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EFFECTS OF HISTOPATHOLOGICAL ABERRATIONS ON LUNG FUNCTION IN PIGS

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Introduction

Diseases of the respiratory tract are often summarized as the “porcine respiratory disease complex” (PRDC). PRDC shows a high variability in the field. Because of a wide spectrum of etiological factors, diagnosis needs to combine clinical examination, dissection and the isolation of pathogens. Impulse oscillometry (IOS) might be a new, non-invasive method that could add valuable information from living pigs. The aim of the present study was to validate IOS in pigs with respiratory diseases based on their associated histopathology.

Material & Methods

Fifty-eight pigs from 29 herds with PRDC were examined with classical clinical methods, pathology, histopathology and IOS. Lungs were divided into 76 triangles. Macroscopic lesions were scored 0 to 4 for each triangle. Lung tissue was taken from six lobes for histopathological examination and more than 70 histopathological parameters were extracted and specified. Based on these individual histological parameters, the following forms of pathological specifications were defined: interstitial pneumonia; suppurative and non-suppurative bronchitis, bronchopneumonia and pneumonia.

Results

Individual histological parameters correlated well with the IOS parameters and explained up to 70% of lung function variability. Disturbed reactance at lower frequencies resulted from changes in lung parenchyma like thickening of the alveolar septa and infiltration with inflammatory cells. Infiltration of the epithelium of alveoli, bronchioles and bronchi with neutrophils and macrophages significantly affected lung function as characterized by IOS.

Discussion & Conclusion

The results of this study indicate that IOS could supplement classical clinical examination in respiratory diseases in pigs. IOS parameters were well reflecting the histopathological situation of the lungs. However, some aspects of lung clinical pathology (e.g. bronchospasm) that are important for IOS results, could not be verified by histopathology. A relatively high effort to generate IOS data might limit field applications.

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