

## SHORT REPORT

# Non-imported brucellosis outbreak from unpasteurized raw milk in Moroccan immigrants in Spain

J. M. RAMOS<sup>1\*</sup>, E. BERNAL<sup>1</sup>, T. ESGUEVILLAS<sup>2</sup>, P. LOPEZ-GARCIA<sup>3</sup>,  
M. S. GAZTAMBIDE<sup>2</sup> AND F. GUTIERREZ<sup>1</sup>

<sup>1</sup> Unidad de Enfermedades Infecciosas, Hospital General Universitario Elche, Alicante, Spain

<sup>2</sup> Servicio de Epidemiología, Departamento de Salud 20 de la Comunidad Valenciana, Alicante, Spain

<sup>3</sup> Sección de Microbiología, Hospital General Universitario Elche, Alicante, Spain

(Accepted 5 December 2007; first published online 21 January 2008)

### SUMMARY

Nine cases of brucellosis were identified in the city of Elche (Comunidad Valenciana, Spain) in two families of Moroccan immigrants. All of the patients had drunk unpasteurized raw milk from goats. *Brucella melitensis* biovar 3 was identified in clinical specimens. Preventive measures for brucellosis should be implemented among immigrant populations in Spain.

The number of immigrants from less-developed to well-developed countries is growing and has influenced the epidemiology of infectious diseases, such as tuberculosis, malaria and strongyloidiasis in the developed world [1]. Brucellosis is a worldwide zoonosis that is controlled in most developed countries. Humans may become infected by ingestion of unpasteurized cheese or milk, by direct transmission through contact with infected animals or by handling specimens containing *Brucella* spp. in laboratory workers. The incidence of human brucellosis in Spain decreased from 22.72 cases/100 000 in 1984 to 1.5/100 000 in 2004 [2]. We have no knowledge of a previous brucellosis outbreak in the immigrant population in Spain. This report describes a brucellosis outbreak among Moroccan residents in the city of Elche, on the Mediterranean coast of Spain.

The Hospital General Universitario de Elche is an urban, public, university-affiliated hospital with 450 beds that provides health care for a population of the Baix Vinalopo Department of Health (BVDH) (267 954 inhabitants; 9.6% immigrants in 2006)

\* Author for correspondence: Dr J. M. Ramos, Unidad de Enfermedades Infecciosas, Hospital General Universitario Elche, Camí de l'Almazara, 11, 03203 Elche, Alicante, Spain.  
(Email: jramosrincon@yahoo.es)

on the Mediterranean coast of Spain. The incidence of brucellosis in the province is lower than in other Spanish provinces with rates of 0.71 cases/100 000 inhabitants in 2003 and 2004 and 0 cases in 2005.

On 22 July 2006, a 41-year-old Moroccan male (case 1) was admitted with sacral pressure sore and fever that had persisted for 7 days. Unexpectedly *Brucella* spp. grew on blood cultures within 48 h (BACTEC 9240; Becton Dickinson, Heidelberg, Germany) [3] (Table).

The second case (case 2) was a 14-year-old Moroccan male who came to the Emergency Department on 27 July. The patient had suffered from symptoms of fever, chills, sweating and myalgias for 17 days. *Brucella* spp. grew on blood cultures within 3 days. The boy was a relative of case 1 and used to eat at his house. Cases 1 and 2 are referred to as 'family A' (see Table).

On 11 September 2006 another two Moroccan males from a different family (cases 3 and 4) visited the Emergency Department complaining of fever. Case 3 was aged 29 years and had fever, headache, sweating, chills, and loss of weight over the previous 30 days. Case 4 was aged 21 years, a nephew of case 3, and complained of pain and swelling of the left testicle

Table. Epidemiological, clinical features and outcome of 11 patients with brucellosis

