



Effect of dystocia on some hormonal and biochemical parameters in the one-humped camel (*Camelus dromedarius*)

I.M. Ghoneim, M.M. Waheed*, M.M. Al-Eknaah, A. Al-rajaa

Department of Clinical Studies, College of Veterinary Medicine and Animal Resources, King Faisal University, Al-Ahsa, Kingdom of Saudi Arabia

ARTICLE INFO

Article history:

Received 10 November 2015

Received in revised form 5 March 2016

Accepted 8 March 2016

Keywords:

Dystocia

Dromedary camels

Hormones

Blood chemistry

ABSTRACT

The present study compared some of the hormonal and biochemical constituents of serum from eutocic and dystocic one-humped camels (*Camelus dromedarius*). Sera were harvested from eutocic (n = 9) and dystocic (n = 20) camels within the first 15 minutes after delivery. Although there were no differences in the concentrations of estradiol-17 β (E2) and prostaglandin F₂ α (PGF₂ α) between the eutocic and the dystocic animals, the level of progesterone (P₄) and cortisol was significantly higher (P < 0.01) in animals that experienced dystocia than those that had a normal birth. There were no differences between the concentrations of alkaline phosphatase, aspartate aminotransferase, calcium, cholesterol, creatine kinase, creatinine, or magnesium (Mg) in eutocic and dystocic animals. The nitric oxide concentration was significantly higher (P < 0.01) in the serum from animals with dystocia than those that had normal births. By contrast, the serum concentrations of glucose, phosphorus (P), and triglycerides were significantly lower (P < 0.01) in eutocic camels compared with dystocic camels. As the delayed decline of P₄ is reported to be the major hormonal difference between eutocic and dystocic camels, we propose that the insensitivity of corpus luteum to luteolytic action may be a cause of dystocia. Moreover, stress and hormonal changes may affect the metabolic traits in dystocia camels.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Delivery takes place as a complex, consecutive series of endocrine events in the maternal, fetal, and placental tissues that lead to hematological and biochemical changes in the dam [1,2]. Dystocia is defined as calving difficulty resulting from prolonged spontaneous calving or prolonged or severe assisted extraction. [3]. Parturition is a hectic process that is further aggravated by dystocia [4,5]. The dromedary camel is a seasonally poly-estrus animal with induced ovulation [6]. The gestation length is highly variable in dromedary camels, varying from 315 to 440 days [7]. In dromedary camels, information about the prevalence of dystocia is scarce and conflicting. Although one study [8] has estimated the incidence of dystocia as 9%, others [7,9]

have reported relatively lower incidences (2%–5%). Fetal causes of dystocia are much more frequent than maternal causes in camels due to the exceptionally long extremities and neck [10,11]. The economic impact of dystocia, which includes fetal and maternal losses, subsequent infertility, culling rate, and cost of treatment [12–14], is well documented in the animal industry. Although, the hormonal and metabolic variations associated with dystocia have been extensively studied in cattle [1,15], similar studies have not yet been reported in dromedary camels. The aim of this study was to determine the effect of dystocia on some metabolic and endocrine traits of dromedary camels.

2. Materials and methods

2.1. Animals

The study was conducted at the Camel Research Center, King Faisal University (located between 25° 05' and 25° 40'

* Corresponding author. Tel.: +966135816600x2236; fax: 966135896617.

E-mail address: mmwaheed@kfu.edu.sa (M.M. Waheed).

northern latitude and 49° 55' eastern longitude), Saudi Arabia. The Scientific Research Deanship Ethical Committee of King Faisal University approved the protocol and conduct of this study. This work was carried out from 2012 to 2015. The animals involved in this study were pluripara pregnant one-humped camels ranging from ages 6 to 18 years and weighing 500 to 800 kg. During the study, the camels were maintained under standard conditions of feeding and management. A total of 397 animals gave birth over approximately 4 years. On the basis of the breeding records of the Camel Research Center, King Faisal University and the average length of gestation archived for the Center, the signs of approaching parturition [16] were carefully examined 10 days before the due dates for parturition. There was no significance difference between the average gestational length between dystocic and eutocic animals. Dystocia was diagnosed [17–19] and the grades of dystocia were scored [20,21] as previously described. Briefly, the labor was graded as follows: score 1 (no assistance; $n = 366$), score 2 (farm-staff assistance provided with calf in normal or mal posture; $n = 20$), and score 3 (veterinary assistance provided, including caesarean section and fetotomy; $n = 11$). The animals chosen for this study included nine randomly selected female camels with scores of 1 and 20 animals with scores of 2. No animals with scores 3 were involved (to avoid the impact of premedication, such as fluid therapy, anesthesia, and antibiotics, on the hormonal and biochemical values in cases of fetotomy and cesarean).

