OnLine Journal of Biological Sciences 3 (3): 282-286, 2003
ISSN 1608-4217

Effect of Chemoprophylaction Against Neonatal Buffalo Calf Diarrhea over Normal Physiology of Buffalo Neonates

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Abstract: The following project was designed to check the high mortality rate in buffalo neonates (28-30%) at Animal Nutrition Centre Dera Chahl. For this purpose 30 buffalo neonates were selected through pigeon hole method dividing into groups A, B, C, D, E and F (non-medicated control group). During the course of research we found no causality and the neonates remained free from any kind of malfunctioning.

Key words: Chemoprophylaction, buffalo neonates, diarrhea

Introduction

Neonatal buffalo calf diarrhea is one of the most common disease complex which causes a great loss in vital body fluid and decrease in the immune status of the neonates. Which renders the neonates to different diseases and eventually results into the death of the calves (Hanif ***et al.***, 1996). The effectiveness of treatment and control of hard epidemics of diarrhea in buffalo calves is frustrating and causes heavy economical losses (Radostits ***et al.***, 1994).

Neonatal buffalo calf diarrhea is characterized by profuse watery diarrhea, progressive dehydration, acidosis and finally death within a few days. (Aly ***et al.***, 1993). Common pathological lesions are dehydration, emaciation and a fluid filled intestinal tract with no other gross lesions (Brenner ***et al.***, 1995).

Treatment of diarrhea largely determines the alteration of diet, electrolyte and fluid replacement therapy and immunoglobulin therapy along with supportive therapy (Radostits ***et al.***, 1994).

Materials and Methods

Thirty new born buffalo calves were selected through pigeon hole method, which were divided into six different groups marked as A, B, C, D, E and F; consisting of five neonates each, which were medicated by a single therapeutic agent like, Colimune Ora (10 ml/calf within 12 h), Cosumix Plus (10 gm kg^{-1}), Streptomagma (25 gm $calf^{-1}$), N.M.K Powder (1 gm kg^{-1}) and Bio. Vet. (10 ml day^{-1}). Group F was the non-medicated control group (Table 1).

Normal saline and sodium bi-carbonate were medicated for the treatment of dehydration and acidosis per quality of dehydration and acidosis. Separation of buffalo calves from their dams as

well as from each other was done. Clean and proper environment was provided to the buffalo calves.

In the battery of testing hematological parameters four different tests were done i.e. packed cell volume through haematocrit, total erythrocyte count, total leukocyte count through haemocytometer and differential leukocyte count through slide method (Mohiuddin, 1994).

Serology

In the zone of serology six different tests were done i.e., Total Serum Protein, Serum Albumin and Serum Globulin through Biuret Method (Doumas I, II, 1981) and the concentration of Sodium and Potassium was tested through Flame Photometer (Coles, 1982).

Results and Discussion

Non of the buffalo neonate showed any sign of septicemia of bacteriemia or acidosis during the course of the research. It is observed that Packed Cell Volume (Table 1) showed significant fluctuation for the time period (36.01) with in a time period but showed a significant increase between therapeutic agents (23.92) which is favored by the observations of Khan ***et al.*** (1996) as he described that in such conditions the value of Packed Cell Volume is increased.

Total Erythrocyte Count (Table 1) showed a significant tendency to increase within time period (21.87) and significantly increased in between the therapeutic agents (5.94), which is against the observations of Sodhi ***et al.*** (1998) as he described that Total Erythrocyte Count shows non-significant difference. The reason for this difference is that in the present project the animals are under medication so this difference is observed.

Total leukocytes count (Table 1) remains constant for time period (0.348) and a significant decrease for therapeutic agent's (1.387). These observations do match the previous observations of Adam, 1998 that reported that Leukopenia is observed in neonates with diarrhea.

Neutrophils (Table 1) showed a strange behaviour both for time frame and therapeutic agents i.e., first they tend to increase but after words becomes constant (5.115 and 5.818) convincing the results of Khan ***et al.*** (1996) and Sodhi ***et al.*** (1996) who reported that neutrophilia is observed in the neonates opposing the observations of Donovan ***et al.*** (1998) who depicted that neutropenia is observed in the diarrheic neonates. While Lymphocytes (Table 1) showed a significant increase in their value with the introduction of therapeutic agents (0.532) as well as for the time period (8.054) opposing the observations of Sodhi ***et al.***, 1996 who reported that decrease in lymphocytes is observed in Diarrheic animals. The only reason for this difference is that during this time calves were consuming precautionary medication, which cause the increase in lymphocytes population.

