Differences in Nursery Pigs' Behavior on the Day of Vaccination

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Anna K. Johnson, PhD., assistant professor;
Jennifer Kline, undergraduate;
Rachel Witte, undergraduate;
Whitney Holt, undergraduate;
Ken J. Stalder, PhD., associate professor, Department of Animal Science, Iowa State University;
Lori L. Layman, research associate II,
Locke A. Karriker, DVM, MS, DACVPM assistant professor;
Brenda de Rodas, PhD., manager, Swine Research, Land O' Lakes Purina Feed LLC, Gray Summit, MO

Summary and Implications

Swine industry feed suppliers are continually striving to develop techniques and tools to reduce the additive stressors imposed on the weanling piglet, to increase advantageous behaviors (feeding and drinking) and to reduce aggressive interactions. One product on the market designed to ease the transition from a liquid diet (sow's milk) to a dry ration is a gel-based feed supplement that was incorporated in this trial as a means to positively affect feeding and drinking behaviors. The objectives of this study were to determine if there were differences in the nursery pigs' behavior on the day of vaccination when provided a gel supplement. A total of 29 d crossbred pigs (5.94 kg) were housed in Double L® confinement nursery buildings. Four treatments were compared. ***No vaccine and no gel*** (control n = 4) defined as unvaccinated and without supplemental gel at days 8 to 10. ***No vaccine and gel*** (n = 4) defined as pigs that were provided supplemental gel at days 8 to 10 without vaccination. ***Vaccinated and no gel*** (n = 4) defined as pigs that were vaccinated but did not receive supplemental gel at days 8 to 10. ***Vaccinated and gel*** (n = 4) defined as pigs that were provided supplemental gel at days 8 to 10 and were vaccinated. The group of four pigs housed together in a pen was considered the experimental unit for data analysis. Definitions for the behaviors and postures recorded and summarized for the trial included the following: ***Active*** was defined as standing, this included any upright postures. ***Inactive*** posture was defined as sitting or lying postures (both lateral and sternal). ***Time at drinker*** was defined as when an individual pig's mouth was around the water nipple. ***Time at feeding stations*** was defined as the time when the individual pig's head was inside the creep (that contained gel) or the three hole feeder (dry pelleted feed). Nursery aged pigs were less active ($P < 0.05$; Figure 1) and spent less time ($P < 0.05$; Figure 2) at the feeding stations 1-h after receiving *Mycoplasma hyopneumoniae* vaccination, indicating a short term behavioral response to this stressor. These behavioral alterations continued for approximately 6-h (or 5:00 PM the vaccination day afternoon). After this time, all nursery pigs regardless of treatment engaged in the same behavioral repertoire. However, the behavioral repertoire of these nursery pigs were not different over the 3-d trial (previously published worked by Johnson et al., 2008) suggesting that the effects of this vaccination stressor and product were not long lasting.

Introduction

Swine industry feed suppliers are continually striving to develop techniques and tools to reduce stress imposed on pigs at weaning, to increase advantageous behaviors (feeding and drinking) and to reduce aggressive interactions. In addition to social reorganization, pigs are often vaccinated during the nursery phase to reduce the impact of potentially harmful diseases. It has been noted by swine practitioners that at the time of vaccination pigs lie down, become more lethargic and reduce feed consumption after vaccination. One product on the market is a gel-based feed supplement that is designed to ease the transition from a liquid diet (sow's milk) to a dry ration. According to the manufacturer this gel-based feed supplement contains high quality ingredients, is highly palatable and provides the young pig with both a feed component and a water component. The gel can be used in addition to a standard dry based nursery feed. Although, often recommended to be used at the time of weaning, the possibility of implementing the gel around the time of vaccination is a novel concept that might impact the individual pig's overall performance through shortening the time the pigs are disinterested in eating and drinking behaviors. The objectives of this study were to determine if there were differences in the nursery pigs' behavior on the day of vaccination when provided a gel supplement.

