

Short Communication

Screening of household members and contacts of patients with acute brucellosis to detect unrecognized cases

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Acute brucellosis among household members of index cases due to common food sources is reported. The aim was to screen family members and coworkers of patients with acute brucellosis to detect unrecognized cases. A descriptive study was conducted among contact cases of acute brucellosis patients. Five millilitre of venous blood samples were taken from contact cases to measure *Brucella* antibody IgM, IgG, and IgA. Thirty six index cases had a mean number of (4.5± 2.5) contact cases. A total of 117 contact cases [59 (50.5%) male, 58 (49.5%) female] were enrolled. Positive IgM, IgA and IgG Enzyme-Linked Immunosorbent Assay (ELISA) titers were detected in [7(6%)], [25(21.5%)] and [31(26.5%)] of contact cases respectively. The seroprevalence was detected in 40 (34.2%) of the 117 contact cases. Thirty eight (32.5%) of the contact cases manifested various symptoms. The positive seroprevalence (34.2%) and symptomatic individuals among contact cases (35%) in this study showed that household members are not the single most important identifiable risk, and screening of other shared common food sources is necessary.

Key words: Enzyme-linked immunosorbent assay, brucellosis, household members, screening.

INTRODUCTION

Brucellosis is a multi-systemic disease that may present with a broad spectrum of clinical manifestations that require laboratory testing for diagnosis (Young, 1994). It is transmitted mainly from domestic animals to humans through direct contact, contaminated animal products (particularly dairy products), and by inhalation of infectious particles. *Brucella* has developed many ways to evade the human immune system, and it induces a disease that is often relapsing or chronic (Pappas et al., 2006). The geographical distribution of the disease is constantly changing, with new foci emerging, and

Brucella also has the potential to be used in biowarfare as it is easily produced in a stable aerosolised form (Pappas et al., 2006). Acute brucellosis among household members of an index case has been reported (Alsubaie et al., 2005). The time between the appearance of an index case and development of secondary cases was 33.8 days, with a range of 1 - 115 days (Gotuzzo et al., 1989). Seropositive individuals were found among 15% of household members and 74% of them were symptomatic (Almuneef et al., 2004). *Brucella* Enzyme-Linked Immunosorbent Assay (ELISA) is a rapid, sensitive and specific assay, provides a profile of immunoglobulin classes in the diagnosis of acute and chronic brucellosis, is useful for mass screening and could be considered the method of choice for the serological diagnosis of brucellosis (Araj et al., 1986; Irmak

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et al., 2004). We conducted this study to determine whether screening family members and coworkers of patients with acute brucellosis might detect additional unrecognized cases.

MATERIALS AND METHODS

A descriptive study (retrospective cohort study) was conducted among contact cases of acute brucellosis patients in two provinces (Tehran and Lorestan) of Iran, between 2005 to 2007.

Patients and clinical specimens

An index case was defined as an individual with the clinical syndrome of brucellosis and a positive history of epidemiological exposure confirmed by ELISA. Contact cases were defined as all household and family members and their colleagues working in the abattoir, husbandry or on the farm. 5 ml of venous blood samples were taken from index cases and contact cases, then centrifuged ($3000 \times g$ for 10 min) and the serum stored at -20°C until evaluation.

Laboratory testing

All sera were evaluated by using *Brucella* IgM, IgG, IgA ELISA kits (IBL, Germany). An antibody (IgM, IgG, IgA) level of 11 NU or more was considered positive and a level of 8 NU or less was considered negative, with values between 8-11 NU defined as intermediate.

Ethics

The study was approved by the ethics committee of Shaheed Beheshti Medical University.

Statistical analysis

Statistical analysis was performed by SPSS software (version 11.5, SPSS Inc. USA). The descriptive tests and Chi-square were used. P values < 0.05 were considered significant. The seroprevalence rate among contact cases was defined according to positivity of one ELISA (IgM, IgA, IgG) test.

