ABSTRACTS

6th International Symposium on Canine and Feline Reproduction

&

6th Biennial EVSSAR Congress

European Veterinary Society for Small Animal Reproduction

"Reproductive biology and medicine of domestic and exotic carnivores"

University of Veterinary Sciences
9th – 11th July 2008
Vienna, Austria

Editors: G. England, P. Concannon, S. Schäfer-Somi

Reprinted in IVIS with the permission of the Symposium Organizers
CANINE NEONATAL CLINICAL, HEMOGASOMETRIC AND RADIOGRAPHIC ASSESSMENT IN EUTOCIA, VAGINAL DYSTOCIA OR CESAREAN SECTION

University of São Paulo. Faculty of Veterinary Medicine. Department of Animal Reproduction. São Paulo-SP. Brazil. E-mail: liegegarcia@yahoo.com.br

**Introduction** - Technical and scientific deficit related to veterinary neonatology is conspicuous. It is known that the canine mortality rate is up to 30% in the first weeks of life (3). In Human Medicine, neonatal well-being assessment is performed by the use of the Apgar score, which measures main vital functions and enables medical adjustment procedures. The newborn respiratory distress has countless causes and unspecific clinical features. Hence, chest radiographs at birth would be helpful to analyze pulmonary parenchyma integrity, the presence of bronchiolar or alveolar fluids, as well as to establish differential diagnoses. Laboratory analyses also contribute to define respiratory distress diagnosis. In Human Neonatology, pH and blood gas determination are a diagnostic criteria to determine the acid-base imbalance related to the respiratory diseases. The aim of this study is to standardize a symptom and diagnostic criterion for the respiratory function of canine neonates born under eutocia, vaginal dystocia and cesarean section.

**Material and methods** - To achieve this objective, a clinical assessment by pulmonary auscultation and Apgar score, as well as blood gas analysis and lung x-ray were performed. Forty-eight canine neonates of distinct breeds and weights were allocated into 3 groups according to the whelping condition: group A – eutocia (n = 20); group B – fetal/maternal dystocia with vaginal obstetric assistance (n = 8); group C – cesarean section (n = 20). Immediately after birth, neonatal airways were cleared and the following assessments were performed at 0, 5 and 60 minutes after birth: Apgar score (0-10; heart beat, respiratory effort, muscle tone, reflex irritability and mucous color) and rectal temperature. Venous hemogasometric evaluation through jugular vein punctation was attained after birth and 1 hour later to evaluate pO₂ and SO₂. Lung x-ray was performed between 0 and 5 minutes of life with the Pxp 20 HS Plus POSKON® (70 kV/0.4 mAs). Data were analyzed using ANOVA and Newman-Keuls at p<0.05.

**Results** - Group C neonates showed lower vitality, with Apgar score significantly inferior at birth (5.1 ± 1.67) and after 5 minutes (7.5 ± 1.1). These findings can be explained by the fetal cardiorespiratory and nervous depression caused by anesthetic agents. Moreover, neonate liver and kidney functions are not completely developed at birth, thus pharmacological agents as anesthetic drugs tend to remain active in the bloodstream during a prolonged period of time. Nevertheless, there is a satisfactory recovery at 5 minutes in all groups, with the Apgar score superior to 7. There was a significant reduction in rectal temperature at 5 and 60 minutes of birth in all groups. Values lower than those of reference (5) were measured at 5 minutes in group A (34.2 °C ± 1.7) and C (32.7 °C ± 2.3) and at 60 minutes in group A (32.3 °C ± 2.8), B (32.8 °C ± 1.5) and C (31.2 °C ± 3.0). Thermoregulation is not properly developed in newborns, due to the scarce reserves of subcutaneous adipose tissue, large body surface, low capacity of shivering and hypothalamic inability to maintain a stable body temperature. Group A respiratory pattern was irregular at lung auscultation, with mild to moderate sounds in 78% of the neonates at birth and only 27.7% and 21% at 5 and 60 minutes postnatal, respectively. At 0, 5 and 60 minutes after birth, 87.5%, 62.5% and 12.5% of group B puppies, respectively, presented irregular respiratory rate rhythm, moderate to intense respiratory sounds with sporadic agonic episodes (gaspings, with open mouth respiratory pattern). For group C, respiratory alterations were diagnosed in 70%, 45% and 16% of the neonates, respectively. Lung x-rays indicated relevant alterations in 17% of the puppies in
Group A, 25% in Group B and 30% in group C. Cardiac silhouette and the main caudal bronchi were clearly visualized and the image of the thymus appeared like an enlarged domed volume in cranial mediastin, adjacent to the heart. The radiographic findings ranged from mild to moderate diffuse or restricted opacification of pulmonary parenchyma. Little or no definition of the cardiac silhouette, the main bronchi and the vagueness of the thymus were all findings consistent with pulmonary edema. In neonates born by cesarean section, the absence of a compressive stimulus that occurs in vaginal delivery reduces breathing reflex and in association to the respiratory depression may cause lung fluid accumulation. No significant difference in SO2 values at 0 and 60 minutes of birth in group A (22.3% ± 12.1; 28.9% ± 11.4) and B (31% ± 16.2; 31.1% ± 11.4) were observed. Group C neonates had significantly lower SO2 values at 60 minutes (20.1% ± 7.6) than at birth (34% ± 19.4). Values of oxygen saturation (SO2) below 30% are considered critical and suspicious of severe tissue hypoxia (4). All puppies presented hypoxemia at 0 and 60 minutes after birth, with significant decrease in venous pO2 values in group C (21.6 mmHg ± 8.6; 12.5 ± 3.6 mmHg). Venous pO2 values below 27 mmHg indicate anaerobic metabolism and the development of lactic acidosis (1). As a consequence of the cardiopulmonary depression, there is a reduction on inspiratory intensity (2), compromising alveolar expansion and blood oxygenation.

**Conclusion** - We can conclude that canine neonates present hypothermia at 5 and 60 minutes of birth, tissue hypoxia and lactic acidosis after birth, specially the ones born by cesarean section. An irregular respiratory pattern at birth with notorious improvement 1 hour later was observed. Moreover, cesarean section puppies have lower vitality than those born vaginally through eutocia or dystocia, however all evolve to a satisfactory Apgar score (> 7) at 5 minutes of life, regardless of the obstetric condition.

**References**