A newly developed membrane-based assay for simultaneous serologic screening and differentiation of echinococcoses

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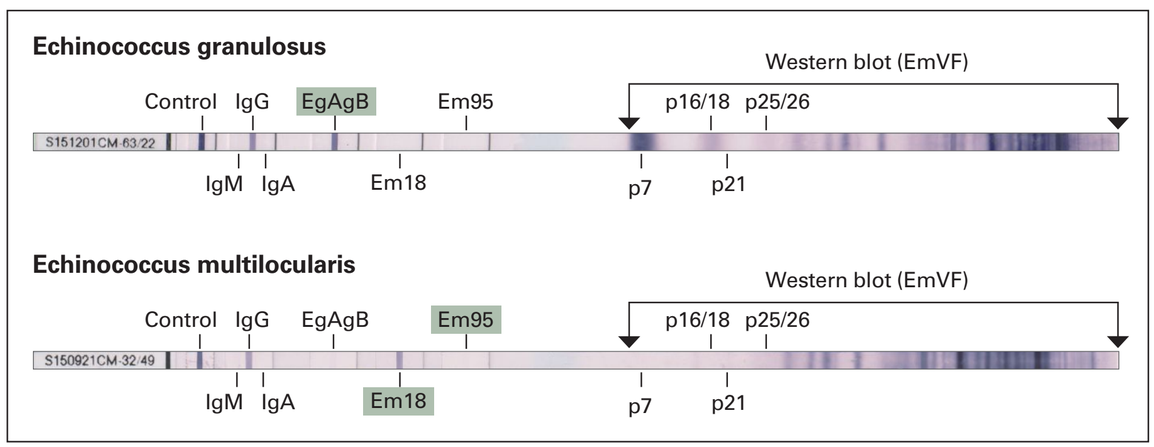

Examples of Anti-Echinococcus EUROLINE-WB strips incubated with sera from patients infected with E. granulosus (top) and E. multilocularis (bottom)

Panel		Positive	Negative
Echinococcus granulosus samples	(n=55)	54	1
Echinococcus multilocularis samples	(n=52)	45	7
Blood donors	(n=50)	0	50
Tumor patients	(n=50)	0	50
Sensitivity		93%	
Specificity		100%	
Species differentiation		81%	

Determination of sensitivity and specificity using sera from patients with Echinococcus ssp. infections and clinically relevant controls

Introduction

Cystic (CE) and **alveolar echinococcosis (AE)** are zoonotic diseases caused by the tapeworms Echinococcus granulosus and Echinococcus multilocularis, respectively. Initial diagnosis is usually made by MRI and other imaging techniques. Serological tests are useful for species differentiation especially in regions co-endemic for both parasites.

We determined the suitability of a novel Anti-Echinococcus EUROLINE-WB (IgG) to differentiate serologically between Echinococcus granulosus and Echinococcus multilocularis infections.

Methods

The Euroimmun test system Anti-Echinococcus EUROLINE-WB (IgG) contains electrophoretically separated **E. multilocularis metacestode vesicle fluid (EmVF)** antigens, and three membrane chips with recombinant E. granulosus antigen AgB8 plus E. multilocularis antigens Em18 and Em95. 329 sera were tested for anti-Echinococcus IgG, including 55 CE and 52 AE patient sera from different disease stages, 50 sera from blood donors, 50 sera from tumor patients, and 122 sera from patients infected with other parasites. Presence and intensity of the bands were automatically evaluated using a commercial software (EUROLineScan, Euroimmun).

Results

Sera from patients with clinically confirmed Echinococcus infections revealed a sensitivity of 93% at a specificity of 100% with regard to blood donors and tumor patients. Assignment of the respective Echinococcus ssp. was possible in 81% of the positive results.

Sera of patients infected with Fasciola hepatica, Strongyloides stercoralis, Taenia solium, Trichinella spiralis, Schistosoma ssp., Plasmodium ssp., Toxocara spp., Entamoeba histolytica, Leishmania ssp. and Filarioidea types exhibited no cross reactivity, 4 cases out of 10 affected with Ascaris lumbricoides and 2 out of 16 with Anisakis simplex samples displayed positive reactions.

Conclusion

The combination of the Echinococcus multilocularis metacestode vesicle fluid Western blot and immobilized recombinant species specific proteins in a single line assay provides a unique tool for the simultaneous serological diagnosis and differentiation of cystic and alveolar echinococcosis. The test shows no serological cross reactivity with diagnostically highly relevant larval Taenia solium, Schistosoma ssp. and Entamoeba histolytica infections.

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