RESULTS AND DISCUSSION

Thirty six index cases [21(58%) male, 15(42%) female] with a mean of age (41.14 ± 18.13) year were included. The mean of number of contact cases per index case was (4.5 ± 2.5). Clinical findings in index cases were as follows: fever [29 (81%)], bone pain [30 (83.3%)] and arthralgia [26 (72.2%)]. The history of epidemiological exposure was drinking unpasteurized milk [25 (69.5%)], unpasteurized cheese [30 (83.3%)], fresh cheese [19 (53%)], performing husbandry or working on a farm [25 (69.5%)], and animal delivery [18 (50%)]. 23(64%) index cases had four contact cases or more. The mean

antibody titer in the index cases were: IgM (10.7 ± 20.52), IgG (87.37 ± 69), and IgA (90.8 ± 90.65). Positive IgM, IgG and IgA titers were detected in [8 (22.2%)], [27 (75%)] and [24 (66.7%)] of index cases respectively.

A total of 117 contact cases [59 (50.5%) male, 58 (49.5%) female] were screened. The mean age was (25.8 ± 17.1) years. There was fever [32 (27.4%)], bone pain [33 (28.2%)], and arthralgia [38 (32.5%)]. There was a history of epidemiological exposure including drinking unpasteurized milk [99 (84.5%)], unpasteurized cheese [103 (88%)], fresh cheese [92 (78.5%)], performing husbandry or working on a farm [69 (59%)], or carrying out animal delivery [41 (35%)].

The mean antibody titer in the contact cases was IgM (4.08 ± 7.1), IgG (31.78 ± 60.3), and IgA (29.78 ± 69.16). Positive IgM, IgA, or IgG titers were detected in [7(6%)], [25(21.5%)], [31(26.5%)] of contact cases respectively. Positive serology was detected in 40 (34.2%) contact cases. Thirty-eight (32.5%) contact cases manifested various symptoms. Among the 40 contact cases with positive serology, 14 (35%) had complaints, but among the 77 contact cases with negative serology, only 24 (31%) reported symptoms. There was no significant correlation between positive serology and clinical complaints. There was also a significant correlation between a positive IgM titer with presence of clinical symptoms in contact cases ($P < 0.0001$).

In addition, there was a significant correlation between the consumption of fresh cheese in the index cases with the contact cases ($P < 0.005$). A total of 117 contact cases were screened. Positive serology was detected in 40 (34.2%) of the contact cases. This was somewhat lower than one study (Mendoza-Núñez et al., 2008) that showed a seroprevalence of 50.9%, but it is much greater than (Alsubaie et al., 2005; Almuneef et al., 2004; Sharifi - Mood et al., 2007) other studies with seroprevalence rates of 19, 13 and 20% respectively. Our study detected the seroprevalence rate among family members and colleagues in the abattoir, husbandry or farm activity and might have been greater if a wider range of contacts had been tested.

In this study, among 40 contact cases with positive serology, 14 (35%) had medical complaints. There are other reports that showed 78% (Alsubaie et al., 2005), 74% (Almuneef et al., 2004) and 61% (Sharifi - Mood et al., 2007) symptomatic seropositive household members.

In this research, the consumption of unpasteurized dairy products and a job on a farm or other husbandry activity were shown to be risk factors as evidenced by numerous index and contact cases. This indicates that household and family members are not the only important identifiable risk group, and screening of other contact cases provides an effective means for diagnosis in these other risk groups. (Abramson et al., 1991) showed that screening of the high risk population can detect many more brucellosis patients and this is similar to our

findings. It is also in agreement with other studies (Almuneef et al., 2004; Mendoza-Nunez et al., 2008; Issa and Jamal 1999; Hartigan et al., 1997; Corbell et al., 1989).

Conclusion

The high seroprevalence rate (34.2%) and symptomatic individuals among contact cases (35%) shows that the screening of the high risk population can detect many more brucellosis patients. Because humans become infected with *Brucellae* by coming into contact with animals or animal products that are contaminated with these bacteria, the household and family members are not the only important identifiable risk group, and screening of other contact cases is necessary.

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