



Prevalence of Sub-Acute Ruminal Acidosis in Cattle in and around Rewa, Madhya Pradesh

Khan S, Gajbhiye S*, Dixit P and Kumar Singh S#

Department of Veterinary Medicine; C.V.Sc & A.H., Rewa, Nanaji Deshmukh Veterinary Science University, , India

***Corresponding author:** ShilpaGajbhiye, Department of Veterinary Medicine; C.V.Sc & A.H., Rewa, Nanaji Deshmukh Veterinary Science University, Madhya Pradesh, India, Email: drshilpagajbhiye@gmail.com

#Indicates contributed equally to this work

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Abstract

Livestock plays an important role in Indian economy. According to 20th Livestock Census, India's total cattle population in 2019 was 193.46 million. In Madhya Pradesh, it was 18.7 million. Sub-acute ruminal acidosis (SARA) is a well-recognized digestive disorder that is an increasing health problem in most dairy herds. The present study is planned to investigate the prevalence of sub-acute ruminal acidosis in cattle. Total 200 cattle were screened showing suboptimal appetite, reduced body condition, reduced ruminal motility and intermittent diarrhoea were examined during the period from June to December 2024 in and around Rewa (M.P.). The cattle screened for SARA on the basis of rumen fluid pH ranging from 5.2 to 6.0. The ruminal fluid were systematically collected and labelled to determine precisely the over-all prevalence with age-wise, breed-wise, gender-wise and lactationstage wise frequency distribution. The overall prevalence of subacute ruminal acidosis in cattle was 13.50%. Intensity of affection was higher in 2 to 6 years of age (17.5%). The prevalence of SARA affection was higher in the females (14.7%) and non-descript breed of cattle showed higher prevalence (16.34%) compared to other breeds. Lactation stage-wise prevalence was higher in the mid phase of lactation (16.84%).

Keywords: Subacute Ruminal Acidosis; Rumen Fluid; Cattle

Introduction

The Indian economy depends heavily on livestock. The 20th Livestock Census of India estimates that there were 193.46 million cattle in the nation in 2019. With 18.7 million animals overall, Madhya Pradesh is the third-largest state in terms of cow population. Livestock is the primary source of income for almost 20.5 million people. Compared to the average of 14% for all rural families, livestock accounts for 16% of small farm households' income. In India, livestock employs roughly

8.8% of the workforce and provides a living for two-thirds of the rural population. India's cattle resources are extensive [1]. Many families in India rely on livestock as a supplemental source of income, particularly those with limited resources that keep a few animals. Livestock farmers receive a steady income from the selling of milk from cows and buffaloes. With 80 million dairy farmers directly employed and a 5% economic contribution, dairy is India's largest agri-commodity. Higher productivity levels, such as increased weight gain and feed conversion rates, are necessary for

animals kept in confinement and semi-confinement systems. Increased adoption of high-energy diets, which are high in concentrates and promote productive efficiency, is necessary to meet these production goals [2].

Subacute ruminal acidosis, which is typified by episodes of low ruminal pH, is one effect of feeding ruminants excessive amounts of quickly fermentable carbohydrates with insufficient fibre. This syndrome is a danger factor for feedlot sheep, cattle, and dairy cows. According to Constable, et al. [3], cows who only graze lush grass from highly managed pastures run the risk of getting subacute ruminal acidosis.

A well-known digestive condition that is becoming more prevalent in the majority of dairy herds is sub-acute ruminal acidosis (SARA), sometimes referred to as chronic or sub-clinical acidosis. If left unchecked, SARA's economic losses—roughly Rs. 20,000 per cow per lactation—could pose a serious danger to the dairy industry [4].

Further complications of SARA, such as polio encephalomalacia, abomasal illness, rumen tympany and epistaxis, can lead to the death of the animal. The challenge for dairy farmers and nutritionists is to implement feeding management and husbandry practices that prevent or reduce the incidence of SARA, even in high-producing dairy herds where higher levels of concentrate are fed to maximize energy intake. Hence, the present study was proposed to study the prevalence of sub-acute ruminal acidosis in cattle in and around Rewa.

Methodology

Place of Work

The study was performed in the Department of Veterinary Medicine at the College of Veterinary Science & A.H. in Rewa, clinical cases presented at the Veterinary Clinical Complex (VCC), as well as at the Livestock Farm in Rewa, Lakshman Bagh, Tikar Kamdhenu Gaushalas and adjacent villages of Rewa.

Duration of Work

The work was conducted over approximately six months.

Research Methodology and Experimental Design

Selection of animals: Total number of 200 cattle were screened for the prevalence study from the Livestock Farm in Rewa, Lakshman Bagh and Tikar Kamdhenu Gaushalas, clinical cases brought to the Veterinary Clinical Complex (VCC), and nearby villages of Rewa. The animals positive for digestive disorders, sub-optimal appetite, or reduced body condition were subjected to ruminal pH examination.

Prevalence: SARA was diagnosed based on the history of carbohydrate-rich feed intake, clinical manifestations and by recording ruminal pH. Cattle showing the above clinical signs and a ruminal pH ranging from 5.2 to 6.0 were diagnosed as cases of SARA. The age, sex, breed, and stage of lactation of the animals were recorded.

Method of Fluid Collection for Prevalence Study: The rumen fluid collection for prevalence study was done by inserting a 6-inch long 18 G needle through the left paralumbar fossa into the rumen. The pH of the ruminal fluid was estimated with the help of indicator paper. A pH ranging from 5.2 to 6.0 was confirmed for SARA.

Statistical Analysis

The data were analyzed statistically as per Snedecor and Cochran (1994).

