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Reproductive Failures Associated with Swine Influenza Virus H3N2 With or Without PRRS Virus Infection in Swine Farms

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Introduction

A severe form of porcine reproductive and respiratory syndrome (PRRS) with high rates of abortion and sow mortality has been experienced in mid-western swine farms since 1996 (1). Infection with virulent strains of PRRS virus (PRRSV) has been suggested as the cause, while the high abortion syndrome has not been reproduced experimentally. A few years later in 1998, a new subtype of swine influenza virus (SIV) H3N2 has been reported in the U.S. incriminating as a cause of respiratory and/or reproductive problems. The present study compared the impacts of reproductive parameters between farms associated with both SIV and PRRSV infection and only SIV infection.

Materials and Methods

Twelve 4,000-sow farms under a large company were investigated. Seven of them were PRRSV endemic, and 5 farms were PRRSV free. Between August and October 1998, all of the 12 units exhibited high numbers of abortions and sow mortality. Sows showed respiratory signs and high fever first, abortion and/or mortality were subsequently observed. PRRSV and SIV serology of the breeding herds was performed using banked sera collected between March 1998 and February 1999. PRRSV and/or SIV H3N2 were isolated from the lung and serum samples of the affected sows. Monthly production parameters from March 1998 to February 1999 were analyzed from data extracted from the computerized records using PigCHAMP™ version 4.02.

Results

PRRSV specific antibodies were consistently detected in the 7 PRRSV endemic herds (75-100%) but not in the 5 free herds. One month after the clinical outbreak, prevalence of SIV H3N2 antibodies was almost 100% in the 12 farms. The herds infected with both PRRSV and SIV had higher rates of abortion/pregnancy losses than those were SIV-positive only (Table 1). Abortion was observed in all stages of gestation but majority of the abortion in the PRRSV endemic farms were during the late stage of gestation. Higher sow mortality, increased numbers of stillborns and mummies were found in PRRS endemic farms ($p < 0.05$). Annual rate of sow mortality ranged from 11 to 16% in the PRRS endemic farms and 6 to 8% in the free herds. Numbers of pigs born-alive of the PRRSV free farms was significantly lower ($p < 0.05$)

than those of the endemic herds. Non-productive sow days and farrowing rates were not statistically different between PRRSV endemic and free farms ($p \geq 0.05$).

Table 1. Pregnancy losses (%) of the 12 farms during from March 1998 to February 1999

| | <i>PRRSV positive farms</i> | <i>Negative farms</i> | |
|------|-----------------------------|-----------------------|-----|
| 1 | 11.5 | 8. | 2.4 |
| 2 | 4.9 | 9 | 5.2 |
| 3 | 6.6 | 10 | 1.8 |
| 4 | 5.4 | 11 | 4.2 |
| 5 | 8.4 | 12 | 3.8 |
| 6 | 12.3 | | |
| 7 | 7.6 | | |
| Mean | 8.1* | Mean | 3.5 |

*Statistical difference ($p < 0.01$)

Discussion and conclusion

In the present study, outbreaks of SIV occurred on all 12 farms but reproductive parameters of the PRRSV-endemic farms were more severely affected. It appears that concurrent infection of SIV H3N2 and PRRSV can have a severe outcome. On the contrary, an experimental demonstration of dual infection with these two viruses in Europe had inconsistent results (2). It is possible that secondary bacterial infection could have occurred on these farms, and such concurrent infection can also enhance the clinical outcomes. Unfortunately, bacterial diagnosis was not attempted in this study. Results of these suggest that SIV could exasperate PRRSV and the combined infection may cause severe clinical signs of PRRS.

References

1. Zimmerman J, Epperson W, Wills R et al. (1997) Swine Hlth & Prod 5:74-75.
2. Pol JMA, Van Leengoed L, Stockhofe N et al. (1997) Vet Microbiol 55:259-264.