EFFECT OF DIFFERENT ECBOLIC THERAPY ON BLOOD METABOLIC PROFILE AND PROTEINOGRAM IN DYSTOCIA AFFECTED DANGI COWS

D. B. BHOI, C. T. KHASATIYA* AND V. K. DESAI

Department of Veterinary Gynaecology and Obstetrics
Vanbandhu College of Veterinary Science and Animal Husbandry
Navsari Agricultural University (NAU), Navsari - 396450 (Gujarat)

ABSTRACT

The study was conducted on dystocia affected eighteen Dangi cows to investigate effect of different ecbolic therapies at calving on postpartum blood metabolic profile and proteinogram. Group-I (T1) and Group-II (T2) cows were injected intramuscularly with methyl-ergometrine (5mg) and dinoprost tromethamine (25 mg), respectively, immediately after parturition. Group-III (T3) cows received herbal ecbolic boli Exapar @ 2-4 boli, bid, PO for first 10 days postpartum. The mean plasma glucose levels were found significantly higher (P<0.05) on the day of calving and then declining up to 28th day postpartum. The mean serum total cholesterol levels in all treatment groups differed non-significantly with an increasing trend. The serum total protein concentrations fluctuated either significantly or non-significantly between various days of postpartum. The mean serum albumin concentration in T1 and T2 groups were decreased non-significantly (P?0.05) and in T3 group decreased significantly (P<0.05) at 7th day postpartum and thereafter linearly increased with a significant difference at 28th day postpartum. The mean serum globulin concentration in T1 and T3 groups decreased significantly (P<0.05) and in T2 group decreased non-significantly (P?0.05) at 7th day postpartum and thereafter linearly increased with significantly higher value at 28th day postpartum. The albumin globulin ratio fluctuated non-significantly (P?0.05) between different days/ intervals in all the treatment groups in Dangi cows and significantly (P<0.05) higher ratio was found on the 7th day postpartum in treatment T3.

Keywords: Dangi cow, Dystocia, Ecbolic, Metabolic profile, Postpartum, Protein.

INTRODUCTION

Dangi cow (*Bos indicus*) is one of the 38 recognized dual purpose cattle breed of India reared mostly by tribes in Dangs district and adjoining areas of Gujarat and Nashik, Ahmednagar and Dhule districts in Maharashtra. The early postpartum period in cattle is characterized by dramatic changes in metabolism and host defense mechanisms particularly during the puerperal period (Fiore *et al.*, 2015). Hence, the present study was aimed to evaluate effect of different ecbolic treatments at calving on blood metabolic profile and proteinogram during postpartum period in Dangi cows in their home track.

MATERIALS AND METHODS

The present study was carried out under field conditions on 18 dystocia affected Dangi cows following successful parturition with artificial aids without any complications, from parturition to puerperal period and thereafter up to eighteen months postpartum. The animals were maintained by farmers in different villages of Dangs district, Gujarat. They were randomly divided into three groups comprising of six cows each. The cows in Group-I (T1) and II (T2) were treated intramuscularly with methylergometrine maleate (Inj. Nexbolic, 5 mg, Intas Pharmaceuticals Ltd.) and dinoprost tromethamine, a natural PGF2á (Inj. Lutalyse, 25 mg, Pfizer Animal Health Ltd.), respectively, immediately after parturition. The cows in Group-III (T3) were treated with herbal ecbolic (Bol. Exapar, 2-4 bolus bid, Ayurvet Ltd.) after calving to 10 days postpartum. Blood samples were collected by Jugular vein puncture from all animals on day of parturition (0 day), on 7th, 14th, 21st and 28th day postpartum in serum clotting vaccutainers (BD) and serum was separated after clotting followed by centrifugation at 3000 rpm for 15 minutes and stored at -20°C in deep freezer until analysis for estimation of total cholesterol concentration and proteinogram which includes serum total protein, albumin, globulin and A/G ratio. The blood samples were also collected in sodium fluoride/ Na_2EDTA vaccutainers and plasma was separated immediately for plasma glucose estimation. The biochemical analysis was performed using commercially available kits (Diatek Healthcare Pvt. Ltd. Hooghly, WB). The data on metabolic profile and proteinogram were suitably tabulated and analyzed following standard statistical methods using CRD and

Corresponding author:
E-mail: drctkhasatiya@yahoo.in Mob: 09427255039

DMRT as per the procedures described by Steel and Torrie (1981).