Case no.	Family	Age (yr), gender	Clinical presentation	Leuko-cytes (g/ $\mu$ l)	Platelets (g/ $\mu$ l)	AST (U/l)	ALT (U/l)	STA	Coomb's test	Blood cultures		Clinical outcome	Follow-up		
										Isolation	Time to detection (days)		Treatment (mg)	STA	Time
1	A	41, M	Fever	11.0	581	11	11	1/1280	1/2560	<i>B. melitensis</i>	2	Doxycycline 200 (45 d) + gentamycin 240 (15 d)	Cured	1/160	6 mos
2	A	14, M	Fever and hepatitis	3.1	109	172	155	1/5120	1/10 240	<i>B. melitensis</i>	3	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/160	10 mos
3	B	29, M	Fever and hepatitis	5.1	158	128	148	1/1280	1/2560	<i>B. melitensis</i>	2.4	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/320	4 mos
4	B	21, M	Epididymo-orchitis	8.2	306	18	23	1/5120	1/5120	<i>B. melitensis</i>	1.9	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/320	2 mos
5	B	18, F	Meningitis	6.8	214	23	35	1/1280	1/2560	<i>B. melitensis</i>	2.4	Doxycycline 200 (90 d) + rifampicin 600 (90 d) + Co-trimoxazole 320/1600 (45 d)	Cured	1/80	7 mos
6	Farmer	21, M	Fever	n.a.	n.a.	n.a.	n.a.	1/640	1/2560	n.d.	—	Doxycycline 200 (60 d) + gentamycin 240 (15 d)	Cured	n.d.	
7	Farmer	16, M	Fever	n.a.	n.a.	n.a.	n.a.	1/1280	1/2560	Negative	—	Doxycycline 200 (60 d) + gentamycin 240 (15 d)	Cured	n.d.	
8	A	26, F	Asymptomatic	5.3	210	20	41	1/640	1/1280	Negative	—	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/320	7 mos
9	B	12, M	Asymptomatic	4.8	229	43	23	1/1280	1/5120	Negative	—	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/160	6 mos
10	B	24, M	Asymptomatic	5.7	224	31	38	1/1280	1/5120	Negative	—	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	n.d.	
11	B	44, F	Arthritis	5.3	283	30	48	1/1280	1/2560	Negative	—	Doxycycline 200 (45 d) + rifampicin 600 (45 d)	Cured	1/320	2 mos

F, female; M, male; n.a., not available; n.d., not done; mos, months; AST, aspartate aminotransferase; ALT, alanine aminotransferase; STA, standard tube agglutination.

for 10 days. Both patients were positive by the Rose Bengal test (Brucelloslide test; bioMérieux, Marcy-l'Etoile, France) [4], and *Brucella* spp. grew from blood cultures. These patients did not know the first two patients. They also stated that they occasionally purchased fresh cows' and goats' milk from a local farm and drank it unpasteurized.

On 2 October 2006, an 18-year-old female, the sister of case 4, presented with a 3-day history of fever, nausea, vomiting and headache. She had a previous episode of fever in early September 2006 that disappeared after a course of empiric antibiotics prescribed by her doctor. The Rose Bengal test was positive and *Brucella* spp. grew on blood cultures. Cerebrospinal fluid showed the following results: leukocytes 346/ml (60% lymphocytes); proteins 69.5 mg/d; glucose 100 mg/dl; the Rose Bengal test was positive and *Brucella* was not isolated. Cases 3–5 are referred to as 'family B'.

The public health staff of the BVDH visited the farm where patients of family B had bought unpasteurized milk. The farm had stopped selling milk from goats in July 2006 because several animals on the farm were found to have brucellosis. Moreover, two workers on this family farm, which was in a municipality belonging to a different Department of Health, had been diagnosed with occupational brucellosis (by serology) in July 2006. The two workers were sons of the owner of the farm and use to help with calving (cases 6 and 7). Members of family A also had purchased unpasteurized milk from the farm.

The public health staff of the BVDH contacted all the house relatives of case 2 (family A) and cases 3–5 (family B) in order to perform a *Brucella* serology test. Six asymptomatic members of family A were studied. A sister-in-law of case 2 gave a positive agglutination test titre (case 8) (Table), whereas her two sons (a 2-year-old boy and a baby), and two brothers and a sister of case 2, gave negative results. The attack rate in family A was 37.5%.

