



Biochemical changes related with retention of fetal membranes in Iraqi buffaloes

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Abstract

The present study was performed in 36 Iraqi buffaloes, which were divided into 4 equal groups each of 9 buffaloes. 1st group were suffered from Retention of fetal membranes after calving for 24hrs, 2nd group were suffered from RFMs after calving for 48hrs and 3rd group were suffered from RFMs after calving for 72hrs and 9 buffaloes were left as a control group (without retained). Blood samples were taken to estimate some serum biochemical (metabolites, ions and hormones) constituents, from all groups. Glucose and cholesterol were significantly higher ($P<0.01$) in control group in compared with infected groups and there were no significant differences ($P<0.01$) in glucose and cholesterol levels between the three groups of RFMs, while total protein were significantly lower ($P<0.01$) in the 3rd group compared with the 1st and 2nd groups and it was significantly higher ($P<0.01$) in control group in compared with infected groups. There were no significant differences ($P<0.01$) between the infected groups and with control group in the level of urea, as for ions, there were a significantly lower value of (Ca, Na and Mg) in the infected groups compared with control group, while potassium were significantly lower in the 2nd and 3rd groups compared with the 1st group, and it was significantly higher in control group in compared with the infected groups. There were no significant differences in progesterone and estrogen concentration between the infected groups, and they were significantly higher ($P<0.01$) in control group compared with the infected groups. In conclusion: RFMs leads to significantly ($P<0.01$) decline in biochemical's, ions and hormonal components in Iraqi buffaloes, and this decline has a diagnostic importance that it could be benefit to expect the occurrence of RFMs and make a preventive measure to prevent RFMs in Iraqi buffaloes.

Key words: Buffaloes, RFMs, Metabolites, Hormones.

التغيرات الكيميائية المتعلقة باحتباس الأغشية الجنينية في الجاموس العراقي

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الخلاصة

اجريت الدراسة على 36 جاموسة عراقية حيث قسمت هذه الحيوانات الى اربعة مجاميع متساوية في كل مجموعة 9 حيوانات . حيوانات المجموعة الاولى عانت من حالة احتباس الأغشية الجنينية بعد الولادة باربعة وعشرين ساعة ، بينما عانت حيوانات المجموعة الثانية من حالة احتباس الأغشية الجنينية بعد الولادة بثمانين واربعين ساعة ، و حيوانات المجموعة الثالثة عانت من حالة احتباس الأغشية الجنينية بعد الولادة باثنتين وسبعين ساعة، اما حيوانات المجموعة الرابعة اعتبرت كمجموعة سيطره

(لاتعاني من حالة احتباس الاغشية الجنينية). اخذت عينات الدم من كل المجاميع لقياس بعض المتغيرات الكيميائية (الايضات، الايونات والهرمونات). كان مستوى الكلوكوز والكولسترول اعلى بمستوى معنوية ($P<0.01$) في مجموعته السيطره مقارنة مع المجاميع الثلاثة المصابة بينما لم يكن هناك فرق معنوي ($P<0.01$) بين المجاميع المصابة، بينما سجل مستوى البروتين الكلي انخفاضا معنويا بمستوى ($P<0.01$) في المجموعه الثالثه مقارنة مع المجموعتين الاولى والثانيه وكان اعلى معنويا ($P<0.01$) في مجموعته السيطره مقارنة بالمجاميع الثلاثة المصابة. لم يكن هناك فرق معنوي بمستوى البورينا بين المجاميع الثلاثة ومجموعه السيطره. اما فيما يخص الايونات (الكالسيوم، الصوديوم والمغنيسيوم) فقد كان هناك انخفاض معنوي بمستوى معنوية ($P<0.01$) في المجاميع الثلاثة المصابة مقارنة مع مجموعته السيطره كما وجد انخفاض معنوي في مستوى البوتاسيوم في المجموعتين الثانيه والثالثه مقارنة مع المجموعه الاولى بينما سجل ارتفاعا معنويا بمستوى ($P<0.01$) في مجموعته السيطره مقارنة مع المجاميع المصابة. لم يسجل اي فرق معنوي في تركيز هرموني البروجسترون والاستروجين بين المجاميع الثلاثة المصابة بينما سجل ارتفاعا معنويا في مجموعته السيطره مقارنة مع المجاميع المصابة. نستنتج من هذا ان الاصابه بحالة احتباس الاغشية الجنينية يؤدي الى انخفاض معنوي بمستوى ($P<0.01$) في مستوى الايضات، الايونات والهرمونات في الجاموس العراقي وهذا الانخفاض له اهميه تشخيصيه حيث يمكن الاستفاده منها في توقع حدوث حالة احتباس الاغشية الجنينية واتخاذ اجراءات وقائيه لمنع حدوثها في الجاموس العراقي.

