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An Investigation on Body Condition Score and biochemical Profile in Crossbred Dairy Cows Suffering from milk fever

التحري عن مقاييس حالة الجسم والاختبارات الكيموحيوية في ابقار الحليب الهجينة المصابة بحمى الحليب

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Abstract

The knowledge of body condition score and biochemical profile are useful in diagnosing and prevention of various pathological and metabolic disorders and importance for animal health which can adversely affect on reproductive performance of cows. Healthy parturient cows (n=10) and 10 parturient cows with milk fever and no signs of other diseases were included in the present study at AL-Hamza quarter farms at a period lasted from November 2012 to March 2013, This study was conducted to estimate the though body condition score , biochemical profile in all animals of study such minerals (Calcium, magnesium and Phosphors) some enzymes (ALP , GPT and GOT) and some of metabolic indicators as (Glucose , Cholestrol , Triglycerids and Creatinine phosphate) . the results revealed that the values of body condition score in milk fever group showed no significant differences compared with normal calving group. biochemical profile which include Creatinine , triglyseide , uric acid , cholestrol and GPT also showed nonsignificant differences between normal groups . while Ca, P, Mg, ALP, urea, bilirubin , glucose , GOT in milk fever group showed significant differences if compared with normal group.

الخلاصة

تعتبر المعايير الكيموحيوية مؤشر لصحة الحيوان وخاصة الامراض الايضية فالابقار التي تصاب بحمى الحليب يمكن السيطرة على المرض بتعديل الكالسيوم والفسفور لذا صممت الدراسة لتحديد علاقة المرض ودراسة التغيرات الكيموحيوية ، شملت الدراسة 20 بقرة عشرة مصابة بحمى الحليب وبدون أعراض ، وعشرة اخرى سليمة ، امتد مدة الدراسة من تشرين الثاني 2012 الى اذار 2013 في قضاء الحمزة الشرقي بمحافظة القادسية ، استهدفت الدراسة ملاحظة التغيرات الفسلجية (صحة الحيوان العام) وتأثيرها بحمى الحليب ودراسة التغيرات الكيوحيوية للابقار المصابة بحمى الحليب . بينت نتائج الدراسة الحالية عدم وجود فرق معنوي في درجة حالة الجسم بين الابقار المصابة بحمى الحليب والابقار السليمة. كذلك اظهرت نتائج التحري عن القيم الكيموحيوية في الابقار المصابة وغير المصابة بحمى الحليب ان قيم الكرياتينين ، الكليسيريدات الثلاثية، حامض البوليك، الكوليستول والخمائر الناقلة للامين وانزيم ال جي بي تي لم تظهر فرقا معنويا في الابقار المصابة بحمى الحليب بالمقارنة مع الابقار السليمة فيما اظهرت مستويات الكالسيوم والمغنسيوم والفسفور وانزيم ال ALP واليوريا البليروبين والكلوكوزو انزيم GOT فرقا معنويا بين الابقار المصابة بحمى الالحليب بالمقارنة مع الابقار السليمة كما اظهرت نتائج مستويات الكالسيوم والمغنسيوم والفسفور وانزيم ال ALP واليوريا والكلوكوز وانزيم GOT تتغير في الابقار المصابة بحمى الحليب وان قيم الكرياتينين ، والكليسيريدات الثلاثية، وحامض البوليك، والكوليستول الخمائر الناقلة للامين تتاثر عند اصابة البقرة بحمى الحليب ، واحتفاظ الحيوان بفعاليته الحيوية في ابقار حمى الحليب. اكدت النتائج وجود تغير في القيم الكيموحيوية في الابقار الهجينة المصابة بحمى الحليب عن السليمة.

