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Diagnostics, other than Molecular: Diagnostic/laboratory methods (other than molecular)

Evaluation of serological methods for diagnosis of echinococcosis

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Objectives

Echinococcosis is a parasitic disease caused by infection with tapeworms of the genus *Echinococcus.* Echinococcosis is classified as either cystic (CE) or alveolar (AE). CE is caused by infection with *Echinococcus granulosus*, AE is caused by *Echinococcus multilocularis*. Diagnosis is mainly suggested by the imaging identification of cyst-like mass in a person with a history of exposure. Serological assays must be combined with imaging techniques.
Assay performance is mainly dependent on the test format and the nature of the antigen used but also varies according to disease characteristics. The aim of this study is to evaluate different assays for the detection of echinococcal antibodies.

Methods

69 serum samples, received in the Department of Microbiology and Virology of Padua Teaching Hospital between May and November 2013, were tested for the presence of specific *Echinococcus* antibodies. We used an immuno-enzymatic assay (EIA, Novagnost® *Echinococcus* IgG, marketed by Siemens), an immunoblot technique confirmatory assay (LDBIO Diagnostics *Echinococcus* WB IgG, marketed by Effegiemme) and an indirect hemagglutination test (IHA, Cellognost® Echinococcosis, marketed by Siemens) for the qualitative and quantitative detection of echinococcal total antibodies.EIA makes use of test plate coated with purified *Echinococcus* antigen and results are expressed in Novagnost® Units: cut-off = 10 arbitrary units (AU), grey zone = 8.5 – 11.5 AU, negative <8.5 AU, positive >11.5 AU. Immunoblot nitrocellulose strips are blotted with antigens from a crude larval extract of *E. multilocularis*. The presence on the strip of the 7 and/or the 26-28 kDa band(s) is indicative of the presence of *Echinococcus*-specific IgGs in the serum sample. IHA detects specific antibodies to *E. granulosus*; serum dilution of 1:32 and higher provide diagnostically useful titers.

Results

Table 1 shows the results obtained using EIA and immunoblot assays. 56 samples were found concordant (81.16%). All those samples were also concordant with IHA. 13 samples were found discordant (18.84%). Among those samples, 5 patients who tested positive with EIA and negative with immunoblot were also negative with IHA. Among the 8 patients who tested negative with EIA and positive with immunoblot, 6 were confirmed positive with IHA (with a clinical history suggestive of CE) and 2 resulted negative with IHA. Among those 2 patients, the first has a medical history of lung cancer, and so we consider it a false positive; the second patient had a histopathologic diagnosis of CE treated pharmacologically and surgically.

Table 1

Samples N = 69		Novagnost® *Echinococcus* IgG	
		positive	negative
LDBIO Diagnostics *Echinococcus* WB	positive	16	8
	negative	5	40
Concordant		56	81.16%
Discordant		13	18.84%

Conclusions
On the basis of these results we can infer that EIA is not usable as a screening test. Immunoblot and IHA gave similar results: we propose immunoblot, automatable and therefore quicker, as screening test, and IHA, qualitative and quantitative method, for the follow-up of positive patients.