Materials and Methods

Animals and Housing: All procedures were approved by Iowa State University's Animal Care and Use Committee. A total of 64, 29-d old, crossbred pigs (5.94 kg) were housed in Double L® confinement nursery buildings. Two identical barns, each with two rooms of 14 pens (1.5 m^2) each were utilized. Each nursery pen contained one nipple drinker and one three hole feeder (1.2 m x 11.9 cm x 23.9 cm) attached to the front of the pen and feed and water was provided ad libitum throughout the duration of the trial. Flooring was plastic and fully slatted. Environmental control was provided by a positive pressure system utilizing: two 1 m^2 exhaust

outlets located under the pig flooring area, two 1 m^2 inlet fans, one ceiling mounted 60,000 BTU propane barn heater and one Varifan ECS-2 electronic controller for each individual room. All pigs were uniquely identified by one plastic ear tag (Allflex, Dallas, TX) located in their left ear, were blocked by weight and sex and sorted on the day of arrival to produce pen groups of equal weight and cohorts of two barrows and two gilts per pen providing 0.38 m^2 of floor space/pig. Pigs were observed twice daily by two experienced caretakers at 0600 and 1600 hours.

Treatments: Sixteen pens were used during this trial and pen was the experimental unit. Pigs were identified by sex, weighed (individually on an electronic scale [Salter Brecknell, PS250 Platform Scale, Brooklyn, NY] accurate to 0.1 kg) and assigned to pens so that pen weight and sex was even. Pigs were identified by a plastic button ear tag (Global small male, Allflex, Dallas, TX) located in their left ear. Four treatments were compared. ***No vaccine and no gel*** (control n = 4) defined as unvaccinated and without supplemental gel at days 8 to 10. ***No vaccine and gel*** (n = 4) defined as pigs that were provided supplemental gel at days 8 to 10 without vaccination. ***Vaccinated and no gel*** (n = 4) defined as pigs that were vaccinated but did not receive supplemental gel at days 8 to 10. ***Vaccinated and gel*** (n = 4) defined as pigs that were provided supplemental gel at days 8 to 10 and were vaccinated.

Gel: Ultra Care Gel pre started supplement for swine (1.6 % crude fat, 3 % crude protein, moisture 80 %; LOL, 2009a) was mixed with the commercially available pelleted feed in a 1:1 ratio (567 g commercially available pelleted feed to 567 g Ultra Care Gel pre started supplement for swine). The gel-feed mix was placed into a plastic, circular removable feeder that measured 19.8 cm in diameter x 10 cm height. The creep feeder was placed into the pens and attached to the floor panel in the front of the pen, 30 cm behind the trough feeder. Gel-feed mix was examined for quality twice a day (6:00 AM and 4:00 PM). If the gel-feed mix was in good quality at the time of inspection, additional gel-feed mix was weighed and added to provide the pigs with the aforementioned amount of gel-feed mix. All gel-feed mix was removed if there was any evidence of desiccation or fecal contamination. The solid contamination was removed; the contaminated gel-feed mix was weighed (Berkley digital fish scale, Bass Pro Shops, Altoona, IA) and discarded. The gel circular feeder was rinsed clean with clear water and was then refilled with a new gel-feed mix. Note; all pens had a creep feeder placed into the pen; although half of these creep feeders did not contain the gel.

Vaccination schedule: For treatments that were vaccinated a single dose (2 cc per pig) of commercially licensed *Mycoplasma hyopneumoniae* (Pfizer Inc., Pfizer Animal Health, New York, NY, USA), killed bacterin was administered intramuscularly (1.27 x 21 mm needle) in the neck region of each nursery pig on d 9 of the trial. Treatments that were not vaccinated were sham handled and sham vaccinated (saline) to simulate the vaccination process. Vaccinations or sham vaccinations began at 10:00 AM and was completed by 11:00 AM on day 9 of the trial.

