A First-calf Heifer at 4 Years Old – And It Was A PI!

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"ELISA tests detected BVD virus in a herd of Holsteins and Charolais cattle. The presence of a PI animal was confirmed in a four-year-old primipara."

Background

Calves with neurologic symptoms are shown to the vet, one year apart. These calves were born without complications on a farm of 170 Holsteins and 50 Charolais with 220 calves born each year. Located in the Avesnois (Nord department of France), the herd is divided over three sites:

- The first for dairy cows and female calves up to 6 months (male Holstein calves are sold at 15 days old),
- The second for Charolais cows and their calves (free-raised Charolais calves are sold at weaning),
- The third for fattening cattle and Holstein heifers (from 6 months to preparation for calving).

According to data from BDiVet software, calf mortality has stabilized at around 9% for the past three years.

Preliminary Indication

In July 2014, the farmer shows two calves (including one Charolais) to the vet because of marked neurologic symptoms since birth: generalized trembling, hyperesthesia, inability to get up, head nodding. Both calves were born a few days apart and calving was uncomplicated.
Clinical examination of the two calves does not find any classical neonatal pathology: no neonatal gastroenteritis, no omphalitis. All parameters are normal (temperature, heart rate, respiratory rate, suckling reflex, etc.). The farmer reports that both calves drink willingly.
We explain to the farmer that the prognosis is reserved, especially for the young male Charolais which is unsaleable. No specific treatment is given to this calf. On the other hand, the female calf No. 83 is treated with a drug containing papaverine and vincamine to promote oxygenation of the brain.

Further Development

In early May 2015 during an on-call visit for another reason, the farmer has us take a quick look at three calves, all born at term with no complications.

Male calf No. 1, two days old, is in lateral decubitus and presents with convulsions and hyperesthesia. No other anomaly is observed.

Male calf No. 2, one month old, is somnolent (video 3). Clinical examination is otherwise unremarkable.

Female calf No. 3, six weeks old, presents hyperesthesia, cerebellar ataxia (video 2) and head nodding. All three calves drink without problem.

Heifer No. 83 (seen in July 2014) is still present on the farm (videos 5 and 6). This animal presents hypermetria, with an erratic gait when it tries to run. There is a slight growth delay. Clinical examination is otherwise normal.

At this point in time, two main diagnoses are possible, involving agents that can infect the fetus and cause congenital neurologic anomalies:

· BVD (bovine viral diarrhea)

· Neosporosis

Treatment Applied

Blood samples are collected into dry tubes from the three newborn calves and the heifer for ELISA assay of BVD antigen. Blood samples are collected into dry tubes from the mothers for neosporosis serology (except for calf No. 3 whose mother is no longer present on the farm).

We include ovine catarrhal fever in our differential diagnosis (hydrocephalus described during the OCF epidemic of 2008) and take appropriate samples as a precaution.

Calf No. 1 is euthanized: the brain shows no gross abnormalities. A brain specimen is taken for PCR because this technique provides the definitive diagnosis of neosporosis.

Result

The cows that delivered calves No. 1 and 2 are seronegative for neosporosis (cf. “Cattle neosporosis” document). PCR on the brain of calf No. 3, whose mother was no longer on the farm, is negative for neosporosis (see PCR result below).

Calves No. 2 and 3 and heifer No. 83 are positive for BVD antigen (see “Calves – BVD ELISA” document). These animals are euthanized.

We suspect the presence of Immunotolerant Persistently Infected animals. The farmer then describes to us a first-calf heifer “which doesn’t produce, doesn’t look good but doesn’t look sick”. We learn that this animal is four years old, whereas the average age at this farm is 25-26 months. Apparently this was not a cause for concern for the farmer.

Clinical examination of this animal does not reveal any problem that would explain the lack of production. An ELISA test is positive for BVD antigen and the primiparous heifer is euthanized.

No other PI animal is detected from blood samples collected from calves less than six months old. The entire herd is not tested for reasons. Only three older calves are sampled due to growth retardation, with negative results.

We recommend that all breeder stock over 12 months old be vaccinated, both Holsteins and Charolais.

We also advise the farmer to take blood samples from all dry cows and do PCR on a pool from 20 animals and on tank milk. Individual tests will be done in case of positive results.

We think that BVD virus has been circulating in the Holstein herd at this farm since at least winter 2009-2010, the date of infection of primipara No. 5587 at the fetal stage between day 30 and day 125 of gestation. Furthermore, during the winter of 2012-2013, circulating virus was detected in the Charolais herd following an outbreak of neonatal diarrhea.

Environmental contamination appears to be the most likely origin of the introduction of BVD virus into the herd. The farm is located in a district with a high density of dairy farms (more than six farms per 10 square km, source BDNI 2009). The farm counts about ten neighboring pastures: circulation of BVD virus has been confirmed in some of these herds several times over the past 10 years.

Circulation of BVD virus could have been detected earlier if the screening for PI animals was done routinely or if all breeding stock on the farm had been vaccinated…considering the epidemiological context.

Questions

Q1: Neurologic symptoms were observed in newborn calves. What were the vet's possible diagnoses?

1. BVD and neosporosis.
2. BVD and OCF.
3. BVD only.

Q2: The presence of a PI animal was confirmed:

1. On one of the calves with neurologic symptoms.
2. On a first-calf heifer.
3. On a recently bought heifer.