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Treatment of Pregnancy Toxemia in Does With Polyherbal Formulation

KEYWORDS: Herbal gel, pregnancy toxemia, does, glucose, hemoglobin

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ABSTRACT

In present study the impact of herbal product in treatment of pregnancy toxemia in does was examined. 12 does 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 does 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 does 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 does, there was significant (P≤0.05) improvement in hemoglobin, PCV, total erythrocyte count and total leukocyte count as compared to conventional therapy treated does of T2 group. AV/KPC/10 treatment in group T1 does efficiently restored the altered hematological as well as biochemical parameters as compared to that of conventional therapy treated group T2 does. In the present clinico-therapeutic trial, AV/KPC/10 herbal gel was found effective to treat pregnancy toxemia in does in comparison to conventional therapy.

INTRODUCTION

Pregnancy toxemia, also called gestational ketosis, caused by negative energy balance in late gestation is commonly observed in does (Kulcsar *et al.*, 2006). The affected animals shows the clinical signs of sudden onset of lethargy, hypothermia, dehydration, sternal recumbency with decreased awareness, open glazed eyes, black tarry stools and a doughy feeling to the skin (Batchelder *et al.*, 1999 ; Lewington, 2007). Negative energy balance is usually caused by increased fetal demand and decreased mother supply which usually results in severe hypoglycemia (Dalrymple, 2004). Glucose concentration changes during pregnancy vary from 60 mg/dl at 42 to 56 days of pregnancy to about 46 mg/ml at 112 to 126 days (Khan and Ludri, 2002). Animals carrying twins or triplets require 180% or 240% more energy, respectively, than those with a single fetus (Ermilio and Smith, 2011). The failure to meet this high demand of energy leads to mobilization of fat reserves in the body. Thus, ketone bodies are produced and get accumulated, which eventually leads to excessive ketone bodies in blood circulation, causing the increased susceptibility to pregnancy toxemia (Menzies, 2011). Hepatic lipidosis is a major metabolic disorder resulting due to pregnancy toxemia in goats. The objective of the study was to evaluate the clinico-therapeutic efficacy of AV/KPC/10, a herbal gel (M/S Ayurvet Limited, India) in the treatment of pregnancy toxemia in does.

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 Jamnapari and Black Bengal breeds of goats. A total of 12 does 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 does 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 does were treated with conventional therapy, propylene glycol at the rate of 50gm/day and glycerine at the rate of 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 kids survived, number of treatments required per animal per group and time required for complete recovery were also studied.

RESULTS AND DISCUSSION

Hematological parameters

The performed hematological investigations showed decrease in hemoglobin content, packed cell volume (PCV) percentage and total erythrocyte count (TEC) in does suffering from pregnancy toxemia. Mohamed *et al.*, (2004) and Barakat *et al.*, (2007) also reported decreased hematological values in the goats suffering from pregnancy toxemia.

Hemoglobin percentage among both the groups, T1 and T2, varied non- significantly on day zero (7.5 gm% and 7.4 gm%, respectively). On day 3rd after treatment with AV/KPC/10 hemoglobin concentration increased significantly (P<0.05) in group T1 does (9.5 gm%) as compare to conventional therapy treated group T2 does (8.7 gm%). This significant (P<0.05) increasing trend in hemoglobin concentration in group T1 does continued to day 7th and day 14th

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(12.2 gm% and 12.8 gm%) in comparison to conventional therapy (9.8 gm% and 11.4 gm%, respectively) (Table 1).

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	7.5±.024	9.5± 0.49[a]	12.2±0.63[a]	12.8±0.34[a]	25.6±0.83	35.2±0.92[a]	37± 1.03[a]	40± 1.52[a]
Group T2 Conventional therapy	7.4± 0.53	8.7± 0.52[b]	9.8± 0.39[b]	11.4±0.31[b]	26.1±0.95	31.2±1.85[b]	30.2±0.96[b]	36± 1.63[b]

Means with different superscripts differ significantly (P<0.05)

PCV percentage on day 0 also varied non significantly among both treatment groups, T1 (25.6%) and T2 (26.1%). On 3rd day in AV/KPC/10 treated group T1 does, the increase in PCV % (35.2%) was significantly (P<0.05) more in comparison of conventional therapy treated group T2 does (31.2%). This increasing trend (P<0.05) in PCV % continued to day 7th and day14th after AV/KPC/10 treatment (37% and 40%, respectively) in comparison to conventional therapy (30% and 32%, respectively) (Table 1).

