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Chemo-prophylactic and Hemato-serological effect of anti-diarrheal drugs against Neonatal Calf Diarrhea

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ABSTRACT: A very important disease of younger age that usually appears and leads to death of neonate in case of improper diagnosis and treatment is Neonatal calf diarrhea. Disease has its own economic importance as livestock has a major role in gross domestic production (GDP) of Pakistan. A trail was conducted to check chemo-prophylactic effects of different anti-diarrheal drugs. Thirty neonates were selected and divided into six equal groups treated respectively with Colimune Ora, Cosumix Plus, Streptomegma, NMK Powder and Biovet by keeping last group as control. Blood sample were collected to check any untoward change in blood just after birth, on 3rd and 28th day of experiment. Mixed results were found in hematology on 28th day with overall increasing pattern in Total leukocyte count (TLC) and Packed cell volume (PCV). IN contras Total erythrocyte count (TEC) shows increase of 16.57%, 96% and 93.47% respectively in case of Colimune Ora, NMK and Cosumix Plus whereas decrease in case of Streptomegma and Bio Vet up-to 5.06%. Mixed results concerning DLC, serum sodium and potassium level were witnessed. Inclusively there was no annoying change was noticed with increase in (TLC) eventually providing protection to animal to avoid the disease. Henceforward use of above listed drugs prophylactically especially Cosumix Plus, strongly suggested against neonatal calf diarrhea to lessen the mortality due to neonatal calf diarrhea.

KEYWORDS: Ruminants, Collibacillosis, Neonatal calf diarrhea, anti-diarrheal drugs.

1 INTRODUCTION

Neonatal calf diarrhea, usually caused by Collibacillosis and Salmonellosis, is an acute and fatal disease of calves of 1-4 weeks of age. Calves of less then 7 days of age are more affected. Outbreaks of calf diarrhea are more common during fall winter and early spring in the large heads [1]. In mild case faces become loose than the normal but in severe cases common symptom are depression, lack of appetite, severe yellowish foul smelling diarrhea which may be watery or foamy. Affected calves may have rough hair coat, sunken eyes due to dehydration and emaciated. In very acute or septicemic cases death may occur before the onset of diarrhea; however death usually occurs after 2-3 days of commencing of diarrhea [2]. Common pathophysiological conditions are dehydration, emaciation, and fluid filled intestinal tract. Field and laboratory investigation revealed that there are many etiological agents of calf diarrhea e.g. bacteria (enterotoxigenic E.coli, Salmonella spp, Clostridial spp etc) viruses (Rota virus, Corona virus, Astro virus) and other pathogens such as babesia, coccidia, fasciola

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and cryptosporidium species [1], [2]. Calf diarrhea is mostly treated by alteration of diet, electrolyte and fluid therapy, immunoglobulin therapy and antimicrobial therapy along with some supportive treatment [2]. In the present study chemo-prophylactic effect of some antidiarrheal drugs like colimune ora, cosumix plus, streptomegma, n.m.k. powder and bio vet were studied which reveled that all the drugs worked well and their hematological and serological studies did not show any untoward change/reaction when used as prophylactically against neonatal calf diarrhea.

2 MATERIAL AND METHODS

Thirty neonates were selected by systemic random from Animal Nutrition Center, Rakh Dera Chahl, Lahore, which were divided into six different groups, each consisting of five calves. Keeping one group as control, five other were medicated by a single therapeutic agent amongst, Colimune Ora, Cosumix Plus, Streptomegma, NMK Powder and Biovet (Table 1). The composition of these drugs was as under:

Colimune Ora

E Coli antiserum minimum K99- Antibody titer of 1:512	
Thimerisal 10%	0.03ml
Oxytetracycline HCL	0.003ml
Phenol 5%	1ml

Cosumix Plus

100 gm sachte contains	
Sulphachloropyridazine Sodium Salt	10grams
Trimethoprim	2 grams

Streptomegma

Kaoline USP	486 mg
Pectin USP	43.3 mg
Auminium Hydroxide gel USP	63.3mg

NMK Powder

Neoterea	6gm
Magnesium Carbonate	5gm
Kaolin	10gm

Bio Vet

EM basic solution	1 liter
Molasses	1 kg
Water	20 liter

Table 1. Schedule of using anti-diarrheal drugs as a prophylactic agent in different animal groups

