Effects of milk production and seasonal calving on some blood metabolite changes in dairy cows at postpartum period

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INTRODUCTION

Negative energy balance in the postpartum period is a risk factor for ovarian dysfunction. The cows with the greatest milk production have the highest incidence of infertility, but epidemiological studies indicate that, in addition to milk production, other factors probably contribute to decreasing reproductive efficiency in dairy herds. The modern dairy cows became more sensitive to heat stress as their internal heat production significantly increased. The objective of this study was to evaluate the relationships among some blood metabolites and milk production in postpartum period of dairy cattle in the cold and warm seasons.

MATERIAL AND METHODS

This study was conducted on 43 postpartum lactating Holstein cows. Cows were divided into four groups on the basis of milk production and season of calving (cold and warm season). Daily milk yield in low and high groups were less than 35 kg/day and higher than 35 Kg/day respectively. Blood samples were collected once weekly at days 50-60 postpartum. Plasma was used to assay glucose, urea, phosphorus, BHBA, total protein. Cows were housed in free stall, milked three times daily, and fed a total mixed ration according to NRC (2001) to meet production requirements. Statistical procedures were performed using the (SAS, 1999). Data for blood serum glucose, urea, phosphorus, total protein and BHBA were analyzed by the General Linear Models.

RESULTS

The concentrations of glucose, phosphorus, and BHBA varied between groups (Table1). In low milk production cows that calved in cold season, the concentration of serum glucose was significantly higher than high milk production cows at postpartum in warm season ($P<0.05$). BHBA levels in cold season-low milk production cows were significantly lower than warm season-high production cows ($P<0.05$). Serum phosphorus concentration in cold season-high producing group was significantly lower than warm season-high producing cows ($P<0.05$).

Table1 Blood serum glucose, urea, phosphorus, total protein and BHBA concentration during the postpartum period of cows in cold and warm seasons.

		Glucose mg/dl	Urea mg/dl	Phosphorus mg/dl	Total protein g/dl	BHBA mol/l
Cold season	A	58.06^{ab}	30	5.41^{b}	8.21	0.92^{ab}
	B	62.33^{a}	31	6.30^{ab}	7.93	0.53^{b}
Warm season	A	51.57^{b}	30.36	6.22^{a}	8.20	0.95^{a}
	B	60.00^{ab}	29.33	5.90^{ab}	8.76	0.70^{ab}
	P- value	0.007	NS[1]	0.046	NS	0.041
	R-Square	0.29	0.01	0.19	0.06	0.24

1. NS: Non Significant.
Values are least square means.
A: High milk yield; B: Low milk yield.
Cold season: from November 2007 to February 2008; warm season: from February 2008 to May 2008.

Conclusion

Results of the present study indicated that blood metabolites changes during a critical period of postpartum in dairy cows may be affected by levels of milk production and seasonal calving. Fertility and ovarian function during the early post partum period is associated with concentrations of glucose, phosphorus, and BHBA. Hence, nutritional and reproductive management are critical for better reproductive performance in dairy cattle.

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