

Clinico-haemato-biochemical and therapeutic studies on enteritis in goats

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ABSTRACT

The study was conducted in sixteen goats of 6 months to 3 years of age suffering from enteritis, presented at teaching veterinary clinical complex, Rajuvas, Bikaner (Rajasthan). These goats were presented with the typical clinical signs and symptoms of diarrheic faeces, in appetite to anorexia, dull and depressed, and mild to moderate dehydration since the last 2-3 days. Blood and serum samples of all these enteritis affected goats were collected by standard procedures on the day first before initiation of the treatment. For therapeutic management, these goats were randomly divided

in two groups (groups-I and II) containing 8 animals in each group. The animals of group-I were treated with ofloxacin at 5 mg/kg body weight by intramuscular route daily and group-II were administered with a combination of sulphadiazine (400 mg/ml)+trimethoprim (80 mg/ml) at 1 ml/10 kg body weight intramuscularly daily for 3 days. In both groups supportive treatment in the form of NSAIDs (meloxicam), multivitamins (vitamin B₁, B₆ and B₁₂) and fluid therapy (normal saline solution and Ringer's lactate) was given in standard recommended doses for 3 days. After 3 days of regular treatment, it was found that the treatment regime provided to the goats of both group-I and group-II were recovered based on the remission of clinical signs and symptoms but group-I was considerably more effective.

Key Words: Clinical; Biochemical; Therapeutic; Goats

INTRODUCTION

Goat is the second most important livestock in India, which plays an important role in rural economy and is known as poor man's cow [1]. Identifying the etiological agents is not always possible, and field and laboratory studies have shown that there is no single agent in the etiology of neonatal enteritis. Enteropathogenic bacteria, viruses, and protozoa, as well as the immune system of animal and environmental factors, all play roles in the disease [2].

Diarrhoea is documented as a frequent cause of neonatal mortality among animals including goats throughout the world. Enterotoxigenic *Escherichia coli* (ETEC) and *Cryptosporidium parvum* are considered among the most prevalent causative agent of enteritis in goats. Bacterial enteritis is the most important cause of diarrhoea in lambs and goat kids. It is caused by pathogenic serotypes of *Escherichia coli* [3]. Animals suffering from white scour have severe colitis characterized by abdominal pain, pasty faeces, severe enteritis that may culminate into death due to severe dehydration [4]. *Salmonella enteritidis* produces enterotoxins which are invasive to cause inflammatory changes within the intestine leading to diarrhoea. Bacterial enteritis remains the most common clinical problem in the goats. Despite improvements in managemental practices and prevention and treatment strategies, enteritis is still the most common and costly disease affecting small ruminants.

Gastrointestinal (GI) parasitism causing major threats such as production losses in small animal industry and mortality in severe cases has been reported [5]. Helminth infection of the gastrointestinal tract is one of the major problems in goats which are characterized clinically by enteritis, anemia, emaciation, dehydration, and death. These changes are responsible to affect the growth, body weight, yield, and reproductive performance of the animal leading to economic loss of the farmer [6].

Serum biochemistry and haematological analysis have been found to be an important and reliable indicator for assessing an animal's health status and might give an assessment of the degree of damage to the host tissue as well as the severity of infection resulting in anemia, hypoproteinemia, and lower blood glucose [7-10].

MATERIALS AND METHODS

This study was conducted at teaching veterinary clinical complex, Rajuvas, Bikaner (Rajasthan) in sixteen goats of 6 months to 3 years of age suffering from enteritis, presenting with clinical signs and symptoms of diarrheic faeces, in appetite to anorexia, dull and depressed and mild to moderate dehydration since last 2-3 days [11].

Collection of samples

For haematobiological examination, blood samples from these 16 goats were collected on day 0 and then post-treatment by jugular vein puncture in EDTA sterile and non-EDTA sterile vacutainers. The serum was harvested in small pyrex tubes and was stored in the deep freeze at -20°C until analysis [12].

For haematological examination, blood samples were analysed for haemoglobin, packed cell volume, total erythrocyte count, total leukocyte count, and differential leukocyte count as described by Jain.

