



Brucellapt: A New Method Immunecapture-agglutination test for the Diagnosis of Human Brucellosis



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OBJETIVES

Among the techniques used for the diagnosis of human brucellosis, SAT and Coombs test are most often used. The convenience of using Brucellapt® (Vircell S.L.), a new serological test for the diagnosis of human brucellosis based on immunocapture-agglutination of total anti-*Brucella* antibodies, was studied

MATERIAL AND METHODS

Eight hundred and eighty four sera from different groups of patients were studied. Three hundred and fifteen sera were from 82 patients with a diagnosis of brucellosis. A further 157 sera from patients in whom brucellosis was suspected but could not be confirmed were also studied. Four hundred and twelve sera from people living in rural areas were included as control group. SAT, the Coombs anti-*Brucella* test and Brucellapt® were performed for each serum. The SAT and Coombs test were performed using a commercial *B. abortus* antigen (Linear Chemicals, Spain). Brucellapt® test (Vircell SL, Spain) was performed according to manufacturer's instructions. Data were analyzed with the help of SPSS 8.0 for Windows and Twobytwo analyzer 1.0 programs.

RESULTS

All the initial sera from the 82 patients proved to be positive in Brucellapt® and Coombs, 75 (91.4%) were positive in the SAT. If a 1/160 diagnostic threshold titer was defined for Brucellapt®, Coombs tests and SAT, the sensitivity were 95.1%, 91.5% and 65.8% respectively. Taking the same diagnostic threshold titer for the 412 control sera, the specificity of Brucellapt®, Coombs test and SAT were 99.0%, 99.8% and 100% respectively. In acute brucellosis, both tests render positive titers $\geq 1/160$. When titers are lower, they increase significantly in the following 30 days, despite the evolution of SAT titers. In contrast, Brucellapt® and Coombs titers are always high ($\geq 1/640$) in brucellosis with long evolution, whether SAT titers are higher or lower than 1/160. Results of the Brucellapt® test were compared with those of Coombs test (correlation coefficient 0.956, $p=0.000$) and SAT (correlation coefficient 0.0866, $p=0.000$). Taking the Coombs' test as gold standard, the area below the ROC curve for Brucellapt® were 0.98019 (95% CI 0.96869-0.98832), and taking the SAT as gold standard, the area below the ROC curve for Brucellapt® were 0.97128 (95% CI 0.95802-0.98126).

CONCLUSIONS

The study shows a higher sensitivity of Brucellapt® and a very good correlation between Brucellapt® and Coombs test, with a high concordance between titers obtained with both tests. Nevertheless, lower correlation and concordance were found between Brucellapt® and SAT.

TABLE 1: Sensitivity, specificity and likelihood ratio of the SAT, Coombs anti-*Brucella* and Brucellapt® tests in the 82 diagnostic and 412 control sera. (titer 1/160)

	Sensitivity (%)	Specificity (%)	Positive L.R*	Negative L.R*
Brucellapt®	95.1% (87.3-98.4)	99.0% (97.3-99.6)	97.9 (38.4-251.8)	0.049 (0.019-0.120)
Coombs test	91.5% (82.7-96.2)	99.8% (98.4-99.9)	376.8 (67.01-2135.7)	0.085 (0.042-0.166)
SAT	65.8% (54.5-75.7)	100% (99.1-100)	542.6 (57.0-5210.5)	0.341 (0.248-0.449)

*LR: Likelihood ratio

TABLE 2: Clinical and serologic characteristics of the four patients with chronic brucellosis.

Patient	Blood culture	SAT*	Coombs test*	Brucellapt®*	Duration Symptoms
Bcr1	Positive	40	640	1280	5 months
Bcr2	Positive	0	1280	2560	6 months
Bcr3	Negative	0	5120	20480	6 months
Bcr4	Positive	160	640	2560	3 months

TABLE 3: Relation between the titers in the Brucellapt® and Coombs anti-*Brucella* tests.

Brucellapt®	Coombs' anti- <i>Brucella</i> Test									Total
	0	40	80	160	320	640	1280	2560	5120	
0	474	1	4							479
20	1	11	1							
40		10	3							
80	23	16	9	3						
160	5	14	24	3	3	1				
320		7	15	21	9	2				
640			5	17	19	10	2			
1280			2	15	15	14	9			405
2560				8	7	19	15	1		
5120					3	13	20	1		
10240						1	4	10	3	1
20480									1	1
40960							1	1	1	2
81920									1	2
Total	503					381				884

* Correlation coefficient 0.956 ($p=0.000$)

Figure 1: Brucellapt® ROC curve compared with Coombs test and SAT as gold standard