Table 1: Analysis of variance table for the hematology section

Source of variance	Degree of freedom	Sum of square					Mean square					F ratio				
		PCV	TEC	TLC	NP	LP	PCV	TEC	TLC	NP	LP	PCV	TEC	TLC	NP	LP
Replication	4	102	14	7	21	386	25	3.5	1.8	5.4	96.7	1.9	1.3	6.1	1.7	2.7
Factor A	5	119	29	6	29	2	23	5.9	1.3	5.8	0.5	1.8*	2.2*	4.5*	1.8NS	1.6*
Factor B	2	72	43	0.0	10	16	36	21.8	0.3	5.1	8.0	2.7	8.1*	1.1NS	1.6NS	2.8*
AB	10	213	10	62	31	9	21	1.0	6.2	3.1	0.9	1.6	0.4	2.0	0.9	0.3
Error	68	884	183	20	21	193	13	2.7	0.3	3.1	2.8	-	-	-	-	-

PCV = Packed cell volume; TEC = Total erythrocyte count; TLC = Total leukocyte count;
NP = Neutrophils; LP = Lymphocytes * Significant P<0.05 NS = Non significant

Table 1: Analysis of variance table for serology section

Source of variance	Degree of freedom	Sum of square					Mean square					F ratio				
		K^+	Na^+	PRO	ALB	GLB	K^+	Na^+	PRO	ALB	GLB	K^+	Na^+	PRO	ALB	GLB
Replication	4	4.4	214	1.64	6.37	4.19	1.10	53.54	0.41	0.41	1.04	1.34	1.92	1.34	5.19	1.31
Factor A	5	1.1	251	5.38	5.38	1.12	0.22	50.25	1.07	1.07	0.22	0.2NS	1.8*	3.51*	3.15*	0.28NS
Factor B	2	3.2	152	0.49	0.79	2.81	1.60	76.48	0.24	0.34	1.40	1.9NS	2.74	0.80NS	1.13NS	1.7NS
AB	10	6.5	446	0.96	63.6	5.75	0.65	44.61	0.09	6.36	0.57	0.79	1.6	0.3149	2.073	0.718
Error	68	55.7	1895	20.8	20.8	54.4	0.819	27.88	0.30	0.30	0.80	-	-	-	-	-

K+= Potassium; Na+ = Sodium; PRO= Protein; ALB = Albumin; GLB = Globulin

Total Serum Protein (Table 2) showed non-significant increase with in time period (0.246) but with in therapeutic agents it showed significant difference (1.077). These observations are regulated with the observations of Donovan ***et al.*** (1998) as he said that as the Total Protein increases the mortality rate decreases but goes against to the observations of Adam (1998) who observed that Total Protein decreased in diarrheic animals. This difference is because we are dealing with prophylactic treatment while Adam studied the animals infected with diarrhea.

Serum albumin (Table 2) showed non-significant increase with in time period (0.348) but for the therapeutic agents it showed a significant increase (1.077) which is against the observations of Adam as he described that Serum albumin decreases with diarrhea but only difference between these two observations is that in the present observations animals are under medication.

The values of Serum Globulin (Table 2) decreased non-significantly within time period (1.408) but remains constant within the therapeutic agents (0.224). These observations do match the observations of Adam.

Serum electrolytes i.e., Sodium and potassium showed alternative results. Sodium (Table 2) fluctuates after drug administration (50.254) and decreased significantly within a time period (0.246) while potassium (Table 2) decreased non-significantly after drug administration (0.22) and remains constant for time period (1.60). These results matches the results of Donovan ***et al.***, 1998 who described that serum sodium and potassium decreased considerably from their values in diarrheic calves.

As far as the drug efficacy was concerned all the drug worked well against neonatal buffalo calf diarrhea in the said project which is supported by the observations done by Bukhari (2002) as he observed that when we use these therapeutic agents chemoprophylactically these do their job very well i.e., Control the diarrhea in a convincing way.

So in the light of these results we can use any of the above mentioned therapeutic agent chemoprophylactically against neonatal buffalo calf diarrhea to minimize the mortality rate in buffalo calves due to neonatal buffalo calf diarrhea.

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