Biochemical analysis of serum samples was made to ascertain liver function by estimating serum total protein, creatinine, and serum glucose. All the parameter was estimated by using IDEXX vet test chemistry analyzer [13].

Faecal samples were collected prior to the start of the treatment with the help of sterile cotton swabs in screw-capped plastic tubes and in sterile vials. Collected faecal samples were kept in a cool transport box and brought to the postgraduate laboratory, CVAS, Bikaner, for further examination [14]. Faecal examination for endoparasites by using flotation and sedimentation procedure and observed under microscope. The collected samples were cultured on EMB (Eosin methylene blue) and XLD (Xylose Lysin Deoxycholate) agar plate and incubate at 37°C for 24 hrs. Distinct colony was identified as *E. coli* and *Salmonella*.

Treatment

For therapeutic management, these goats were randomly divided in two groups (groups-I and II) containing 8 animals in each group. The animals of group-I were treated with ofloxacin at 5 mg/kg body weight by intramuscular route daily and group-II were administered with a combination

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of sulphadiazine (400 mg/ml)+trimethoprim (80 mg/ml) at 1 ml/10 kg body weight intramuscularly daily for 3 days [15]. In both groups antidiarrhal herbal preparation (Diaroak) 0.5 gm per 10 kg Bwt, orally BD and with the same supportive treatment in the form of NSAIDs (meloxicam), multivitamins (vitamin B₁, B₆ and B₁₂), and fluid therapy (normal saline solution and Ringer's lactate) was given in standard recommended doses for 3 days [16].

RESULTS AND DISCUSSION

In the present study, there were 16 goats selected which have signs of severe enteritis and 8 healthy goats were selected to use as control (Figures 1 and 2). Faecal samples collected from both diarrhoeic groups (group-I to II) for parasitic and bacteriological examination were found to be negative for endoparasites and positive for either *Salmonella enteritidis* or *Escherichia coli* (*E. coli*) [17].



Figure 1) *Salmonella enteritidis* growth on XLD culture media

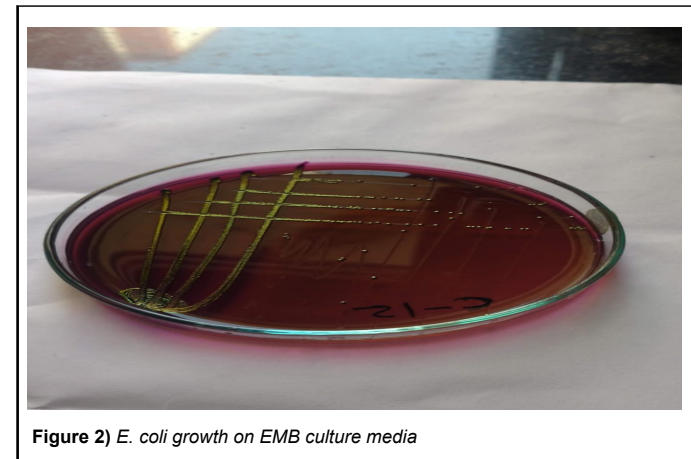


Figure 2) *E. coli* growth on EMB culture media

Table 1: Mean $\pm$ SE values of hematology at pre-and post-treatment in treated groups

