Coxiella burnetii infection in association with equine abortion

Final report summary

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Abstract

The Australian thoroughbred industry relies on live foals and thus seeks to minimise reproductive losses. The bacterium *Coxiella burnetii* has been associated with equine abortion in other countries but has not previously been studied in Australian horses. As part of this project, *C. burnetii* was detected in 21 of 600 equine abortion samples collected in Australia, mostly from New South Wales and Victoria, between 1994 and 2019. Further work is needed to determine whether *C. burnetii* caused the abortions. *C. burnetii* can cause human disease (Q fever) and thus biosecurity and hygiene precautions are recommended for people working in the Australian thoroughbred industry who handle equine abortion tissues.

Background

*C. burnetii* is a bacterium that can cause reproductive loss in a variety of animal species, particularly ruminants, and also causes the disease Q fever in humans. In some other countries, *C. burnetii* has been associated with equine abortion but this had not previously been studied in Australia. In preliminary work as part of this project, *C. burnetii* was detected in some historical cases of equine abortion in Australia, but the significance of this finding with respect to human and equine health was unclear. Understanding the role that *C. burnetii* has in equine abortions is important because the Australian thoroughbred industry relies on live foals, and thus seeks to minimise reproductive losses. Furthermore, close contact between people and horses, including during foaling, increases the potential for *C. burnetii* to be transmitted from horses to people.

Objectives

The objective of this project was to determine whether the bacterium *C. burnetii* was present in equine post-mortem abortion samples collected over time from different areas of Australia. The project also aimed to determine how much *C. burnetii* was present in the abortion samples to assess whether the bacteria likely caused the equine abortions, and whether the bacteria were a human health risk.

Research

This project tested 600 clinical samples collected from equine abortion cases in Australia, mostly from NSW and Victoria, between 1994 and 2019. These samples were tested for the presence of *C. burnetii* DNA using molecular techniques (PCR). *C. burnetii* was detected in 21 abortion cases, giving an overall prevalence of 4%. Of the 21 positive cases, 10 cases were from Victoria (prevalence of 3%) and 11 were from NSW (prevalence of 6%). The annual incidence of *C. burnetii* ranged from 0-14% and was highest between 1997-2003 and 2016-2018. Figure 1 shows locations of the cases that were positive for *C. burnetii*, and also cases that were positive for equine herpesvirus 1, which is a known cause of equine infectious abortion.

Outcomes/key findings

This study confirmed the presence of *C. burnetii* in equine abortion samples in Australia, specifically in NSW and Victoria, but did not prove that *C. burnetii* caused the abortion events. Only low loads of *C. burnetii* were detected in the Australian equine samples. The low levels of *C. burnetii* in the equine samples could suggest that the bacteria did not cause the abortion event, but the presence of even low levels of *C. burnetii* in the equine samples is a human health risk.
Implications for industry

Further work is needed to clarify the role of C. burnetii in equine reproductive loss. Future work should involve testing for the presence of C. burnetii and detailed microscopic examination of the abortion tissues to identify what changes are present in the placenta and foetal tissues where C. burnetii is detected. Testing placential tissues from normal (healthy) deliveries for the presence of C. burnetii may also help clarify whether the presence of C. burnetii in the equine placenta is incidental or causes equine abortion.

Irrespective of the role that the bacterium may play in equine reproductive loss, the detection of C. burnetii in equine abortion samples is significant in itself. This is because of its potential for human infection and the possibility of human disease arising from a very small infectious dose. For this reason, biosecurity practices, including the use of personal protective equipment (PPE), the use of disinfectants and attention to hygiene, should be implemented to prevent human C. burnetii infection. This applies to people working in the thoroughbred breeding industry and other associated industries, such as equine veterinarians and veterinary diagnostic and pathology laboratory staff, who may be exposed to equine abortion tissues.

Recommendations

Infection control measures, including biosecurity and hygiene practices, should be implemented to help manage the risk of C. burnetii infection in horses and humans. These include measures on farms where equine abortions take place, and in veterinary diagnostic and pathology laboratories where post-mortem assessments take place.

To clarify the role of C. burnetii in equine reproductive loss, a prospective study that tests abortion tissues for C. burnetii and examines tissues for histopathological changes would be helpful. Testing of placential tissues from normal (healthy) deliveries may also help determine whether the presence of C. burnetii is incidental or causes equine abortion.

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Publications


Acknowledgements

The authors thank Agriculture Victoria Research and Dr Martins Olaogun from The University of Melbourne for providing DNA extracted from recent abortion cases. The authors also thank Mebratu Asaye Bitew from The University of Melbourne for his assistance with qPCR and Dr Joan Carrick for her advice and input, and for supplying clinical samples for the study.

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