Safety Evaluation of a Modified Live Pseudorabies Virus Vaccine Administered Using a Needle-free, Transdermal Injection Device

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Pork carcass defects from intramuscular injections and residual needle fragments are a major problem in the pork industry. Needle fragments are a major concern for packing plants that slaughter adult animals. Needle-free, transdermal jet injection devices present a potentially less hazardous alternative to traditional injection by hypodermic needle. The objective of the study reported here was to compare the serological responses induced by vaccination with a modified live pseudorabies virus (PRV) vaccine, and evaluate externally visible post-vaccination tissue reactions and general health-related safety between traditional injection by hypodermic needle and a needle-free, transdermal injection device.

A 1700 sow herd was used for this study. The herd is located in Illinois and is required to vaccinate the entire herd for PRV every 6 months. Approval from the state veterinarian was obtained for conducting the study. Gestating sows at all stages of gestation were randomly assigned to one of three injection procedures: 1- Air in rump; 2- Air in neck; and 3- needle in neck. The needle injections were done with a 14 gauge by 1.5 inch needle. The air injections were performed with an air powered, needle free, transdermal injection device produced by Felton International. All needle injections were done by the farm's breeding/gestation manager and the air injections were done by the manager or by a Felton International representative. The vaccine (PRV Marker Gold, Schering Plough Animal Health) was used according to label directions. Pregnant sows and gilts in the eight weekly breeding groups that were closest to farrowing were assigned by group. Animals in the nine groups in earlier stages of gestation were assigned to treatment within group with stratification by parity. Each breeding group contained approximately 80 animals. Pre- and post-vaccination rectal temperatures and blood samples were obtained from one breeding group at 9 weeks of gestation. Serum samples were tested by PRV screening ELISA at the Iowa State University Veterinary Diagnostic Laboratory and the results were reported as serum to positive control (S/P) ratios. Reproductive data were captured in PigChamp. Data was analyzed by ANOVA and Fisher's exact test.

As for serological responses, the S/P ratios increased following vaccination in all groups and no there was no difference among the groups. The air rump group had a significantly higher S/P ratio post-vaccination but this group's S/P ratio was higher prior to vaccination.

With regard to rectal temperatures after vaccination, none of the 83 sows evaluated exhibited fever post vaccination and none of the sows in the entire herd exhibited any negative reactions such as reduced appetite following vaccination. The injection sites of these 83 sows were closely evaluated and transient, mild swelling of the skin as noted in 25/29 Group 1, 16/26 Group 2 and 9/28 Group 3 sows. There were no differences among the three injection procedures with regard to farrowing rate and pregnancy loss, or total born, born alive, stillborn or mummified fetuses per litter.

In summary, the needle-free, transdermal injection device performed similar to traditional injection by needle with regard to safety and serological responses to vaccination.