RATE OF PASSIVE IMMUNIZATION VIA COLOSTRUM IN LAMBS BORN TO EWES VACCINATED WITH TWO COMMERCIAL VACCINES FOR PREVENTING ENTEROTOXAEMIA

Badia, J.; Roca, M.; Noguera, M.; March, R.; Ricart, E.; Desmiquels, E.; and Casademunt, S.

HIPRA - Avda. La Selva, 135 - 17170 Amer (Girona)

INTRODUCTION

Haemorrhagic enterotoxaemia caused by *Cl. perfringens type* C is a common disease in raising lambs and the main cause of economic losses during the first few weeks of life. It has been shown that vaccination of newborn lambs is not very effective in conferring protection and seroconversion produced is minimal. However, the transfer of antibodies via colostrum seems to be protective and detectable. The aim of this study was to evaluate the rate of passive immunization via colostrum from animals vaccinated with 2 commercial vaccines for preventing enterotoxaemia using a vaccination and revaccination schedule of ewes ante partum, compared with a control group.

MATERIAL AND METHODS

We used 46 newborn lambs born to 33 primiparous ewes previously free of antibodies against the β-toxin of *Cl. perfringens.* The ewes, mothers of these lambs, were randomly distributed into 3 groups as follows: Group A (n = 8) vaccinated with product M and Group B (n = 15), vaccinated with the product Toxipra® Plus ; Group C (n = 10) was the control group. Lambs born to these ewes were distributed into 3 experimental groups according to the type of treatment received by their mothers. They were distributed as follows: Group A (n = 13), Group B (n = 17), Group C (n = 16). The ewes were vaccinated 6 weeks before the expected date of parturition and revaccinated 3 weeks later. The control group received 2 ml of placebo (PBS) on the same dates. The study was conducted under double-blind conditions.

Serum antibody titres against the *Cl. perfringens* (IgG) β-toxin were determined on the day of birth (D0) and days D2, D7, D14, D28 and D56 of life. Sera were analyzed by an in-house ELISA for the evaluation of specific antibodies against the β-toxoid of *Cl. perfringens* in sheep serum.

Table 1. Tasks performed in the animals.

Task	Days of the study							
	-42*	-21*	+0	+2	+7	+14	+28	+56
Vaccination ewes	X	X						
Blood extraction from lambs (IgG)			X	X	X	X	X	X

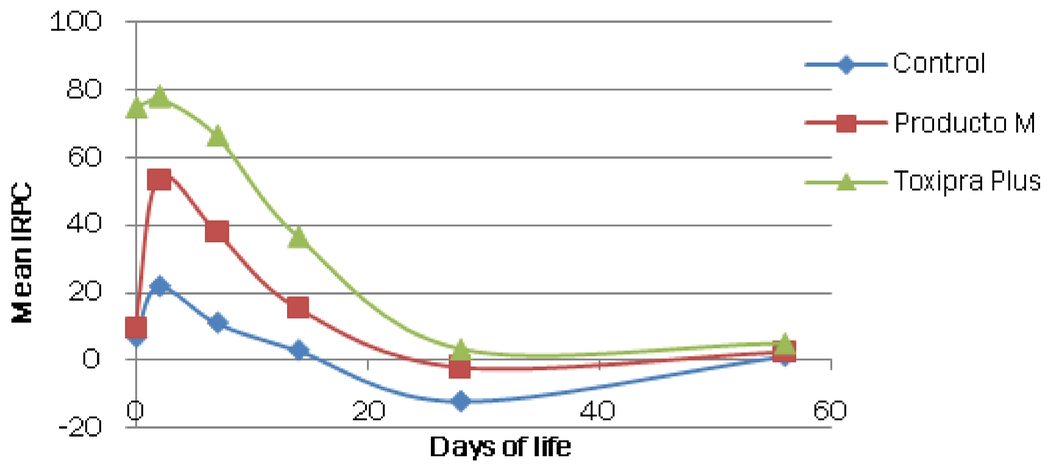
* Day of vaccination and revaccination of the ewes in pre-partum.

A statistical analysis was performed using a non-parametric Mann-Whitney test to compare the evolution of the titres of antibodies of the various experimental groups.

RESULTS

The mean results obtained are shown in figure 1. It can be observed that the serum titres of IgG between the various experimental groups were, on D0, significantly higher in the group of animals vaccinated with Toxipra® Plus in comparison with the group vaccinated with product M (p=0.002) or the control group (p=0.001), although these differences could be explained by the individual variability in the time between ingesting colostrum and the taking of the sample. From D2 to D28, the two vaccinal groups showed significantly higher antibody values ($p<0.05$) than the control group. Although no statistically significant differences were observed between the two vaccinated groups, a trend was observed in the Toxipra® Plus group, in which higher antibody titres were maintained, throughout the entire study, compared to the group vaccinated with product M (see table 2).

Figure 1. Levels of Ab against the β-toxin of *Cl. perfringens.*



The results are expressed as average values per group and date.

Table 2. Statistical analysis of mean Ab levels against the β-toxin of *Cl. perfringens* between groups.

	D0	D2	D7	D14	D28	D56
Prod. M	9.77	53.6	38	15.75	-2.14	2.62
Toxipra Plus	74.64	77.94	66.47	36.53	3.47	5
p value	p=0.002	p=0.145	p=0.113	p=0.08	p=0.465	p=0.830

DISCUSSION

The two vaccines induced a potent seroconversion in the ewes and enabled a significantly higher transfer of passive immunity of antibodies against the β-toxin, via colostrum than in the control group. Moreover, a non-significant trend was observed in the animals vaccinated with Toxipra® Plus in that it achieved higher titres in comparison to the group vaccinated with product M.

CONCLUSIONS

Vaccination and revaccination of the ewes with the two vaccines tested is effective in early immunization, via passive route, of lambs but differences were observed in the titres of antibodies conferred by the two vaccines, although not significant. This study suggests that the vaccination schedule at six weeks and three weeks prepartum should be considered as the optimal one to induce efficacious protection in lambs. The results obtained also indicate that the optimum time for vaccination of the lambs should be around four weeks of age to avoid prior interference with maternal antibodies

BIBLIOGRAPHY

SAKURAI, J and NAGAHAMA, M. *Clostridium perfringens* beta-toxin: characterization and action. Toxin Reviews, 25:89-108, 2006. TWETEN, R.K. *Clostridium perfringens* Beta toxin and *Clostridium septicum* alpha toxin: their mechanisms and possible role in pathogenesis. Veterinary Microbiology, vol 82, 2001.

Oral communication presented at the XXV SEOC Conference. Valladolid, September 2010

Laboratorios Hipra, S.A.
Avda. la Selva, 135
17170 Amer (Girona)
Spain

Tel (34) 972 43 06 60
Fax (34) 972 43 06 61
hipra@hipra.com
www.hipra.com