كلمات مفتاحيه: جاموس، احتباس الاغشية الجنينية، الايضات والهرمونات.

Introduction

One of the most common reproductive disorders in bovine is retention of fetal membranes (1). It is defined as failure to expel the fetal membranes within 12-24hrs post calving (2). Many causes have been acknowledged for RFMs such as abortion, twinning, uterus paresis, infections, hormonal disorders and dystocia, as well as deficiency in minerals and vitamins which predispose to RFM (3& 4). Some researchers mention that a complex of metabolic disturbance at the pre-partum period may lead to RFMs (5). Low serum zinc, potassium, calcium and magnesium before calving in bovine could lead to increase the risk of RFM (6 & 7). Insufficient supplementation of iodine, copper, vitamins, selenium and zinc might cause abortion leading to RFM (8 & 9). Higher level of cholesterol in serum during post partum may cause prolonged in involution of the uterus (10). The aims of this study was to evaluate the hormonal concentration of progesterone and estrogen, ions (calcium, sodium, potassium and magnesium) and metabolites (glucose, cholesterol, total protein and urea) in the blood serum of Iraqi buffaloes with RFMs

within 24, 48 and 72hrs and compare it with normal cases.

Materials and Methods:

The study was conducted in two villages around Baghdad Province from June 2016 to June 2017, and they included 36 buffaloes, which were divided into 4 equal groups each of 9 buffaloes. 1st group were suffered from RFMs after calving for 24hrs, 2nd group were suffered from RFMs after calving for 48hrs and 3rd group were suffered from RFMs after calving for 72hrs and 9 buffaloes were left as a control group (without retained). Blood samples were taken from all groups, blood were collected from jugular vein and kept in centrifuge tubes and left to coagulate then samples were moved to the lab and centrifuged in 2500 rpm / 10 min (11). Serum were collected in sterile tubes and saved in -20°C until biochemical tests were made.

Hormonal analysis: serum concentrations of progesterone and estradiol 17β levels were determined by immuno-enzymatic methods (Biodata Diagnostic tests).

Biochemical analysis: the serum glucose, cholesterol, total protein, urea, calcium, sodium and magnesium were determined using commercial test kits, while serum

potassium (K) were analyzed with a flame photometer (Petracourt PFP1).

Statistical analysis: include mean, standard error; chi square, F-test and analysis of variance were used according to (12).

Results

The serum metabolites level were showed in table -1-, the glucose level showed no significant differences ($P<0.01$) between the infected groups which were (44.22 ± 4.62 , 47.36 ± 5.14 and 45.53 ± 2.76 mmol/l) in the 1st, 2nd and 3rd group respectively, while it was significantly higher ($P<0.01$) in control group (58.42 ± 6.23) compare with the infected groups. The cholesterol was significantly higher ($P<0.01$) in control group (6.27 ± 0.45) compare with the infected groups and there were no significant differences ($P<0.01$) in between the infected groups which were (3.59 ± 0.36 , 3.12 ± 0.23 , 2.96 ± 0.13 mg/dl) in the 1st, 2nd and 3rd group respectively. Total protein was significantly lower ($P<0.01$) in infected groups (68.24 ± 4.86 , 66.46 ± 5.32 and 60.75 ± 3.62 g/l) in compare with control group (78.14 ± 6.82 g/l) and there were a significant differences ($P<0.01$) between the 3rd group with the 1st and 2nd group which was significantly lower, but there were no significant differences ($P<0.01$) between 1st and 2nd group. Urea showed no significant differences between the four groups which recorded (7.12 ± 1.62 , 7.28 ± 1.35 , 8.16 ± 1.82 and 9.23 ± 1.15 mg/dl) in the 1st, 2nd, 3rd and 4th group respectively. Table-2- revealed the level of ions in infected and control groups in Iraqi buffaloes, the ca level showed no significant differences ($P<0.01$) in between infected groups (20.41 ± 1.26 , 18.33 ± 2.03

