

Seroprevalence of Q-fever, brucellosis and leptospirosis in farmers and agricultural workers in Bari, southern Italy

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INTRODUCTION

Several factors exist that promote zoonotic infection in an agricultural setting, such as frequent contact with domestic animals, and poor animal sanitation. *Coxiella burnetii* is widespread in Italy among housed ruminants, even though few cases of human Q-fever have been reported. In Italy, leptospirosis is a disease reported both in animals and humans [1]. Apulia, Italy, is one of the Mediterranean regions in which brucellosis is present. During the year 2005, 39 cases of human brucellosis from Apulia, southern Italy, and 681 from other Italian regions were reported to the Italian Ministry of Health [2]. We carried out a serological investigation to estimate the presence of antibodies against *C. burnetii*, *Leptospira* and *Brucella* in subjects at risk of exposure to these microorganisms.

POPULATION AND METHODS

We studied workers and veterinarians working in rural areas near Bari, southern Italy. The control group consisted of 280 healthy blood donors.

IgG and IgM antibodies to *C. burnetii* were detected by indirect immunofluorescence assay. Leptospiral antibodies were detected by the microagglutination test. Antibodies to *Brucella* were detected by the standard tube agglutination test.

RESULTS AND DISCUSSION

Serological testing revealed that 73.4% of subjects exposed to farm animals were positive for anti-*C. burnetii* IgG (titre ≥ 20), as compared to 13.6% of control subjects ($p < 0.0001$). The IgG seropre-

valence for *C. burnetii* was 84.0% in the group of animal breeding workers, 60.6% in that of mixed agriculture/animal breeding, and 100% in the group of veterinarians. Of the 94 workers positive for IgG, 64 (68.1%) were males and 30 (31.9%) were females. In the group of subjects exposed to animals, a high antibody titre (80–160) to *C. burnetii* was observed in males as compared to females ($p < 0.01$). The trend of percentage of subjects scoring positive at high antibody titres was statistically significant both in males and in females when adjusted for age ($p < 0.001$) and for type of job ($p = 0.091$). All 38 sera of the control group were positive at a titre of 20. Both the two groups of subjects exposed to animals and control subjects were negative for IgM to *C. burnetii* and for antibodies to *Brucella* and *Leptospira*.

The trend of percentage of positivity to antibodies to *C. burnetii* (antibody titre ≥ 20 and ≤ 160) was significant only in the group of workers in the age group ≥ 70 years when adjusted for sex ($p = 0.0005$) and/or for occupation ($p = 0.04$). In addition, the risk group of ≥ 70 years of age had a statistically higher antibody titre (160) than all the remaining age groups ($p = 0.0145$). All these data suggest that prolonged contact with animals during life represents a real risk factor for *C. burnetii* infection.

Despite the presence of *C. burnetii* among animals, few data have been reported in Italy on the incidence of *C. burnetii* pneumonia and on the seroprevalence of *C. burnetii* in humans. There was a Q-fever outbreak in northern Italy involving 58 subjects after three flocks had passed through the outbreak area. In Sweden, seroprevalences of sheep farmers of 24–30% and of veterinarians of 12% have been found, in comparison to 5–17% of non-risk groups [3].

In our area, Apulia, Italy, 18.9% of aborted fetuses from domestic ruminants tested PCR-positive for *C. burnetii*. Nevertheless, cases of human Q-fever in our area have not been reported. In our study, none of the workers

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exposed to animals and none of the control group had antibodies to *Leptospira*. In animals living in northern and central Italy, seropositivity to *Leptospira* has been reported; 5.6% of the human sera examined tested positive [1]. A seroprevalence of 32% for serovars that are widespread in pigs has been found. In Italy, the major occupational risk was among farm and animal breeding workers. In the Bari area, 0% seroprevalence has been previously reported. Over a period of 6 years, we have diagnosed leptospirosis in three patients: one patient had drunk river water, and the other two had work exposure (in agriculture). An overall prevalence of antibodies to *Brucella* of 3.1% was recorded in the general population in two regions of southern Italy. The seroprevalence increased with age and was not significantly associated with occupation. Occupational exposure may not be the primary route of infection, and the main route of human infection could be related to exposure through food [4].

Further improvements in the occupational hygiene of the work environment to prevent exposure to dusts containing *C. burnetii*, and an increased awareness of the presence of this microorganism in cattle and sheep in our area, are necessary.

REFERENCES

1. Cerri D, Ebani V, Fratini F, Pinzauti P, Andreani E. Epidemiology of leptospirosis: observations on serological data obtained by a 'diagnostic laboratory for leptospirosis' from 1995 to 2001. *New Microbiol* 2003; **26**: 383–389.
2. Repubblica Italiana. Ministero della Salute. Malattie infettive. Roma: Ministero della Salute, 2003. Available at: <http://www.ministerosalute.it> (Last accessed February 2007).
3. Macellaro A, Akesson A, Norlander L. A survey of Q fever in Sweden. *Eur J Epidemiol* 1993; **9**: 213–216.
4. De Massis F, di Girolamo A, Petrini A, Pizzigallo E, Giovannini A. Correlation between animal and human brucellosis in Italy during the period 1997–2002. *Clin Microbiol Infect* 2005; **11**: 632–636.