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Dynamics of infection of *Mycoplasma hyorhinis* in two commercial swine herds

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Introduction

Mycoplasma hyorhinis is a common inhabitant of the respiratory tract of pigs, which can cause polyserositis in animals of 3 to 10 weeks of age, as well as arthritis in finishing pigs.[1] Approximately 50% of cases with polyserositis received at the Minnesota VDL in 2010 were positive for this pathogen by PCR.[2] In a previous transversal study it was found that the prevalence of *M. hyorhinis* nasal colonization in two clinically affected herds was low in sows (average 7%) and suckling piglets (8%) and high in nursery pigs (98%). In contrast, in a herd with no *M. hyorhinis* disease, no colonized sows were found and colonization levels in pigs were very low until the last week in the nursery. In the same study we observed an interesting trend suggesting an effect of parity in the probability of sows to be positive. Younger sows (parity 1 and 2) were more likely to be positive than older sows (parity 3 and older).[3] These results lead us to hypothesize that transmission of *M. hyorhinis* from sow to piglets is an important factor for the development of disease in growing pigs. The objectives of this study were: a) To describe the dynamics of colonization of *M. hyorhinis* in pigs from birth to finish; b) To evaluate the effect of parity on sow and piglet *M. hyorhinis* colonization; and c) To investigate the effect of time of colonization with *M. hyorhinis* on development of disease

Materials and methods

Two breeding herds, A and B, were selected based on history of polyserositis in the pig flow and no *M. hyorhinis* vaccination use. In each herd, a longitudinal sampling of pigs at different ages was performed. A total of 50 young sows (p1 and p2) and 50 older sows (p3 and older) were randomly selected and tested for *M. hyorhinis* by nasal swab qPCR and *M. hyorhinis* antibodies in serum by ELISA. One piglet per litter was randomly selected from each sow, for a total of 100 piglets. A nasal swab and a serum sample was collected from each pig at birth, weaning and 10 days post-weaning. Two final samplings were performed in the nursery and finishing stage during the peak of polyserositis/ arthritis/ pneumonia. In order to confirm involvement of *M. hyorhinis* in polyserositis cases a total of twelve pigs were be euthanized and necropsied (10 clinically diseased and 2 clinically healthy) during these two sampling points. Oral fluids were also collected at each post-weaning sampling point for a total of 56 samples. In summary, a total of 1050 nasal swabs were collected from 216 sows and 216 pigs, at 10 different collection times.

Results

M. hyorhinis was detected by PCR in the nasal cavity of 5/107 sows in herd A, 2/110 in herd B. Four of the positive sows were parity 1-2 while 3 were parity 3. The colonization prevalence in suckling piglets was low in both herds (avg = 1.7%) and high in post-weaning pigs (avg = 85%). Most pigs became colonized soon after placement in the nursery and remained positive throughout the nursery and finishing stage. In both herds, antibody titer results revealed that piglets, shortly after birth, have antibodies (maternal antibodies) against *M. hyorhinis*. These start to decay soon after weaning. Approximately at 94 and 64 days antibody titers start to rise in Herd A and B, respectively. It is presumed that this rise is due to an active immune response. In Herd A, a total of 25/31 oral fluids were positive. Furthermore, detection of *M. hyorhinis* in oral fluids was consistent with detection in nasal swabs. In herd A, *M hyorhinis* was detected in pericardium (12/18) and in joints (10/18) of diseased pigs. Similarly, in herd B, *M hyorhinis* was detected in pericardium (5/10) and in joints (4/10) of diseased pigs. This contrasted with an absence of *M. hyorhinis* in the same tissues of healthy cohorts. All necropsied pigs were *M. hyorhinis* PCR positive in the nasal cavity.

Discussion and conclusions

M. hyorhinis is an important cause of post-weaning mortality. Results from this study demonstrated that most pigs became colonized around 3-4 weeks of age. Prevalence in sows was relatively low, confirming results from our previous study.[3] However, a parity effect was not evident in these two herds. The use of oral fluids for the detection of *M. hyorhinis* appears to be useful for surveillance, however more validation is required. The role of *Mycoplasma hyorhinis* in polyserositis and arthritis could be demonstrated in

these two herds. Knowledge of the dynamics of infection within the herd will allow implementation of better control strategies in affected herds.

References

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