

7 SUMMARY

Evaluation of lung function changes associated with *Chlamydiaceae* in pigs and calves using impulse oscillometry and the software FAMOS

Aim: In clinically healthy pigs and calves, *Chlamydiaceae* can be found quite regularly in samples obtained from the respiratory system. Whether this finding is related to functional and/or pathological changes within the respiratory tract has yet to be defined. Consequently, lung function was evaluated in animals with and without a naturally acquired chlamydial infection.

Animals and Methods: Sixteen conventionally raised pigs and 25 calves were examined. Animals did not show clinical signs of respiratory infectious diseases but were partly positive for the presence of *Chlamydiaceae* within the respiratory tract. Chlamydial DNA was isolated from rectal and nasal swabs as well as from tissue samples using the High Pure PCR Template Preparation Kit (Roche Diagnostics, Mannheim, Germany). According to PCR results, animals of each species were divided into *Chlamydiaceae* positive or negative groups (ChI- and ChI+). In addition, serology was performed using ELISA in pigs and CFT in calves.

In each animal, lung function was evaluated regularly starting at the age of the 2nd month up to the 7th month of life. Variables of ventilation (respiratory rate, tidal volume, minute volume) and respiratory mechanics (airway resistance, respiratory reactance) were measured using the impulse oscillometry system (IOS), a non-invasive technique that has been validated for both species. Statistical analysis was conducted to clarify whether the presence of *Chlamydiaceae* had any significant influence on lung function.

To explore information in the frequency range 1 – 5 Hz by recalculation of original IOS-data the software FAMOS (**F**ast **A**nalysis and **M**onitoring **O**f **S**ignals) was used, after previous validation. FAMOS allows evaluation of the respiratory impedance at frequencies lower than 5 Hz and facilitates examination of the peripheral respiratory system in calves and pigs for further diagnostic purposes.

Results: In six of 16 pigs, at least one of the following chlamydial species was detected by PCR: *C. psittaci*, *C. trachomatis*, *C. pecorum* (old taxonomy). However, all 16 pigs were serologically negative. In 13 of 25 calves, predominantly *C. psittaci* and *C. pecorum* were found

by PCR. Serologically, a chlamydial infection was confirmed in 7 of the 13 PCR-positive calves.

pigs:

- rectal temperature was significantly higher in *Chlamydiaceae* positive pigs (PCR)
- all 16 pigs were serologically negative (ELISA)
- free of clinical symptoms (fever, cough, nasal or eye secretion)
- no significant differences in respiratory rate
- no deterioration in lung function

calves:

- rectal temperature was significantly higher in *Chlamydiaceae* positive calves
- 7 of 13 calves with *Chlamydiaceae* positive results in PCR were also serologically positive (CFT)
- no clinical signs of respiratory illness
- respiratory rate was significantly higher in *Chlamydiaceae* positive calves
- significantly higher airway resistance (indicating chronic airway obstruction) in *Chlamydiaceae* positive calves

Conclusions: As shown in pigs, the presence of *Chlamydiaceae* within the respiratory tract alone does not necessarily lead to a deterioration in lung function. As demonstrated in calves (partly serologically positive), the development of chronic airway obstructions may be included in the pathogenesis of a clinically silent, but chronic respiratory chlamydial infection.