and 18.12 ± 3.26 mg/dl) in the three infected groups respectively, but the control group showed a significantly ($P<0.01$) higher level (25.43 ± 4.32 mg/dl) than the infected groups. Also Na level recorded no significant differences between the three infected groups (11.25 ± 2.14 , 10.34 ± 1.97 and 8.53 ± 2.10 mg/dl) in the 1st, 2nd and 3rd group respectively, with a significantly higher level in control group (16.34 ± 2.12 mg/dl). Potassium was significantly higher ($P<0.01$) in 1st group (16.24 ± 2.11 mg/dl) than the 2nd and 3rd group (11.54 ± 1.46 , 12.76 ± 2.13 mg/dl) respectively and the control group showed a significantly higher ($P<0.01$) level (21.15 ± 2.24 mg/dl) than the infected groups. The magnesium level recorded the same as sodium and calcium that the control group was significantly higher ($P<0.01$) (10.63 ± 0.31 mg/dl) than the 1st (6.32 ± 1.08 mg/dl), 2nd (7.43 ± 0.16 mg/dl) and 3rd (6.05 ± 0.27 mg/dl) group respectively and the three infected groups showed no significant differences between them. The hormonal results illustrated in table-3- , estradiol and progesterone concentration were with no significant differences between the infected groups, estradiol concentration was (145.26 ± 10.13 , 139.23 ± 9.17 and 138.51 ± 8.38 ng/ml) in the three infected groups respectively, and progesterone was (216.16 ± 13.24 , 196.56 ± 16.26 and 188.33 ± 17.04 pg/ml) in the 1st, 2nd and 3rd group respectively and the control group in these two hormones were significantly higher ($P<0.01$) than the infected groups (230.86 ± 19.46 ng/ml) for estradiol and (384.21 ± 24.32 pg/ml) for progesterone.

Table -1- Serum levels of metabolites in different times of RFMs in Iraqi buffaloes.

Groups	No. of animals	Glucose m mol/l M $\pm$ SE	Cholesterol mg/dl M $\pm$ SE	Total protein g/l M $\pm$ SE	Urea mg/dl M $\pm$ SE
G 1	9	44.22 ± 4.62 b	3.59 ± 0.36 b	68.24 ± 4.86 b	7.12 ± 1.62 a
G 2	9	47.36 ± 5.14 b	3.12 ± 0.23 b	66.46 ± 5.32 b	7.28 ± 1.35 a

G 3	9	45.53±2.76 b	2.96±0.13 b	60.75±3.62 c	8.16±1.82 a
G 4	9	58.42±6.23 a	6.27±0.45 a	78.14±6.82 a	9.23±1.15 a
Total	36	-----	-----	-----	-----

Different letters means significant differences (P<0.01).

Table -2- Serum levels of ions in different times of RFMs in Iraqi buffaloes

Groups	Calcium mg/dl M±SE	Sodium mg/dl M±SE	Potassium mg/dl M±SE	Magnesium mg/dl M±SE
G 1	20.41±1.26 b	11.25±2.14 b	16.24±2.11 b	6.32±1.08 b
G 2	18.33±2.03 b	10.34±1.97 b	11.54±1.46 c	7.43±0.16 b
G 3	18.12±3.26 b	8.53±2.10 b	12.76±2.13 c	6.05±0.2 b
G 4	25.43±4.32 a	16.34±2.12 a	21.15±2.24 a	10.63±0.31 a

Different letters means significant differences (P<0.01)

Table -3- Serum levels of hormones in different times of RFMs in Iraqi buffaloes

Groups	Estradiol ng/ml M±SE	Progesterone pg/ml M±SE
G 1	145.26±10.13 b	216.16±13.24 b
G 2	139.23±9.17 b	196.56±16.26 b
G 3	138.51±8.38 b	188.33±17.04 b
G 4	230.86±19.46 a	384.21±24.32 a

Different letters means significant differences (P<0.01).

Discussion

The outcomes in table-1- observed the concentration of metabolites in serum of Iraqi buffaloes which suffered from RFMs in different times that they include glucose, cholesterol, total protein and urea and they recorded significantly higher (P<0.01) related with glucose concentration in control group compared with infected groups with RFMs in different times but non significantly (P<0.01) between infected groups (G1, G2 & G3) and these finding was in agreement with (3) and (4) which reported the reduce in metabolites concentration in RFMs and dystocia and these results similar with cholesterol concentration which recorded significantly higher (P<0.01) in control group compared with infected groups, while the results which represented the concentration of total protein was recorded best significantly (P<0.01) in

control group with infected groups as well as significantly between G3 compared with G1 and G2 and these findings agreement with (13), but the concentration of urea which recorded non- significantly between control and infected groups (14 & 5). The results in table-2- which revealed the concentration of Ions in Iraqi buffaloes infected with RFMs in different times which recorded significantly higher in control group compared with infected groups related with calcium, sodium, potassium and magnesium and these results which found by (6 & 7). Finally the concentration of both hormones (estradiol and progesterone) recorded highly significant (P<0.01) related with infected group (G1, G2 & G3) compared with control group due to hormonal imbalance occurred as a result from infection of FM which indicated to these decrease in quantity of hormones (E & P4) and these facts reported

by many authors (14; 15; 16 & 17). In conclusions from this study that the effect of RFMs was included the disturbance of metabolites, ions and hormones with significantly decrease) $P < 0.01$) compared with normal cases (without RFMs). So that the treatment of these cases need to these biochemical components as a supportive treatment to antibiotics and other treatments which uses as traditionally treatment.

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