RESULTS AND DISCUSSION

The plasma glucose, serum total cholesterol, total protein, albumin and globulin concentrations and albumin/globulin ratio at different time intervals of postpartum period treated with ecbolics in Dangi cows are presented in Table No. 1.

The overall pooled mean plasma glucose concentration was 56.58±0.79 mg/dl for all the groups of Dangi cows. It was in agreement with 58.01±0.76, 58.74±0.85 and 61.52±0.80 mg/dl reported by Patel *et al.* (2017) in methyl-ergometrine, Utrovet and $PGF_2á$ treated HF crossbred cows, respectively. The mean plasma glucose concentrations on the day of calving were found highest in all the treatment groups, which then fluctuated significantly (P<0.05) with declining trend till 28th day postpartum. This may be attributed to parturition and lactational stress leading to negative energy balance postpartum. The present findings corroborated well with those of Omur *et al.* (2016) who reported a significantly higher glucose concentrations on the day of parturition (80.5±5.96 mg/dl) as compared to three weeks postpartum (50.7±3.71 mg/dl).

The mean serum total cholesterol levels were found non-significantly different ($P_⌐$ 0.05) in all the treatment groups and significantly differed (P<0.01) between various days. The overall mean serum total cholesterol of 123.55±1.44 mg/dl found in Dangi cows was in agreement with the reports of Kumar *et al.* (2001) in RFM cows treated using ecbolic drugs, and values of 125.60±3.30, 120.56±3.91 and 120.61±4.45 mg/dl reported by Patel *et al.* (2017) in methylergometrine, $PGF_2á$ and Utrovet treated HF crossbred cows, respectively. In the present study, an increasing trend of cholesterol levels was found from calving to 28th day postpartum which was in agreement with the observations of Coroian *et al.* (2017) and Omur *et al.* (2016).Lactation probably also affected the level of serum cholesterol, which act as a fatty acid carrier in the form of cholesterol ester for milk synthesis, which resulted in gradual increase in serum cholesterol level with advancement of lactation.

Means bearing different superscripts within the column (w,x) or within the row (a,b,c) for a trait differ significantly (P<0.05).

The overall mean serum total protein level of 7.68±0.09 g/dl from all the treatment groups of Dangi cows and was within the normal range of 6.7 - 8.5 g/dl (Merck, 2003) and corroborated well with 7.77±0.26, 7.89±0.20 and 7.84±0.16 g/dl as reported by Patel *et al.* (2017) in methylergometrine, $PGF_2á$ and Utrovet treated groups of HF crossbred cows, respectively. The mean serum total protein concentration in each of the treatment groups was observed to be fluctuated either significantly (P<0.01) or non-significantly (P>0.01) between various days postpartum. This might be attributed to the process of wear & tear, repair and building of damaged tissues during parturition and to overcome the forthcoming lactational and production stress. The trend of total protein level was comparable with the findings of Cernescu *et al.* (2010), who found a linear increase in serum total protein level as 7.23±0.08, 7.45±0.11 and 8.09±1.02 g/dl on 5-6, 20-21 and 40-41 days postpartum in HF cows, respectively.

