, Veterinary College, Hebbal.

cyst wall were studied for the differentiation of *Sarcocystis* species from sheep. Measurements of the cyst, cyst walls and wall protrusions were made using a calibrated micrometer eyepiece.

Muscle squash preparation: Muscle samples (1gm) were cut in to small pieces (3-5 mm thick) and crushed firmly between two glass slides and examined under low power of the microscope (40x).

Modification of muscle squash method: Small pieces of muscle sample (2mm x 2mm) put on a glass slide and covered with thin transparent polythene strip (2.5cm x 2.5cm), moderate pressure was applied with another slide and was removed. The polythene cover was then examined under the microscope (Pethkar and Shah, 1982).

Rapid isolation technique: Small pieces of muscle samples (2-3 cm) were cut and teased in normal saline solution (0.85%) with needles and forceps for 2 minutes in a watch glass and material was examined for sarcocyst (Juyal *et al.* 1989)

Acid-pepsin digestion technique: A modification of method of Jacobs *et al.*, (1960) was used. 20 gms of tissue was minced and digested for 30 minutes at 40°C in 50 ml of digestion medium containing 1.3 gm pepsin, 3.5 ml HCl and 2.5 gm NaCl in 500 ml of distilled water. The digestate was filtered and allowed to settle for 30 minutes, the sediment was microscopically examined at 10x and 40x magnifications.

Results and Discussion

In the goat samples screened 72.24 and 21.12 percent were found to be positive for *S.capracanis* and *S.hircicanis* species. The mixed infections with both species were observed in 14.08 percent of the animals. The chi-square test indicated significant difference in the prevalence of *Sarcocystis* species at 0.05 levels (Table-1).

The epidemiological study of *Sarcocystis* infection in goats was 71% in Bangalore. The results of the survey were in agreement with Lal Singh (1991), Dayashanker (1991) and Agarwal *et al.*, (1991) who reported prevalence rates ranging from 66.92 to 73.33 percent. But Aulakh (1997) and Wadajkar (1994) reported lower prevalence of 55.26 and 56.18 percent in Ludhiana and Marathwada regions, respectively. The high prevalence in the study may be due to the free movement of large number of stray dogs and access to infected offal accounts for the higher prevalence of the infection. However lower prevalence recorded by other authors may be due to screening of lower number of samples as compared to the present study.

The prevalence of *S.capracanis* was 72.24% as compared to *S.hircicanis*, which was 21.12 percent

during the current study. Similar findings were recorded by Dayashanker (1991) and Aulakh (1997) who reported higher prevalence of *S.capracanis* than other species. The epidemiological reasons for variations in the prevalence of species were unclear.

In the goats screened, the prevalence rate of 69.45, 36.10, 62.50, and 12.5 percent was observed in oesophagus, heart, diaphragm and tongue, respectively. The results of chi-square test indicated significant difference at 0.05 level. (Table-2).

The distribution of sarcocysts in different tissues of goats was studied by Lal Singh (1991) and Agarwal *et al.*, (1991) where in oesophagus the most was infected among all other tissues screened. However Dayashanker (1991) reported diaphragm as the most infected tissue followed by oesophagus, while Singh *et al.*, (1990) reported tail muscles as primary site of infection. In the present study also oesophagus was the most infected organ (69.45%) followed by diaphragm (62.5%), but tail muscles were not screened in the study.

Morphologically both *S.capracanis* and *S.hircicanis* cysts were microscopic, spindle-shaped, elongate, with both the ends tapering. The micrometry sarcocysts of *S.capracanis* measured 898 to 1009 mm in length and 52 to 168 mm in width with an average of 540±50 mm and 72.5±13 mm. The cyst wall appeared thick and radially striated showing finger like projections, which measured 3-4 mm. Whereas sarcocysts of *S.hircicanis* measured 760 to 1600 mm in length and 65 to 180 mm in width with average measurements of 980 ± 10 mm and 110 ± 3.5 mm. The sarcocyst wall was thin (<1 mm) and had hair like projections on its outer surface, which measured 6-7 mm.

The identification of sarcocysts from goats was undertaken by Agrawal *et al.*, (1991), Sharma and Shah (1992) and Wadajkar *et al.*, (1994), who observed two types of microsarcocysts. The sarcocysts which were spindle-shaped with thick radially striated wall were identified as *S.capracanis* and the cysts which appeared similar but with thin cyst wall with fine hair like fibrils were identified as *S.hircicanis*. The cysts encountered from goats in Bangalore were very much similar as described by the above authors and were identified as *S.capracanis* and *S.hircicanis*. The measurements of the cysts were similar as observed by these workers.

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Table-1 Species-wise prevalence of Sarcocystosis in Goats in Bangalore

Species	Animals	No. positive examined	%Prevalence
<i>S.capracanis</i>	100	52 (52.0%)	72.24
<i>S.hircicanis</i>	100	15 (15.0%)	21.12

Table-2 Tissue/organ wise prevalence of Sarcocystosis in Goats in Bangalore

Tissues/organs	No. of tissues examined	No. positive	%Prevalence
Oesophagus	100	50 (50.0%)	69.45
Heart	100	26 (26.0%)	36.10
Diaphragm	100	45 (45.0%)	62.50
Tongue	100	09 (09.0%)	12.50

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