EFFECTS OF TWO TEETH RESECTION METHODS ON PLASMA C-REACTIVE PROTEIN AND CORTISOL IN PIGS

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Introduction

Resection of newborn piglets 'needle' teeth is widely practised in order to reduce facial injuries to piglets during the establishment of the 'teat order' and to minimise damage to the sows udder. Teeth are generally clipped to the gum line using side-cutting pliers. This can cause trauma in the oral mucosa and consequently result in infection and/or inflammation. The use of rotating electric grinders reduces this problem. However, grinding takes more time and involves more handling. This study aimed to determine the effect of two teeth resection methods on concentrations of C-reactive protein (CRP) and cortisol in pigs.

Material and Methods

Litters from 21 multiparous sows were used. All piglets from the same litter were subjected to the same treatment and had their teeth either clipped (CLIP), ground (GRIND) or left intact (INT). Clipping was done using clean, sharp side-cutting pliers. Grinding was performed using a high-speed diamond coated cylinder, grinding no more than one third of each tooth [Pigmatic 110, SFK Technology A/S, Herlev, Denmark]. The same trained technician applied all treatments within 12 h of birth. Twenty-four hours after treatments were imposed, blood samples from 1 male and 1 female piglet selected from each litter were collected by jugular puncture into lithium heparinised syringes [Vacutainer™, Unitech Ltd., Dublin 24, Ireland]. These animals were also blood sampled 24 h after weaning at 28 days of age. Blood samples were immediately centrifuged at 2000 g for 10 minutes at 5ºC, and plasma was stored at –20ºC until analysis. Plasma samples were analysed for their concentration of CRP [Tridelta Development Ltd., Maynooth, Co. Kildare, Ireland] and cortisol [DGR-Diagnostics, Marburg, Germany]. Data from 1-day-old piglets were subjected to analysis of variance (ANOVA) using the general linear model (GLM) procedures of SAS® to test for main effects of treatment and gender, and their interaction. Data from samples collected on day 29 were analysed similarly using data from day 1 as a covariate.

Results

Plasma CRP levels on day 1 did not differ between treatment or gender groups (p_v>0.1, Table 1). No significant treatment by gender interaction was found (p_v>0.1). A tendency towards a significant effect of treatment (p_v=0.060) was found on day 29 (Table 1). CLIP pigs had higher plasma concentrations of CRP than GRIND pigs (p_v<0.05). There was no effect of gender or treatment by gender interaction in pigs at this age (p_v>0.1). A significant effect of treatment was found in plasma cortisol concentrations on day 1 (p_v<0.05, Table 1). GRIND piglets had significantly higher levels of cortisol in plasma in comparison to CLIP piglets (p_v<0.05). GRIND piglets also tended to have higher plasma cortisol concentrations in comparison to the INT group (p_v=0.082). No gender effects were found and the treatment by gender interaction was also not significant (p_v>0.1). On day 29 no significant effects of treatment, gender or their interaction were found (p_v>0.1, Table 1).

Table 1. Plasma concentrations of C-reactive protein (CRP) and cortisol of pigs from three treatments on days 1 and 29 of age. Data are presented in means ± SEM.

		Intact	Clipping	Grinding	p_v
CRP, µg/ml	Day 1	13.91 ± 3.75	16.54 ± 2.48	15.23 ± 2.10	0.814
	Day 29	183.34 ± 33.94	229.47 ± 46.50	108.25 ± 14.10	0.060
Cortisol, ng/ml	Day 1	338.65 ± 52.65	271.07 ± 60.06	494.56 ± 70.01	0.047
	Day 29	17.38 ± 4.21	32.28 ± 10.72	23.46 ± 6.95	0.124

Discussion

CLIP and INT piglets were more affected by infection and/or inflammation at weaning than GRIND piglets. This reflects the higher incidence of mouth and facial injuries respectively in these animals. The lack of a difference between the CLIP and INT groups indicates that both facial and mouth injuries activate the immune/inflammatory response to the same degree. Blood sampling of 1 day-old piglets is

an acute stressor that results in high plasma cortisol levels. This HPA axis activation was enhanced due to the longer handling times inherent to the GRIND treatment. Plasma CRP determination is a useful indicator to assess the welfare consequences of two different teeth resection methods in pigs at weaning.