The overall mean serum albumin concentration found as 4.01±0.05 g/dl from all the groups of Dangi cows was within the normal range of 2.7-4.7 g/dl reported by Lager and Jorden 2012) and in agreement with 3.9±0.1 g/dl in HF cows on day 40-41 postpartum, and 4.10±0.12 g/dl in healthy cows at early lactation up to two months postpartum reported by Cernescu *et al.* (2010) and Ruginosu *et al.* (2011), respectively. The mean serum albumin concentrations in the treatment groups I and II were observed to be decreased non-significantly ($P_⌐$ 0.05) and in the treatment group T3 decreased significantly (P<0.05) at 7th day postpartum and thereafter linearly increased and was found to be significantly higher at 28th day postpartum in Dangi cows. The mean serum albumin concentrations showed gradual increase from the 7th day postpartum to 28th day postpartum in Dangi cows which was supported by the observations of Al-Mujalli (2008). On the contrary, Tothova e*t al.* (2018) found significantly decreasing albumin concentration in Slovak spotted cows to be 3.50±0.26, 3.43±0.40 and 3.26±0.41 g/dl at 1st, 3rd and 6th week postpartum, respectively.

Table1: Blood metabolic profile and proteinogram of ecbolic treated Dangi cows at different time intervals (Mean±SEM)

Groups/ Parameter	Time Intervals/Days postpartum					Overall
	0 (Day of calving)	7th	14th	21st	28th	
Glucose (mg/dl)						
Group-I	62.71±2.40^a	58.05±2.65^{ab}	58.23±2.40^{ab}	54.28±2.05^b	52.00±2.62^b	57.05±1.22
Group-II	61.76±4.20^a	59.23±2.67^{ab}	56.08±3.08^{ab}	54.01±2.12^{ab}	51.21±2.06^b	56.46±1.40
Group-III	61.93±4.04^a	60.35±3.13^a	56.20±2.51^{ab}	53.23±3.11^{ab}	49.45±1.70^b	56.23±1.50
Overall	62.13±1.97^a	59.21±1.55^{ab}	56.83±1.47^{bc}	53.84±1.34^{cd}	50.88±1.20^d	56.58±0.79
Total Cholesterol (mg/dl)						
Group-I	108.83±5.06^a	118.00±3.40^{ab}	125.66±2.40^{bc}	130.66±2.41^c	142.33±4.60^d	125.10±2.61
Group-II	106.83±4.90^a	115.50±1.97^{ab}	118.50±0.92^{bc}	125.83±2.30^c	136.66±4.60^d	120.66±2.32
Group-III	109.83±4.69^a	116.50±3.46^{ab}	126.00±3.36^{bc}	133.66±2.94^{cd}	138.50±4.76^d	124.90±2.55
Overall	108.50±2.66^a	116.66±1.66^b	123.38±1.57^c	130.05±1.59^d	139.16±2.59^e	123.55±1.44
Total Protein (g/dl)						
Group-I	7.80±0.29^{bc}	6.74±0.13^a	7.56±0.33^b	8.15±0.16$^{bc}_x$	8.60±0.47^c	7.77±0.17
Group-II	7.48±0.28^a	6.69±0.10^a	7.05±0.24^a	7.51±0.20^a_w	8.52±0.55^b	7.45±0.17
Group-III	8.13±0.09^{bc}	6.59±0.27^a	7.75±0.08^b	8.00±0.08$^{bc}_x$	8.59±0.48^c	7.81±0.16
Overall	7.80±0.14^b	6.68±0.10^a	7.46±0.15^b	7.89±0.11^b	8.57±0.27^c	7.68±0.09
Albumin (g/dl)						
Group-I	4.01±0.19^{ab}	3.56±0.09^a	3.94±0.17^{ab}	4.22±0.09$^{bc}_x$	4.61±0.26^c	4.07±0.09
Group-II	3.97±0.15^{ab}	3.56±0.06^a	3.74±0.13^a	3.93±0.10$^{ab}_w$	4.43±0.28^b	3.93±0.08
Group-III	4.12±0.04^{bc}	3.49±0.12^a	3.91±0.04^b	4.17±0.04$^{bc}_{wx}$	4.43±0.23^c	4.02±0.07
Overall	4.03±0.08^b	3.54±0.05^a	3.86±0.07^b	4.11±0.05^b	4.49±0.14^c	4.01±0.05
Globulin (g/dl)						
Group-I	3.79±0.16$^b_{wx}$	3.18±0.09^a	3.62±0.16$^{ab}_{wx}$	3.93±0.08^b_x	3.99±0.24^b	3.70±0.08$_{wx}$
Group-II	3.50±0.15^a_w	3.13±0.04^a	3.31±0.12^a_w	3.57±0.10^a_w	4.08±0.27^b	3.52±0.08$_w$
Group-III	4.01±0.05^b_x	3.10±0.17^a	3.83±0.04^b_x	3.83±0.04^b_x	4.16±0.24^b	3.78±0.08$_x$
Overall	3.76±0.08^b	3.13±0.06^a	3.59±0.08^b	3.78±0.05^b	4.07±0.13^c	3.67±0.05
Albumin/Globulin Ratio						
Group-I	1.06±0.05	1.12±0.04	1.08±0.01$_x$	1.07±0.01	1.16±0.06	1.10±0.01$_{wx}$
Group-II	1.14±0.04	1.13±0.01	1.12±0.02$_x$	1.10±0.01	1.08±0.01	1.11±0.01$_x$
Group-III	1.029±0.005^a	1.137±0.057^b	1.021±0.005^a_w	1.090±0.007^{ab}	1.067±0.007^{ab}	1.069±0.013$_w$
Overall	1.07±0.02	1.13±0.02	1.07±0.01	1.08±0.01	1.10±0.02	1.09±0.01

