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PREGNANCY TOXEMIA TREATMENT WITH POLYHERBAL FORMULATION IN EWES

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ABSTRACT

In present study the impact of herbal product in treatment of pregnancy toxemia in ewes was examined. 12 ewes tentatively diagnosed for pregnancy toxemia by physical examination, clinical symptoms and presence of ketone bodies in the urine, were randomly divided into two groups (n=6). Group T1 ewes were treated with herbal product AV/KPC/10 (M/S Ayurvet Ltd., Baddi) at the rate of 1tube (300gm)/day/animal for 3-5 days along with fluid administration and group T2 ewes were treated with conventional therapy, propylene glycol (50gm/day) and glycerine (100gm/day), for 2-3 days as per the severity of disease along with fluid therapy of 50% glucose solution @100ml/day. The statistical analysis of the result revealed that in AV/KPC/10 treated group T1 ewes there was significant ($P \leq 0.05$) improvement in hemoglobin, PCV, total erythrocyte count (TEC) and total leukocyte count (TLC) as compared to conventional therapy treated group T2 ewes. AV/KPC/10 treatment in group T1 ewes efficiently restored the altered hematological as well as biochemical parameters as compared to that of conventional therapy treated group T2 ewes. In the present clinico-therapeutic trial, AV/KPC/10 herbal gel was found effective to treat pregnancy toxemia in ewes in comparison to conventional therapy.

Keywords: Herbal gel, pregnancy toxemia, ewes, glucose, hemoglobin

INTRODUCTION

Pregnancy toxemia is a metabolic disease of ewes that occurs in late stages of pregnancy[1]. Pregnancy toxemia usually occurs due to a long period of negative energy balance and impaired gluconeogenesis which results in hypoglycemia, fat mobilization, ketonemia, and ketonuria[2]. Economic losses due to the disease have been considerable. In severe outbreaks, morbidity rates can reach up to 20%, with 80% mortality of affected animals[3]. Crossbred ewes carrying multiple pregnancies are much more likely to experience pregnancy toxemia[4] but it can also be observed in poorly nourished sheep with only a large single fetus[2]. In ewes the gestation period is short as compared to other animals and almost 80% of the fetal growth takes place in the final 6 weeks of pregnancy[1] and thus, the fetal demand for nutrients and glucose is at its greatest during the last two months of pregnancy[5]. Only small amount of glucose is absorbed from the rumen and therefore glucose requiring tissues rely on gluconeogenesis, mainly in the liver[6]. This alternative source involves the production of glucose from other non carbohydrate substances to facilitate glucose availability to the fetuses. As the ewe's body progresses in mobilizing more body fatty tissue an increase in hepatic fat accumulation occurs that will produce highly toxic byproducts or ketone bodies that are released into the blood circulation. The present study was undertaken to study the clinico-therapeutic efficacy of AV/KPC/10, a herbal drug (M/S Ayurvet Limited, India) in the treatment of pregnancy toxemia in ewes.

MATERIAL AND METHODS

Experimental design

The present investigation was undertaken at Department of Veterinary Medicine, College of Veterinary and Animal Sciences, Ranchi, Birsa Agricultural University, Jharkhand, in Chottanagpuri

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breed of sheep. A total of 12 ewes suffering from pregnancy toxemia, diagnosed by clinical symptoms, physical examination and Ross test, were selected for the study and were randomly divided into two groups– T1 (n=6) and T2 (n=6). Group T1 ewes were treated with AV/KPC/10 at the rate of 1tube (300gm)/day/animal for 3-5 days along with fluid administration and group T2 ewes were treated with conventional therapy, propylene glycol (50gm/day) and glycerine (100g/day), for 2-3 days as per the severity of disease along with fluid therapy of 50% glucose soln.@100ml/day. Hematological and biochemical parameters estimated on day 0 (before treatment) and 3rd, 7th and 14th day (post treatment). In addition to these parameters, other parameters like number of animals recovered per group, number of lamb survived, number of treatments required per animal per group and time required for complete recovery were also studied.

