Original Research

Incidence of Colon Ciliate *Buxtonella sulcata* in Cattle at Hisar, Haryana

Richa Khirbat[1], Sukhdeep Vohra[2*], Sandeep Gera and Kulender Pal

Institute of Para Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar-125 004, Haryana, INDIA

[1]Veterinary and Livestock Development Diploma (VLDD) Section
[2]Department of Veterinary Parasitology

***Corresponding author:** sukhdeepvohra@gmail.com

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Abstract

The present study was conducted to detect the incidence of Buxtonella sulcata infection in Cattle at Hisar, Haryana. A total of 60 faecal samples from Shri Krishan Gaushala and Go Anusandhan Kendra, Kabrel, Hisar (n = 30) and Haryana Kurukshetra Gaushala, Hisar, (n = 30) were examined. The results revealed an overall infection of 45% in the examined animals. A significant difference (p<0.01) in the incidence of infection was observed between two Gaushalas. The prevalence of B. sulcata also showed a significant (P<0.01) difference between the diarrhoeic and normal faeces. The sedimentation method of examination of cyst showed a significant (P<0.01) higher number of positive animals as compared to floatation method using saturated magnesium sulphate solution. Addition of Lugol's Iodine further enhanced the visibility of the protozoan cyst. The examination of sediment also revealed the eggs of amphistomes in one of the cattle of Haryana Kurukshetra Gaushala, Hisar.

Key words: *Buxtonella sulcata*, Cattle, Hisar, Incidence

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Introduction

Large ruminants form the backbone of dairy industry in India. The animals are kept for milk supply and cattle keeping is important to increase the quantity of milk. The health of animals is affected by various disease conditions like diarrhoea caused by various enteric protozoa (*Cryptosporidium*, *Eimeria* and *Giardia* spp.) especially in neonatal and young bovine calves (Soulsby 1982; Urquhart *et al*., 2003). Among protozoa, *Buxtonella sulcata* is considered as an important opportunistic ciliate protozoan inhabiting colon of bovines (Levine, 1985; Bhatia, 16). This protozoan is very similar to *Balantidium coli*, which inhabit large intestine of swine and man. Some authors included

them into the same genus (Tomczuk *et al*., 2005). In neonates and immune-compromised calves, it multiplies very fast by binary fission, become virulent and cause clinical disease, characterised by debilitating diarrhoea that sometimes become severe and life threatening in untreated animals (Fox and Jacops, 1984; Goz *et al*., 2006; Al-Zubaidi and Al-Mayah, 2011). Although sporadic reports have appeared in literature from the Indian subcontinent (Mamatha and Placid, 2006), it often misdiagnosed as *Balantidium coli* (Al-Saffar *et al.*, 2010; Mohammad *et al*., 2011). In environment, they assume the form of a cyst. It is an endosporic form, but also invasive. Infection follows consuming cysts with fodder or drinking water. Trophozoites are released from cysts in the end part of the small intestine or colon. It is supposed that the increased invasion by the protozoan may result in the acceleration of the passage of alimentary contents in the digestive tract of dairy cows, thus causing clinical disorders such as diarrhoea or poor condition of animals (Tomczuk *et al*., 2005). Considering the importance of parasitic ciliate and few reports of infection in this part of country, the present study was planned to determine the prevalence of *B. sulcata* in cattle in two organized *gaushalas* of Hisar, Haryana, India.

Materials and Methods

A total of 60 fresh faecal samples were collected from Shri Krishan Gaushala and Go Anusandhan Kendra, Kabrel, Hisar (n = 30) and Haryana Kurukshetra Gaushala, Hisar, (n = 30) for the examination of *Buxtonella* infection. The details of animal (age and body condition), management, housing etc. were also collected. Faecal samples were collected in a clean plastic container and brought to the department for examination. Sedimentation and floatation methods were performed for detection of various gastrointestinal parasites (Urquhart *et al*., 2003). The sedimentation method consisted of emulsifying one gram of faeces in 10 ml water, straining to remove coarse particles; centrifuging (2,000 rpm, 2 min); decanting; adding water to 2 ml volume; re-suspending the sediment and cysts were identified with aid of 100x magnification of microscope. The suspected structures were confirmed at 400x magnification. The floatation method consisted of triturating about one gram of faecal sample in about 10 ml of saturated Magnesium sulphate solution. After thorough mixing and sieving, the material is sieved in a flat bottom tube. The tube is filled to brim by adding more of saturated solution to form a convex layer at the top. A glass slide was placed over top of the tube for 25-30 minutes. The slide was then removed, everted and examined at 10X magnification after placing a coverslip. The statistical analysis was done by applying chi square test using SPSS software.

Results and Discussion

The results of coprological examination of 60 faecal samples of cattle are presented in Table 1. The result indicates an overall infection of 45% (n=27) in the examined samples. Higher infection rate in cattle was also reported by various authors (Fox, 1984; Hong and Youn, 1995; Al-Saffar, 2010; Ganai *et al.*, 2015).

