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Research Article

COMPARATIVE ANALYSIS OF LIVER FUNCTION TESTS IN PERI-PARTURIENT AND DYSTOCIA AFFECTED DOES

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ABSTRACT

The present research work was undertaken to evaluate the liver enzymes activity in does affected with dystocia (n=12) and following obstetrical interventions. Six does with normal kidding (n=6) served as a control group. The result indicated that the enzymes AST varied significantly (P<0.05) between the groups as well as various periods, ALT varied significantly (P<0.05) with in the groups while AKP varied significantly (P<0.05) for various periods.

Key words: Alanine amino transferase, alkaline phosphatase, aspartate amino transferase, does, dystocia

Dystocia is a common obstetrical problem in all farm animals, which, unless relieved, leads to death of the fetus and sometimes the death of the dam (Arthur *et al*., 1999). Circulatory activities of transaminase are index of tissue damage. Severe stress and trauma is caused by obstetrical manuvarium employed to deliver the fetus (Hayer and Jochle, 1990). Any stress can cause rise in circulatory transaminase (Kaushik and Bugalia, 1999). Alkaline phosphatise (AKP), aspartate amino transferase (AST) and alanine amino transferase (ALT) are present in small quantities in plasma of ruminant as a consequence of normal tissue metabolism and subsequent enzyme release (Coles, 1986). The increases observed are often a reflection of cellular metabolism or some disease conditions. The increases of AST is necessary for accelerating the rate of metabolism and protein biosynthesis needed for fetal growth as well as milk production (Arthur *et al*.,1999). Compared to other species, relatively, very little/no information is known about liver function tests in dystocia affected does. Therefore, the present study was conducted to monitor altered enzymatic levels in does affected with dystocia.

MATERIALS AND METHODS

A total of 18 does comprised of 12 difficult kidded (presented at Clinical Complex Deesa) and 6 normal kidded (selected from the Panjrapole Kant) were selected for the present study. These dystocic does were further examined for gyneco-clinical examination and classified into Group I maternal (n=6) and Group II fetal (n=6) dystocia causes. Normal kidded does (n=6) served as a control (Group III). Depending upon the nature of dystocia, it was relieved either by forced traction, mutation, or caesarean section. The appropriate medicinal therapy after reliving the dystocia i.e. Inj. Ceftriaxone as broadspectrum antibiotic, Inj. Meloxicam as analgesic and Normal Saline + Ringers lactate as supportive fluid therapy were given. Blood was collected aseptically from each doe 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 the day 7th (P3) and 11th (P4) of post obstetrical manuvarium or day of kidding. Plasma was harvested and stored at -20^{o}C until analysis. All the plasma samples were analysed for AST, ALT, AKP using standard analytic kits (Agappe Diagnostic Ltd., Ernakulam, Kerala) on semi-automatic biochemistry analyzer RX-50V (Micro Lab, India). The data obtained were analysed statistically by factorial randomized block design (FRBD) followed by Duncan's new multiple range test (MRT) to find out the significant difference between the groups during various periods as described by Snedecor and Cochran, 1994.

RESULTS AND DISCUSSION

Significantly(P<0.05) higher levels of AST were found in both dystocia affected groups after reliving the dystocia as well as after normal kidding as compared to 7th and 11th day of post partum. Thereafter, AST was found to be decreasing up to P4 (day 11th) in the present study. In comparison to the post-partum periods, the higher AST level before and after reliving the dystocia has been reported in torsion affected buffaloes (Ali *et al.,* 2011; Arora *et al*., 2013) and dystocia affected cattle (Hussain and Abdellah, 2008). Further, Amin *et al.* (2011) reported higher AST activity in dystocia affected buffaloes, however, no significant change was recorded during various periods. In an another study on doe, Iridam (2007) found no significant change in AST levels from parturition to 3 weeks in normal kidded does but Tharwat *et al.* (2013) reported significant higher levels of plasma AST after one week of kidding as compared to day of kidding and 2nd week post kidding, which contradict to the findings of the present study.

