

Serological diagnosis of Cystic echinococcosis - a nine-year survey from South Eastern Serbia

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Background

Cystic echinococcosis (CE) is a parasitic disease caused by an adult organism or larva of the *Echinococcus granulosus* complex and it is the cause of diseases in humans, domestic and wild animals. The diagnosis of human CE is still problematic since it is insufficiently or incidentally detected.

Objectives

The aim of the study was to establish the significance of confirmatory immunoblot test in the diagnosis of CE compared to serological screening tests, as well as to establish demographic characteristics of the examinees.

Material and Methods

In the period from January 2011 to the end of 2019, in the region of South Eastern Serbia, 1817 individuals with suspected CE were examined in the cross-sectional study. The following commercial screening tests were used for the detection of specific antibodies: Hydatidosis IgG ELISA and Indirect hemagglutination assay (IHA). The commercial confirmatory Western Blot (WB) test was used as well. The results of the examination were statistically processed.

Results

In order to determine the agreement between the utilized diagnostic methods we calculated kappa value and prevalence-adjusted and bias-adjusted kappa (PABAK). Although the female gender was more frequent in our study, the only significant difference in EC positivity between the genders was found for the results obtained from ELISA test, where the females were more frequently diagnosed as positive than males (Table 1). Calculated kappa and PABAK between ELISA and WB were 0.437 and 0.434, while between IHA and WB these were found to be 0.721 and 0.732, respectively. These values, along with the probability value ($p < 0.001$), indicated a significant moderate and substantial agreement between the tests (Table 2).

Conclusion

The studied region is endemic for echinococcosis. In a coordinated health surveillance system, control, and implementation of measures to prevent echinococcosis, serological diagnosis is a necessary tool, together with screening and confirmatory tests.

Keywords: Cystic echinococcosis, serodiagnosis, endemic area



Table 1. Comparison of the positive serological results between the genders

	ELISA test			IHA test			WB		
	(-)	(+)	p value	(-)	(+)	p value	(-)	(+)	p value
Female	84 (34)	73 (29.5)	0.018	103 (41.9)	53 (21.5)	> 0.05	96 (38.9)	61 (24.7)	>0.05
Male	34 (13.8)	56 (22.7)		50 (20.3)	40 (16.3)		46 (18.6)	44 (17.8)	
Total	118 (47.8)	129 (52.2)		153 (62.2)	93 (37.8)		142 (57.5)	105 (42.5)	

Table 2. ELISA and IHA test comparison in relation to the gold standard

Method	Finding	WB		Agreement				
		Negative (-)	Positive (+)	Kappa	PABAK	BI	PI	p
ELISA	Negative (-)	95 (38.5)	23 (9.3)	0.437	0.434	0.0927	0.0526	<0.001
	Positive (+)	47 (19)	82 (33.2)					
IHA	Negative (-)	131 (53.3)	22 (8.9)	0.721	0.732	0.0447	0.1992	<0.001
	Positive (+)	11 (4.5)	82 (33.3)					