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Effect of dystocia on liver enzymes activities and concentration of some oxidative stress markers in goats

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Abstract
A total of 18 goats (n=12 difficult kidded and n= 6 normal kidded) were incorporated in this research work to calculate the liver enzymes activity and oxidative stress. The outcome specify that various liver enzymes as well as oxidative stress markers altered significantly (p<0.05) and it is summarize that abnormal parturition apply excessive stress to dam ensuing increase in the various liver enzymes concentration as well as oxidative stress.

Keywords: Dystocia, goats, liver enzymes, oxidative stress markers

Introduction
India is predominantly an agricultural country with about 70 percent of its population dependent on agriculture. Livestock is an important component of the Indian rural economy. Goat is kept for milk and meat production. Reproduction in goats is described as seasonal; the onset and length of the breeding season is dependent on various factors such as latitude, climate, breed, physiological stage, presence of the male, breeding system and photoperiod (Khanum *et al*., 2000) [10]. Goat is small ruminant and there gestation period is 142-145 days. The average estrous cycle length, first mating age, kidding age and gestation length of goats are 21 days, 9-10 months, 13 months and 150 days, respectively (Khadiga *et al*., 2005) [9]. Goats are the most fertile species of the domestic animals with conception rates in the range of 90% (Peaker, 1978) [15].
Failure/prolongation of transition from stage I to stage II of labour is defined as dystocia (Anderson *et al*., 1990) [2]. The occurrence for this problem in goats is 8.23 % (Mehta *et al*., 2002) [12]. Much data are available for peri parturient disorder in bovine. However, it is very scanty for goats hence the present research was undertaken to evaluate the liver enzymes activity and oxidative stress in goats affected with dystocia.

Materials and Methods
The research was conducted on twelve goats presented at Clinical Complex Deesa with history of difficulty in kidding and were again grouped as Group I maternal (n=6) and Group II fetal (n=6) based upon the etiology of dystocia. Six normal parturited (selected from the Panjrapole Kant) were serve as control group (Group III).These difficult kidded goats dystocia was relieved by appropriate obstetrical operation. The complete medicinal treatment was given i.e. Inj. Oxytetracycline, to combat infection, Inj. Piroxicam like pain killer, animals were rehydrated if required. Blood was collected by jugular vein puncture aseptically from each goats at the time of clinical presentation prior to relieve of dystocia or just prior to kidding (P1); immediately after reliving of dystocia/immediately after kidding (P2); on day 7th (P3) and 11th (P4) of post obstetrical manuvarium/day of kidding and plasma was collected. All the plasma samples were analysed for liver enzymes using market available kits and oxidative stress markers in terms of malondialdehyde (MDA) by using the method of Zadeh *et al*. (1996) whereas the glutathione reductase (GR) content of blood plasma was calculated using the method of Sedlak and Lindsay (1968) [16].

The obtain numbers were analysed statistically by factorial randomized block design (FRBD) followed by Duncan's new multiple range test (MRT) to find out any alteration for parameters as describe by Snedecor and Cochran (1994) [18].

Results and Discussion

A. Aspartate amino transferase

Significantly (p<0.05) alteration was noticed for Aspartate amino transferase being higher in both difficult kidded groups as compare to normal kidded for various periods (Table 1).similar trends for aspartate amino transferase is documented in dystocia affected ovines (Azawi *et al*., 2007) [3] and in cattle (Hussain and Abdellah, 2008). However the finding of (Ahmed *et al*., 2009) [1] was contradictory to this research.

Increased values for transaminase in difficult parturited goats may be justified as widespread uterine and placental damage which in turn increases. Cellular permeability due to tissue hypoxia (Devkota *et al*., 2015) [5]. Increased levels of transaminase due to increased stress favours gluconeogenesis and sudden increase in transaminase (Faria and Simoes 2015) [7].

B. Alanine amino transferase

Significantly (p<0.05) increased value for alanine amino transferase were found in both difficult kidded goats for various periods. The finding of (Yeldiz *et al*., 2002) [19] in goats is similar and support to finding of present study but disagree with the finding of (Brozos *et al*., 2012) [4] in ewes. Increased concentration of Alanine amino transferase in difficult kidded goats might be due to damage of liver tissue/toxemia (Mehta *et al*., 2002) [12].

C. Alkaline phosphatase

In the present study, increased value for alkaline phosphatase were found in difficult kidded as well as normal kidded groups for P3 while lower levels were found for P1 difficult kidded as well as normal kidded groups. (Table1). The result of present study for plasma alkaline phosphatase is in accordance with (Manju *et al*., 1985) [11]. However, No such trend was noticed by (Patel 2019) [14].