Statistical analysis

All the results were analyzed statistically by analysis of variance to determine the means and standard error[7].

RESULTS AND DISCUSSION

Hematological parameters

In the present study, on day 0 the hemoglobin percentage (gm%) among both groups, T1 (7.3 gm%) and T2 (7.2 gm%) varied non- significantly. But on 3rd day, the increase in hemoglobin (9.9 gm%) in AV/KPC/10 treated group T1 ewes was significantly (P<0.05) high in comparison to conventional therapy (8.3 gm%) treated group T2 ewes. Similarly, the hemoglobin percentage (gm%) in AV/KPC/10 treated group T1 ewes was significantly (P<0.05) high on day 7th (11.8 gm%) and day 14th (13.4 gm%) in comparison to conventional therapy treated group T2 ewes (9.2 and 11.2, respectively) (Table 1).

The variation in Packed cell volume (PCV) percentage on day 0 (pretreatment) was non significant among both treatment groups, T1 (23.8%) and T2 (22.9%), but PCV % increased significantly (P < 0.05) in AV/KPC/10 treated group T1 ewes on day 3rd (34.9 %), day 7th (35 %) and day 14th (38 %) as compared to conventional therapy treated group T2 ewes in which values were found to be 29.6 %, 30 % and 32 % on day 3rd, day 7th and day 14th, respectively (Table1).

Total erythrocyte count (TEC) on day 0 was low in group T1 ewes (6.2 X 10^6/µl) in comparison to group T2 ewes (6.7 X 10^6/µl) but on 3rd day after AV/KPC/10 treatment, the increase in TEC (7.6 X 10^6/µl) was more in group T1 ewes in comparison of conventional therapy treated group T2 ewes (7.2 X 10^6/µl). This significant increase in TEC in AV/KPC/10 treated group T1 ewes was seen on day 7th (9.3 X 10^6/µl) and day 14th (10.2 X 10^6/µl) in comparison to conventional therapy treated group T2 ewes (8.2 X 10^6/µl and 9.1 X 10^6/µl, respectively).

The total leukocyte count (TLC) on 0 day was low in group T2 ewes (2800**/**µl) in comparison to group T1 ewes (2900**/**µl) but after treatment on 3rd day, the comparative increase in TLC was more in AV/KPC/10 treated group T1 ewes (3800**/**µl) as compared to conventional therapy treated group T2 ewes (3200/µl**).** Also on day 7th and day 14th the TLC was significantly (P < 0.05) more in AV/KPC/10 treated group T1 ewes (7200/µl and 9200/µl, respectively) in comparison to conventional therapy treated group T2 ewes (6300 /µl and 7900 /µl, respectively) (Table 2).

Table 1: Hemoglobin (gm %) and PCV (%) during pre and post treatment in different treatment groups

	Haemoglobin (gm%)				PCV (%)			
Days / Parameters	**0**	**3rd**	**7th**	**14th**	**0**	**3rd**	**7th**	**14th**
Group T1 AV/KPC/10	7.3± 0.23	9.9± 0.38 [a]	11.8±0.43[a]	13.4±0.49[a]	23.8±0.89	34.9±1.31[a]	35± 1.03[a]	38± 1.05[a]
Group T2 Conventional therapy	7.2± 0.33	8.3± 0.41[b]	9.2± 0.32[b]	11.2±0.52[b]	22.9±0.67	29.6±1.26 [b]	30± 0.92[b]	32± 1.62[b]

Means with superscripts a and b differ significantly (P<0.05)

Biochemical parameters

Serum glucose concentration on 0 day was low in group T2 ewes (33 mg/dl) in comparison to group T1 ewes (36 mg/dl). After treatment on 3rd day, the comparative increase in serum glucose concentration was more in AV/KPC/10 treated group T 1 ewes (48 mg/dl) as compared to conventional therapy treated group T2 ewes (38 mg/dl). On day 7th and day 14th the serum glucose concentration was significantly (P<0.05) more in AV/KPC/10 treated group T1 ewes (54 mg/dl and 58 mg/dl, respectively) in comparison to conventional therapy treated group T2 ewes (43 mg/dl on both sampling days).

