Animal Reproduction Science 170 (2016) 149–156

Contents lists available at ScienceDirect

Animal Reproduction Science

journal homepage: www.elsevier.com/locate/anireprosci

Dystocia in dromedary camels: Prevalence, forms, risks and hematobiochemical changes

Ahmed Ali[a,c,*], Derar Derar[a,c], Mohamed Tharwat[a,d], Moustafa M. Zeitoun[b], Fahd A. Alsobyil[a]

[a] Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, 51452 Qassim, Saudi Arabia
[b] Department of Animal Production, College of Agriculture and Veterinary Medicine, Qassim University, 51452 Qassim, Saudi Arabia
[c] Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, 71526 Assiut, Egypt
[d] Department of Animal Medicine, Faculty of Veterinary Medicine, Zagazig University, Egypt

ARTICLE INFO

Article history:
Received 29 February 2016
Received in revised form 27 April 2016
Accepted 4 May 2016
Available online 6 May 2016

Keywords:
Camels
Obstetrics
Mortality
Hemogram
Blood chemistry

ABSTRACT

The objectives of this study were to investigate the prevalence of dystocia in camel herds, its forms in primi- and multipara, the risks to fetus and dam, and the associated hematobiochemical changes. A total of 1890 calvings were surveyed for the prevalence of dystocia. Cases with dystocia ($n = 107$) were examined for causes and treated with traction, fetotomy or Cesarean section. Logistic regression was performed to identify risk factors. The dependent variables were the fetal and maternal mortality, while the independent variables were parity, duration of dystocia, causes of dystocia, and method of treatment. Blood samples were collected from all dystocia camels and six controls for hematology and concentrations of serum amyloid A (SAA), haptoglobin (Hp), estradiol-17β (E2), progesterone (P4), total protein, albumin, calcium, phosphorus, magnesium, blood urea nitrogen (BUN), creatinine and aspartate aminotransferase (AST). The overall prevalence of dystocia was 8.6%. Risk of dystocia was higher in camels managed in an intensive system than in those in a free system (Odds ratio = 1.9, $P = 0.0003$) and higher in primipara than in multipara (Odds ratio 1.7, $P = 0.005$). Abnormal posture was the most important cause of dystocia (51.4%). Uterine torsion was the second most important cause (23.4%) and was mainly observed in multipara ($P = 0.0006$). Dystocia was linked to high fetal mortality (87.9%). A significant relationship was found between fetal death and duration of dystocia (Odds ratio = 8.04, $P = 0.005$). The percentage of dam mortality was 17.8%. Significant associations were detected between dam mortality rate and the duration of dystocia (Odds ratio = 4.74, $P = 0.03$) and fetal viability (Odds ratio = 5.82, $P = 0.02$). Increasing duration of dystocia was associated with significant increases in SAA, Hp, BUN and AST, but with decreases in E2 ($P < 0.05$). After a transient period of elevation, the white blood cell and neutrophil counts decreased ($P < 0.05$). In conclusion, abnormal posture and uterine torsion were found to be the common causes of dystocia in dromedary camels, and fetal and maternal deaths were mainly associated with the duration of dystocia.

* Corresponding author at: Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, Burayda, Mulaydaa, Box Office 6502, 51452 Qassim, Saudi Arabia.
E-mail addresses: ahmedali77@hotmail.com, drahmedali77@gmail.com (A. Ali), derar40@yahoo.com (D. Derar), mohamedtharwat129@gmail.com (M. Tharwat), mmzeitoun@yahoo.com (M.M. Zeitoun), fsobayil@hotmail.com (F.A. Alsobyil).

http://dx.doi.org/10.1016/j.anireprosci.2016.05.004
0378-4320/

1. Introduction

In livestock industries, dystocia is a main factor in reduced productivity, including fetal and maternal losses, subsequent infertility, culling rate, and cost of treatment (Tenhagen et al., 2007; Mee, 2008; Uematsu et al., 2013). The direct causes of dystocia differ from one species to the other. In mares, dystocia is most often caused by an abnormal presentation, position, or posture (Vandeplassche 1987, 1993; Noakes et al., 2009; McCue and Ferris, 2012). In cows, feto-pelvic disproportion is common, especially in primipara (Nix et al., 1998; Noakes et al., 2009; Mee, 2012; Mee et al., 2013). In camels, little is known about the forms of dystocia and the associated risk factors. Aboul-Fadle et al. (1993) have estimated the prevalence of dystocia as 9%; however, Arthur (1992) and Tibary and Anouassi (1997) have reported relatively lower incidences (2–5%).