Introduction

Milk fever (hypocalcemia) had been a long-standing problem in dairy industry occurring in 5-10%, calculated either as the lactational incidence or incidence per cow year characterized by weakness, recumbency and ultimately shock and death in cattle cows with milk fever were susceptible to problems such as dystocia (1). Over-conditioned cows at calving have a higher incidence of milk fever (2) and other diseases postpartum (3, 4,5). (6) found that over-conditioned cows (body condition score (BCS) ≥ 4) had a 3.3 times higher risk of contracting milk fever. Accordingly (7) found a relatively higher body weight in cows contracting milk fever. It is therefore recommended that the energy intake of cows in mid and late lactation is controlled to ensure a BCS of ≤ 3.75 . Optimum BCS has been proposed to be 3.25 to 3.75. However, if over-conditioned, cows in the late dry period should maintain body condition to prevent fatty liver (4). The calcium demand of the dry cow is very limited: 33 g/day per 500 kbw in the last 2 months of pregnancy (8) Most dry cow rations contain considerably larger amounts. At calving the production of 10 liters of colostrum will result in a loss of 23 g of calcium in a single milking (1). This sudden and extensive draw on blood calcium must be replaced via increased intestinal calcium absorption and increased resorption of calcium from the bones (9). The serum muscle enzyme levels of creatine phosphokinase (CPK) and aminotransferase (AST) increase due to muscle injury associated with prolonged recumbency. Blood glucose levels increase and serum phosphorus and potassium levels decrease (5). The present study was planned to determine the biochemical profile in crossbred cows with or without milk fever during parturition the second goal was to investigate possible effects of body condition score (BCS).

Material & Methods

Animals

Healthy parturient cows (n=10) and 10 parturient cows with milk fever and no signs of other diseases were used in the study at AL-Hamza quarter farms between November 2012 and March 2013.

Assessments of the Body condition score

The assessments of the BCS were made according to (10). The scores were assigned using a five-point scale (0=very thin to 5=grossly fat). It was based on the palpation of the transverse processes of the loin vertebrae, cranial coccygeal vertebrae, and tuber ischii.

Blood sampling and laboratory analyses

Samples of venous blood were obtained by puncture of jugular vein before I.V. therapy for milk fever was instituted or within 48 hours after calving in healthy cows. After blood clotting, samples were centrifuged at 3000 rpm for 10 minutes and the supernatants were centrifuged again at 3000 rpm for 10 minutes at room temperature. collected blood serum was stored at -20° C until analyses. Biochemical analyses of blood serum samples was performed by photometric device (spectrophotometer and reflotron). Ca, P and Mg concentration were measured by use (spinrect, spin) according to manufacturers' instructions, urea, GOT, GPT, Bilirubin, cholesterol, uric acid, glucose, triglyceride and creatinine phosphokinase were measured by use reflotron kit (Roche Diagnostics, USA) according to manufacturers' instructions.

Statistical Analysis

All data were expressed as mean \pm SE. Analysis of data was statistically performed by using the **student t test** to determine the statistical differences between mean values. P-value (0.05) was considered significantly different. All analyses were performed using the Statistical Package for Social Sciences software (12).

Results & Discussion

Body condition score

Body condition scoring is being used as a management tool to assess the energy reserves and nutritional status of dairy cattle BCS must be optimal to ensure an easy calving change in BCS is related to both changes in live weight and body composition in dairy cattle Over conditioned cows have been reported to have a higher risk of dystocia and metabolic disorders In this study, BCS in cows with and without milk fever were recorded as 4.2 ± 0.31 and 3.2 ± 0.21 , respectively, and there was differences but nonsignificant between the two groups .this partially agreement with(13,14) who mentioned BCS related but not related to incidence of milk fever and other metabolic diseases

Table(1) Body condition score for Parturient cow with milk fever and cow without milk fever (Mean±SE)

Body condition score for Parturient cow with milk fever	condition score for Parturient cow without milk feverbody
4.2±0.31	3.2±0.21

