A severe PRDC challenge and the effect of a trivalent PRDC vaccine for PCV2, Mhp and PRRS

P. Philips[1], E. Fano[1], E. Schmaling[2], R. Edler[2]
[1] Boehringer Ingelheim Vetmedica, Inc., MO, USA; [2]Health Management Center (HMC), Field Research Services, BIVI, Ames, Iowa

INTRODUCTION

Porcine respiratory disease complex (PRDC) is a significant challenge for the global swine industry. PRDC includes both viral and bacterial respiratory pathogens, mainly Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), Porcine Circovirus type 2 (PCV2), *Mycoplasma hyopneumoniae (Mhp)* and secondary bacterial agents. Vaccine derived immune protection against clinical disease associated with PRDC pathogens is one control intervention. The purpose of this controlled-experimental study was to evaluate pigs vaccinated with 3FLEX® (a trivalent PCV2, *Mhp* and PRRS vaccine) compared to a non-vaccinated group following a severe PRDC challenge.

MATERIALS AND METHODS

Group 1 was a non-vaccinated challenged control group of 20 pigs. Group 2 was a 3FLEX® vaccinated and challenged group of 20 pigs. Groups 1 and 2 were simultaneously inoculated with PCV2d (intranasal and intramuscular), *Mhp* strain 232 (intra tracheal) and PRRSV strain SDSU-73 (intranasal and intramuscular). The challenge incorporates a well referenced virulent heterologous PRRSV isolate, a contemporary virulent PCV2 field isolate, given simultaneously with *Mhp*, representing a severe PRDC challenge.

RESULTS

Significant differences ($P < 0.05$) in respiratory clinical signs, gross lung lesions and PCV2 parameters (Lymphoid depletion, IHC and Viremia) are shown in Tables 1, 2 and 3. A reduction in post-challenge PRRSV viremia (Figure 1), and increased average daily weight gain was demonstrated (Table 4) in vaccinates compared to non-vaccinates. Based on clinical, pathological and production results from this study a severe PRDC challenge was successfully accomplished.

DISCUSSION AND CONCLUSION

The results of this trial demonstrate that 3FLEX® provides protection to pigs simultaneously challenged with PRRS, PCV2 and *Mhp*. In the face of severe PRDC challenge, use of a trivalent vaccine mixture is an option for mitigation of the biologic impact of PRDC.

Table 1: Post-challenge clinical observations

Clinical Observation	Treatment		P-value
	Challenge control	3FLEX®	
Respiratory	268/530 (50.57 %)	205/559 (36.67 %)	< 0.0001
Behavior	217/530 (40.94 %)	49/559 (8.77 %)	< 0.0001

Analyzed using Pearson's chi-square

Table 2: Least square means for affected lung percentage by treatment

Treatment Group	Mean	SD	SE	Lower 95%	Upper 95 %
Challenge Control	43.21[a]	16.87	3.29	36.55	49.87
3FLEX®	22.81[b]	12.19	3.29	16.15	29.47

[ab] Means Differ < 0.05 Wilcoxon rank sums test

Table 3: Summary inferential statistics for PCV2 variables. Improvement compared to challenge controls

Variable	Reduction compared to challenge control	P-Value
Tonsil Depletion	Yes	0.073
LN Depletion	Yes	0.038
Tonsil IHC	Yes	0.000
LN IHC	Yes	0.001
Lung IHC	Yes	0.01
Viremia %	Yes	0.01
Viremia CT	Yes	0.00001

Table 4: Summary descriptive statistics for growth performance from day 28 (challenge) to 56 (end of the study). Average Daily Gain, lbs.

Treatment Group	Response Variable	Mean	SD	SE	Lower 95 % CI	Upper 95 % CI	CV
Challenge control	Day 28 to 56 ADG, lbs./day.	0.60	0.47	0.12	0.35	0.86	78.43
3FLEX®		1.20	0.34	0.07	1.05	1.36	27.82
Challenge control	Day 0 to 56 ADG, lbs./day.	0.97	0.24	0.06	0.84	1.10	24.87
3FLEX®		1.23	0.21	0.05	1.13	1.33	17.11

Figure 1: Percentage positive and average CT for PRRS PCR results.