HERD IMMUNIZATION AS AN APPROACH TO REDUCE THE INCIDENCE OF RESPIRATORY DISEASES IN CALVES - A CASE STUDY

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Introduction: Bovine respiratory disease (BRD) is an issue of major concern in cattle herds worldwide. It is a painful and often fatal disease in as well young stock as in adult cattle. Because of its high morbidity and mortality rate it also raises high economic losses caused by veterinary and drug costs, increased labor, and production losses (Hurd et al. 1995, van der Fels-Klerx et al. 2001). The onset of BRD is influenced by several factors: immunity status, environment, housing, and management but also by infectious agents: viral, bacterial, mycoplasmal (Autio et al. 2007, Guilksen et al. 2009, Radaelli et al. 2008). Because of the high financial pressure burdening the beef and dairy industry, the prevention of BRD is vitally important.

Therefore, vaccination schemes in calves are a crucial instrument in the prevention of BRD. This case study aimed at evaluating the effect of a complete herd vaccination against the complex of bovine respiratory diseases on the incidence of treatment required by respiratory diseases (TRRD) in calves during their first 90 days of lifetime.

Material & Methods: The study was conducted on a German 120 cow dairy farm with young cattle, fattening bulls, and a small herd of suckler cows. Since 2005, some individuals of different ages had died occasionally on pneumonia on this farm. All animals were diagnosed microbiologically after necropsy with the Bovine Respiratory Synzytial Virus (BRSV). Except for a maternal immunization of the pregnant cows against BRD no further vaccinations against BRD were conducted. Therefore, the mentioned farm was very suitable to evaluate the incidence of TRRD in calves before and after the initiation of a consequent vaccination scheme starting with a whole herd immunization.

Farm anamnesis: General: The herd size was approx. 370 cattle. With exception of the suckler cows, the herd consisted of German Holstein (25%), German Fleckvieh (25%) and their different cross-breds (50%). Nearly all born calves stayed on the farm to be risen and only own heifers were taken for replacement. The dairy herd, the fattening bulls and the young stock, the heifers, the calves, and the dry cows were all housed separately in different stables. A standard procedure for feeding the colostrum was followed for all calves. All calves were kept under the same housing conditions and received the same feeding scheme. The herd was officially BHV-free.

Vaccinations: Routinely all pregnant cows received a maternal immunization against neonatal calf diarrhea and BRD. Furthermore, all calves received an immunization against Trichophyton verrucosum. Starting in December 2008, an oral farm-specific vaccination against E.-coli was given to the newborn calves during their first 10 days of life, in order to take control of an outbreak of severe diarrhea. Since spring 2008, the whole herd has been vaccinated against Blue Tongue Virus Type 8 accordingly to the official Blue Tongue Virus regulation of Germany.

Veterinary Treatments: All animals conspicuous by anorexia, depression or any other abnormalities (esp. increased respiratory rates, nasal discharge etc.) were examined by a veterinarian. In case of TRRD (respiratory symptoms coinciding with body temperature >39.5°C) all animals received antibiotic treatments in combination with an NSAID and an expectorant for at least three days. The antibiotic drugs were chosen in accordance with frequently (min. twice a year) renewed antibiograms taken from trans-tracheal aspirations or nasal swab samples. In case of diarrhea in newborn calves the treatment was depending on the general condition, the severity of dehydration and the appetite of the calf. Accordingly, antibiotics, NSAIDs, and oral or parenteral rehydrations were administered. The choice of the antibiotic drugs also depended on frequently renewed sensitivity patterns. All initial and all follow-up treatments were only performed by a veterinarian.

Study design: Study period and animals: The study was divided into a control period (P1: Nov. 2006 - Nov. 2007) and an experimental period (P2; March 2008 - March 2009). Both P1 and P2 covered a time range of 13 months and were both followed by a 90-days observation period in order to observe the incidence of TRRD and other diseases also in the calves born at the end of P1 and of P2. Totally, a number of 337 calves were born during the study (P1 n=168; P2 n=169), of which 268 (P1 n=145; P2 n=123) could be compared for TRRD during their first 90 days of life. Calves, which died or left the farm earlier than aged 90d were excluded from data analysis regarding the incidence of diseases.

