



Clinical, hematological, and biochemical findings of uterine torsion in buffaloes (*Bubalus bubalis*)

A. Ali^{a,*}, R. Derar^a, H.A. Hussein^a, M.R. Abd Ellah^b, A. Kh. Abdel-Razek^a

^a Department of Theriogenology, Faculty of Veterinary Medicine, Assiut University, 71526 Assiut, Egypt

^b Department of Animal Medicine, Faculty of Veterinary Medicine, Assiut University, 71526 Assiut, Egypt

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ABSTRACT

The aim of this study was to investigate uterine torsion in buffaloes, examine factors influencing the outcome of the disease, and to characterize the related alterations in blood constituents. A total of 126 buffaloes with uterine torsion were examined for stage of gestation, duration, degree, site and direction of torsion, as well as the location of the pregnant horn. Methods of correction were documented along with dam and calf survival. Blood samples were obtained from 20 buffaloes with uterine torsion and 10 healthy buffaloes for hematological and biochemical comparisons. Results showed that uterine torsion in buffaloes occurred in multi- (81.7%) and primiparous (18.3%), during late pregnancy (58.4%) and at full term (41.6%), clockwise (96%) and counter-clockwise (4%), at post- (98.4%) and precervical (1.6%), and was of high (52.3%), moderate (31%) and mild (16.7%) degrees. Torsion was predominantly ($P=0.01$) on same direction of the pregnant horn. Fetal and maternal mortalities occurred in 78.6% and 23.8% of the cases, respectively. The stage of pregnancy, and degree and duration of uterine torsion were major risk factors for fetal mortality ($P=0.0001$), while the stage of pregnancy and fetal viability were important risk factors for maternal mortality ($P<0.05$). There were significant ($P<0.05$) increases in monocytes, albumin, aspartate aminotransferase, creatine phosphokinase, blood urea nitrogen, and phosphorus and decreases in mean corpuscular hemoglobin concentration and globulin in the affected buffaloes. Time of occurrence and duration of torsion affected some of these parameters. Uterine torsion appears to be a serious problem in buffaloes that has certain peculiarities including time of occurrence, site and direction of torsion, and the high mortality rates. Uterine torsion adversely affects liver and kidney functions. Multiparous might be at greater risk of uterine torsion. The stage of pregnancy, as well as degree and duration of uterine torsion are risk factors for fetal and maternal mortalities.

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1. Introduction

Uterine torsion has been reported as a serious cause of dystocia in cattle (Frazer et al., 1996; Aubry et al., 2008; Noakes et al., 2009) and buffaloes (Murty et al., 1999; Nanda

et al., 2003; Amin et al., 2011), threatening the lives of both fetus and dam. The etiology and pathogenesis of this condition is inadequately understood and remains open to speculation. A diverse list of contributing causes has been proposed, including the anatomy, slipping, the manner in which the animal rises, and the strong movements of the fetus during the first stage of labor (Roberts, 1986; Kolla et al., 1999; Noakes et al., 2009).

Frazer et al. (1996) suggested that uterine torsion in cows is ultimately of fetal origin, as it tended to be associated with oversized male fetuses. Several authors have

* Corresponding author. Current address: Department of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Qassim University, P.O. Box 6622, Burydah 51431, Saudi Arabia.

E-mail address: ahmedali77@hotmail.com (A. Ali).

supported the idea that active movements by a large fetus during late gestation and early stage of labor might precipitate rotation of the unstable uterus (Baker, 1988; Noakes et al., 2009). Decreased amniotic fluid in relation to the size of fetus and uterus has been suggested as a very plausible explanation for the selective occurrence of uterine torsion in cows (Schonfelder and Sobiraj, 2005).

A large variability in the fetal and maternal mortalities has been reported in cows and buffaloes with uterine torsion. Factors such as duration of the condition and severity of the torsion have been suggested as determinants of the outcome (Frazer et al., 1996; Amer et al., 2008; Amin et al., 2011).

When physical examination fails to yield a diagnosis or prognosis in difficult cases, blood analysis may help to identify the problem. Erythrogram, leukogram, and biochemical parameters can exclude some diseases, and if there are abnormalities, they might aid in establishing a prognosis and developing a therapeutic plan (Amer et al., 2008; Hussein and Abd Ellah, 2008; Amin et al., 2011).

