Serotesting of Human Brucellosis on Wider Area of Bosnia and Herzegovina

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Abstract

The study involved 286 individuals from different regions of Bosnia and Herzegovina, whose sera were tested in the Laboratory for specific diagnosis of human brucellosis in Microbiology Department of Medical Faculty of University in Sarajevo, during the period from 2000. to 2003. Sera were tested using Brucelloslide Test, qualitative agglutination test Rose Bengal. Using the agglutination test, we serologically confirmed a diagnosis of human brucellosis in 59 (20.62%) seropositive individuals, whereof 38 (64.40%) men and 21 (35.60%) women. Individuals with human brucellosis were the most present in the age group of 31-40 (22.03%) and 41-50 (22.03%). One serologically confirmed death case was registered. The most seropositive individuals were from Zenica-Doboj Canton (32.20%), Sarajevo Canton (28.82%), Herzegovina-Neretva Canton (23.73%), Central Bosnia Canton (13.55%) and Una-Sana Canton (1.70%). During our four-year study, it was serologically confirmed that human brucellosis is present in Bosnia and Herzegovina and, through seropositive testing, we revealed the level of general exposition to Brucella spp. on wider area of Bosnia and Herzegovina.

KEY WORDS: Brucella, human brucellosis, serodiagnosis, Bosnia and Herzegovina.

INTRODUCTION

Genus Brucella is consisted of small, immobile, Gram-negative coccobaccili which are pathogenic for humans and animals. The first human cases of brucellosis were described in 1861., by J.A. Marston, physician with the British army settled in Malta (1). Brucellae are intracellular parasites that can be transmitted to a range of animal species, including humans (2). Four Brucella species, B. abortus, B. melitensis, B. suis and B. canis, can cause brucellosis when transmitted to humans. General infection routes in humans are digestive tract (consuming contaminated milk), mucosa (splashing route), skin (contact with infected animal tissues) or inhalation. Brucellosis is a system-affecting disease able to involve any of the major organ systems. Clinical disease manifestations are therefore very different. The most frequent described symptoms include periodical fever, cold, night sweating, headache, physical pains, anorexia and weakness. Additionally, infection focuses can occur in liver, reticuloendothelial system, bones and joints, urogenital tract, central nervous system, eyes, skin, lungs and heart (endocarditis) (3). The treatment of brucellosis includes a logn-term antibiotic therapy, with recurrences if the therapy is discontinued too early or if microorganisms are in particularly deep focus of infection. These recurrences usually occur in 3 or 6 months after the therapy discontinuation. Controlling and supervising brucellosis is based on limited disease spreading and possible eradication of the infection in animals, pasterizing the milk and milk products, and reducing professional risk, wherever it is possible.

PATIENTS AND METHODS

During the period from 2000. to 2003., sera from 286 individuals from different regions of Bosnia and Herzegovina, clinically suspected to have brucellosis, were tested in the Laboratory for specific diagnosis of human brucellosis in Microbiology Department of Medical Faculty of University in Sarajevo. Blood samples were collected by venipuncture, and isolated serum samples were preserved on –200C until testing. Sera were tested using Brucelloslide Test, qualitative agglutination test Rose Bengal.

RESULTS

Out of 286 clinically suspect serotested individuals during the four-year period mentioned above, anti-Brucella antibodies were detected in tested sera in 59 (20,62%) individuals, while the result of agglutination test Rose Bengal remained negative in 227 (79,38%) individuals (Chart 1). Serotesting results for 286 individuals clinically suspected to have human brucellosis are represented in Table 1., for the period from 2000. to 2003. During 2000., 87 individuals clinically suspected to have brucellosis, were serotested. Agglutination test was positive in 15 (17,24%) individuals, while the result remained negative in 72 (82.76%) individuals. During 2001., 27 individuals were serotested, whereof 3 (11,11%) individuals had a positive agglutination test, while the result remained negative in 24 (88,89%) individuals. Out of 61 individuals serotested in 2002., 8

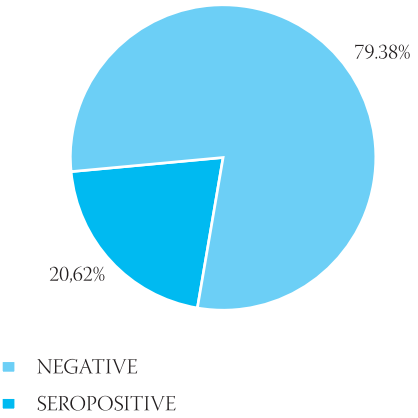

FIGURE 3. The rate between Brucella seropositive and negative individuals

YEAR	INDIVIDUALS TESTED	SEROPOSITIVE	
		Number	%
2000	87	15	25,42
2001	27	3	5,08
2002	61	8	13,56
2003	111	33	55,94
Total	286	59	100,00

TABLE 1. The results of serotesting during the period from 2000. to 2003.

