ABSTRACTS

6th International Symposium on Canine and Feline Reproduction

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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

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MEASUREMENT OF THE CONCENTRATIONS OF SERUM CALCIUM, PARATHYROID HORMONE AND VENOUS PH IN THE WHELPING BITCH

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Introduction - The exact pathogenesis of canine peripartal uterine inertia has been studied in little detail. Changes in the concentration of serum ionised calcium (iCa), parathyroid hormone (PTH) and venous pH were examined during the peripartal period in the bitch. We postulated that an acute respiratory alkalosis may be associated with the onset of whelping which would reduce the amount, and delay the secretion of, PTH in response to increased calcium demand (3). Subsequent subclinical hypocalcaemia would lead to uterine inertia with delayed delivery and intrapartal hypoxia of puppies (1).

Materials and methods - Bitches were selected from a colony of German Shepherds with a history of uncomplicated parturition (Group 1: Control; n=10) and from a Labrador colony experiencing an increased incidence of stillbirths (Group 2; n=20). Jugular blood samples were collected daily from –96 h until the onset of whelping (Time 0 = onset of stage 2 labour) and then every 4 h until the last pup was born. Serum was processed and stored under anaerobic conditions until analysis by radio-immunoassay (PTH; 4), ion selective potentiometry (iCa; 5) and an i-Stat portable analyser (pH). Multiple linear regression was used to determine the effect of the independent variables (group and time) and their interactions on each of the dependent variables (PTH, iCa, and pH).

Results - Mean concentrations of serum PTH, iCa and pH during the peripartal period in Group 1 bitches are tabulated below:

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>-96</th>
<th>-72</th>
<th>-48</th>
<th>-24</th>
<th>0</th>
<th>+4</th>
<th>+8</th>
<th>+12</th>
<th>+16</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH (pmol/L)</td>
<td>5.05</td>
<td>4.07</td>
<td>2.68</td>
<td>3.24</td>
<td>2.74</td>
<td>2.38</td>
<td>1.97</td>
<td>2.70</td>
<td>2.80</td>
</tr>
<tr>
<td>Ionised Calcium* (mmol/L)</td>
<td>1.39</td>
<td>1.39</td>
<td>1.40</td>
<td>1.36</td>
<td>1.38</td>
<td>1.41</td>
<td>1.52</td>
<td>1.52</td>
<td></td>
</tr>
<tr>
<td>Venous pH</td>
<td>7.36</td>
<td>7.36</td>
<td>7.36</td>
<td>7.36</td>
<td>7.36</td>
<td>7.36</td>
<td>7.38</td>
<td>7.38</td>
<td>7.38</td>
</tr>
</tbody>
</table>

Time 0h=onset of Stage II of whelping
*adjusted to pH 7.4

During the peripartal period, Group 2 bitches had higher PTH (P<0.001), higher pH (p<0.05) and lower ionised calcium concentrations (P< 0.05) than Group 1 bitches.

This is the first report of the normal changes that occur in ionised calcium, PTH and pH during the immediate peripartal period of bitches. Comparing results from the two populations of bitches suggests that low ionised calcium resulting from a rising pH and decreasing PTH during the peripartal period may contribute to decreased uterine contractility and increased risk of stillbirths in bitches. Serum samples from bitches in both groups are currently being analysed for determination of oxytocin concentrations to examine its pattern of secretion during the peripartal period and its potential role in the pathogenesis of canine stillbirths.
Dietary manipulation of the cationic/anionic difference (DCAD), similar to the bovine model for hypocalcaemia (2), in diets formulated for pregnant bitches may be a potential preventative treatment to aid in reducing the incidence of stillbirths in the bitch.

Funded by Nestle Purina, USA.

Acknowledgements

The Guiding Eyes, NY and Dr Sydney Moise, Cornell University

References


