Comparison of antibody titres between intradermal and intramuscular rabies vaccination using inactivated vaccine in cattle in Bhutan

A thesis presented in the partial fulfilment of the requirements for the degree of

Master of Veterinary Science

at Massey University, Palmerston North

New Zealand

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2018

Abstract

In developing countries, the cost of vaccination limits the use of prophylactic rabies vaccination, especially in cattle. Intradermal vaccination delivers antigen directly to an area with higher number of antigen-presenting cells. Therefore, it can produce equivalent or higher antibody titres than conventional intramuscular vaccination even when a lower dose is given.

This study aimed to compare the antibody response in cattle vaccinated intramuscularly with 1mL of inactivated rabies vaccine (Raksharab, Indian Immunologicals) against intradermally vaccinated cattle with 0.2mL of the same vaccine. The study was conducted in Haa province of Bhutan where rabies is not endemic. One hundred cattle from 27 farms were selected for the study. Virus neutralising antibody (VNA) response was measured using the fluorescent antibody virus neutralisation test on the day of vaccination (day 0) and 14, 30, 60 and 90 days later.

Overall, 71% of intradermally vaccinated cattle and 89% of the intramuscularly vaccinated cattle produced a protective response (≥0.5IU/mL). This difference was significant ($P<0.02$) on days 14 and 30 post vaccination with 36 and 56% in the intradermal group having titres ≥0.5 IU/mL respectively compared to the equivalent figures of 78 and 76% in the intramuscular group. The mean VNA titres were lower for intradermal group than intramuscular group ($p<0.001$) with the mean difference being greater than 0.6 IU/mL. Although low dose intradermal vaccination did produce a detectable antibody response, it was inferior to intramuscular vaccination. Thus, although, intradermal vaccination has the potential to reduce the cost of vaccination by reducing the dose required, this study showed that a single dose of 0.2mL intradermally was inferior to an intramuscular dose of 1mL. Further research evaluating dose and dose regimen is needed before intradermal vaccination using the Raksharab rabies vaccine can be recommended in cattle.

Acknowledgements

My sincere gratitude goes to a lot of people for their support and guidance throughout my Masters project.

I am really thankful to my supervisor, Dr. Richard Laven for his excellent supervision. I am lucky to have got an opportunity to work with an experienced professional like him. I am really grateful for his timely feedbacks and support in spite of his busy schedule.

I am grateful to Dr. Florence Cliquet, Marine Wasniewski, Jonathan Rieder, Alexandre Servat and the entire team at OIE/EU/WHO reference laboratory on Rabies in France for analysing my samples and sending the results on time. I am indebted to Dr. Florence Cliquet, who offered to process my samples for free without which this study would not have been possible. I am forever grateful for this generosity. I would also like to thank Marine and the team for timely correspondence and for sharing information and materials related to this project.

I am ever grateful to my dear friend Dr. Sonam Peldon and her entire team at Haa, Bhutan for agreeing to help me collect and process samples at odd hours of the day and making this project possible.

I am also thankful to all the cattle owners who agreed to participate in this study and gave me permission to collect blood samples from their cattle.

My acknowledgment would be incomplete without thanking New Zealand Development Aid for providing this scholarship to pursue Masters of Veterinary Science without whose financial support; I won't have been able to carry out this study.

I also thank the Royal Government of Bhutan and Department of Livestock for giving me permission to conduct this study in the country.

I thank Kencho Sum (Triple Gem) and almighty Buddha for blessing me and giving determination to complete this study.

I would also like to thank Dr. Mary Gaddam (my landlord) and Dr. Linda Laven (my Supervisor's wife) for their guidance and encouragement to complete this study.

Lastly I thank my family members, friend (Xue Qi Soon) and for giving me the moral support and inspiration to pursue and complete this study.

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