Table 2: TEC (10^6/µl) and TLC (/µl) during pre and post treatment in different treatment groups

	TEC (10^6/µl)				TLC (/µl)			
Days Parameters	**0**	**3rd**	**7th**	**14th**	**0**	**3rd**	**7th**	**14th**
Group T1 AV/KPC/10	6.2±0.56	7.6± 0.84	9.3± 1.37[a]	10.2± 1.08[a]	2900±6.23	3800±7.02	7200±6.9[a]	9200±6.3[a]
Group T2 Conventional therapy	6.7±0.39	7.2 ±1.02	8.2± 1.26[b]	9.1± 0.99[b]	2800±7.53	3200±7.81	6300±7.59[b]	7900±7.03[b]

Means with superscripts a and b differ significantly (P<0.05)

Table 3: Glucose level (mg/dl) during pre and post treatment in different treatment groups

	Serum Glucose (mg/dl)			
Days Parameters	**0**	**3rd**	**7th**	**14th**
Group T1 AV/KPC/10	36± 1.38	48± 1.21	54± 0.93[a]	58± 0.89[a]
Group T2 Conventional therapy	33± 2.09	38± 1.69	43± 0.67[b]	43± 0.96[b]

Means with superscripts a and b differ significantly (P<0.05)

On day 0 the total protein concentration was more in group T1 ewes (4.18 gm/dl) in comparison to group T2 ewes (3.98 gm/dl). But on day 3rd the increase in total protein concentration (4.63 gm/dl) was significantly (P<0.05) more in AV/KPC/10 treated group T1 ewes in comparison to conventional therapy treated group T2 ewes (4.08 gm/dl). Also on day 7th and day 14th the total protein co ncentration was significantly (P<0.05) more in AV/KPC/10 treated group T1 ewes (5.32 gm/dl and 7.34 gm/dl, respectively) in comparison to conventional therapy treated group T2 ewes (4.72 gm/dl and 6.52 gm/dl, respectively) (Table 4). Similarly, on day 0 the albumin concentration varied non significantly among both the groups T1 (2.15 gm/dl) and T2 (2.22 gm/dl). On 3rd day after treatment, the increase in albumin concentration was significantly (P<0.05) more in AV/KPC/10 treated group T1 ewes (2.97 gm/dl) in comparison to conventional therapy treated group T2 ewes (2.69 gm/dl). Though on day 7th and day 14th the albumin concentration decreased in both groups but the albumin concentration values were comparatively more in AV/KPC/10 treated group T1 ewes (2.69 gm/dl and 2.8 gm/dl, respectively) to conventional therapy treated group T2 ewes (2.42 gm/dl and 2.51 gm/dl, respectively).

On 0 day the alanine transaminase (ALT) concentration varied non significantly among both the groups, T1 (87 IU/L) and T2 (91 IU/L), but after treatment on day 3rd the decrease in ALT level was comparatively more in AV/KPC/10 treated group T1 ewes (75 IU/L) in comparison to conventional therapy treated group T2 ewes (82 IU/L). Even after completion of therapy on day 7th and day 14th, significantly (P < 0.05) low level of ALT observed in AV/KPC/10 treated group T1 ewes (53 IU/L and 34 IU/L, respectively) in comparison to conventional therapy treated group T2 ewes (68 IU/L and 49 IU/L, respectively) (Table 5).

The aspartate Aminotransferase (AST) concentration on 0 day also varied non significantly among both the groups. After treatment the AST level was decreased in both the groups on day 3rd (T1-135 IU/L and T2-141 IU/L) but on day 7th and day

14th the AST concentration was significantly (P < 0.05) low in AV/KPC/10 treated group T1 ewes (92 IU/L and 78 IU/L, respectively) as compared to conventional therapy treated group T2 ewes (101 IU/L and 95 IU/L, respectively) (Table 5).