The overall mean serum globulin concentration (3.67±0.05 g/dl) was in agreement with 2.9-4.9 gm/dl as reported by Regmi and Pande (2017) in cows and 3.70±0.32 g/dl by Hashem and Amer (2009) in postpartum Holstein dairy cows. The mean serum globulin concentrations in the treatment groups T1 and T3 were observed to be decreased significantly (P<0.05) and in the treatment group T2 decreased non-significantly (P?0.05) at 7th day postpartum and thereafter linearly increased and found significantly higher concentrations at 28th day postpartum in Dangi cows. However, Al-Mujalli (2008) reported significantly higher globulin levels at one week post calving (2.61±0.29 g/dl) as compared to four week post calving (1.87±0.32 g/dl) in dairy cows in Saudi Arabia.

The overall mean serum albumin globulin ratio found was 1.09±0.01, which was in agreement with 0.79-1.17 as reported by Regmi and Pande (2017) in cows. The mean serum A/G ratio varied non-significantly (P?0.05) between different days from the day of calving to 28th day postpartum in all the treatment groups in Dangi cows and a significantly (P<0.05) higher mean ratio was found on the 7th day postpartum in treatment T3.However, the lower mean serum albumin globulin ratios were reported as 0.93±0.16, 0.80±0.15 and 0.71±0.11 by Tothova et al. (2018) in Slovak spotted cows at 1st, 3rd and 6th week postpartum, respectively. Moreover, higher mean ratios were reported as 1.40±0.06 and 1.99±0.20 by Amle et al. (2014) in postpartum normal cyclic and repeat breeder crossbred cows, respectively. Albumin/Globulin ratio do not play a significant role in causing reproductive problems and underlines the importance of other serum biochemical parameters like total cholesterol, phosphorus and calcium in diagnosing the long term cases of postpartum anestrus and sub-estrus. Several factors may influence the concentration of serum albumin globulin ratio in healthy cows and thereby affect the clinical

interpretation; however, few studies have addressed the sources of variation (Chorfi et al., 2004).

REFERENCES

Al-Mujalli, A.A.M.(2008). Studies on Some Serum Constituents of Dairy Cows in Saudi Arabia. *Scientific Journal of King Faisal University (Basic and Applied Sciences).,***9** (2):105-114.

