RESEARCH ABSTRACT

SWINE HEALTH

Title: Establishment of sensitivity and specificity levels of different sampling techniques for early detection of Mycoplasma hyopneumoniae and correlation between oral fluid PCR results and clinical signs. ***#18-133***

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Scientific Abstract:
Mycoplasma hyopneumoniae (MHP) is the cause of enzootic pneumonia; a disease that costs the swine industry approximately $400 million annually. Although detection of MHP DNA by PCR from a tracheal swab is the preferred specimen for early detection, oral fluid samples are easily collected and offers prevalence assessment at the herd level. Therefore, the goal of this study was to evaluate the predictive association between oral fluid or tracheal swab PCR results and clinical signs from animals of known MHP infection status as this knowledge does not currently exist. Additionally, the sensitivity of two PCR protocol were compared and a preliminary evaluation on the utility of air and water sampling was conducted. Six-week-old MHP-free pigs (n = 39) were blocked by litter and randomized to 5 groups housed separately: (1) sham-inoculated, negative control (n = 3), (2) 1 MHP-inoculated pig + 8 susceptibles, (3) 3 MHP-inoculated + 6 susceptibles, (4) 6 MHP-inoculated + 3 susceptibles, and (5) 9 MHP-inoculated pigs, i.e., MHP prevalence differed by group. MHP pigs were inoculated intratracheally (10 ml) with a lung homogenate containing MHP 232. Tracheal swabs were taken on -3, 3, 7, 10, 14, 21, 24, 28, 35, 38, 45, 52, and 59 days post inoculation (DPI). Oral fluid were daily collected. Individual scores were taken by a blinded individual twice weekly. Water samples were taken once weekly. Air samples were collected three times weekly in Groups 1, 3 and 5. Samples were tested by two distinct PCR protocols. Pigs were euthanized 59 DPI. Linear mixed regression was used to estimate the association between PCR cycle threshold (Ct) values of tracheal samples and individual cough scores. The association between oral fluid PCR result and the number of pigs coughing was estimated with logistic mixed regression. Logistic regression was used to assess difference between protocols on the proportion of PCR positive results from MHP-inoculated groups. MHP was not detected by PCR in any sample type from the sham-inoculated, negative control group and cough was not observed in this group. MHP was detected in 90% (18/20) of MHP-inoculated pigs at 3 DPI. MHP was first detected in oral fluids in groups 2 and 5 at 8 DPI and was inconsistently detected in group 2 until 40 DPI but was detected consistently thereafter. MHP was continuously detected in oral fluids in group 4 and 5 as earlier as 15 and 12 DPI, respectively, and until the termination of the study in group 4. MHP DNA was detected in 13 air samples and 21 water samples at various time points throughout the study. Coughing was first noted in group 3 at 10 DPI and was later detected in groups 2, 3, and 4 until 59 DPI. A significant inverse association between tracheal sample PCR Ct value and individual cough was found. No significant association was found between oral fluid PCR result and the number of pigs coughing. One of the PCR protocols offered the highest detection rate of MHP DNA in tracheal swabs, oral fluid and water samples. While tracheal swabs remain the gold standard for early detection of MHP infection, the data presented in this study suggests that when MHP prevalence is high, oral fluids, water samples and/or air samples offer an easier alternative to monitor MHP at the herd level. In addition, differences in the frequency of detection between two PCR protocols suggest opportunities for molecular testing optimization.