ABSTRACTS

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PERIPARTUM HEMODYNAMIC STATUS OF BITCHES UNDER DISTINCT OBSTETRIC CONDITIONS

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Introduction - Clinical and obstetric appraisals of the whelping bitch are not commonly applied in veterinary medical assistance. Hemodynamic and vascular changes occur during normal parturition and those modifications are well notified in Human Medicine. However, such physiological mechanisms need to be clarified in the canine species. The main physiological change during pregnancy in women is the increase in total blood volume due to fetal metabolic demand. From the beginning to midpregnancy the following modifications are registered: increased heart rate and cardiac output; and decreased peripheral vascular resistance (3, 6). During parturition, an important hemodynamic change is verified as a consequence of pain, anxiety and uterine contractions. During the second stage of labor, an acute increase of heart rate, blood volume and cardiac output occur, which consequently increase arterial blood pressure. Just after delivery, the sudden blood transfer from the contracted uterus allied with the cava vein decompression increase cardiac output and blood pressure (3). However, oxytocin may modify this hemodynamic status as it leads to negative inotropic and chronotropic effects (5). The aims of the present study were to evaluate maternal hemodynamic changes during eutocia and verify the consequences of dystocia treated medically by oxytocin administration, surgically by cesarean section or assisted through manual delivery.

Material and methods - Twenty-four healthy females of distinct breeds were used. They were allocated into 3 groups according to the subjected treatment: eutocia (group 1; n=10), manipulative obstetric assistance or cesarean section (group 2; n=5) and maternal dystocia treated with oxytocin and calcium gluconate (uterine hypotonia or atonia) (group 3; n=9). Hemodynamic status was established by monitoring heart rate (HR), noninvasive systolic and diastolic arterial blood pressure, blood glucose and electrocardiogram records during the first stage of labor, intra-partum, immediately after the last puppy was born and 1 hour later. Reference ranges adopted were stated elsewhere (2,4). Data were analyzed using a repeated measure analysis of variance (ANOVA) and the post hoc Newman-Keuls comparisons were conducted to establish overall differences among groups at p<0.05.

Results and Discussion - Glucose was considered to be stable at the normal range during all periods of observation and groups (75.4 ± 15.2 – 106.7 ± 14.6 mg/dL). Dams of group 1 exhibited significantly higher glucose after 1 hour of parturition (98.3 ± 14 mg/dL) than at the pre-partum evaluation (75.4 ± 15.2 mg/dL). Bitches of group 3 also showed significantly lower glucose level before whelping (83.2 ± 12.1 mg/dL; p<0.01) than immediately after parturition and 1 hour later (104.9 ± 11.1 and 106.7 ± 14.6 mg/dL, respectively). Labor is considered to be a stressful condition for any female, signed by a reflex release of cortisol and relative hyperglycemia. However, an endocrine control through an acute release of insulin maintains glucose level at the normal range. Tachycardia was observed in group 1 and 2 (121 to 138 bpm) during the role period of measurement, except for group 2 which showed normal HR 1 hour post-partum (119 ± 18 bpm). Bitches of group 3 also showed significantly lower glucose level before whelping (83.2 ± 12.1 mg/dL; p<0.01) than immediately after parturition and 1 hour later (104.9 ± 11.1 and 106.7 ± 14.6 mg/dL, respectively). Labor is considered to be a stressful condition for any female, signed by a reflex release of cortisol and relative hyperglycemia. However, an endocrine control through an acute release of insulin maintains glucose level at the normal range. Tachycardia was observed in group 1 and 2 (121 to 138 bpm) during the role period of measurement, except for group 2 which showed normal HR 1 hour post-partum (119 ± 18 bpm). Bitches of group 3 presented a normal HR during oxytocin infusion (120 ± 21 bpm) and just after parturition was over (119 ± 20 bpm). The 1 hour later evaluation revealed a high HR (123 ± 22 bpm). These data confirm the negative inotropic and chronotropic action of oxytocin while systemic infusion at uterine atonia/hypotonia. Tachycardia possible mediated by cathecolamines was verified during both
uneventful parturition and dystocia. No significant differences on systolic and diastolic pressure were verified among groups and periods of observation. Nevertheless, hypotension was verified prior to parturition in all groups (115/70, 115/67 113/64 mmHg, respectively for groups 1, 2 and 3), similar to what is stated for pregnant women. An overall increase in systolic pressure was noticed as whelping progressed, probably due to augmentation of blood flow and cardiac output, allied to a diastolic pressure decrease in the eutocia (123/66 mmHg) and obstetric assistance (119/56 mmHg) groups. However, dams from group 3 showed an increase in diastolic pressure, hence switching to a normotension status (123/77 mmHg) during oxytocin infusion. Interestingly, the obstetric assistance in group 2 was not a medical procedure capable of increasing blood pressure to normal range, besides the higher stress and pain. On the other hand, the suspicious hypotension effect of oxytocin (5) was not verified here. The ecbolic action could have enhanced uterine contraction and ultimately increased blood volume and pressure. Immediately after parturition, hypotension by decreased diastolic pressure (112/62 mmHg) was again verified in bitches of group 3. This rapid change can be explained by the short half-life of plasma oxytocin (1). Normal systolic and low diastolic pressure was observed 1 hour after parturition regardless of the obstetric condition. The electrocardiograph tracings showed a normal sinus rhythm during all parturition, without wave variance among groups and periods.

**Conclusion** - Bitches exhibited normal glycemia independently of the obstetric management. Oxytocin administration promoted normotension and normal heart rate in a previously hypotension and tachycardiac status. An overall increase in systolic pressure occurs during labor, as a consequence of stress and pain, regardless of the obstetric condition.

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**References**