DURATION OF IMMUNITY CONFERRED AFTER VACCINATION WITH HIPRABOVIS® SOMNI/LKT IN YOUNG CALVES

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INTRODUCTION

The duration of immunity is defined as the longest interval from the time the vaccine is administered to the target animals for which protection against the infectious agent continues to be observed. This duration can be assessed by vaccination-challenge trials. However, these trials have proved to be expensive and time-consuming as well as having animal welfare issues involved. EMEA/CVMP/682/99 states that the duration of immunity may also be assessed by other indicators such as antibody assay correlated with an indicator of protection in the target species such as lung lesion evaluation.

The aim of this trial was to study the duration of immunity conferred by a standard protocol of vaccination with HIPRABOVIS® SOMNI/Lkt based on an evaluation of serological response and lung lesions.

MATERIALS AND METHODS

Sixteen two-month-old calves, serologically negative for *Mannheimia haemolytica* and *Histophilus somni*, were randomly assigned to group A (n=10) and group B (n=6). Animals in group A were vaccinated subcutaneously with HIPRABOVIS® SOMNI/Lkt according to the recommended administration programme. Animals in group B received PBS following the same schedule as the vaccinated group.

Blood samples were taken on the day of vaccination and at weeks 1, 2, 3, 4, 5, 6, 10, 15, 19, 24, 28, 32, 36 and 40 post-vaccination.

To verify and evaluate possible lung lesions, all calves were euthanized and necropsied 40 weeks after vaccination. The severity and extent of the lung lesions were assessed according to a pre-established scale.

The serological response to *M. haemolytica* A1 leukotoxin strain was assessed by ELISA, while a microscopic agglutination test (MAT) was used to detect antibodies to *H. somni*. The mean antibody level (measured by ELISA) and the geometric mean titre (GMT) in respect of antibody agglutination were calculated. The mean antibody response was compared within a group using the paired t-test. The response was found to be significant if $p < 0.05$.

RESULTS

1. Serological response to *Mannheimia haemolytica* leukotoxin (Lkt):

Vaccinated calves (group A) displayed a significant increase in anti-Lkt antibodies by week 3 post-vaccination. Revaccination significantly increased anti-Lkt antibody levels at week 5. Anti-Lkt antibodies remained significantly raised until week 40 post-vaccination.

A significantly different ELISA antibody response was observed between the two groups from week 4 to 28 (Fig. 1). Two unvaccinated calves developed a spontaneous antibody response from weeks 28 to 40, probably due to a subclinical natural infection. Because of this, no significant differences were observed between the groups from weeks 32 to 40.

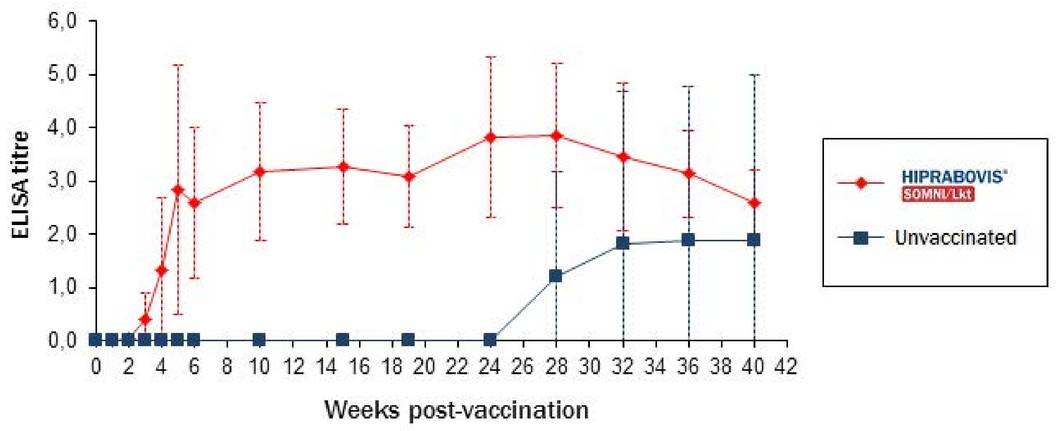

Fig. 1. Mean serological response to *M. haemolytica* leukotoxin

2. Serological response to *Histophilus somni*:

Significant agglutinating antibody seroconversion in vaccinated calves occurred by week 2 post-vaccination. The highest GMT was achieved at week 5. Significant differences in agglutinating antibody response were observed between the two groups from weeks 1 to 40 post-vaccination. The GMT decreased gradually until week 40, although it remained significantly higher than the pre-vaccination value (Fig. 2).

No seroconversion was observed in the unvaccinated group of calves throughout the trial.

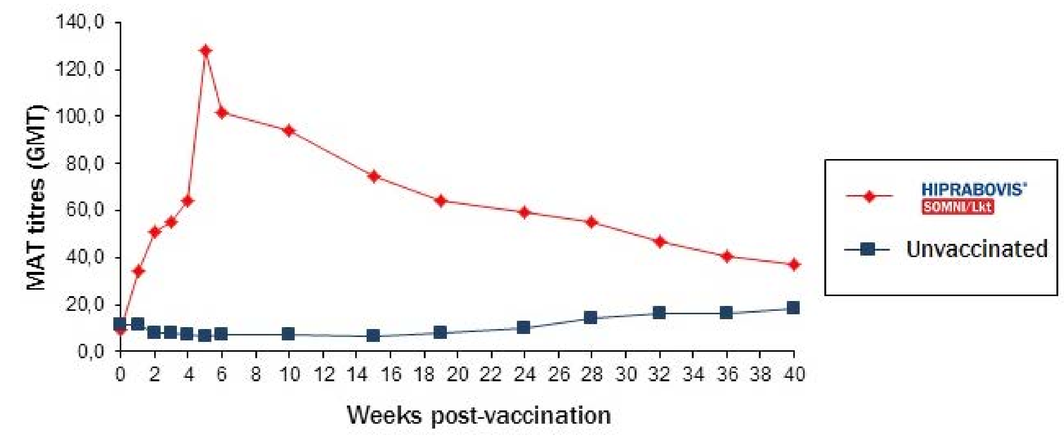

Fig. 2. Geometric mean of serological titre in response to *H. somni*

3. Lung lesion evaluation at week 40:

The mean lung lesion score (as extent of lesion from 0 to 5) was 4.3 times higher in the non-vaccinated group than in the vaccinated group. Similarly, the mean lesion score measuring the severity of lesions in the non-vaccinated group was 1.9 times higher than that in the vaccinated group.

CONCLUSIONS

The results indicate that vaccination with HIPRABOVIS® SOMNI/Lkt induced a significant response to anti-Lkt antibodies and antibodies to *H. somni*. These antibodies persisted in vaccinated animals until week 40 after vaccination. The vaccinated animals had lower scores for both for the percentage and severity of lung lesions than the non-vaccinated calf group. A positive correlation was therefore demonstrated between antibody titres and lung lesions score following the EMEA/CVMP/682/99 statements and establishing the duration of immunity at 40 weeks.

REFERENCES

EMEA/CVMP/682/99: CVMP final.

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