RESEARCH ABSTRACT

SWINE HEALTH

Title: Determination of the virulence of a mutant PCV2 (PCV2d) recently identified in cases of apparent vaccine failure and the ability of commercial PCV2a vaccines to protect against PCV2d

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Scientific Abstract

PCV2d (formerly known as mutant or mPCV2) emerged in the U.S. in 2012 and important questions on virulence of this novel strain and vaccine protection by currently used vaccines needed to be answered. Two different studies were conducted. Initially the pathogenesis of PCV2d was evaluated by comparing PCV2d to PCV2a and PCV2b in caesarian-derived, colostrum-deprived (CDCD) pigs (Aim 1). In a follow-up study the efficacy of PCV2a-based commercial vaccines to protect against PCV2d challenge was investigated in the conventional pig model (Aim 2). For Aim 1, a total of 29, two-week-old CDCD pigs were assigned to one of 4 treatment groups. At 3 weeks of age, the pigs were experimentally inoculated with saline, PCV2a, PCV2b or PCV2d. All pigs were necropsied 21 days post infection (dpi). Gross lesions were limited to visible icterus and loss of body condition in a portion of the PCV2d pigs. The amount of PCV2 DNA was significantly higher in pigs inoculated with PCV2d compared to those infected with PCV2b in sera at 7 dpi and fecal swabs at 14 dpi. The results indicated that all PCV2 isolates were capable of inducing severe lesions and disease in the CDCD pig model, and there was no overall significant difference in virulence. For Aim 2, 50-naturally PCV2b-infected 2-week-old pigs were divided into five treatment groups with 10 pigs each. Pigs were unvaccinated (positive and negative controls) or vaccinated at 3 (BIVI, Zoetis, Merck) and at 5 weeks of age (Merck). At 11 weeks of age, all pigs except the negative controls were challenged with PCV2d. The experiment was terminated 21 days after challenge. Under the conditions of this study, vaccinated pigs were protected against PCV2d viremia and lesions whereas non-vaccinated pigs were not. The results indicate that commercial vaccines are effective in protecting conventional pigs against emerging PCV2d strains despite the presence of an ongoing PCV2b infection and passively-acquired anti-PCV2 antibodies at the time of vaccine administration.