

Hepatitis B carriage and Brucella seroprevalence in urban and rural areas of Bolu province of Turkey: A prospective epidemiologic study

Bolu ilinin kentsel ve kırsal kesiminde hepatit B taşıyıcılığı ve Brusella seroprevalansı

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Background/aims: In this study, we aimed to investigate the prevalence of hepatitis B surface antigen positivity and antibodies against Brucella in rural and urban areas of Bolu province of Turkey. **Methods:** A total of 5,234 people were screened from the urban and rural regions (4084 versus 1150, respectively). All sera were evaluated for HBsAg and Brucella antibody. **Results:** HBsAg, rose bengal and serum tube agglutination positivity were found to be 2.85%, 1.0%, 0.46%, respectively, in the urban area, versus 2.6%, 1.7%, 1.1%, respectively, in rural areas ($P>0.05$). **Conclusions:** HBsAg seropositivity in Bolu is lower than in many other centers in Turkey. Brucella prevalence is 1%, which is higher than that in the Ministry of Health records. This shows that the recording system in our country is not very efficient. Similar studies should be carried out in different regions of our country to determine the actual values, which requires the cooperation of scientific foundations and the Ministry of Health.

Key words: Hepatitis B, Brucella, epidemiology, seroprevalence, urban, rural

Amaç: Bu çalışmada Bolu ilinin kırsal ve kentsel bölgelerindeki Hepatit B yüzey antijeni ve Brusella antikor seroprevalansının araştırılması amaçlanmıştır. **Yöntem:** Çalışmaya 4084 kentsel ve 1150 kırsal olmak üzere toplam 5234 olgu dahil edildi. Toplanan serumlarda HBsAg ve brusella antikorları araştırıldı. **Bulgular:** Kentsel bölgelerde HBsAg, RoseBengal ve Serum Tüp Aglutinasyon testlerinin pozitifliği sırasıyla % 2.85, %1.0 ve %0.46 olarak bulunmuşken, kırsal bölgelerde aynı oranlar sırasıyla %2.6, %1.7, %1.1 olarak bulundu ($P>0.05$). **Sonuç:** HBsAg seropozitifliği için bulduğumuz rakamlar Türkiye'nin bir çok merkezinden bildirilen oranlardan düşüktür. Brusella'nın %1 lik seroprevalansı ise Sağlık Bakanlığının kayıtlarına göre fazla olarak bulunmuştur. Bu sonuçlar Sağlık Bakanlığı istatistiki verilerinin sapmaları olduğunu göstermektedir. Ülkemizin değişik bölgelerinden yapılacak benzer çalışmalarla gerçeğe en yakın oranlar bulunabilecektir. Bu konuda Sağlık Bakanlığı ve üniversiteler işbirliği yapmalıdır.

Anahtar kelimeler: Hepatit B, Brusella, epidemiyoloji, seroprevalans, kentsel, kırsal

INTRODUCTION

Hepatitis B virus (HBV) is believed to have infected more than 400 million individuals throughout the world and its prevalence varies widely in different geographic regions. The relationship between chronic HBV infection and cirrhosis and liver carcinoma has been presented by many authors, making this infection an important cause of morbidity and mortality and a major concern to public health (1, 2). Turkey is considered to be a region of moderate endemicity (3, 4).

Brucellosis is an important public health problem that is seen worldwide. It causes significant economic loss among domesticated animals used as a source of meat and dairy products and is frequently transmitted from animals to humans in areas where the disease is enzootic (5).

It is mandatory to obtain epidemiological data about hepatitis B and *Brucella* in order to succeed in fighting them. The incidence of both diseases is variable in different regions of our country, but we

have no epidemiological data from Bolu. In this study, we aimed to determine the prevalence of hepatitis B surface antigen (HBsAg) and *Brucella* antibodies in the Bolu province.