We studied four members of family B. Two brothers of cases 4 and 5 who were asymptomatic had standard and Coombs tube agglutination test titres (*Brucella abortus* agglutinations; BioSystems, Barcelona, Spain) of  $\geq 1/2560$  [4] (cases 9 and 10). Finally, the mother complained of pain in the right hand with no fever. On physical examination, she had mild arthritis of the right carpal joint and standard and Coombs tube agglutination test titres of  $\geq 1/1280$  (case 11). The father of cases 4, 5, 7 and 8 had no symptoms

and the Rose Bengal and standard tube agglutination tests were negative. The attack rate in family B was 85.7%.

No additional cases of brucellosis were found from June to December 2006, after a search of hospital records and infectious diseases outpatient clinic files, looking for undiagnosed pyrexia of unknown origin (code 780.6 for CD-9-CM). All isolates were identified as *Brucella melitensis* biovar 3 according to the National Brucellosis Reference Laboratory (Valladolid, Spain).

In Spain outbreaks [5, 6] associated with unpasteurized raw goats' cheese have been described. The last one published occurred in Andalusia in 2002 and involved 11 patients [5]. The outbreak described in this report was unique because it involved two immigrant Moroccan families and happened in an area with a very low incidence of brucellosis. The outbreak was due to unpasteurized raw milk from goats, and it was possible to identify two main factors: the illegal sale of raw milk by certain dairy farmers and the belief of these Moroccan families in the beneficial effects of raw milk consumption.

This outbreak alerted us to the fact that it is necessary to reinforce both educative and focused public health measures for the prevention of infectious diseases among the immigrant population. In Spain, previous outbreaks of other diseases, including tuberculosis [7] and rubella [8, 9], have been described in immigrant populations. As a result of the outbreak described here, several meetings were held with the different immigrant associations in the Health Authority to explain to them that the consumption of unpasteurized raw milk and cheese is a health hazard. Closer surveillance to avoid illegal sale of milk has also been implemented.

#### ACKNOWLEDGEMENTS

We thank the staff of the the Baix Vinalopo Department of Health and the Microbiology Service of Hospital General Universitario de Elche and the National Brucellosis Reference Laboratory (Valladolid, Spain) for help and support during the field investigations. We also thank Judith Williams for technical support.

#### DECLARATION OF INTEREST

None.

## REFERENCES

1. **Gushulak BD, MacPherson DW.** Globalization of infectious diseases: the impact of migration. *Clinical Infectious Diseases* 2004; **38**: 1742–1748.
2. **Sanchez Serrano LP, et al.** Human and animal incidence of brucellosis declining in Spain. *Eurosurveillance* 2005; **10**: E050421.4.
3. **Bannatyne RM, Jackson MC, Menish Z.** Rapid diagnosis of *Brucella* bacteremia by using the BACTER 9240 System. *Journal of Clinical Microbiology* 1997; **35**: 2673–2674.
4. **OIE World Organisation for Animal Health.** Bovine brucellosis, chapter 2.3.1. In: *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*, 5th edn, 2004 ([http://www.oie.int/eng/Normes/mmanual/A\\_00052.htm](http://www.oie.int/eng/Normes/mmanual/A_00052.htm)). Accessed June 2007.
5. **Méndez Martínez C, et al.** Brucellosis outbreak due to unpasteurized raw goat cheese in Andalucía (Spain), January–March 2002. *Eurosurveillance* 2003; **8**: 164–168.
6. **Castell Monsalve J, et al.** Epidemic outbreak of 81 cases of brucellosis following the consumption of fresh cheese without pasteurization [in Spanish]. *Revista Española de Salud Pública* 1996; **70**: 303–311.
7. **Valles X, et al.** Imported tuberculosis: an emerging disease in industrialised countries [in Spanish]. *Medicina Clínica (Barcelona)* 2002; **118**: 376–378.
8. **Torner N, et al.** Rubella outbreak in young adults of Brazilian origin in a Barcelona suburb, October–December 2005. *Eurosurveillance* 2006; **11**: E060223.3.
9. **Red de Vigilancia Epidemiológica de la Comunidad de Madrid.** Outbreak of rubella in the Madrid region, Spain, 2005. *Eurosurveillance* 2005; **10**: 050707.