PREWEANING PERFORMANCE OF PIGS INJECTED WITH DEXAMETHASONE AT BIRTH

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Abstract. A trial was conducted to determine preweaning performance of pigs injected with dexamethasone either 1 or 24 hours after birth. For this experiment 165 pigs (S.C.D.A. Simnic) were used. Treatments included 2 mg/kg i.m. injection of dexamethasone within 1 h of birth or 2 mg/kg i.m. injection of dexamethasone within 24 h after birth. At weaning there was a treatment x sex interaction on body weight (BW). Males with dexamethasone 11% heavier than control males, and no significant differences in BW among the females.

INTRODUCTION

After parturition, the piglet undergoes transient changes in growth and development. In the pig, adrenal sensitivity and plasma cortisol concentrations increase in late gestation, peak at birth, and decrease significantly the first week postnatally (Dvorak, 1972; Silver & Fowden, 1989, cited by A.M. Gaines).

It has suggested that the glucocorticoid surge at birth is the endocrine signal necessary for maturational changes in the postnatal pig. Carvoll et al. (2000) cited by A.M. Gaines reported that circumventing the glucocorticoid surge associated with the natural birth process, via caesarian section, reduces piglet growth and alters the somatotrophic axis. This would suggest that the cortisol surge at the time of parturition is an important regulator of postnatal growth and development.

The objective of this study was to determine the effect of dexamethasone via injection on preweaning performances of pigs.

MATERIAL AND METHOD

This experiment was conducted at S.C.D.A. Simnic (comercial sow unit). 165 pigs were used from primiparous and multiparous sows, 91 males and 74 females (Table 1).
Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Barrows</th>
<th></th>
<th></th>
<th>Gilts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>LExp 1</td>
<td>LExp 2</td>
<td>Control</td>
<td>LExp 1</td>
<td>LExp 2</td>
</tr>
<tr>
<td>Number of pigs</td>
<td>29</td>
<td>32</td>
<td>30</td>
<td>26</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Number of deaths</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Birth weights (kg)</td>
<td>1,420</td>
<td>1,480</td>
<td>1,450</td>
<td>1,400</td>
<td>1,440</td>
<td>1,420</td>
</tr>
<tr>
<td>Weaning weights (kg)</td>
<td>7,340</td>
<td>8,160</td>
<td>8,130</td>
<td>7,780</td>
<td>7,570</td>
<td>7,560</td>
</tr>
</tbody>
</table>

RESULTS

Birth to weaning data are presented in Table 1. Birth weights 1,450 kg ± 0.030 kg for barrows and 1,440 kg ± 0.020 for gilts.

A treatment x sex interaction was detected for BW at weaning. Males treated with dexamethasone 11% heavier than control males and no significant differences in BW at weaning among treatment groups in the females.

DISCUSSIONS

Recent studies have indicated that the somatotrophic axis is functional in the neonatal pig and can be influenced by exogenous hormone therapies such as porcine GH (Matteri et al., 1998, cited by A.M. Gaines) and dexamethasone (Carvoll, 2001), (A.M. Gaines et al. 2002). Carvoll findings using dexamethasine treatment in piglets point to the need for careful attention to dose, age and sex in analyses of glucocorticoid effect on the somatotrophic axis.

Carvoll (2001) cited by A.M. Gaines observed a 10,1% increase in BW at weaning when pigs were administrated dexamethasone (1 mg/kg BW) within 1 h of birth, which was attributed to stimulation of the somatotrophic axis. A.M. Gaines (2002) a single dose of dexamethasone (2 mg/kg BW within 1 or 24 h of birth may have also altered the somatotrophic axis which led to a 10% increase in BW at weaning; however, this effect was only observed in the males.

In the present study the single dose administration of dexamethasone (2 mg/kg BW) within 1 or 24 h of birth, led to a 11% increase in body weights at weaning only in the males.

The positive growth response in the male pig to dexamethasone treatment was not seen in the female pig, this indicating a sexually dimorphic response to the dexamethasone treatment.

Gallagher et al. (1999) cited by A.M. Gaines, also reported a sexually dimorphic response in neonatal piglets injected with GHRH (Growth hormone-releasing hormone). GHRH enhanced growth in male piglets with no effects in females piglets.

In conclusion resoult of the current study indicate that dexamethasone administrated via injection within 24 h oh birth significantly improves preweaning performances of barrowe with no benefical effects on gilts. Given that there may be potential differences in glucocorticoid sensitivity in amle and female pigs, additional
studies are needed to determine the optimum concentration of dexamethasone to administred.

IMPLICATIONS

This study further demonstrates that the somatotrophic axis is functional in the neonatal pig and can be altered by dexamethasone to stimulate growth. Preweaning performance can be improved if dexamethasone is administered to barrows within 24 h of birth. This improvement results in accelerated pig growth.

LITERATURE CITED