D. Lipid peroxidase

Significantly (p<0.05) higher levels of MDA was noticed in difficult kidded goats while no significant changes were noticed for various periods. (Table 2). The obtained values were in harmony with findings of (Satya *et al*., 2007) [22] in buffaloes While differ from study of (Yokus *et al*., 2007) [20] in cattle. Elevated membrane damage markers like MDA in difficult kidded goats could be due to severe straining during kidding. The problem of difficult kidding and method of relieving dystocia further add in oxidative damage (Moren *et al*., 1979) [13].

E. Glutathione reductase

A significant (p<0.05) alterations is noticed in all groups and for different periods in present research, Significantly (p<0.05) higher value of plasma glutathione reductase was found in group III then group I and II, further, higher level of plasma glutathione reductase was noticed for P4 of group III (Table 2). A similar trends was reported by (Dhindsa *et al* 2005) [6] in buffaloes.

Table 1: Plasma concentration of liver enzymes in dystocia affected goats

Parameters	Groups	P1 (just before to relieve the dystocia/ kidding)	P2 (just after the relieve the dystocia/ kidding)	P3 (on the 7th post kidded days)	P4 (on the 11th post kidded days)
Aspartate amino transferase (U/L)	G1 (Maternal)	$98.01\pm6.98^{ab}_{qr}$	$111.82\pm 4.59^{b}_{p}$	$104.69\pm4.92^{a}_{pq}$	$93.29\pm4.14^{ab}_{r}$
	G2 (Fetal)	$99.71\pm2.18\ ^{a}_{q}$	$118.23\pm15.12^{a}_{p}$	$89.41\pm4.12^{b}_{q}$	$97.16\pm3.06^{a}_{q}$
	G3 (Control)	$74.16\pm2.18^{c}_{qr}$	$85.55\pm15.12^{c}_{p}$	$69.25\pm4.12^{c}_{qr}$	$77.08\pm3.06^{c}_{pq}$
Alanine amino transferase (U/L)	G1 (Maternal)	39.56 ± 3.98^{a}	31.68 ± 2.37^{b}	28.78 ± 6.98^{a}	28.20 ± 6.56^{a}
	G2 (Fetal)	31.85 ± 3.53^{b}	37.12 ± 1.84^{a}	29.13 ± 1.27^{a}	30.28 ± 0.82^{a}
	G3 (Control)	21.81 ± 1.57^{c}	24.09 ± 3.24^{c}	20.68 ± 1.86^{b}	28.93 ± 5.08^{a}
Alkaline phosphatase (U/L)	G1 (Maternal)	$269.73\pm3.89_{r}$	$264.48\pm2.09_{r}$	$291.45\pm3.85_{q}$	$300.42\pm4.35_{p}$
	G2 (Fetal)	$255.91\pm6.77_{s}$	$266.21\pm4.44_{r}$	$292.43\pm3.51_{q}$	$300.17\pm3.53_{p}$
	G3 (Control)	$255.65\pm4.04_{r}$	$257.19\pm2.31_{r}$	$289.50\pm4.15_{q}$	$300.94\pm4.53_{p}$

Note: Different superscripts in rows and subscripts in columns for a parameter differ significantly (p<0.05)

Table 2: Plasma concentration of oxidative stress markers in dystocia affected goats

Parameters	Groups	P1 (just before to relieve the dystocia/kidding)	P2 (Just after the relieve the dystocia/ kidding)	P3(On the 7th post kidded days)	P4(On the 11th post kidded days)
MDA (umol/ml)	G1 (Maternal)	2.34 ± 0.28^{ab}	2.27 ± 0.27^{a}	1.77 ± 0.31^{b}	1.75 ± 0.22^{b}
	G2 (Fetal)	2.40 ± 0.31^{a}	2.52 ± 0.32^{a}	2.42 ± 0.29^{a}	2.22 ± 0.19^{a}
	G3 (Control)	1.97 ± 0.22^{b}	1.65 ± 0.24^{b}	1.70 ± 0.13^{b}	2.02 ± 0.28^{ab}
Glutathione reductase (U/L)	G1 (Maternal)	$10.49\pm0.54^{b}_{r}$	$10.90\pm0.50^{b}_{r}$	$11.51\pm0.49^{c}_{q}$	$12.32\pm0.69^{c}_{p}$
	G2 (Fetal)	$10.51\pm0.51_{r}\ ^{b}$	$11.02\pm0.61_{r}\ ^{b}$	$12.10\pm0.54^{b}_{q}$	$12.890\pm0.74^{b}_{p}$
	G3 (Control)	$13.31\pm0.75^{a}_{s}$	$13.98\pm0.67^{a}_{r}$	$14.60\pm0.63^{a}_{q}$	$15.20\pm0.62^{a}_{p}$

Note: Mean bearing different superscripts in row and subscript in columns differ significantly (p<0.05)

Conclusions

In the present study rigorous changes were noticed for various liver enzymes as well as for oxidative stress markers. These changes can be used as a prognostic value for future survival of dam as well as for fetus.

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