The prevalence and risk factors of porcine cysticercosis in Zambia


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Summary: The objectives of these studies were to determine the prevalence and importance of porcine cysticercosis in Zambia. Lingual examination of live pigs and visual inspection of their carcass as well as blood sampling for measuring circulating parasite antigen by enzyme-linked-immunosorbent assay (Ag-ELISA) were used as parameters to determine infection. During the field surveys a questionnaire was also administered to every household whose pigs were examined to obtain information on husbandry practices and study risk factors associated with the infection. A total of 1416 free-range pigs were examined at slaughter slabs in Lusaka and 950 pigs have been examined in field surveys in Southern and Eastern provinces. Four hundred and seventy three farmers were interviewed using a questionnaire. The abattoir surveys indicate prevalence of 11% by tongue examination and 54.8% by Ag-ELISA. The field surveys showed 15.8% positive by lingual examination and 28% were found to be positive by Ag-ELISA. It is clear from the 473 farmers interviewed that most risk factors for transmission and sustainability of pork tapeworm are available. These include free ranging, lacked latrines, pork consumption, pigs home slaughtered without inspection and eating cysticerci-infected pork. These studies indicate that the pork tapeworm is a serious agricultural problem and poses a substantial public health hazard to the population especially in rural Zambia.

Keywords: Ag-ELISA, Neurocysticercosis, Taeniosis, Tapeworm.

Introduction: Data collected during the last decade show that T. solium cysticercosis in pigs and man is more widely distributed in sub-Saharan Africa than previously assumed (Geerts et al. 2002, Phiri et al. 2001, Phiri et al. 2002, Phiri et al. 2003). The cysticerci of T. solium may lodge in the brain causing cerebral cysticercosis (neurocysticercosis), a very serious zoonosis causing headache, epileptic seizures, epilepsy, mental disturbance and death. The T. solium taeniosis/cysticercosis complex is associated with poor sanitation and hygiene, poor pig husbandry and poor meat inspection and control. However, precise data on the prevalence and importance of this zoonotic disease in Zambia are scarce.

Materials and Methods: The studies were done in Eastern and Southern Provinces but a limited number of pigs also came from Western and central Provinces. The surveys started in 1999. The pigs slaughtered were between 6 months and several years and both sexes were included. At slaughter the presence of cysticerci was assessed by examining cyst predilection sites in the carcass including the masseter muscles, hind leg muscles, tongue, heart and psoas muscles. In the both field and slaughter slab surveys pigs were examined for the presence of cysticerci by tongue palpation (Gonzales et al., 1990) and blood was collected by puncture of the cranial vena cava or the jugular vein into plain tubes. Serum was separated and dispensed into aliquots and stored at -20°C until analysis. The Ag-ELISA was performed as described by Dorny et al. (2000) with a few modifications. Information on the environmental, demographic and risk factors associated with transmission of T. solium within the surveyed communities were recorded by way of questionnaires.
Results: Of the 1416 pigs examined at the slaughter slab 156 pigs (11%) were found to be positive by lingual examination. 21.3% (302) were found positive at meat inspection meaning that 145 pigs (48%) with cysticercosis at meat inspection were not detected by lingual examination. And 54.8% of them were positive by Ag-ELISA. Thus far 950 pigs have been examined in field surveys with 15.8% positive by lingual examination and 28% positive by Ag-ELISA. Of the 473 farmers interviewed, 74.9% kept pigs under free-range conditions, 53.4% lacked latrines, 92.4% consumed pork, 96.6% slaughtered pigs at home without inspection, 32.1% admitted eating cysticerci-infected pork, 61% were ignorant about cysticercosis while 42.7% obtained drinking water from rivers and shallow wells. The studies showed that 40.4% households were positive for porcine cysticercosis having at least one positive pig.

Discussion: It was shown in these studies that tongue palpation is a very specific method to demonstrate cysticercosis in pigs, but that it has a sensitivity not exceeding 70% this is in agreement with Gonzales et al., 1990. Therefore, the value of tongue palpation in community-based studies does not reflect the extent of the prevalence. There are a number of factors in the surveyed villages contributing to optimal conditions for transmission of this cestode include the free-roaming of pigs, lack of latrines, the absence of meat inspection and the lack of awareness of the local population, of the risks involved in eating meat with *T. solium* cysts. Although statistical analysis failed to show associations between infection in pigs and various epidemiological factors, the study population was fairly homogeneous in terms of most of these factors and the pigs appear to be equally and permanently at risk of coming into contact with the parasites. The high prevalence of cysticercosis in pigs strongly suggests that many people are carriers of the pig tapeworm and consequently contaminate their direct environment with eggs containing oncospheres that are infective for man. In regions where cysticercosis in pigs is common, human cysticercosis prevalence is usually high. Results from other endemic areas in Africa (Newell et al., 1997) have indicated a strong relationship between cysticercosis and epilepsy. Therefore, there is an urgent need to collect baseline data on human cysticercosis in Zambia for a better understanding of the local epidemiology and the transmission risks.

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