Behavioral equipment and acquisition: Behavior was collected on pigs housed in 16 pens (n = 4 per treatment) on d10. Two days prior to visual recording of behavior, all pigs in a pen were identified with an individual number placed on the back between the scapulas using an animal safe crayon (Raidex™ Animal Marking Crayons, Otterbach Company, Germany). One 12 v black and white CCTV camera (Model WV-CP484, Panasonic® Matsushita Co Ltd., Japan) was affixed onto the back wall of the nursery so that two pens were captured with a single camera. Cameras were placed approximately 1.7 m above the pen floor. Video was captured onto a DVR (RECO-204, Darim Vision®, USA) at 10 frames per second in black and white mode (Figure 1). Video was then remuxed (defined as changing the recorded format of film into a useable format for the computer) using Video ReDo® (DRD Systems, Inc.) and placed on DVDs. The acquisition of two mutually exclusive postures (active and inactive) and two behaviors (time at drinker and time at feeding station) were collected by two experienced observers who viewed the DVDs utilizing a 10-min scan sampling technique. The postures and behaviors used are defined in the following text. ***Active*** was defined as standing, this included any upright postures. ***Inactive*** posture was defined as sitting or lying postures (both lateral and sternal). ***Time at drinker*** was defined as when an individual pig's mouth was around the water nipple. ***Time at feeding stations*** was defined as the time when the individual pig's head was inside the creep (that contained gel) or the three hole feeder (dry pelleted feed; Figure1).

Figure 1. Screen print of the nursery pen containing four pigs per pen.

Statistical Analysis: All behavioral data were expressed as percentages and were transformed using the arcsine square root process to achieve a normal distribution. Data were analyzed using the PROC MIXED procedure of SAS (SAS Inst. Inc., Cary, NC) software for parametric data on a pen basis. Statistical model main plot include the parameter of interest, the hour, main effects of gel, and vaccine and the 2 x 2 factorial arrangement of gel and vaccination treatment. Pen was included as a random effect in the model. A repeated measure statement of hour within pen was used. A $P < 0.05$ as considered significant and PDIF was used to separate the means.

Results and Discussion

Nursery aged pigs were less active ($P < 0.05$; Figure 2) and spent less time ($P < 0.05$; Figure 3) at the feeding stations 1-h after receiving *Mycoplasma hyopneumoniae* vaccination, indicating a short term behavioral response to this stressor. These behavioral alterations continued for approximately 6-h (or 5:00 PM the vaccination day afternoon). After this time, all nursery pigs regardless of treatment engaged in the same behavioral repertoire. However, the behavioral repertoire of these nursery pigs were not different over the 3-d trial (previously published worked by Johnson et al., 2008) suggests that the effects of this vaccination stressor and product were not long lasting.

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Figure 2. Least square means and standard errors for the main effect of vaccination on the inactivity levels of nursery pigs on day 9 (6:00 AM) to day 10 (5:00 AM) of the trial when pigs were either vaccinated or sham vaccinated at 10:00 AM. Superscripts (*) indicate a difference at a $P < 0.05$.

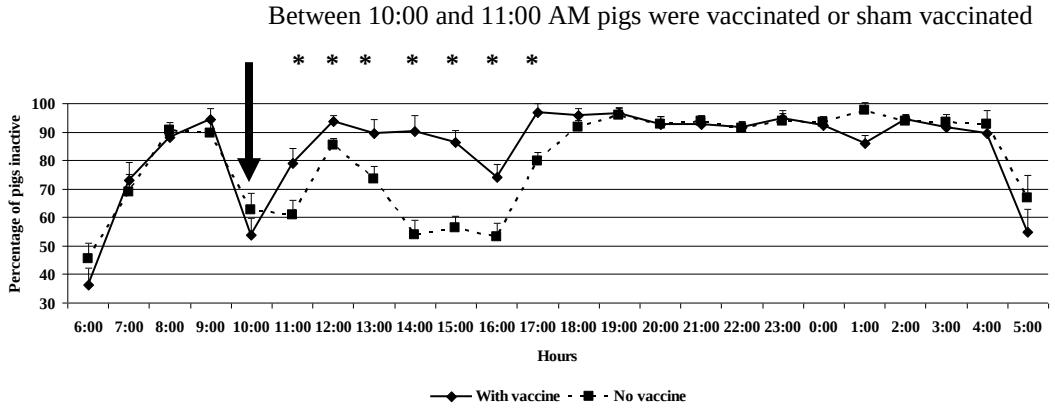

Figure 3. Least square means and standard errors for the main effect of vaccination on the time spent at the feeding stations levels of nursery pigs on day 9 (6:00 AM) to day 10 (5:00 AM) of the trial when pigs were either vaccinated or sham vaccinated at 10:00 AM. Superscripts (*) indicate a difference at a $P < 0.05$.