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Confirmation of the presence of Mycobacterium avium infections in two pig herds which had a high risk profile for M. avium as assessed by serologically monitoring

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Introduction

Diagnosis of Mycobacterium avium (MA) infection in pigs is based on detection of granulomatous lesions in lymph nodes by incision and visual inspection by traditional meat inspection at slaughter. In certain cases MA bacteria can be detected whereas granulomatous lesions are absent (1). On the other hand also Rhodococcus equi has been frequently isolated from lymph nodes with lesions (2). In 2009 a serological monitoring has been implemented within a "risk based meat inspection" pilot in a german slaughterhouse as an alternative for detection of MA infections by traditional meat inspection. From each delivery of pigs from a pig producer to the slaughterhouse, a specific number of blood samples are examined for MA antibody titers (4). Test results from current and several previous deliveries were used to determine the MA risk level for each pig producer. On the basis of this serological monitoring 17 pig herds with a high risk for an MA infection were identified. Here we describe experiments on two of these pig herds to confirm their high risk status for MA infections.

Materials and Methods

Two farms (A and B) with a high risk profile for MA infections were selected. Pigs from both farms (A: n=58, B: n=19) underwent an intradermal tuberculin test with 0,1 ml Avian Tuberculin PPD (25.000 I.U., ASG, Lelystad, The Netherlands). The presence of induration and erythema at the injection site was read 72 h after injection. After slaughtering, blood serum samples were taken and analysed by MA-ELISA (4). Submaxillary and mesenteric lymph nodes were collected as well at slaughter, and examined pathologically for granulomatous lesions and bacteriologically for M. avium. To identify colonies, Ziehl-Neelson staining (for acid-fast bacilli) and PCR for the presence of IS1245, which is characteristic for MA (3).

Results

In the tuberculin skin tests 72 h after injection approximately 44 pigs from farm A 29 and 15 pigs from farm B reacted positive. The skin showed swelling, erythema and partial central necrosis and exsudation. Bacteriological examination of the lymph nodes showed that 66% (38/58) and 32% (6/19) of the pigs were positive for MA (Table 1). In farm A 26% (15/58) of the pigs tested positive in MA-ELISA and 28% (16/58) by pathological examination. In farm B pigs tested with 16% (3/19) positivity by serological and pathological examination. The sensitivity of the MA-ELISA in farm A was 21,6% and the specificity 61,1%, whereas the sensitivity of the pathological examination was 40,5% and the specificity 94,4%. In farm B the sensitivity of the MA-ELISA and the pathological examination was 66,6% and the specificity of both examinations was 92,3%.

Table 1: *Results of pathological, serological and bacteriological examination of pigs for detection of M. avium infections.*

Examination	Number of pigs (%) tested			
	Negative	Positive	ND	Total (n)
Farm A				
Bacteriological[1]	17 (29)	38 (66)	3 (5)	58
Pathological[2]	42 (72)	16 (28)		58
Serological	43 (74)	15 (26)		58
Farm B				
Bacteriological[1]	13 (68)	6 (32)		19
Pathological[2]	16 (84)	3 (16)		19
Serological	16 (84)	3 (16)		19

[1] Positive when M. avium bacteria were detected by bacteriological examination on submaxillary lymph nodes and mesenteric lymph nodes. [2] Positive when granulomatous lesions were seen in the submaxillary lymph nodes. ND not determined.

Discussion

Two pig herds with a high risk profile for MA infections based on the serological monitoring had indeed an MA infection. Results of avian tuberculin testing on both farms showed already the presence of an MA infection, bacteriological examination of lymph nodes confirmed it definitely.

Specificity and sensitivity of the pathological examination for MA infections at slaughter is questioned (2, 4). Here we show that serological monitoring for MA infections showed good perspectives to identify succesfully MA positive pig herds.

References

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