TEC on 0 day varied non significantly among group T1 and group T2 does (7.1 X 10^6/µl and 6.9 X 10^6/µl, respectively). But on 3rd day after AV/KPC/10 treatment, the increase in TEC (7.9 X 10^6/µl) was more in group T1 does in comparison of conventional therapy treated group T2 does (7.4 X 10^6/µl). Significantly higher (P<0.05) TEC in AV/KPC/10 treated group T1 does was seen on day 7th (9.5 X 10^6/µl) and14th (10.8 X 10^6/µl) in comparison to conventional therapy (8.1X 10^6/µl and 9.8 X 10^6/µl, respectively) treated group T2 does (Table 2).

The increase in hemoglobin, PCV and TEC in AV/KPC/10 treated group may be attributed to its ingredient herb viz *Phyllanthus niruri* and *Asparagus racemosus* which have direct stimulant effect on hemopoietic tissues such as the liver and bone marrow (Pal *et al.*, 2013; Rekhate *et al.*, 2004; Osime *et al.*, 2008)

Total leukocyte count (TLC) on day 0 was low in group T1 does (2900/µl) in comparison to group T2 does (3100/µl). But after AV/KPC/10 treatment on 3rd day, the comparative increase in TLC was more in group T1 does (3900/µl) as compared to conventional therapy treated group T2 does (3600/µl). Even on day 7th and day 14th the TLC was significantly (P<0.05) more in AV/KPC/10 treated group T1 does (7500/µl and 9600/µl, respectively) in comparison to conventional therapy treated group T2 does (6400/µl and 8200/µl, respectively) (Table 2). The increase in TLC in AV/KPC/10 treated group may be attributed to its ingredient herb viz *Phyllanthus niruri* and *Asparagus racemosus* which have immunomodulatory activity (Alok *et al.*, 2013; Veeresh *et al.*, 2015).

Table 2: Total erythrocyte count (10^6/µl) and Total Leukocyte Count (/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	7.1±0.45	7.9± 0.96	9.5±1.85[a]	10.8± 1.04[a]	2900±6.55	3900±6.99	7500±7.66[a]	9600±6.59[a]
Group T2 Conventional therapy	6.9±0.61	7.4± 1.19	8.1± 1.27[b]	9.8± 1.29[b]	3100±8.02	3600±8.57	6400±7.51[b]	8200±7.11[b]

Means with different superscripts differ significantly (P<0.05)

Biochemical Parameters

Pregnancy toxemia of goats appears to occur when the animal cannot meet the glucose demands of the fetal/placental unit and hypoglycemia and ketonemia develop (Hefnawy *et al.*, 2011). In the present study, the serum glucose concentration was recorded to be 34 mg/dl and 32mg/dl on day 0 in group T1 and T2 does, respectively. On day 3rd after AV/KPC/10 treatment the glucose concentration increased significantly (P<0.05) in group T1 does (51 mg/dl) as compared to conventional therapy treated group T2 does (39 mg/dl). This increasing trend (P<0.05) in glucose level continued to day 7th and day 14th after AV/KPC/10 treatment (56 mg/dl and 61 mg/dl, respectively) in comparison to conventional therapy (41mg/dl and 51mg/dl) (Table 3). The improvement in plasma glucose level may be attributed to ingredient herb of AV/KPC/10 viz *Glycyrrhiza glabra* which helps in glucose metabolism (Gupta *et al.*, 2011).