Results and Discussions

Prevalence of Subacute Ruminal Acidosis in Cattle

Overall Prevalence: An epidemiological survey was conducted to determine the prevalence of SARA in cattle, over a period of approximately six months (June 2024 - December 2024) in and around Rewa, Madhya Pradesh. Of total 200 cattle included in this study, 27 were found SARA positive in the various farms and nearby villages. Thus, overall prevalence of SARA in and around Rewa was 13.5 per cent. (Table 1)

Total numbers of cattle	No. of positive samples	Prevalence (%)
200	27	13.5

Table 1: Overall prevalence of SARA in cattle.

These findings are in agreement with Kleen, et al. [5] and Stefanska, et al. [6] who recorded 20% and 14% prevalence, respectively. However, higher prevalence of SARA was reported by Garrett, et al. [7], Nasr, et al. [8] and Mirzad, et al. [9] as 30%, 26.25% and 20% respectively.

The variation in the result of prevalence of SARA in present study with earlier reports may be attributed to various factors including the selection of animals, managerial practices in different farms, preventive strategies, existence of unfavorable climatic and environmental factors.

Age-wise prevalence: The age-wise prevalence of SARA in cattle was determined by grouping the cattle in different age groups: 2-6, 6-8 and 8-10. Out of total 200 samples, 120 were collected from the 2-6 years, 45 from 6-8 years and 35

from 8-10 years. The prevalence rates of 17.50% (21/120) in the 2-6 year, 8.88% (4/45) in 6-8 years and 5.71% (2/35) in 8-10 years. Analysis of data revealed non-significantly higher prevalence in the 2-6 years of age group, followed by animals in the age groups of 6-8 years and 8-10 years (Table 2).

Age groups (years)	No. of sample examined	SARA positive sample	SARA Prevalence (%)
2 to 6	120	21	17.5
6 to 8	45	4	8.88
8 to 10	35	2	5.71
Total	200	27	13.5

$$\chi^2 = 4.280 \pi > 0.05 (\text{Nov} - \sigma_{\text{IYVI}} \Phi_{\text{IXAVT}}) \pi = 0.1176$$

Table 2: Age wise prevalence of SARA in cattle.

Similar results were reported by Alam, et al. [10], Alzahal, et al. [11], Thorat, et al. [12] and Mirzad, et al. [9]. On the contrary Yogananda reported higher prevalence of SARA in cows with age group of 5 years and above.

The increased prevalence of SARA among cattle in the age group of 2 to 6 years in the present study might be due to their increased representation *i.e.*, 17.50% (21/120) in the study group.

The enigmatic differences in the age-wise prevalence rate SARA in cattle (present and previous reports) are ascribable to gross variation in the geo-climatic conditions in different locations, and managerial protocols.

Gender-wise prevalence: The gender-wise prevalence of SARA was determined. Of total 200 samples, 30 were collected from males and 170 from females. The prevalence rates of 6.66% (2/30) in males and 14.7% (25/170) in females were recorded. Thus, the intensity of affection was non-significantly higher in females, compared to males (Table 3).

Sex	No. of sample examined	SARA positive sample	SARA Prevalence (%)
Male	30	2	6.66
Female	170	25	14.7
Total	200	27	13.5

$$\chi^2 = 1.412 \pi > 0.05 (\text{vov} - \sigma_{\text{IYVI}} \Phi_{\text{IXAVT}}) \pi = 0.2347$$

Table 3: Gender-wise prevalence of SARA in cattle.

Female gender predisposition observed in the present study is consistent with the published reports of Alam, et al. [10] and Thorat, et al. [12].

Higher prevalence in female due to higher sample size and owner's preference for female herd looking to production. Physiological stress associated with parturition and lactation in female animals predisposes the cattle to SARA affection due to reduce in immune tolerance.

Breed-wise prevalence: The breed-wise prevalence of SARA in cattle was studied. Of total 200 samples, 42 were collected from HF, 38 from Jersey, 16 from Sahiwal and 104 from non-descript breed of cattle, The prevalence rate 16.34% (17/104) was highest in non-descriptive breed, followed by HF 11.9% (5/42), Jersey 10.52% (4/38), Sahiwal 6.25% (1/16) (Table 4).

Breed	No. of sample examined	SARA positive sample	SARA Prevalence (%)
HF	42	5	11.9
Jersey	38	4	10.52
Sahiwal	16	1	6.25
Non-descriptive 104 17 16.34			
Total	200	27	13.5

$$\chi^2 = 1.824 \pi > 0.05 (\text{vov} - \sigma_{\text{IYVI}} \Phi_{\text{IXAVT}}) \pi = 0.620$$

Table 4: Breed-wise prevalence of SARA in cattle.

The data on SARA in cattle revealed statistically non-significant higher prevalence in non-descript breed, compared to the established breeds of cattle. Similar finding was reported by Alam, et al. [10]. On the contrary several other investigators Nawid, et al. [13], Bipin, et al. [14], Thorat, [12] and Mirzad, et al. [9] reported higher prevalence in pure breeds of cattle. The variation in the susceptibility to SARA affection in study area is due to owner's preference to rear non-descript breed as compared to pure breed of cattle.

Lactation stage-wise prevalence: The lactation stage-wise prevalence of SARA in cattle was studied. Of total 170 samples, 40 were collected from early phase of lactation (1-3 months), 95 were collected from mid phase of lactation (3-6 months), and 35 from late phase of lactation (above 6 months) of cattle. The prevalence rate 16.84% (16/95) was highest in mid phase of lactation, followed by early phase of lactation 15% (6/40) and late phase of lactation 8.57% (3/35) (Table 5).

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