On the specificity of Ag-ELISA in the diagnosis of human cysticercosis

Original Article

Seroprevalence to the Antigens of Taenia solium Cysticercosis among Residents of Three Villages in Burkina Faso: A Cross-Sectional Study

On the specificity of Ag-ELISA in the diagnosis of human cysticercosis

Posted by **mtgalan** on **12 Jan 2010** at **11:44 GMT**

Carabin et al. have carried out a relevant study on the prevalence of human cysticercosis in Burkina Faso, where there was a lack of data concerning this neglected tropical zoonosis. The prevalence of cysticercosis was assessed by an enzyme-linked immunosorbent assay (ELISA) for the detection of circulating T. solium antigens of the metacestode (Ag-ELISA). As the authors point out, this assay was originally developed for the detection of bovine cysticercosis. In pigs, the specificity of this Ag-ELISA was 96.7% in Zambia and 84.1% in South Africa, respectively. This assay was used for the first time in humans in Vietnam with a specificity of 100%, and we assume that this result justified its use in the survey carried out by Carabin et al in Burkina Faso.
Taeniasis and cysticercosis are diseases caused by the same parasite but in different developmental stages, i.e. intestinal adults cause taeniasis and extraintestinal metacestodes cause cysticercosis. Cattle, in the case of Taenia saginata, and pigs, in the case of T. solium, only suffer cysticercosis. Therefore, a positive result in the Ag-ELISA test might be due to cysticercosis only. However, in the case of T. solium, humans are both definitive and intermediate hosts, thus suffering taeniasis as well as cysticercosis. Hence, a positive result in the Ag-ELISA in humans could be due to cysticercosis as well as to taeniasis, unless the antigens employed are stage-specific to avoid cross-reactivity between taeniasis and cysticercosis. Carabi et al. did not analyse human stool samples, but in the previous report in humans in Vietnam, the authors pointed out that eggs of Taenia spp. were not found in any stool sample [1]. In case any tapeworm carrier took part in the survey, a positive Ag-ELISA result would indicate cysticercosis, but it is unknown whether a tapeworm carrier could produce a false positive result.
Another matter regarding the specificity of the test is that it has apparently not been tested with the third human Taenia species, i. e. T. asiatica. T. asiatica could be considered the most neglected human taeniasis basically for two reasons. First, its definitive geographical distribution has not been determined yet. Second, it is still unknown whether the species - which shares the same hosts with T. solium (humans and pigs) - is able to cause human cysticercosis [2]. Only the use of immunological tests 100% specific for both species T. asiatica and T. solium in humans and pigs, could contribute to the solution of these two open questions [3].

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No competing interests declared.

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RE: On the specificity of Ag-ELISA in the diagnosis of human cysticercosis

hcarabin replied to **mtgalan** on **21 Jan 2010** at **16:07 GMT**

The monoclonal antibodies used in the Ag-ELISA in this study are produced from immunisation of mice with excretory/secretory antigens of Taenia saginata and are genus, but not species specific (Brandt et al., 1992). For diagnosis of Taenia solium cysticercosis in pigs, we may expect cross reactions with Taenia asiatica and Taenia hydatigena, in areas where these species occur, such as Southeast Asia (Conlan et al., 2009). For a more specific diagnosis, antibodies should be produced that are species-specific. Recently, the use of nanobodies for more specific diagnosis of T. solium in pigs has been suggested for this purpose (Deckers et al., 2009) and these antibodies may also offer possibilities for diagnosis in humans. For diagnosis of circulating antigens of T. solium in humans the lack of species-specificity of the Ag-ELISA is not an issue, because until know the existence of species other than T. solium that can produce human cysticercosis has not been demonstrated. Regarding the stage specificity of the Ag-ELISA in humans, we have not been able to detect circulating antigens in Taenia carriers except for a number of cases of T. solium taeniosis, where we suspected that these persons were also infected with the larval stages as a result of self- or auto-infection (unpublished results). We acknowledge that these results on stage specificity of the Ag-ELISA should be confirmed in a well-designed study. T. asiatica has so far only been found in Asian countries (Eom et al., 2009). In Africa, few studies have been done on the identification of adult Taenia spp from humans, but only T. saginata and T. solium have been described in this continent.

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No competing interests declared.

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