

Lack of interference with maternal immunity and reduction of viremia in PCV2 vaccinated pigs

Mathias Ritzmann^{1,2}, Andreas Palzer¹, Matthias Eddicks¹, Sabine Elicker¹, Karl Heinritzi¹
¹Clinic for swine, Ludwig-Maximilians-University, Munich, Sonnenstrasse 16, 85764 Oberschleissheim, Germany
²Clinic for swine, University of Veterinary Medicine Vienna, Veterinärplatz 1, A-1210 Vienna Austria
 schweineklinik@vu-wien.ac.at

Introduction

Porcine circovirus type 2 (PCV2) has been associated with different disease syndromes such as postweaning multisystemic wasting syndrome (PMWS) or Porcine Dermatitis and Nephropathy Syndrome (PDNS) which have been summarized under the term porcine circovirus diseases (PCVDs). Recently vaccines for active immunization of piglets against PCV2 were developed. The objective of the present study was to investigate the effect of a one-shot PCV2 vaccine on PCV2 viremia and possible interference of vaccination with maternal antibodies.

Materials and Methods

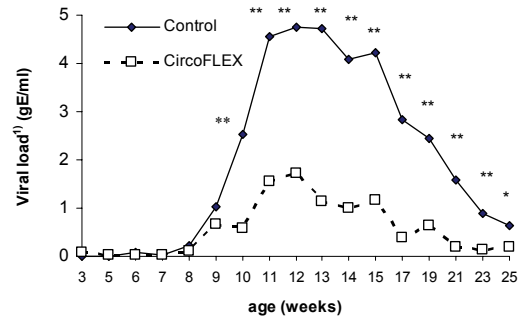
A total of 1519 pigs were included in the trial and received either 1 ml Ingelvac CircoFLEX® (Boehringer Ingelheim Vetmedica GmbH, Germany) i.m. (n=754) or 1 ml placebo i.m. (n=765) at approximately 3 weeks age. At inclusion blood was taken from every study animal. During the study 14 % pre-selected animals were bleed weekly (from 5 to 15 weeks of age) or every other week (from 17 to 25 weeks of age). Quantification of antibodies to PCV2 and of PCV2 viral load in serum samples was performed using recognized IFAT and qPCR procedures. All pigs were weighed individually at 3, 10, 15, 20 and 26 weeks of age. Groups were compared regarding viral load and duration of viremia with the Wilcoxon Mann-Whitney test.

Results

In the unvaccinated animals onset of viremia was observed at 10 weeks age. At the peak of infection 84.6% unvaccinated pigs were PCV2 positive compared to 21.3% in the vaccinated group. From 10 weeks onwards the viral load was always significantly lower in the vaccinated group when compared to the control group ($p \leq 0.0001$ for week 10 to week 23 and $p = 0.136$ for week 25) (Figure 1). Vaccinated animals had an approximately 30 days shorter duration of viremia and about a 70% lower overall \log_{10} viral load when compared to the unvaccinated animals. Based on antibody titer at time of vaccination pigs were grouped in 3 classes: low, medium and high titre. The results in table 1 show that the level of maternal antibodies against PCV2 at the time of vaccination did not interfere with the efficacy of the vaccine in terms of reduction of the duration of PCV2 viremia or reduction of viral load. No significant difference

was observed in regard to body weight between high and low titred vaccinated animals.

Figure 1: Viral load



* significantly different at $p=0.0136$

** significantly different at $p \leq 0.0001$

¹) mean \log_{10} viral load derived from the genomic equivalents (gE)/ml per animal

Table 1. Parameters of viremia in correlation with PCV2 antibody titer present at the time of vaccination

Titre score ¹)	Total	< 1:100 (low)	1:100-1000 (medium)	>1:1000 (high)
Duration (days)				
Control	60.7	68.8	60.3	56.3
CircoFLEX	30.0	36.5	26.9	31.1
p-value	<0.0001	0.0205	<0.0001	0.0066
Viral load ²) (gE/ml)				
Control	33.9	38.2	35.6	28.9
CircoFLEX	9.6	10.8	9.7	8.9
p-value	<0.0001	<0.0001	<0.0001	<0.0001

¹) PCV2 antibody titer at the time of vaccination

²) viral load indicates the mean overall \log_{10} viral load derived from the sum of genomic equivalents (gE)/ml per animal of 17 sampling days

Discussion

After onset of viremia at the age of 10 weeks a significant reduction in viremia, was observed in vaccinated pigs. In terms of viremia and weight gain vaccinated animals with low and high titers of maternal antibodies showed no distinct differences. The results of the present study indicate that Ingelvac CircoFLEX® is efficacious independent of the presence of maternally derived antibodies.