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Establishing a serum bank of confirmed cysticercosis positive and negative samples

Murungi M.[1], Falzon L.[1,2], Fèvre E.[1,2], Cook E.[1,2]

[1]International Livestock Research Institute, Nairobi, Kenya, [2]University of Liverpool, Institute of Infection and Global Health, Liverpool, United Kingdom

Introduction

Porcine cysticercosis is a neglected zoonotic disease caused by *Taenia solium*. Despite recent gains in the understanding of the nature and the prevalence of the disease, and successes in health interventions *T. solium* cysticercosis is still endemic and affects poor people in the resource-limited countries. The formal postmortem-inspection at slaughter commonly relies on visual inspection of predilection sites such as heart, diaphragm, masseters, tongue, neck, shoulder, intercostal and abdominal muscles (Gracey, 1986). Exploring other overlooked muscular regions or organs as predilection sites is essential to supplement the current post-mortem inspection procedures. Tongue test was reported to have 70% sensitivity and 100% specificity of in the detection of porcine cysticercosis (Gonzalez et al., 1990). Lightowlers et al. (2015) (Lightowlers, Assana, Jayashi, Gauci, & Donadeu, 2015) estimated that slicing of the heart, tongue and masticatory muscles at a thickness of approximately 3 mm had a diagnostic sensitivity of approximately 80% in lightly infected animals and recommended tissue dissection as a highly specific and relatively low-cost method for diagnosis of porcine cysticercosis. Compared to tongue examination, ultrasonography has been found to more sensitive (100% versus 91%) but less specific (90% versus 98%), although these differences were not statistically significant (Flecker et al., 2017). A recent study estimated prevalence at 37.6% in western Kenya (Thomas et al., 2016). The existing serological tests that detect circulating *T. solium* cyst antigens have poor specificity thus limiting their diagnostic capacity. Fine carcass dissection method is considered a gold standard for detecting porcine cysticercosis with lesions consisting of cysticerci in cyst measuring 5-8 mm by 3-5 mm, translucid and filled with brownish to pinkish liquid. Sometimes the head of the metacestodes can be seen as white spot. Cysts are in the following active muscles; heart, tongue, masseters and diaphragm, shoulder, intercostal and oesophagi. More rarely cysti are found in lymph nodes, liver, spleen, lungs and brain.

Objective

The aim of this project is to collect a bank of blood and serum samples from pigs confirmed to be cysticercosis positive and negative via fine dissection. These samples will then be used for future diagnostic test validation.

Materials and Methods

Twelve slaughterhouses have been recruited from two counties in western Kenya with the help of the County Veterinary officials. Pigs are sourced through local butchers and purchased at the market rate. Each pig is identified, and relevant meta-data such age, sex and area of origin recorded. Blood samples are collected from the jugular vein and lingual palpation performed peri-mortem. Following slaughter, the carcass is weighed and dressed following a specific protocol. The carcass and organs are transported to the field lab in Busia and refrigerated. Fine dissection is performed on the carcass and organs in slices approximately 3mm and checking for the presence of cysts. All relevant data is recorded electronically, while the serum and uncoagulated blood are frozen for future diagnostic work.

Results

We have so far processed twenty carcasses, and all were confirmed to be having no cysts. This work poses challenges especially with lack of supply in the market. Pigs are purchased at market rate although the pricing is usually not fixed thus making the process of bargaining difficult. The average dissection time is four hours. We project to dissect a total of 110 pigs in the next 6 months.

Conclusion

At the end of this project, a bank with confirmed cysticercosis positive and negative blood and serum samples will be established. These results will be made available via open access so as to expedite validation of diagnostics kits with higher specificity This, in turn, will aid quicker and more accurate diagnosis of the disease.

References

Flecker, R. H., Pray, I. W., Santivañez, S. J., Ayvar, V., Gamboa, R., Muro, C., … O'Neal, S. E. (2017). Assessing ultrasonography as a diagnostic tool for porcine cysticercosis. *PLoS Neglected Tropical Diseases*, *11*(1), e0005282.

Oral Presentations

Gonzalez, A. E., Cama, V., Gilman, R. H., Tsang, V. C. W., Pilcher, J. B., Chavera, A., … Miranda, E. (1990). Prevalence and comparison of serologic assays, necropsy, and tongue examination for the diagnosis of porcine cysticercosis in Peru. *The American Journal of Tropical Medicine and Hygiene*, *43*(2), 194-199.

Gracey, J. F. (1986). *Meat hygiene*. Baillière Tindall.

Lightowlers, M. W., Assana, E., Jayashi, C. M., Gauci, C. G., & Donadeu, M. (2015). Sensitivity of partial carcass dissection for assessment of porcine cysticercosis at necropsy. *International Journal for Parasitology*, *45*(13), 815-818.

Thomas, L. F., Jayne, L., Harrison, S., Toye, P., Glanville, W. A. De, Anne, E., … Fèvre, E. M. (2016). Prevalence of Taenia solium cysticercosis in pigs entering the food chain in western Kenya, 233-238. https://doi.org/10.1007/s11250-015-0949-6