

The impact of seroconversion following vaccination on the efficacy of PCV2 vaccination

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Introduction

This paper describes the serological results obtained following vaccination with a one-dose vaccine against porcine circovirus type 2 (PCV2), and protection against natural challenge.

Materials and methods

In a Canadian study Ingelvac CircoFLEX® was administered between 19 and 59 days of age to about 1900 pigs going to four different finishing units.¹ A similar number of nonvaccinated control pigs were injected with sterile water and placed in the same finishing units. In this production system, pigs usually started showing clinical signs at about 85 days of age. Twenty pigs each vaccinated at 26, 40 and 52 days of age, and controls of the same age groups, were blood tested for the presence of PCV2 antibodies using the Ingezim Circovirus IgG/IgM ELISA test (Ingenasa) and an indirect fluorescent antibody (IFA) test (Biovet).

Results

The respective mortality rates for pigs vaccinated at various ages, and for the controls, were the following: 0.4 vs 7.6% (19 to 22 days), 2.8 vs 10.6% (22 to 36 days), 2.1 vs 8.1% (38 to 45 days) and 3.0 vs 9.6% (45 to 59 days). The difference between vaccinates and controls was highly significant ($p < 0.001$). Tables 1 and 2 show the serological results that were obtained using the ELISA and IFA tests.

Table 1: Average S/P ratios (for IgG) of controls and vaccinates following vaccination at 26, 40 or 52 days of age using an ELISA test.

Age at vaccination		Average S/P ratios*		
		Day 1**	Day 30	Day 58
26 days	Ctrl	0.35	0.10	0.49
	Vac	0.43	0.15	0.45
40 days	Ctrl	0.13	0.10	0.84
	Vac	0.18	0.26	0.67
52 days	Ctrl	0.20	0.30	0.71
	Vac	0.12	0.66	0.72

* Pigs are positive at ≥ 0.3

** One day after vaccination

Table 2: Geometric mean antibody titers of controls and vaccinates following vaccination of pigs at 26, 40 and 52 days of age using an IFA test.

Age at vaccination		GMT* IFA		
		Day 1**	Day 30	Day 58
26 days	Ctrl	119	50	1767
	Vac	382	66	680
40 days	Ctrl	108	107	9701
	Vac	112	144	985
52 days	Ctrl	200	553	1600
	Vac	119	2571	2571

* GMT = Geometric Mean Titer

** One day after vaccination

Discussion

Two main conclusions can be reached from this study. The first one is that no correlation was found between seroconversion following vaccination, and protection. Weak or no seroconversion was observed following vaccination, yet all groups of vaccinated pigs were well protected as the mortality difference between vaccinates and controls was highly significant in all groups. The youngest group of pigs tested serologically was vaccinated at 26 days of age. None of the tested pigs of that age group had seroconverted by day 30 after vaccination, yet protection was excellent (2.8% mortality vs 10.6% in controls).

A second conclusion would be that pigs could be effectively vaccinated in the presence of maternal antibodies. The youngest vaccinated pigs were between 19 and 22 days of age at the time of vaccination, and were logically those with the highest level of maternal immunity. Nevertheless their mortality rate was 19 times lower than that of the controls (0.4% vs 7.6%).

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References

- Desrosiers R, Clark E, Tremblay D, Tremblay R, Polson D. Preliminary results with Ingelvac® CircoFLEX™ to protect multiple ages of Quebec pigs against PCVAD. Proc. AASV, 2007, 143-145.