Compared with cattle, relatively little information is known about the etiology, pathogenesis and outcome of uterine torsion in buffaloes. The aim of this study was to characterize the forms and outcomes of uterine torsion in buffaloes and investigate alterations in blood parameters and their links with the clinical findings and outcomes of the disease.

2. Materials and methods

2.1. Clinical examination

A total of 126 buffalo-cows (*Bubalus bubalis*) were submitted to the Veterinary Teaching Hospital of Assiut University in middle Egypt with a history of dystocia or due to a general medical problem like colic, straining or reduced food intake. Definite diagnosis of uterine torsion was achieved only in the Veterinary Hospitals after careful rectal and vaginal examinations. Parity (primi – or multiparous), stage of gestation (during pregnancy or at term), the duration of the condition (time from the appearance of clinical signs until submission), and the presenting clinical signs were recorded. Full term was defined as being within 7 d around the expected calving date (Frazer et al., 1996).

Clinical examinations included determining degree (mild < 180°, moderate > 180–270°, or high > 270°), and direction (clockwise and counter-clockwise) of torsion, and presence of vaginal involvement (pre- or post-cervical).

Methods of correction including rolling with a plank (Roberts, 1986) or cesarean section (Frazer and Perkins, 1995) were documented along with dam and fetal survival. For rolling, the mother was casted in lateral recumbency on the same direction as torsion and a plank was placed on the flank region. Assistance stranded on the plank and the mother was slowly rolled in the same direction as the torsion. Cesarean section was performed in standing position of the dam under local infiltration analgesia using 2% lidocaine (Norbrook Laboratories, UK) at a dose rate of 10 mg/kg in the form of linear infiltration at the left flank. The choice of method of correction varied with stage of gestation,

severity of torsion and the condition of the mother, uterus and fetus.

2.2. Blood analyses

Blood samples were collected from 20 buffalo cows with uterine torsion (torsion group) and from 10 normal pregnant buffalo cows near term (control group). Two blood samples were collected from each animal from the jugular vein, one in plain vacutainer tube (7 mL) and the other in vacutainer tube with EDTA (3 mL). The whole blood sample was used for measuring total red blood cells (RBCs), hemoglobin concentration (HGB), Hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), total white blood cells (WBC), and differential leucocytic counts using standard hematological techniques (Feldman et al., 2000). Serum was separated from the other tube by centrifugation for 10 min at 1200 × g and was immediately frozen for future analyses. Serum concentrations of total protein (TP), albumin (ALB), creatinine (CR), blood urea nitrogen (BUN), calcium (Ca), phosphorus (P), magnesium (Mg) and serum activities of aspartate aminotransferase (AST) and creatine phosphokinase (CPK) were performed using commercial test kits supplied by Spectrum Diagnostics (Egyptian Co. for Biotechnology, Obour City Industrial Area, Cairo-Egypt) and Digital VIS/Ultraviolet Spectrophotometer (Cecil instruments, Cambridge, England, Series No. 52.232).

2.3. Statistical analysis

Risk factors for mortality of dam and calf have been analyzed by binary multiple logistic regression, providing odds ratio and confidence interval. Differences in the percentages and frequency distributions were evaluated by chi-square goodness-of fit and frequency distribution analyses. *t*-Test was used to compare blood parameters in torsion and control groups. Data were expressed in percentages or means ± SD and the level of significance was set at ($P < 0.05$). The SPSS-program, version 16.0 (2007) has been used for the analysis.

3. Results

The main clinical signs of torsion included straining or colic for prolonged time, reduction in feed intake and constipation in 88/126 (69.8%), 72/126 (57.1%) and 13/126 (10.3%) of the cases, respectively. The mean duration of torsion (from appearance of the clinical signs until treatment) was 68.7 ± 10.6 h (range: from 20 to 168 h).

The torsion occurred during pregnancy and at full term in 74/126 (58.4%) and 52/126 (41.6%) of the cases, respectively ($P = 0.1$). Torsion was post-cervical with vaginal involvement in 124/126 (98.4%) of the cases. The rest were pre-cervical without vaginal involvement ($P = 0.0001$). The degrees of uterine torsion were mild, moderate, and high in 21/126 (16.7%), 39/126 (31%), and 66/126 (51.3%) of the cases, respectively ($P = 0.0001$). Clockwise torsion was

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