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THE EFFECT OF PASSIVE IMMUNITY TO *Mycoplasma hyopneumoniae* AND AN EXTENDED LACTATION PERIOD ON PIGLET IMMUNE DEVELOPMENT

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Introduction

Research data suggests that increasing weaning age increases the economic value of weaned pigs[1]. However, little information exists on the impact of extended lactation length (>21 days) on the immune status of pigs. Because of its importance to the swine industry and because it is a proven model of maternal immune transfer in swine[2], *Mycoplasma hyopneumoniae* (*M. hyopneumoniae*) was chosen as the model antigen to investigate the influence of lactation length on vaccine timing. The objective of this study was to determine the optimal time to vaccinate pre-weaning pigs in the face of an extended lactation period of 25 days.

Materials and Methods

The study was performed on a *M. hyopneumoniae* and PRRSV free farm. A total of 16 gilts were included in the study; 8 gilts were vaccinated with RespiSure One™ pre-farrowing. Piglets were ear tagged at birth and randomly assigned to 1 of 8 groups based on gilt *M. hyopneumoniae* status. Experimental groups 1-4 were born to unvaccinated gilts. Group 1: piglets remained unvaccinated. Group 2: piglets were vaccinated at 7 days of age (doa). Group 3: piglets were vaccinated at 21 doa. Group 4: piglets were vaccinated at 25 doa. Experimental groups 5-8 were born to vaccinated gilts. Group 5: piglets remained unvaccinated. Group 6: piglets were vaccinated at 7 doa. Group 7: piglets were vaccinated at 21 doa. Group 8: piglets were vaccinated at 25 doa. Piglets were vaccinated with the same bacterin as gilts, and were allowed to nurse from their biological dams until weaning (25doa). Cell mediated immunity (CMI; delayed-type hypersensitivity) and humoral immunity (antibody testing by ELISA Idexx®) were assessed in piglets 3 weeks post-vaccination (wpv). Humoral immunity was also measured in 12 week-old pigs.

Results

Unvaccinated gilts remained negative to *M. hyopneumoniae* antibodies throughout the study, while vaccinated gilts seroconverted prior to farrowing. Pre-suckling piglets were negative to *M. hyopneumoniae* antibodies (data not shown). Humoral immunity to *M. hyopneumoniae* in animals born to unvaccinated gilts was evidenced only in one piglet from group 3 and one piglet from group 4, when measured 3 weeks post-vaccination (data not shown). Serological response detected 3 weeks post-vaccination in piglets born to vaccinated mothers suggested a decay of maternal antibodies, and interference with the development of active immunity. Humoral immunity detected in piglets at 12-weeks of age is shown in Figure 1. CMI was not significantly different among piglets born to unvaccinated gilts, regardless of vaccination age. In the group of pigs born to vaccinated gilts, a significantly higher number of unvaccinated pigs showed CMI compared to pigs vaccinated at 25 doa.

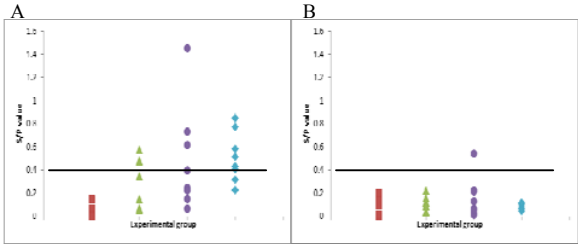

Figure 1. *M. hyopneumoniae* antibodies in 12-wo pigs (measured by ELISA). Panel A: piglets born to unvaccinated dams. Panel B: piglets born to vaccinated dams. (■) unvaccinated, (▲) vaccinated at 7 doa, (●) vaccinated at 21 doa, (◊) vaccinated at 25 doa. Horizontal line marks cut-off (0.4 S/P value).

Conclusions

The magnitude of humoral and cellular immune response was not significantly different when examined by age of vaccination. In piglets born to vaccinated gilts, pre-existing antibodies interfered with active immunity at all 3 ages at vaccination. Overall, vaccination status of the mother was more important than vaccination of the offspring, at least at the vaccination times selected for this study.

References

1. Main, R et al. 2005. *J Swine Health Prod*. 13:189-197.
2. Bandrick, M et al. 2008. *Clin Vaccine Immunol*. 15: 540-543.
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