Amle, M., Patodkar, V., Shelar, R. and Birade, H. (2014). Serum Biochemical Levels of Repeat Breeder Cross Bred Cows under Rural Condition of Satara District of Maharashtra. *International J. Adv. Vet. Sci & Technol.,* **3** (1): 109-113.

Cernescu, H., Onita, P., Knop, R., Ionescu, C., Zarcula, S. and Groza, E. (2010). The metabolic and hormonal profile on peripartal period in cow. *Lucrãri stiin³ifice medicinã veterinarã.*, XLIII (2): 1-8.

Chorfi, Y., Lanevschi-Pietersma, A., Girard, V. and Tremblay, A. (2004). Evaluation of variation in serum globulin concentration in dairy cattle. *Vet. Clin. Pathol.,***(33)**: 122-172.

Coroian, C.O., Mireºan, V., Coroian, A., Rãducu, C., Andronie, L., Marchiº, Z., Terheº, S. and Muntean, M. V. (2017). Biochemical and Haematological Blood Parameters at Different Stages of Lactation in Cows. *Bulletin UASVM Animal Science and Biotechnologies.,***74** (1): 31-36.

Fiore, E., Barberio, A., Morgante, M., Rizzo, M., Giudice, E., Piccione, G., Lora, M. and Gianesella, M. (2015). Glucose infusion response to some biochemical parameters in dairy cows during the transition period. *Anim. Sci. Papers Reports* **33**: 129-36.

Hashem M.A. and Amer H.A. (2009). Hormonal and biochemical anomalies in dairy cows affected by retained fetal membranes. http://priory.com/vet/cow_fetal_membrane.htm

Kumar, H., Mahmood, S. and Singh, L.P. (2001). Treatment of placental retention with ecbolic drugs and its effect on subsequent fertility in crossbred cows. *Ind. J. Anim. Sci.,* **71** (7): 654-657.

Lager, K. and Jordan, E. (2012). The metabolic profile for the modern transition dairy cow. *Mid-South Ruminant Nutrition Conference,* Grapevine, Texas, USA, pp. 9-16.

Merck (2003)**.** Merck Veterinary Manual. 8th Edn. Merck Co., Inc., Whitehouse Station, NJ, USA.

Omur, A., Kirbas, A., Aksu, E., Kandemir, F., Dorman, E., Kaynar, O. and Ucar, O. (2016). Effects of antioxidant vitamins (A, D, E) and trace elements (Cu, Mn, Se, Zn) on some metabolic and reproductive profiles in dairy cows during transition period. *Polish J. Vet. Sci.,***19** (4): 697–706.

Patel, R.V., Khasatiya, C.T., Parmar, S.C., Chaudhary, S.S. and Patel, V.R. (2017). Comparative Evaluation of Different Therapies on Post-partum Fertility and Blood Biochemical profile in Holstein Friesian Crossbred cows. *Intas Polivet.,***18** (1): 22-28.

Regmi, B. and Pande, K.R.(2017). Determination of hematological and important blood biochemical parameters in cross jersey cattle at lactating stage: reference value. *Inter. J. Res. Culture soc.,***1** (4): 47-49.

Ruginosu, E., Creanga, S., Sofronie, M., Malancus, R., Boghian, V. and Solcan, G. (2011). The biochemical profile in cows with reproductive disorders. *Cercetari Agronomice in Moldova* **44**: 75-86.

Steel, R.G.D. and Torrie, J.H. (1981). *Principles and Procedures of Statistics, A Biometric Approach*. 2nd edn. Mc Graw Hill Book Agency, Singapore.

Tothova, C., Nagy, O., Nagyova, V. and Kovac, G. (2018). Serum protein electrophoretic pattern in dairy cows during the periparturient period, *J. Appl. Anim. Res.,* **46** (1): 33-38.