Dystocia has been found to have a profound effect on survival of the dam and fetus. In horses, survival rate of mares at discharge ranged between 84% and 96%, while that of the foals was low, between 10% and 35% (Byron et al., 2003; Carluccio et al., 2007; Norton et al., 2007). In cattle, the survival rate of cows with dystocia ranged between 70% and 95% and that of the calves was relatively high, between 40 and 70% (Noakes et al., 2009; Roberts, 2012). Dystocia also has adverse effects on reproductive performance. The service interval, service period, days open, and foaling/calving interval were found to be longer in mares or cows afflicted with dystocia compared to normal parturient dams (Byron et al., 2003; Carluccio et al., 2007; Gaafar et al., 2011; Abernathy-Young et al., 2012).

When physical investigation fails to provide a diagnosis in demanding cases, blood analysis may benefit in ascertaining the problem. Assisted calving was found to cause important metabolic changes in the dam and fetus (Vannucchi et al., 2015). The serum concentration of estradiol-17beta increased with the calving difficulty score (Sorge et al., 2008). Cattle and buffaloes suffering from dystocia, and especially those with uterine torsion were associated with hepatic dysfunction; on the other hand, fetotomy had no effect on hepatocellular damage (Hussein and Abd Ellah, 2008; Ali and Derar, 2015). In horses and cattle, acute phase proteins (serum amyloid A [SAA] and haptoglobin [Hp]) are produced by the liver in response to inflammation, infection, trauma and stress (Petersen et al., 2004; Chan et al., 2010; Canisso et al., 2014; Brodzki et al., 2015a,b). No reports could be found dealing with the profile of acute-phase proteins during dystocia in any animal species.

Studies on dystocia and the associated risks in camels, compared to other livestock, are very limited. The aims of this study were to investigate the prevalence, forms and risks of dystocia in the dromedary camel as well as the associated hematobiochemical changes.

2. Materials and methods

2.1. Survey for the prevalence of dystocia in two herd management systems

A herd-level questionnaire was used to gather information about the prevalence of dystocia in dromedary camel herds ($n = 95$). In 61 herds, the camels ($n = 3435$) were left unconfined in open desert areas (free system), while in the other 34 herds, the camels ($n = 1893$) were kept in pens (intensive system, ~15–20 m^2/head, 10–15 heads/pen). The probability of anterior, posterior and transverse presentations was included in this survey. Data were collected for the calving season 2014/2015. Camels in both management systems were fed mainly on alfalfa hay and barley concentrate.

2.2. Obstetrical examination and animal classification

One hundred and seven female dromedary camels were presented at the Qassim Veterinary Teaching Hospital due to severe dystocia (failure to progress in labor to the point of needing human intervention). Of the dams, 9.3% ($n = 10$), 15% ($n = 16$), 15.9% ($n = 17$) and 59% ($n = 64$) arrived at the clinic within 24, 48, 72 and >72 h of labor pain, respectively. All but five females were at full term (12–13 mo of gestation). Two cases of uterine torsion were in the 8th and 9th month of gestation, while three other cases were in the 11th month of pregnancy. The dams showed signs of depression (46.7%, $n = 50$), lack of appetite and anorexia (88.8%, $n = 95$), distress with frequent standing and sitting and repeated side-to-side rolling accompanied by excessive straining (56.1%, $n = 60$), abnormal vaginal discharges (8.4%, $n = 9$) and diminishing signs of parturition (6.5%, $n = 7$). Of the dams, 30.8% ($n = 33$) were primiparous and 69.2% ($n = 74$) multiparous.

On admission, the dams were examined per vagina for the adequacy of the soft and bony birth ways for normal passage of the fetus. The fetus was examined for the presentation, position, posture and viability. When it was difficult to reach the fetus, as in cases of vaginal adhesion or narrowing/closure of the cervix or due to uterine torsion, the fetal viability was determined per-rectum or after performing Cesarean section.

In cases of uterine torsion, clinical examinations included determining the degree of torsion (mild: <180°, moderate: 180–270°, high: >270°), the direction of torsion from behind position (clockwise or counter-clockwise) and the presence of vaginal involvement (pre- or postcervical). The degree of torsion was determined vaginally (degree of twisting of vaginal folds) and/or rectally (degree of tension on the broad ligaments) (Noakes et al., 2009; Roberts, 2012).

Dystocia was treated with traction (19.6%, $n = 21$), partial fetotomy (38.3%, $n = 41$) and Cesarean section (33.6%, $n = 36$). Partial fetotomy (1–3 cuts) was carried out using a Thygesen fetotome (Kruuse Embryotome Thygesen, 180011, Longeskov, Denmark). Cesarean section was performed at the left paralumbar fossa (Elias, 1991). A few cases were treated with slow rolling (2.8%, $n = 3$), administration of 25 mg $PGF_{2\alpha}$ im (Dinoprost®, Lutalyse, Pharmacia & Upjohn, NY, USA) (0.9%, $n = 1$) or euthanized due to poor health status (6.5%, $n = 7$).

2.3. Blood analysis

Before obstetrical handling, two jugular blood samples were collected from each animal, one on EDTA and the