RESEARCH ABSTRACT

SWINE HEALTH

Title: Improved vaccines for porcine reproductive and respiratory syndrome
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ABSTRACT

An attenuated-porcine reproductive and respiratory syndrome (PRRS) virus (PRRSV) vaccine first became available commercially in 1994. This vaccine, initially marketed under the name RespPRRS® and more recently as RespPRRS/Repro®, and another vaccine, introduced later and marketed under the name PrimePac PRRS®, are now used extensively. Although vaccines are now often included in strategies for the prevention and control of PRRS, numerous field observations and related experimental studies have revealed that they sometimes fail to provide complete protection. The most common theory in regard to this lack of complete protection is genetic variation among strains, namely, between the vaccine strain and the virulent field strain(s) circulating in an affected herd. The hypothesis of this experiment was that a vaccine containing several strains of PRRSV (multi-strain vaccine) might provide better protection than the single-strain vaccines in current use.

The experiment comprised 6 groups with 8 pigs/group. Treatments were the following: Group I, nonvaccinated, nonchallenged (nonchallenged = not exposed to virulent virus); Group II, nonvaccinated, challenged (challenged = exposed to virulent virus); Group III, vaccinated (single-strain vaccine), nonchallenged; Group IV, vaccinated (single-strain vaccine), challenged; Group V, vaccinated (multi-strain vaccine), nonchallenged; and Group VI, vaccinated (multi-strain vaccine), challenged. The single-strain vaccine was RespPRRS/Repro®. The multi-strain vaccine was RespPRRS/Repro® plus 4 additional strains of PRRSV that had been attenuated in our laboratory. The virulent (challenge) strain of PRRSV to which groups II, IV, and VI were exposed was isolated from a severe clinical epidemic of atypical PRRS. It was a different strain than any of those in the single-strain and multi-strain vaccines. Pigs were vaccinated when they were 2-3 weeks of age and challenged 4 weeks later. On the basis of 1 or more of the measurements of body temperatures, clinical signs, weight gains, virus isolations, and lung lesions both types of vaccine provided a measurable, but less than full, protection against challenge. For example, the mean extent of lung lesions was reduced from 56% for nonvaccinated pigs of group II to 7% and 11% for pigs of groups IV and VI, respectively. Neither vaccine was clearly superior in regard to effectiveness. Our impression was that protective immunity would have been greater had challenge been delayed for at least several weeks because vaccine virus was still circulating in the blood of vaccinated pigs at the time of challenge. Delayed challenge also might have revealed multi-strain vaccine to be superior in regard to protective immunity in that on the basis of lymph node enlargement pigs appeared to have a more forceful immunologic response to multi-strain vaccine. Two or more strains of PRRSV were often isolated from the blood of pigs vaccinated with the multi-strain vaccine. Irrespective of the type of prior vaccination, virulent virus quickly predominated in the circulation of most challenged pigs.