CANTON	INDIVIDUALS TESTED	POSITIVE	
		Number	%
UNA-SANA	10	1	1,70
TUZLA	1	0	-
ZENICA-DOBOJ	65	19	32,20
CENTRAL BOSNIA	41	8	13,55
HERZEGOVINA-NERETVA	73	14	23,70
CANTON 10. LIVNO	2	0	-
SARAJEVO	94	17	28,82
TOTAL	286	59	100,00

TABLE 2. The results of serological diagnosis of human brucellosis for cantons, for the period from 2000. to 2003.

(13,11%) individuals had a positive agglutination test, while the result remained negative in 53 (86,89%) individuals. During 2003., 111 individuals were serotested, whereof 33 (29,72%) individuals had a positive agglutination test, while the result remained negative in 78 (70,28%) individuals. Chart 1. represents the rate between seropositive and negative individuals in overall diagnostic specimen for the period from 2000. to 2003. Out of 59 seropositive individuals, there were 38 (64,40%) men and 21 (35,60%) infected women. The most seropositive individuals were confirmed in the age group of 31-40 (22,03%) and 41-50 (22,03%). One serologically confirmed death case was registered. Out of 15 seropositive individuals confirmed during 2000., 7 of them (46,67%) were from Mostar, 5 (33,33%) from Sarajevo, 2 (13,33%) from Gornji Vakuf, 1 (6,67%) from Blagaj. Three seropositive individuals in 2001. were from Sarajevo. During 2002., out of 8 seropositive individuals, 5 of them (62,5%) were from Zenica, while 3 (37,5%) from Sarajevo. During 2003., we had 33 seropositive individuals, whereof 8 (24,25%) from Zenica, 6 (18,18%) from Sarajevo, 6 (18,18%) from Konjic, 3 (9,09%) from Busovača, 2 (6,06%) from Visoko, 2 (6,06%) from Travnik and 1 (3,03%) from Novi Travnik, Cazin, Breza, Žepče, Olovo and Tešanj. The results of serological diagnosis of human brucellosis for cantons, for the period from 2000. to 2003., are represented in Table 2. During the four-year period, we recorded the highest seroprevalence of human brucellosis in Zenica-Doboj Canton (32,20%), Sarajevo Canton (28,82%), Herzegovina-Neretva Canton (23,73%), Central Bosnia Canton (13,55%) and Una-Sana Canton (1,70%).

Discussion

Brucellosis is a zoonosis of the world-wide importance, especially in developing countries. According to the World Health Organization, the annual incidence of cases reported in endemic areas varies between 1 and 78 per 100000 inhabitants, with serological diagnosis in minimum 20% of human population (4). Professions traditionally related to the higher risk include farmers, veterinarians, shamblers and butchers, as well as laboratory personnel. However, effective control steps in ranch industry, as well as more frequently consuming unpasterized milk products, lead to the fact that brucellosis is disease most commonly caused by nutrition (5). Significant increase in the proportion of food-home transmissions is the main reason for a great need for tests that would be fast and reliable detectors of brucellae in food and environment. Through specific diagnostic of the cases suspected for human brucellosis, as well as through seroprevalent testing, we tried to reveal a level of general exposition to Brucella spp. Immediate actions should focus on public education that will help decrease the risk of brucellosis: Supervising and controlling disease outbreaks in already determined seats. Defining sources and routes of disease transmissions. Consume only boiled or pasteurized milk, or dairy products prepared from milk treated in this way. Wash hands thorougly after handling raw meat or milk.

Conclusions

1. Detecting specific anti-Brucella antibodies using agglutination test Rose Bengal, we serologically diagnosed human brucellosis in 59 (20.62%) clinically suspect individuals.
2. The highest prevalence of human brucellosis was present in Zenica-Doboj Canton (32.20%).
3. Agglutination test Rose Bengal can provide a useful diagnostic information.
4. A fast diagnostic of human brucellosis has important implications of public health and laboratory security.

References

(1) Marsten J. A. Report on fever (Malta). Great Br. Army Med. Dept. Rep. 1861; 3:520-521.
(2) Corbel M.J., Brinley – Morgan W.J. Genus Brucella. Bergey's manual of systematic bacteriology, 1984; 1:377-388
(3) Young E. J., Mandell G.L., Benett J.E., Dolin R. Brucella species. Principles and practice of infectious diseases, 2000; 2:2386-2393.
(4) World Health Organization. Brucellosis. Fact sheet N173. www.who.int/inffs/en/fact_173.html. (Online) World Health Organization, Geneva, Switzerland. 1997.
(5) Chomel B. B., De Bess E.E., Mangiamele D.M., Reilly K.F., Farver T.B., Sun R.K., Barett L.R. Changing trends in the epidemiology of human Brucellosis in California from 1973 to 1992: A shift toward food-home transmission. J. Infect. Dis, 1994; 170:1216-1223.
(6) Bešlagić O. Sero-epidemiološka istraživanja bruceloze među stanovnicima ugroženih područja u Federaciji Bosne i Hercegovine. Diplomski rad, Medicinski fakultet Univerziteta u Sarajevu, 2004.