Biochemical profile

biochemical parameters in cows suffering from milk fever and in normal cows were summarized in Tables 1. In cows suffering from milk fever , Creatinine , triglyceride , uric acid, cholesterol ,GPT were non significantly different between it . but Ca significantly decreased ($P<0.03$) in the milk fever group as compared to normal group. Agreement with were observed by many studies (15, 16,17&18). Marked hypophosphatemia ($P<0.05$) in milk fever cows as compared with healthy group, (19,15,1,16 &17) obtained these similar results. Serum Mg significant increased($P<0.01$) in milk fever group as compared with normal group, (19, 20 ,&17) also reported increasing level of Mg on the first and second day after calving than later in lactation. Higher Mg values after calving are associated by hypocalcemia and release of PTH, which stimulates tubular resorption of Mg in kidneys (21, & 22) and possibly regulates ionic equilibrium. (16) did not establish statistically significantly higher values of Mg on the first day after calving compared to the next 2 weeks of lactation in cows with and without milk fever. Total ALP activity was significantly decreased in effected cows than in healthy cows in our study this may be result from metabolic disturbances in late stage of pregnancy , this in agreement with (15) on the contrary measured lower values of ALP in cows with MF than in healthy ones and concluded that cows with MF had impaired osteoblast and osteoclast function. Urea significantly increment in milk fever group than normal group , the increment of urea related to temporary renal dysfunction during milk fever " , also found increased of bilirubin in MF group than normal group . Glucose deeply significant decrement in MF group than normal group , this decrement related to anorexia or loss of appetite during the disease this result partially disagreement with (23) ,who mention the Blood glucose levels are usually normal, although they may be depressed if ketosis" GOT significantly increased in milk fever group than normal group this may because hepatic dysfunction and muscles also as a result of downer syndrome of disease this agreement with (23) who mentioned that the Prolonged recumbency results in ischemic muscle necrosis and increases in the serum muscle enzymes creatine phosphokinase (CPK) and aspartate aminotransferase(ASI) or SGOT.

Table(2)Minerals concentration

Biochemical parameter	Parturient cow with milk fever	Parturient cow without milk fever	P value
Ca(g/dl)	4.95±0.6	8.51±1.3	*
P(mmol/L)	0.80±0.48	1.54± 0.3	*
Mg(mmol/L)	2.2±0.41	1.6±0.1	**

**significance at <0.01 level; *significance at <0.05 level; NS – non significant

Table(3) biochemical concentration

Biochemical parameter	Parturient cow with milk fever	Parturient cow without milk fever	P value
GOT	105±0.7	80±5.4	**
GPT	27.9±0.72	27.6±1.8	NS
Bilirubin	0.5±0.03	1.5±0.29	*
ALP	24±3.3	62±6.7	*
Creatinine	1.33±0.27	1.39±0.07	NS
Triglyceride	70±0.006	70.05±0.014	NS
Uric acid	2±0.006	2±0.07	NS
Urea	40.2±3.4	35±2.1	*
Glucose	11.1±0.4	74±3.04	**
Cholesterol	110±3.7	107±2.4	NS

**significance at <0.01 level; *significance at <0.05 level; NS – non significant

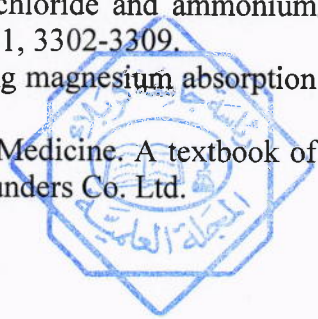
Table (4) enzymes activity

Biochemical parameter	Parturient cow with milk fever	Parturient cow without milk fever	P value
GOT	105±0.7	80±5.4	**
GPT	27.9±0.72	27.6±1.8	NS
ALP	24±3.3	62±6.7	*

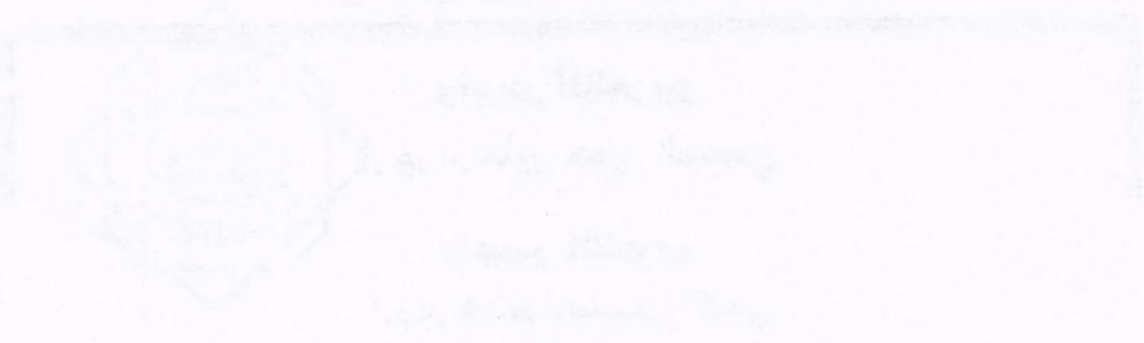
**significance at <0.01 level; *significance at <0.05 level; NS – non significant

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