Parameters	Group-III (Healthy animal)	Group-I		Group-II	
		Pre	Post	Pre	post
Erythrogram					
RBCs (10 ⁶ /mm ³)	12.29 ^A ± 0.69	9.57 ^{aB} ± 1.19	12.01 ^b ± 0.64	9.83 ^{aB} ±0.64	11.46 ^b ±0.54
Hb (gm per cent)	10.60 ^A ± 0.40	6.90 ^{aB} ±0.40	9.75 ^b ±0.41	6.73 ^{aB} ±0.37	9.58 ^b ± 0.43
PCV (per cent)	31.47 ^A ± 1.51	20.34 ^{aB} ±0.79	28.82 ^b ±0.79	19.90 ^{aB} ± 1.02	28.38 ^b ± 1.24
TLC (10 ³ /mm ³)	11.95 ± 0.67	11.70 ± 1.22	11.81 ± 0.70	12.70 ± 0.88	12.68 ± 0.62
Differential leucocytic count (per cent age)					
Lymphocyte	48.63 ± 1.02	47.13 ± 3.65	49.63 ± 1.60	46.88 ± 3.15	47.75 ± 0.87
Neutrophils	48.75 ± 0.92	47.13 ± 4.00	47.75 ± 1.84	46.25 ± 3.05	48.38 ± 1.19
Eosinophils	0.13 ± 0.14	0.38 ± 0.30	0.13 ± 0.14	0.38 ± 0.30	0
Monocytes	2.75 ^A ± 0.61	5.25 ^{aB} ± 0.68	3.38 ^b ± 0.49	6.50 ^a ± 0.69	3.88 ^b ± 0.74
Note: 1) Mean ± SE bearing different superscripts (A, B) between treated and control groups differed significantly (p<0.05). 2) Mean ± SE bearing different superscripts (a, b) within the treated groups differed significantly (p<0.05)					

In biochemical parameters were found significantly low in total serum protein (group-I 4.87 $\pm$ 0.27 and group-II 4.69 $\pm$ 0.32) and high in creatinine (group-I 1.49 $\pm$ 0.16 and group-II 1.40 $\pm$ 0.18) on day 0 in group comparison to control group animals (group-III 5.22 $\pm$ 0.14 and 0.90 $\pm$ 0.07 respectively). Whereas, a significant increase in total serum protein (group-I 5.47 $\pm$ 0.17 and group-II 5.52 $\pm$ 0.20) and a decrease in creatinine (group-I 1.10 $\pm$ 0.09 and group-II 0.91 $\pm$ 0.07) at post treatment compared to the same group at the start of treatment (Table 2). Decrease in serum protein loss of protein through feces and decreased absorption in the body through

the intestinal wall due to inflammation or eruption of mucosa and increased serum concentration of creatinine indicate severe dehydration during enteritis. Post treatment the body is trying to adjust for these values in the normal range. Whereas, there was no significance difference found in TLC, DLC, and serum glucose levels in diseased goats.

Phad and Deshmukh observed a reduction in total serum protein and glucose levels in *E. coli* infected birds. Increase levels of creatinine in enteritis affected animals also have been recorded.

Table 2: Mean $\pm$ SE values of biochemical at pre-and post-treatment in treated groups

Parameters	Group-III (Healthy animal)	Group-I		Group-II	
		Pre	Post	Pre	post
Total protein (g/dl)	5.22 ^A $\pm$ 0.14	4.87 ^{aB} $\pm$ 0.27	5.47 ^b $\pm$ 0.17	4.69 ^{aB} $\pm$ 0.32	5.52 ^b $\pm$ 0.20
Creatinine (mg/dl)	0.90 ^A $\pm$ 0.07	1.49 ^{aB} $\pm$ 0.16	1.10 ^b $\pm$ 0.09	1.40 ^{aB} $\pm$ 0.18	0.91 ^b $\pm$ 0.07
Glucose (mg/dl)	61.67 $\pm$ 1.13	60.79 $\pm$ 1.99	62.43 $\pm$ 1.32	61.26 $\pm$ 1.07	61.91 $\pm$ 1.10

Note: Mean $\pm$ SE bearing different superscripts (A, B) between treated and control groups differed significantly ($p < 0.05$)

Extreme cases treated with herbal formulation combination with ofloxacin found negative of *E. coli* and showed immediate recovery from the diarrhoea after treatment. The antimicrobial agents ciprofloxacin appears to be a logical alternative to trimethoprim-sulfamethoxazole in the initial treatment of acute traveller's diarrhoea caused by enterotoxigenic *Escherichia coli*, invasive enteropathogens, and unknown pathogens. Fluoroquinolones are highly active against most gram-negative pathogens, as well as *Staphylococcus aureus* and coagulase-negative staphylococci.

CONCLUSION

After 3 days of regular treatment, it was found that the treatment regime provided to the goats of both group I and group II were recovered but group I was more effective based on the hematobiochemical and early remission of clinical signs and symptoms.

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