Table 4: Total protein and albumin level (gm/dl) during pre and post treatment in different treatment groups

	Total Protein (gm/dl)				Albumin (gm/dl)			
Days / Parameters	0	3rd	7th	14th	0	3rd	7th	14th
Group T1 AV/KPC/10	4.18± 0.28	4.63± 0.33[a]	5.32± 0.29[a]	7.34± 0.27[a]	2.15± 0.31	2.97± 0.29[a]	2.69± 0.27	2.80±0.19
Group T2 Conventional therapy	3.98± 0.66	4.08±0.52[b]	4.72±0.31[b]	6.52±0.32[b]	2.22±0.29	2.69±0.31[b]	2.42±0.33	2.51±0.27

Means with superscripts a and b differ significantly (P<0.05)

Table 5: ALT and AST level (IU/L) during pre and post treatment in different treatment groups

	ALT (IU/L)				AST (IU/L)			
Days / Parameters	0	3rd	7th	14th	0	3rd	7th	14th
Group T1 AV/KPC/10	87± 2.03	75± 1.92	53± 1.96[a]	34± 0.22[a]	143± 3.69	135±2.95	92± 2.34[a]	78± 1.99[a]
Group T2 Conventional therapy	91± 2.65	82± 2.06	68± 2.08[b]	49± 0.31[b]	154± 3.58	141±3.21	101±2.93[b]	95± 2.06[b]

Means with superscripts a and b differ significantly (P<0.05)

Recovery and mortality

All ewes in AV/KPC/10 treated group recovered after 2 days of treatment but the conventional therapy treated group T2 ewes recovered after 4 day s of treatment. Also there was no mortality of lambs in AV/KPC/10 treated group but in conventional therapy treated group 1 lamb out of 6 died**.**

DISCUSSION

Pregnancy toxemia causes significant decrease in the level of hemoglobin, packed cell volume (PCV) and total erythrocyte count (TEC)[8] which could be due to deficiency of energy, protein and iron that are required for erythrop oietin production and hemoglobin synthesis[9].The increase in hematological parameters *viz* hemoglobin and TEC may be attributed to *Phyllanthus niruri,* an ingredient herb of AV/KPC/10 which has direct stimulant effect on hemopoietic tissues such as the liver and bone marrow[10]. Since hematocrit is the measure of RBC count over the total blood volume thus increase in RBC causes increase in hematocrit level.

The increase in TLC in AV/KPC/10 treated group may be attributed to its ingredient herb viz *Phyllanthus niruri* and *Asparagus racemosus* which are reported to produce leukocytosis and predominant neutophillia[11,12].

Pregnancy toxemia in small ruminants occurs because of the competition for glucose between the pregnant animals and their fetuses, as the latter undergo intensive growth[13]. The main energetic substrate for fetal development and colostrum/milk production is glucose[14,15]. The improvement in plasma glucose level in AV/KPC/10 treated group may be attributed to its ingredient herb of viz *Glycyrrhiza glabra* which helps in glucose metabolism[16].

Liver plays an important role in the protein synthesis. Pregnancy toxemia decreases the total

protein and albumin level[17,18]. ALT and AST are the specific markers to assess hepatocellular damage leading to liver cell necrosis. Ketonemia and ketonuria also significantly increases the level of AST and ALT due to liver damage[18].The increase in AST and ALT indicates the hepatic origin of pregnancy toxemia which may be attributed to fat mobilization[19] which is associated with inadequate dietary intake[20] or hepatic lipidosis .

The increase in total protein and albumin concentration and decrease in ALT and AST level in AV/KPC/10 treated group may be attributed to its ingredient herb viz *Glycyrrhiza glabra* and *Phyllanthus niruri* which possess the hepatoprotective activity and thus stimulates the protein synthesis by accelerating the regeneration process of liver cell[21].

CONCLUSION

Haemato-biochemical parameters improved significantly in AV/KPC/10 treated ewes and all the ewes recovered 2 days after AV/KPC/10 treatment. No mortality was recorded in lambs of AV/KPC/10 treated ewes. It can be concluded that AV/KPC/10 treatment significantly alleviate the pregnancy toxemia in ewes.

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