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	34±1.96	51±1.66[a]	56± 0.99[a]	61±0.85[a]
Group T2 Conventional therapy	32±1.21	39±2.06[b]	41±0.54[b]	51±1.05[b]

Means with different superscripts differ significantly (P<0.05)

Hepatic origin of pregnancy toxemia causes the marked drop in serum total protein and albumin with increase in

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Aspartate Aminotransferase (AST) and Alanine transaminase (ALT) due to fat mobilizationwhich is associated with inadequate dietary intake or due to hepatic damage (Radostits , 2000) or hepatic lipidosis (Vau Saun, 2000).

In the current study, the lower total protein concentrations were found on day 0 in both the groups, T1 (4.37 gm/dl) and T2 (4.12 gm/dl), respectively. On day 3rd after AV/KPC/10 treatment the total protein concentration increased in group T1 does (4.91 gm/dl) as compared to conventional therapy treated group T2 does (4.56 gm/dl). On day 7th and day 14th, the total protein concentration was significantly (P<0.05) more in AV/KPC/10 treated group T1 does (5.51gm/dl and 7.1 gm/dl, respectively) in comparison to conventional therapy treated group T2 does (5.03 gm/dl and 6.29 gm/dl, respectively) (Table 4).

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	4.37±0.32	4.91±0.91	5.51±0.38^{a}	7.1±0.41^{a}	1.95±0.14	2.98±0.46^{a}	2.79±0.31^{a}	2.86±0.31^{a}
Group T2 Conventional therapy	4.12±0.51	4.56±0.21	5.03±0.29^{b}	6.29±0.28^{b}	2.34±0.21	2.42±0.22^{b}	2.57±0.51^{b}	2.64±0.22^{b}

Means with different superscripts differ significantly (P<0.05)

Similarly, albumin concentration on day 0 was found to be 1.95 gm/dl and 2.34 gm/dl in group T1 and T2, respectively. On day 3rd, day 7th and day 14th the increase in albumin concentration was significantly (P<0.05) high in AV/KPC/10 treated group T1 does (2.98 gm/dl, 2.79 gm/dl and 2.86 gm/dl, respectively) as compared to conventional therapy treated group T2 does (2.34 gm/dl, 2.57 gm/dl and 2.64 gm/dl, respectively) (Table 4).

The ALT concentration in groups T1 and T2 does on day 0 was 72 IU/L and 78 IU/L, respectively. After treatments at day 3rd, the ALT level was decreased in both the groups-T1 does (69 IU/L) and T2 does (71 IU/L). But on day 7th and day 14th, significantly (P<0.05) decreased level of ALT was observed in AV/KPC/10 treated group T1 does (55 IU/L and 29 IU/L, respectively) in comparison to conventional therapy treated group T2 does (64 IU/L and 51 IU/L, respectively) (Table 5).

The AST concentration on day 0 was high in group T1 (176 IU/L) does in comparison to group T2 does (166 IU/L). At day 3rd day in AV/KPC/10 treated group T1 does, the decrease in AST concentration (138 IU/L) was significant (P<0.05) in comparison to conventional therapy treated group T2 does (153 IU/L). Even after completion of therapy on day 7th and day 14th the AST concentration was significantly low (P<0.05) in AV/KPC/10 treated group T1 does (91 IU/L and 84 IU/L, respectively) as compared to conventional therapy treated group T2 does (114 IU/L and 98 IU/L, respectively) (Table 5).

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 stimulates the protein synthesis by accelerating the regeneration process of liver cell (Ramamurthy *et al.,* 2014; Saxena, 2005).

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	72± 2.41	69± 1.89	55± 2.34^{a}	29± 0.28^{a}	176±4.09	138±3.19^{a}	91± 1.68^{a}	84± 2.11^{a}
Group T2 Conventional therapy	78± 3.01	71± 2.11	64± 2.09^{b}	51± 0.31^{b}	166±4.25	153±3.22^{b}	114±1.53^{b}	98± 1.83^{b}

Means with different superscripts differ significantly (P<0.05)

Recovery and mortality:
All does in AV/KPC/10 treated group recovered after 2 days of treatment but the conventional therapy treated group T2 does recovered after 4 days of treatment. Also there was no mortality of kids in AV/KPC/10 treated group but in conventional therapy treated group 2 kids out of 10 died.

CONCLUSION

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

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