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The animals of Shri Krishan Gaushala and Go anusandhan Kendra, Kabrel, Hisar had significantly higher (P<0.01) infection rate (66.6 %) than the Haryana Kurukshetra Gaushala, Hisar (26.6%). The difference might be due to different management conditions like at Shri Krishan Gaushala, Kabrel, Hisar, the floor was damp and cleaning practice were less efficient as compared to Haryana Kurukshetra Gaushala, Hisar, thus promoting faeco-oral route of transmission. Regular deworming of the animals was not done at Shri Krishan Gaushala, Kabrel and unusual mono-diet was followed resulting in change in the pH of intestinal environment promoting the multiplication of vegetative forms of the protozoan as well as the change in the virulence of the parasite.

Table 1: Infection of *B. sulcata* in cattle at Hisar

Name of the Gaushala	Examined	Infected	% Infection	Chi^2
Shri Krishan Gaushala and Go anusandhan Kendra, Kabrel, Hisar	30	20	66.6	11.38**
Haryana Kurukshetra *Gaushala*, Hisar	30	7	26.6	
Total	60	27	45	

Significant at 1% level

The relation between faecal consistency and *Buxtonella* infection is given in Table 2. The results depict a significantly higher (P<0.01) infection rate (71.4%) in animals with diarrhoea than animals having normal faeces (36.9 %). Although the role of *B. sulcata* in diarrhoea has not been studied yet, the results of the study clearly indicate the influence of protozoan on the incidence of diarrhoeal symptoms in bovines. Earlier, (Tomczuk *et al.*, 2005) reported that when the intensity of *B. sulcata* exceeds 500 cyst per gram of faeces, the frequency of diarrhoea incidence decidedly increases, reaching 100 % of cases at the intensity exceeding 2000 cysts in 1 g of faeces.

Table 2: Relationship of *B. sulcata* with faecal consistency in cattle

Consistency of faeces	Examined	Infected	% Infection	Chi^2
Diarrhoeal faeces	14	10	71.4	5.15**
Normal faeces	46	17	36.9	
Total	60	27		

Significant at 1% level

The relation between the influence of age and prevalence of *B. sulcata* in cattle is given in Table 3. The young animals had higher infection rate (47.3 %) than the adults (43.9 %) but the difference was non-significant.

Table 3: Influence of age on the prevalence of *B. sulcata* in cattle

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Consistency of Faeces	Examined	Infected	% Infection	Chi^2
Young (< 1 year)	19	9	47.3	0.06^{NS}
Adult (> 1 year)	41	18	43.9	
Total	60	27		

NS: Non significant

The examination of faecal samples for *Buxtonella sulcata* using floatation and sedimentation method is given in Table 4. The result showed a highly significant (P<0.01) difference between the two coprological methods used for detection of infection. The difference in the values might be due to larger size of the cyst making it difficult to float in saturated magnesium sulphate. The cyst was seen easily at the base of the sediment where water was used as solvent.

Table 4: *Buxtonella sulcata* infection in cattle using different coprological methods

Method	Examined	Positive	% Infection	Chi^2
Floatation	60	1	1.6	31.49**
Sedimentation	60	27	45	
Total	60	27		

Significant at 1% level

The addition of one drop of Lugol's Iodine to the sediment in the test tube stained the protozoan cyst as dark brown further enhancing the visibility of the cyst under microscope during examination (Fig. 1).

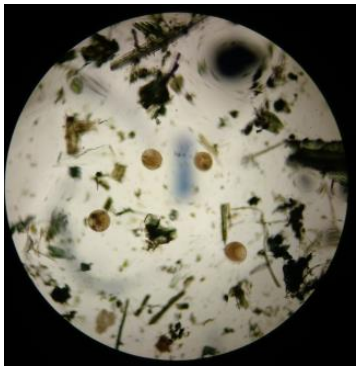

Fig. 1: *Buxtonella* cyst after Lugol's iodine staining (10X)

The inner macronucleus and micronucleus were also visible after staining (Fig. 2). So, it is advised to add 1 drop of Lugol's iodine to the sediment while examination for *Buxtonella* cyst. The examination of faecal samples using floatation method also revealed seven lactating animal positive for strongyle eggs. One animal was found positive for amphistome egg using sedimentation method. As per the available literature, this is the first report of amphistome infection in large ruminants from western Haryana although, amphistomes in sheep and goats were reported recently by Vohra *et al*. (2018). The finding of rumen fluke

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in animals at Hisar is of key importance for the veterinarians as it depicts the new geographical area with amphistome infection and altering the management and chemotherapeutic measures for infection.

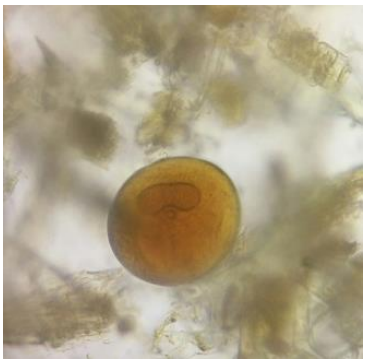

Fig. 2: *Buxtonella* cyst with macro and micronucleus (40X)

Conclusion

The study of faecal samples of cattle from two dairy farms *viz.* Shri Krishan Gaushala and Go Anusandhan Kendra, Kabrel, Hisar (n=30) and Haryana Kurukshetra Gaushala, Hisar (n=30) revealed the presence of *Buxtonella* cyst in 45% (n=27) of animals. A highly significant difference was observed between infections of two Gaushala as well as between the diarrhoeic and normal faeces during examined. Faecal sample of seven lactating animals were positive for strongyle eggs and one animal was also harbouring the amphistome eggs.

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