2.2. Blood sampling

After delivery, blood samples were collected within the first 15 minutes after delivery. Blood serum was separated by centrifugation for 15 minutes at 3000g and stored at -20°C until analysis.

2.3. Estimation of serum hormonal concentration

The concentrations of P_4 (pg/mL), E2 (pg/mL), and cortisol (pg/mL) in blood serum were analyzed using EIA kits (item no. 582601, 582251, and 500360, respectively; Cayman Chemical Company, Ann Arbor, MI, USA). The intra- and inter-assay CVs for three quality-control samples were 4.8% and 2.6% for P_4 , 7.3% and 5.2% for E2, and 4.8% and 5.2% for cortisol, respectively. The concentration of $\text{PGF}_{2\alpha}$ (pg/mL) in the serum was analyzed using EIA kits (item no. 516011; Cayman Chemical Company). The intra- and inter-assay CVs were 9.4% and 12.5%, respectively. All assays were performed according to the manufacturer's directions. The optical densities were measured using an ELISA reader (Absorbance Microplate Reader ELx 800; BioTek, Highland Park, VT, USA) and a Microplate Strip Washer (ELx 800; BioTek).

2.4. Estimation of serum biochemical constituents

The serum concentration of nitric oxide (NO; μM) was evaluated using EIA kits (item no. 780001; Cayman Chemical Company). The serum concentrations of alkaline phosphatase (ALP; IU/L), aspartate aminotransferase

(AST; IU/L), calcium (mg/dL), cholesterol (mg/dL), creatine kinase (IU/L), creatinine (mg/dL), glucose (mg/dL), P (mg/dL), Mg (mg/dL), and triglycerides (mg/dL) were assayed on an automated clinical chemistry analyzer (serial no. OV10200, VetScan VS2; Darmstadt, Germany) using the VetScan Rotor Utilization Booklet of Chemistry Profiles (Abaxis Veterinary Diagnostics, Union City, CA, USA).

2.5. Statistical analysis

Data pertaining to the serum hormones and biochemical constituents of eutocic and dystocic camels were presented as the means \pm SEM. The analysis was carried out using a general linear model procedure, and the means were compared by the least significant differences using Student *t* test in SPSS 22.0 statistical software [22].

3. Results

The animals involved in this study gave birth on their respective due dates. The data presented in Table 1 revealed no significant differences between the serum levels of E2 and $\text{PGF}_{2\alpha}$ between eutocic and dystocic camels. The concentration of P_4 and cortisol was significantly higher ($P < 0.01$) in the serum of dystocic animals compared with the eutocic animals. The mean concentrations of different biochemical constituents in the serum of eutocic and dystocic camels are presented in Table 2. NO was significantly higher ($P < 0.01$) in the serum of the eutocic animals compared with the dystocic animals. There were no significant differences between the serum concentrations of ALP, AST, calcium, cholesterol, creatine kinase, creatinine, and Mg in eutocic and dystocic camels. On the other hand, the serum concentrations of glucose, P, and triglycerides were significantly lower ($P < 0.01$) in eutocic camels compared with dystocic camels.

4. Discussion

The basic mechanism of parturition is mainly a hormonal process [23]. The maternal and fetal endocrine changes that lead to the onset of labor have been detailed in several studies [24–27].

P_4 , which is essential for all mammalian pregnancies, is produced in the corpus luteum, the placental trophoblast, or both [28]. The corpus luteum is necessary for maintaining the pregnancy throughout the gestation in the dromedary [29–31]. In dromedaries and llamas, P_4

Table 1
Concentrations (mean \pm SEM) of different hormones in the serum of eutocic and dystocic camels.

Hormones	Serum of eutocic camels ($n = 9$)	Serum of dystocic camels ($n = 20$)
Progesterone (pg/mL)	768.44 ^a \pm 81.50	1011.10 ^b \pm 53.40
Estradiol 17- β (pg/mL)	137.00 \pm 19.45	113.05 \pm 15.29
Cortisol (pg/mL)	3404.80 ^a \pm 486.80	5264.08 ^b \pm 172.14
Prostaglandin $\text{F}_{2\alpha}$ (pg/mL)	296.89 \pm 116.09	537.15 \pm 60.25

Means with different superscripts in the same row are significantly different at $P < 0.01$.

Download English Version:

<https://daneshyari.com/en/article/2094975>

Download Persian Version:

<https://daneshyari.com/article/2094975>

[Daneshyari.com](https://daneshyari.com)