The association between c-reactive protein level and postweaning multisystemic wasting syndrome (PMWS)

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THE ASSOCIATION BETWEEN C-REACTIVE PROTEIN LEVEL AND POSTWEANING MULTISYSTEMIC WASTING SYNDROME (PMWS)

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Introduction

Postweaning Multisystemic Wasting Syndrome (PMWS) is a widespread pig disease. Porcine circovirus type 2 is believed to be part of the aetiology. Resent studies have revealed the association between PMWS and increased levels of the acute phase proteins haptoglobin and pig major acute protein (1). The purpose of this study is to study whether another acute phase protein – C-reactive protein (CRP) – has a similarly association with PMWS.

Materials and Methods

From herds with no clinical signs compatible with PMWS 90 non-diseased 5-6 weeks old pigs were obtained. In four equal sections, 72 of those were mixed with an equal number of 8-12 weeks old pigs with clinical symptoms of wasting from herds diagnosed with PMWS, leaving 18 non-diseased pigs as controls in a fifth section (2). The study was running for 49 days. Clinical signs were registered twice a week for all pigs, and blood samples were collected once a week from the 90 pigs from the PMWS-free herds. Post-mortem examinations were performed on pigs with signs compatible with PMWS. PMWS diagnoses were based on the presence of lymphocyte depletion together with histiocytic infiltration and giant cells or inclusion bodies in sub-inguinal and mesenteric lymph nodes, and the presence of moderate to massive amounts of PCV2 in the affected tissues (EU definition) (3).

C-reactive protein was measured heterologously with an assay validated for porcine CRP determination (ADVIA 1650, Bayer) (4). All blood samples were tested on the same day to eliminate day-to-day variation of test results.

The association between CRP levels and PMWS in the individual pigs was analysed by proc mixed (SAS 9.1) including section and pen number as random variables. The analysis was adjusted for autocorrelation of repeated blood samples.

Results

Among the 90 non-diseased pigs, 38 pigs were found clinical healthy throughout the study (group A). Ten pigs were diagnosed with PMWS according to the criteria described above (group B). Group B pigs prominently suffered from wasting, depression, dyspnoea, dullness, unthriftiness and coughing. The PMWS compatible signs were observed between day 28 and 43 and in most pigs between day 28 and 35. Nine pigs were euthanized day 29-49 and a single pig suffered from natural death on day 41. Pneumonia and enlarged bronchial lymph nodes were found at the post-mortem examination of group B pigs. Additional findings included: increased synovial fluid, pleuritis, pericarditis, peritonitis, hyperkeratosis in the stomach and colitis.

There was a considerable individual variation with regard to CRP levels (0-60 mg/L), and the standard deviation varied between 7.5 and 15.7 mg/L. CRP measures from day 44 and onwards were excluded due to missing data. Figure 1 shows the mean CRP level in groups A and B.

The analysis of data from the whole period showed that PMWS affected pigs had a significantly higher level of CRP compared to clinically healthy pigs (p=0.005). The PMWS affected pigs had an average CRP level that was 4.73 mg/L higher compared to the average for the clinically healthy pigs. CRP levels increased significantly in both groups (p=0.002) by 4.3 mg/L over the 43 days. Analyses of data from individual days showed a significant difference between groups on days 35 and 43. However, after Bonferroni adjustments for repeated testing, the differences were non-significant (day 35, p=0,090; day 43, p=0,106).

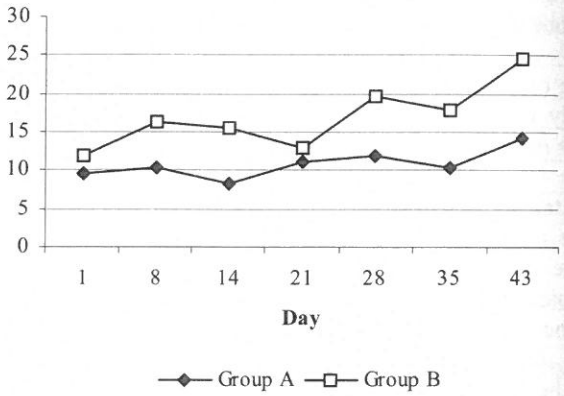

Figure 1 Mean CRP levels (mg/L) in Groups A and B.

Discussion

This study showed that CRP levels are higher in PMWS affected pigs compared to clinically healthy pigs. Further experimental work is needed to understand in more detail the association between PMWS and CRP levels.

The considerable variation of individual measures of CRP indicates that various sub-clinical infections have influenced the outcome in both groups. This should be born in mind when interpreting figure 1.

Considering the fluctuating pattern of CRP, daily blood samplings should have been practiced in this study.

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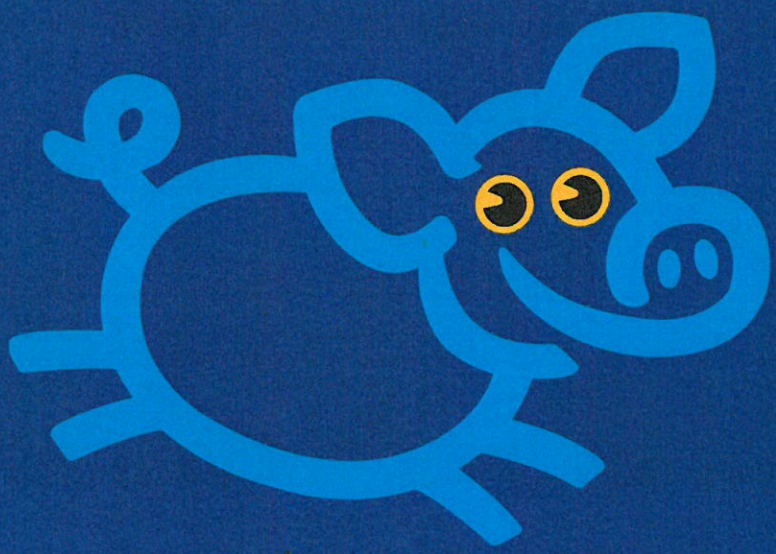

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