MATERIALS AND METHODS

This public survey and the data collection were performed between 9-20 June 2003. Review of the population records of 23 districts in urban regions and nine districts in rural regions of Bolu revealed 17,264 houses and 74,235 people. A health station was set up each day in every two or three districts to question each case regarding socio-demographic properties and history of disease, drug usage and *Brucella* and hepatitis B. A physician examined all the cases and their history and examination results were recorded. A total of 3,084 people were screened and the cases were informed about screening for *Brucella* and HBsAg. The blood samples were taken to the laboratory in +4°C ice boxes. The sera were stored at -20°C before testing. All sera were evaluated using the rose bengal plate agglutination test, and detection of the level of *Brucella* antibodies in the sera was done by serial dilutions (from 1:10 to 1:1280) using bacterial antigen. The antigen was obtained from the Ministry of Agriculture (Veterinary Research Institute, Pendik, Istanbul). Serum tube agglutination (STA) titer of 1:160 or greater was considered positive reaction. Serum samples were tested by ME-IA (microparticle enzyme immunoassay) to detect the HBsAg (Abbott AxSYM System, USA).

The urban and rural area groups were compared using the chi-square test. For statistical calculations, Epi-info (Version 6.0) software program was used. Probability values under 0.05 were considered to be significant ($p < 0.05$).

RESULTS

Blood (8 ml) was obtained from 1,374 (44.5%) cases from urban areas and from 830 (72.1%) cases from rural areas who accepted to participate in the study. As a consequence of tube crash or hemolysis, the sera of 106 samples (4.9%) were not included in the study. HBsAg, rose bengal and STA positivity were found in 37 (2.85%), 14 (1.0%), and 8 (0.46%) cases, respectively, in the sera of 1,298 cases from the urban areas, in which serum separation was possible. HBsAg, rose bengal and STA positivity were found in 21 (2.6%), 14 (1.7%), and 9 (1.1%) cases, respectively, in the sera of 800 cases from the rural areas, in which serum separation

was possible. No significant differences were found for HBsAg and *Brucella* positivity between urban and rural area groups. The results are shown in (Table 1).

Table 1. HBsAg, rose bengal and serum tube agglutination (STA) results

Parameters Areas	HBsAg n %	Rose Bengal n %	STA n %
Urban Area (n=1374)	37 (2.9)	14 (1.0)	8 (0.5)
Rural Area (n=830)	21 (2.6)	14 (1.7)	9 (1.1)
Total (n=2204)	58 (2.7%)	28 (1.3)	17 (0.8)
p value*	0.09	0.19	0.20

- Statistical difference between rural and urban areas.
- Probability values under 0.05 were considered significant ($p < 0.05$)

DISCUSSION

The distribution of HBV infection among the world shows differences according to geography. Because of these differences HBsAg endemicity is classified as low if positivity is lower than or equal to 2%, moderate if between 2-10% and high if greater than 10%. According to this classification, the Bolu region is near the lower borderline of moderate endemicity (2.85%) (3). In our country HBsAg positivity is reported to be between 3.9% and 12.5%, varying in different regions of the country by ELISA method (6). These data show that our country is moderately endemic for HBsAg positivity and that there are 4 million carriers (1). The results of our study demonstrated an HBsAg positivity rate of 2.7%, which is lower than most of the other studies done in Turkey.

The possible reasons for this may be the increase in public consciousness of this disease with the help of the media. Another reason may be the more common usage of screening tests. Out of the 3,084 subjects screened, only 1,374 (44.5%) accepted to be tested for HBsAg positivity. This situation may be related to the following. First, subjects who may have been tested before and already found as positive for HbsAg may not have wanted to take part in the study for fear of their positivity being disclosed. Second, some subjects have a phobia against having their blood drawn. This may partially explain why our results were lower than actual positivity. Furthermore, Bolu was divided into local districts, and samples were collected by public survey in an effort to represent the whole population. Lastly, either professional blood donors or subjects attending Red Crescent Blood

Banks comprised the study groups in most of the other studies. Most of the donors attending Red Crescent Blood Banks are soldiers, and the ones from eastern and southeastern regions of Turkey may have increased the seropositivity for HBsAg.

