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Seroprevalence of HEV, Mycobacterium avium, and Brucella suis in the pig population in Southern Italy

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INTRODUCTION & AIM

Pigs (*Sus scrofa*) are susceptible to a wide range of infections, some of which are of zootechnical interest due to the damage for the agricultural economy, others impacting public health (zoonoses). The list of pathogens transmissible from pigs to humans includes, among others, the hepatitis E virus (HEV) recently renamed *Paslahepevirus balayani*, *Mycobacterium avium* (*M. avium*), and *Brucella suis* (*B. suis*).
The aim of this work was to evaluate the seroprevalence of these three zoonotic pathogens in the pig population of the Campania region, Southern Italy. A further aim of this research was to evaluate the main risk factors associated with greater exposure rates.

METHOD

The sampling procedure was standardized for HEV, which has the greatest expected prevalence according to previous studies. We adopted an expected prevalence of 0.4 (i.e., 40%), an absolute precision of 5%, and a confidence interval (CI) of 95%. The sample size was calculated using Thrusfield's formula. A total of 370 blood samples were collected in 31 clusters (farms).
Three commercial ELISAs were used to assess the detection of antibodies against HEV, M.avium, and B.suis: ID Screen® Hepatitis E Indirect Multi-species, ID Screen® Mycobacterium avium Indirect Multi-species, and ID Screen® Brucella suis Indirect (Innovative diagnostics, IDvet). All the ELISAs were performed following the instructions provided by the manufacturer.
Samples positive for sLPS antigen were further tested with a Rose Bengala test (RBT) protocol (Pourquier Rose Bengale Ag, IDEXX).
Univariate and analysis (chi-square test) was performed on the individual level for each pathogen. ELISAs outcome were the dependent variables and information regarding potential risk factors were independent variables.

FUTURE WORK / REFERENCES

1)Gong, Q.L. et al., 2021. Global Comprehensive Literature Review and Meta-Analysis of Brucella spp. in Swine Based on Publications From 2000 to 2020. Front Vet Sci. https://doi.org/10.3389/fvets.2021.630960
2)Hulinova Stromerova, N., Faldyna, M., 2018. Mycobacterium avium complex infection in pigs: A review. Comp Immunol Microbiol Infect Dis. https://doi.org/10.1016/j.cimid.2018.06.005
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RESULTS & DISCUSSION

Pigs in the Campania region were widely exposed to HEV, which showed an individual seroprevalence of 41.4% (153/370) and at farm level of 83.8% (26/31). No animal had specific antibodies against *B.suis* (0%) although a total of 24 pigs tested positive for the rough antigen and 5 for the smooth antigen. However, the 5 smooth antigen-positive sera tested negative by RBT and were therefore classified as false positives. Specific antibodies against *M.avium* were observed in 13/370 animals (3.5%) and 10/31 farms (32.3%). Statistical analysis was performed only for HEV. Age and sex were statistically associated with higher HEV prevalences ($p<0.05$). The location was also a risk factor, as pigs in the province of Naples had greater exposure than other provinces ($p<0.001$).
Our results highlighted the absence of specific antibodies for *B. suis*. This result coincides with other studies carried out in countries with eradication plans for brucellosis.
Although low, the prevalence of MAC in pigs reported in the literature is far from negligible. A serosurvey carried out in Germany and the Netherlands identified prevalences of less than 2% at the individual level and less than 20% at the herd level, obtaining results similar to those observed in our study.
Also in the present study, exposure to HEV by pigs was widespread, reaching seroprevalences at the individual level of 41.4% and at the herd level of 83.8%. Studies conducted in other regions of Italy have described similar prevalences, demonstrating the spread of the pathogen along the entire peninsula (both among domestic and wild animals).

CONCLUSION

These results are crucial for comprehending the clinical impact and world-wide epidemiology of HEV infection in humans as it relates to zoonotic transmission. The current investigation, although not large-scale, offered specific evidence of exposure to three agents responsible for zoonoses in the southern Italian pig population presenting three completely different scenarios. Since pigs can be a significant source of many pathogens, ongoing surveillance is required to identify potential outbreaks and implement focused measures to limit human transmission.