Elevated activities of transaminase during pre and post obstetrical manuvarium in dystocia could be consequential to extensive uterine and placental damage and resultant increased cellular permeability due to tissue

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Table 1
Plasma concentration of liver enzymes in dystocia affected does

Parameters	Groups	P1 (Just prior to relive the dystocia/ kidding)	P2(Just after the reliving of dystocia/ kidding)	P3(on the 7th post kidded day)	P4(on the 11th post kidded day)
AST(IU/L)	G1(Maternal)	$98.01\pm6.98^{ab}_{qr}$	$111.82\pm4.59^{b}_{p}$	$104.69\pm4.92^{a}_{pq}$	$93.29\pm4.14^{ab}_{r}$
	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)	$74.16\pm2.18^{c}_{qr}$	$85.55\pm15.12^{c}_{p}$	$69.25\pm4.12^{c}_{qr}$	$77.08\pm3.06^{c}_{pq}$
ALT(IU/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}
AKP(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 (a,b,c) in rows and subscript (p,q,r,s) in columns for a parameter differ significantly ($P<0.05$)

hypoxia in stress favouring transfer of transaminase into the circulation (Highman and Atland, 1960). Elevated catecholamine's during stress stimulate gluconeogenesis and associative rise in transaminase (Page *et al.,* 1960). Asparate amino transferase is present in the small quantity in the serum of ruminants as a consequence of normal tissue destructions and subsequent enzyme release. Moreover, the increase in the AST concentration is often associated with cellular destructions or disease (Hoeben *et al.,* 2000).The increase of AST was necessary for accelerating the rate of metabolism and protein biosynthesis needed for fetal growth as well as milk production (Arthur et al., 1999). In addition, the increase in the AST concentrations may be due to the great muscular contractions which are exerted during the process of kidding (Farrag *et al.,* 1984).

Significantly ($P<0.05$) higher levels of ALT were found in both dystocia affected groups before and after reliving the dystocia as compared to 7th and 11th day of obstetrical manuvarium, while, lower levels were found on day 7thday in normally kidded does. These observations are in agreement with the finding in buffaloes (Kaur and Singh, 1993; Prabhaker *et al.*, 2000). However, Pattabiraman and Pandit (1980) observed non significant variations in plasma ALT concentrations in uterine torsion affected buffaloes.

Higher ALT concentrations in dystocia affected does can be explained due to hepatic or muscular damage as increase in plasma ALT concentration is associated specifically with hepatocellular disorders (Kaneko, 1990). Higher plasma ALT concentrations around the kidding may be due to parturition stress, which causes release of catecholamine's (Atland and Benjamine, 1961) and glucocorticoids (Pageetal., 1960) which subsequently increases ALT concentrations. Further, higher levels of ALT might be explained by toxaemia resulted in damage to parenchymatous organ. Excessive release of catecholamine's due to stress of dystocia and increased utilization of carbohydrate reserve might have increased ALT level. Further, in dystocia cases, stress induces tissue hypoxia and adrenaline hyperactivity and increases cellular activity which favours uterine transaminase in total blood circulations (Pattabiraman and Pandit, 1980).

In the present study, significantly higher levels of AKP were found in all the groups on the11th day of obstetrical manuvarium or post kidding while lower levels were found just before reliving the dystocia/just prior to kidding in all the groups. The significantly increased levels of AKP during post-partum are in accordance with previous reports (Mahanwar *et al.,* 2012; Tharwat *et al.*, 2013). The increase in enzyme activity appears to be due to the liberation of enzymes from placenta during pregnancy and the uterine events related to pregnancy. The higher value of AKP at post partum is also reported in Awassi ewes (Gurgoze *et al.,* 2009). Increased activity of alkaline phosphatase during lactation can also be attributed to an increase in the production of isoenzyme. Further, increased levels of plasma AKP during post-partum periods in does may be related to accumulations of triglyceride in liver (Tharwat *et al*., 2013). Contrary to the findings of present study, some workers did not find any significant changes throughout pregnancy and post partum period (Waziri *et al.,* 2010). There are also reports of lower

level of plasma AKP in dystocia affected buffaloes than the normal parturited buffaloes (Prabhaker *et al.,* 2000).

The marked liver enzymes changes were observed during peri- parturient period in dystocia affected as well normal kidded does. The enzyme AST varied significantly ($P<0.05$) between the groups as well as various periods, ALT varied significantly ($P<0.05$) with in the groups while AKP varied significantly ($P<0.05$) for various periods. These alterations in liver enzymes, thus may be used as references for does during the peri-partum period.

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