

Sero-epidemiology of Brucellosis in the UK, 2002 - 2004

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ABSTRACT

- Introduction** The clinical microbiology laboratory at University Hospital Aintree provides a national brucella serology service for England, Wales and Northern Ireland. Approximately, 2,500 tests are performed annually. The results of positive serological tests between 2002-2004 are presented.
- Methods** The micro-agglutination test (MAG) has been used by the laboratory as a screening test for a number of years. It is simple to perform, well standardised and measures both IgG and IgM antibody. A MAG titre of $\geq 1:160$ normally is considered diagnostic for brucella infection at some time. Additional antibody tests are performed on positive samples.
- Results** 44 cases of brucellosis were diagnosed serologically between 2002-2004. Age range was 2 to 72 years (mean 41.2 years). 79% of cases were male and 73% were reported from Northern Ireland.
- Conclusion** The sero-epidemiology of human brucellosis in the UK appears to be strongly linked to brucella infected dairy herds in Northern Ireland and consequent occupational exposure.

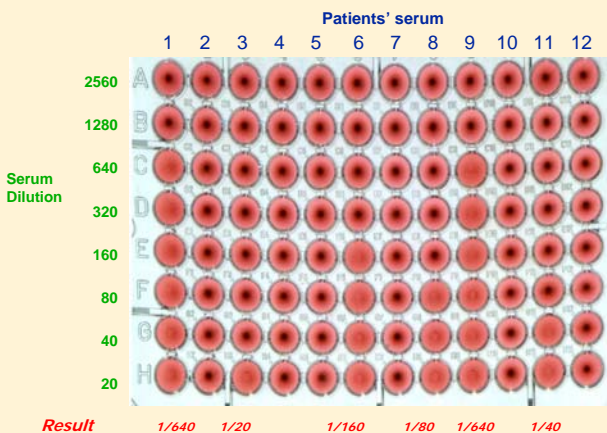
Introduction

- Annual reports by the UK Department of Environment, Food and Rural Affairs (DEFRA) indicate that cases of human brucellosis are rarely reported from this country. In 2002 and 2003, a total of 36 and 21 new cases respectively were identified. The majority were chronic infections linked to infected cattle in Northern Ireland (NI). Due to the introduction of a successful brucella eradication scheme in NI cattle, the number of new human cases is now falling.
- The clinical microbiology laboratory at University Hospital Aintree (UHA) provides a national brucella serology service for England, Wales and NI. Serology plays a major role in diagnosis particularly if the infection is not detected by blood or bone marrow culture. Approximately, 2,500 serum samples are tested annually.
- The results of serological testing between 2002 and 2004 are presented and compared with DEFRA data.

Methods

- Four serological tests were performed on all referred sera:
 - Micro-agglutination (MAG) test:** Simple to perform, well standardised and measures total agglutinating antibodies (IgG and IgM) using a *Brucella abortus* antigen suspension. A MAG titre $\geq 1:160$ is considered diagnostic of brucella infection at some time. An example of a typical MAG screening test is shown in Figure 1.
 - Complement fixation test (CFT)** A more time, labour and reagent intensive screening test. Though total antibody may be detected earlier than MAG, its main role is to assist in the identification of false-positive MAG reactions.
 - Specific IgG and IgM enzyme immunoassays (EIAs):** 'In-house' assays used to detect specific IgG and IgM antibody responses.
- As part of this study, all positive MAG sera ($\geq 1:160$) were also tested against a new commercial EIA immunocapture agglutination technique (Brucellacapt total, IgG and IgM Quest Biomedical Ltd, West Midlands, UK)

Figure 1. Brucella antibody micro-agglutination test



Negative result: button well (safranin stained *Brucella abortus* antigen only, no antigen-antibody complex)
Positive result: opaque well (*Brucella abortus* antigen-patient antibody complex detected)

Results

- 44 cases of brucellosis were diagnosed serologically between 2002 and 2004: 18 in 2002, 11 in 2003 and 15 in 2004. See Figure 2.
- 73% of cases were reported from Northern Ireland. See Figure 2.

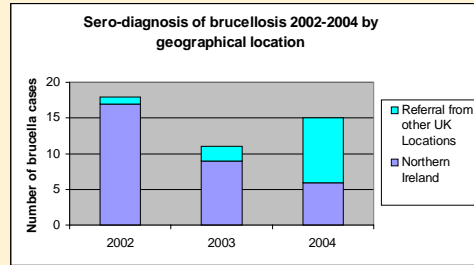


Figure 2

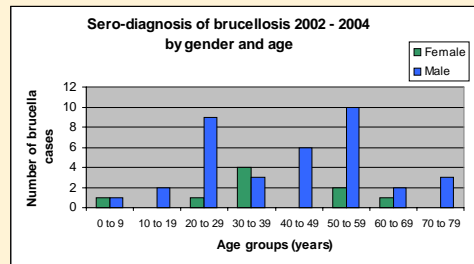


Figure 3

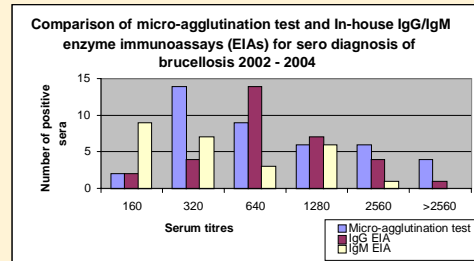


Figure 4

- Age range was 2 to 72 years (mean 41.2 years). 79% of cases were male. See Figure 3.
- A comparison of MAG, IgG EIA and IgM EIA serum titres is shown in Figure 4. One false-positive MAG result was detected (CFT and EIAs) were both negative.
- Brucellacapt total antibody results generally had higher end-points compared to MAG results and proved easier to read. Brucellacapt IgG and IgM are qualitative tests only and did not provide any additional useful information in comparison with 'in-house' EIA assays.

Conclusions

- The number of annual cases of human brucellosis diagnosed serologically between 2002 and 2004 has not changed significantly.
- Sero-diagnosis accounts for only 50% of brucella cases identified by the DEFRA annual reports 2002/2003. It is possible that better collaboration between the different agencies involved in brucella diagnosis (serology, culture and PCR) might improve case ascertainment.
- Commercial brucella specific IgG and IgM antibody EIA tests do not appear to confer any particular advantage over antibody assays currently employed at UHA. However, the Brucellacapt total antibody EIA may prove a useful alternative to the MAG test. Further evaluation is on-going.
- This study confirms the view that human brucellosis in the UK is closely linked to occupational exposure from infected herds in Northern Ireland.