Group no.	Drugs	Dose rate	Route of administration	Manufacturer
1	Colimune Ora	10ml/calf within 12 hours	Orally	AZM Pharmaceuticals Karachi
2	Cosumix Plus	10gm/50kg body weight	Orally	Ciba Geigy Ltd Karachi
3	Streptomegma	25gm/calf	Orally	Wyeth Lederic Division Cyanamid Lahore
4	NMK Powder	1gm/8kg body weight	Orally	Self Prepared
5	Bio Vet	10ml/day	Orally	Nature Farming Faisalabad

Supportive therapy was given to prevent dehydration and acidosis including Normal saline, Dextrose 5% and Sodium Bicarbonate depending upon dehydration and acidosis. Calves were kept separate from their dams. Cleaning of the barn and environment was according to the season. For hematology and serology the samples were collected:

- just after parturition
- 36 hours after parturition
- 28th day of experiment

3 RESULTS

The present study showed an increase in Packed Cell Volume (PCV) but in case of Total Erythrocyte Count (TEC) the results were variable (Table 2). In case of Colimune Ora and Cosumix Plus an increase of 16.57% and 93.47% observed after 36 hours. Streptomegma decreased TEC after 36 hours. NMK increased up to 96% and Bio Vet decreased TEC by 5.06%. An over all increase in Total Leukocyte Count (TLC) was observed with slight decrease in case of Colimune Ora and Streptomegma. Variable results were observed in Differential Leukocyte Count (DLC). Lymphocytes were decreasing 0.3 to 11.07% which showed that every therapeutic agent regress the production of lymphocyte. Same was the case in monocytes. Basophils decreased in case of Colimune Ora. Cosumix Plus and Streptomagma regressed neutrophils by 1.8 to 4.4%.

Table 2. Effects of anti-diarrheal agents on different blood parameters

Group no.	Drugs	PCV (%)	TEC m/mm^3	TLC thousand/mm^3	DLC				
					M	E	L	B	N
1	**Colimune Ora**	34-35	5.9-7.1	5.4-7.3	5-11	7-0	50-51	1-2	30-34
2	**Cosumix Plus**	27-37	5.8-6.3	6.0-7.9	7-11	7-10	50-53	1-2	27-34
3	**Streptomegma**	31-34	5.4-6.4	7.3-8.0	5-7	7-10	50-55	1-2	28-34
4	**NMK powder**	28-34	5.2-6.0	6.0-8.0	7-9	7-8	50-53	1-2	30-34
5	**Bio Vet**	29-35	5.7-6.7	6.9-7.3	5-8	7-10	50-53	1-2	28-35

Mixed results of Serum Sodium concentration were obtained. The Serum Potassium concentration tended to decrease for all therapeutic agents except NMK powder. Total Serum Protein was decreased in all cases except an increase in case of NMK and Bio Vet. The pH of the bodies was fluctuating throughout experiment. Microbiology of fecal samples was done for detection of E coli and Salmonella species as the major cause of diarrhea but after 36 hours and 28 days no fragment was observed in the media of such samples.

4 DISCUSSION

Neonatal calf diarrhea is one of the most important disease in which a veterinarian might face difficulties in the laboratory diagnosis prior to treatment. It is a significant cause of economic losses in cattle herds. One of the calves died during whole of the project of the group treated with Climune Ora. Thus mortality rate was 20%. The fact does not match the observations of [3]. The PCV significantly decreased, thus results were not in agreement with [1]. It also disgraced the observation of [4]. TEC showed non significant difference along with TLC. These results were in agreement with [5]. Significant Neutrophilia was observed as was found by [1]. The results found in this experiment differ from previous findings most probably due to the reason that these calves were consuming precautionary medication which cause the increase in lymphocyte population.

Therapeutic agents when introduced initially increased the values of Serum Protein significantly but as the time passed the values tend towards a non significant change. These observations were not matched with [5], [6]. The probable reason was these neonates were under medication right from birth. Serum albumin increased significantly when we introduced the drugs but as the time passed non significant results were obtained. Serum globulin concentration showed significant difference. None of the bacteria was found in the fecal culture obtained from neonates of each group. The results were the same found by [7], who described that normal healthy calves did not showed any bacteria.

5 CONCLUSION

All the drugs worked well against neonatal calf diarrhea but critically Cosumix Plus was found best because it is in the combination of two best groups of antibiotics i.e. Sulphanomide and Trimethoprim. These observations were same as described by [2] and [8], who reported that antibiotics are good treatment of diarrhea particularly the Slphanomides, Tetracyclines, Trmethoprim and Chlorophenicol.

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