Brucellosis caused by *Brucella spp* occurs naturally in domestic animals and is transmitted to human beings mainly through ingestion of contaminated milk or milk products or by close contact with infected livestock or their tissues or secretions; it is endemic in certain parts of Turkey. It is still an important public health problem throughout the world, but principally, and in particular, in the Mediterranean region, including Turkey, the Arabian Peninsula, the Indian subcontinent, Mexico, and parts of Central and South America (7). In Turkey, approximately 15,000 cases of *Brucella* are reported annually according to the 2001 data of the Ministry of Health of Turkey. However, it is believed that the actual number of cases is at least 50,000-100,000 per year, if the unreported and subclinical cases are considered. For this reason, brucellosis is an important public health problem in our country (8), and it is crucial to detect its actual incidence in fighting against this disease (9). We found that the incidence of exposure to *Brucella* and acquisition of brucellosis in Bolu is 1% and 0.46%, respectively. However, the Ministry of He-

alth of Turkey has reported this incidence as 0.0047%. This may be because the number of unreported or subclinical cases with brucellosis is quite high. The *Brucella* prevalence is higher than the data reported by the Ministry of Health. The significant difference between the data obtained may be a result of the unreliability of health records in our country. We believe that public health programs in Bolu should focus on educating the population about the risk of consuming dairy products made from unpasteurized milk, such as soft cheeses (10).

In conclusion, the prevalence of HBsAg seropositivity, *Brucella* antibodies seropositivity and of brucellosis were determined as 2.85%, 1% and 0.46%, respectively, in the central region of Bolu. No difference in *Brucella* and HBsAg carriage has been detected between urban and rural areas. HBsAg seropositivity in Bolu is lower than in many other centers in Turkey (11, 12). *Brucella* prevalence is 1%, which is higher than that in the records of the Ministry of Health. This shows that the recording system in our country is not very efficient. Similar studies should be carried out in different regions of our country to determine the actual values, and this requires the cooperation of scientific foundations and the Ministry of Health.

REFERENCES

- Hilleman MR. Overview of the pathogenesis, prophylaxis and therapeutics of viral hepatitis B, with focus on reduction to practical applications. *Vaccine* 2001; 19: 1837-48.
- Conjeevaram HS, Lok ASF. Management of chronic hepatitis B. *J Hepatol* 2003; 38: S90-103.
- Taşyaran AM, Tekeli E, Balik I. HBV enfeksiyonu epidemiyolojisi. *Viral Hepatit* 2003: 121-9.
- Kane M. Global programme for control of hepatitis B infection. *Vaccine* 1995; 13: 47-9.
- Young JE, Mandell. Douglas and Bennett's Principles and Practice of Infectious Disease. 4th ed. New York: Churchill Livingstone, 1995; 2053-7.
- Ozdemir O, Arda K, Soylu M, et al. Seroprevalence of hepatitis B and C in subjects admitted to a cardiology clinics in Turkey. *Eur J Epidemiol* 2003; 18: 255-8.
- Geyik MF, Gür A, Nas K, et al. Musculoskeletal involvement in brucellosis in different age groups: a study of 195 cases. *Swiss Med Wkly* 2002; 132: 98-105.
- Statistical Annual Report of the Republic of Turkey. T.C. Government Statistics Institute, 2003.
- Sauret JM, Vilissova N. Human brucellosis. *J Am Board Fam Pract* 2002; 15: 401-6.
- Fosgate GT, Carpenter TE, Chomel BB, et al. Time-space clustering of human brucellosis, California, 1973-1992. *Emerg Infect Dis* 2002; 8: 877-80.
- Erden S, Buyukozturk S, Calangu S, et al. A study of serological markers of hepatitis B and C viruses in Istanbul, Turkey. *Med Princ Pract*. 2003; 12: 184-8.
- Kuru U, Senli S, Turel L, et al. Age-specific seroprevalence of hepatitis B virus infection. *Turk J Pediatr* 1995; 37: 331-8.