

# **Injectable Vitamin A Effects on Infectious Bovine Keratoconjunctivitis in Beef Calves**

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### **Introduction**

Infectious Bovine Keratoconjunctivitis (IBK) is a problematic recurring disease for cow-calf producers. The IBK lesions have been associated with a 7-14 kg decrease in weaning weight compared with calves with no recognized IBK lesions. Given the impact of IBK on production, it is not unexpected that producers are interested in preventing IBK. Preventive practices recommended are often impractical and there is little evidence that vaccines are effective.

In the absence of strong scientific evidence for an effective prevention, many producers seek alternative preventive approaches. One frequently mentioned alternative prevention is Vitamin A supplementation, although no scientific studies have assessed the efficacy of Vitamin A supplementation. The aim of this randomized blinded field trial was to determine if a commercially available supplementation of Vitamin A was associated with a reduction in the incidence of naturally occurring IBK in beef calves.

### **Materials and Methods**

The trial was approved by the ISU Institutional Animal Care and Use Committee (Log # 4-11-7112-B). Calves from the ISU McNay cow-calf herd in southern Iowa and an organic herd in western Iowa were enrolled. The herds were known to the researcher as herds with prior IBK outbreaks affecting 15 percent of calves in a single season. At both

farms, calves born from January 1 to April 30, 2011 and 2012, with no visible eye lesions at both treatment times, were eligible for enrollment.

The number of animals enrolled to test the primary hypothesis was based on treatment efficacy of 50 percent and an anticipated baseline cumulative incidence of disease of 30 percent, type 1 error rate of 0.05 and power of 0.8 and adjustment for 5 percent loss of calves between enrollment and study. The resulting sample size was 120 per treatment cohort.

Commercially available Vitamin AD<sub>3</sub> injectable (Vitamins A and D<sub>3</sub>) product was used. Each ml contained 500,000 I.U. of Vitamin A propionate and 75,000 I.U. of Vitamin D<sub>3</sub>. The experimental unit was the individual calf. At the farms, calves were randomly allocated to one of two treatment cohorts:

Treatment 1: Active product - 2 doses of 1 ml injectable Vitamin AD<sub>3</sub>, intramuscularly at least 30 days apart.

Treatment 2: Non-active product - 2 doses of 1 ml sterile saline, intramuscularly at least 30 days apart

Calves were observed for IBK incidence after the second injection until no longer on the farm or weaned. Determination of IBK incidence was carried out using two approaches. On several occasions the entire study group was handled for routine management procedures, and farm staff during the study period assessed if the calves had IBK. Further, farm staff assessed the occurrence of IBK continuously during the summer. The farm staff was not aware of the animals' allocation status.

The data analyzed used Fishers Exact test to compare the proportions of IBK in active and non-active treatment cohorts.

### Results and Discussion

Results for the two farms for each year are presented in Table 1. Of the calves that were enrolled in the study, 18.46 percent (67/363) developed IBK. Calves from the organic farm were not enrolled in the second year due to the absence of IBK in the first year. However, only the calves of the second parity cows at the ISU McNay Farm had an occurrence of IBK greater than 15 percent. In this management group the incidence of IBK was 69 percent in the supplemented calves and 63 percent in un-supplemented calves. The risk ratio was 1.1 (95% confidence interval =0.8-1.5, Fisher's Exact P = 0.68).

The results of this study provide little evidence to support the concept that Vitamin A supplementation reduces the incidence of

IBK. The closeness of the risk ratio to the null value, one, and the narrowness of the confidence interval, could even be considered evidence against an effect. The sporadic occurrence of IBK in the groups is not inconsistent with the epidemiology of IBK. However, in the group that did suffer a severe outbreak of IBK, supplementation had no meaningful impact on IBK incidence. Although this is just one study on one farm, to our knowledge it represents the first assessment of an intervention often recommended based on anecdotal evidence using a randomized parallel design.

### Acknowledgements

Thank you to the staff at ISU McNay Research Farm and Rosmann Organic Farm for their cooperation and participation for this study. Thank you to the Leopold Center for providing the funding for this study.

**Table 1. Development of IBK lesions of enrolled calves.**

	McNay				Rosmann	
	2011 (May-Nov)		2012 (May-Nov)		2011(May-Nov)	
IBK	Vitamin A	Placebo	Vitamin A	Placebo	Vitamin A	Placebo
Group 1*						
Yes	0	3	1	0	0	0
No	60	56	38	48	18	19
Group 2*						
Yes	27	34	2	0		
No	12	20	16	9		
Total	99	113	57	57	18	19

\*Group 1 were first parity heifers and third and up parity cows for McNay. Group 2 were second parity cows for McNay.