Initial examinations: During June / July 2007, 8 nasal swabs were taken from calves at an age between 21 and 90 days suffering from acute respiratory diseases. The following was diagnosed microbiologically: BRSV (n=3), Mannheimia haemolytica (n=3), Pasteurella multocida (n=2), unspecific bacterial mixed culture (n=2). During October 2007, the whole dairy herd and additionally all heifers pregnant during the last trimemon were examined by blood samples for their BRSV titer. In total, a number of 124 cows and 17 heifers were examined. A sufficient BRSV antibody titer has been defined as >1.64. The result of the mentioned BRSV titer examination was as follows: a titer of ≤ 1:64 was found in 68 cows and 13 heifers. That means only 56 cows and 4 heifers had a sufficient antibody titer against BRSV.

Experimental vaccination scheme: Initially, at the beginning of P2, the whole herd with exception of all cows having a sufficient BRSV titer, the suckling cows, and the fattening bulls > 1 year were vaccinated against BRD (combined vaccine, inactivated, against: BRSV, PI, Mannheimia haemolytica; Bovigrip® RSP plus, Intervet Germany, Unterschleissheim, Germany). The whole herd vaccination scheme was as follows:
- Calves >14d - 90d: 1st shot: day 0, 2nd shot: day 28, 3rd shot: day 70
- Young stock: 1st shot day 0, 2nd shot day 28
- Heifers: 1st shot day 0, 2nd shot day 28
- Cows (1st lactation): 1st shot day 0, 2nd shot day 28
- Cows (>1st lactation): single shot day 0

Additionally, the maternal immunization of all pregnant cows and heifers against BRD had been maintained during P2. Calves, who had not reached the age of 14d at the time of day 0 of the “whole herd vaccination”, were inoculated individually when old enough in accordance with the vaccination scheme for new born calves. All ill or depressed were excluded from the vaccination and were also inoculated individually after their complete recovery.

The vaccination program for all calves born during P2 against BRD was as follows:
1st shot: age of 14d, 2nd shot: age of 42d, 3rd shot: age of 84d

Statistical Analysis: A Chi-Square-Test using SAS® 9.2 was performed in order to evaluate the data. The incidence of TRRD, treatment required by enteritis (TRE), and all other diseases requiring treatment (TRO) during the calves’ first 90 days of lifetime were evaluated and compared between P1 and P2.

Results: Figure 1 represents the results. Data analysis showed a significant decrease of the incidence of TRRD during P2. During P1, 21.4% of the calves never, 28.3% once, and 50.3% repeatedly went down with TRRD. On the contrary during P2, 40.7% of the calves never, 32.5% once, and only 26.8% repeatedly went down with TRRD (P < 0.01). Furthermore, the severe outbreak of diarrhea during P2 became obvious as significantly more calves suffered from TRE than during P1 (incidence TRE = 0: P1 66.9% / P2 38.2%; incidence TRE = 1: 30.3% / 52.0%; incidence TRE ≥ 2: 2.8% / 9.8%; P < 0.001). No difference could be established regarding the incidence of TRO (incidence TRO = 0: P1 93.8% / P2 90.2%; incidence TRO = 1: 4.8% / 8.1%; incidence TRO ≥ 2: 1.4% / 1.6%; p = 0.532).

![Incidence of different diseases](image_url)

**Fig. 1: Comparison of the proportion of different diagnoses between the calves born during P1 and P2**
Conclusions: The results of this case study showed a clear decrease of TRRD in calves during their first 90 days of life after a herd immunization and the establishment of a vaccination schedule for all new born calves against BRSV, PI3, and *Mannheimia haemolytica* using Bovigrip® RSP plus.

Key words: bovine respiratory disease, herd vaccination, Bovigrip® RSP plus.

In memoriam Dr. Reinhard Brunner.

References:


